

BULLETIN OF INFORMATION

UNDERGRADUATE PROGRAMS | 2018-2019

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UNIVERSITY OF
NOTRE DAME

2018–19

Bulletin of Information

University of Notre Dame
Undergraduate Programs



Vol. 114, No. 2, August 2018

The course offerings and requirements of the University of Notre Dame are continually under examination, and revisions are expected. This *Bulletin of Information* is not a contract; it merely presents the offerings and requirements in effect at the time of publication and in no way guarantees that the offerings and requirements will remain the same. Every effort is made to provide advance information of any changes.

Nondiscrimination

The University of Notre Dame does not discriminate on the basis of race, color, national or ethnic origin, sex, disability, veteran status or age in the administration of any of its educational programs, admissions policies, scholarship and loan programs, athletic and other school-administered programs or in employment.

The University has designated the Director of its Office of Institutional Equity to handle all inquiries regarding its efforts to comply with and carry out its responsibilities under Title IX and under Section 504 of the Rehabilitation Act of 1973. The Title IX and Section 504 coordinator may be contacted as follows:

Director
Office of Institutional Equity
100 Grace Hall
University of Notre Dame
Notre Dame, IN 46556
(574) 631-0444

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July 1, 2018 – June 30, 2019

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July 1, 2018 – June 30, 2019

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ACADEMIC CALENDAR

**UNIVERSITY OF NOTRE DAME AND SAINT MARY'S COLLEGE
JOINT ACADEMIC YEAR CALENDAR FOR 2018-2019**

FALL 2018 SEMESTER

Aug. 13-14	Mon - Tues	Orientation and advising for new graduate students
Aug. 15-16	Wed - Thur	Orientation for new international students
Aug. 16	Thursday	Transfer Welcome Weekend and advising for new undergraduate transfer students
Aug. 17	Friday	Undergraduate halls open for first-year student move-in beginning at 9:00 a.m.
Aug. 17-20	Fri - Mon	Welcome Weekend and advising for first-year undergraduate students
Aug. 19	Sunday	Undergraduate halls open for upperclass student move-in beginning at 9:00 a.m.
Aug. 20	Monday	Classes begin for Law and Graduate Business Classes begin for Saint Mary's College Orientation for readmitted students
Aug. 21	Tuesday	Classes begin for Notre Dame Mass - formal opening of school year at Notre Dame
Aug. 28	Tuesday	Last date for all class changes
Sept. 3	Monday	Labor Day - classes are in session
Sept. 21	Friday	Last date to drop a class at Saint Mary's College
Oct. 13-21	Sat - Sun	Mid-Term break
Oct. 15	Monday	Mid-Term deficiency reports submitted through insideND by 3:45 p.m. at Notre Dame
Oct. 16	Tuesday	Mid-Term deficiency reports due in PRISM by 8:00 a.m. at Saint Mary's College
Oct. 26	Friday	Last day for course discontinuance at Notre Dame
Nov. 12-28	Mon - Wed	Registration appointments for the Spring 2019 semester
Nov. 21-25	Wed - Sun	Thanksgiving Holiday
Nov.27-Dec.9	Tues - Sun	Course Instructor Feedback administered
Dec. 6	Thursday	Last class day
Dec. 7-9	Fri - Sun	Reading days (no examinations permitted))
Dec. 10-14	Mon - Fri	Final examinations (no review sessions permitted)
Dec. 15	Saturday	Undergraduate halls close at 2:00 p.m.
Dec. 17	Monday	All grades submitted through insideND by 3:45 p.m. at Notre Dame
Dec. 18	Tuesday	All grades due in PRISM by Noon at Saint Mary's College
Jan. 6	Sunday	January 2019 graduation date (no ceremony)

CLASS MEETINGS*

MWF	41
MW	28
TuTh	29

*The number of class meetings and
class days differ for Saint Mary's College

NUMBER OF CLASS DAYS*

	<u>Mon</u>	<u>Tues</u>	<u>Wed</u>	<u>Thur</u>	<u>Fri</u>	<u>Total</u>
August	1	2	2	2	2	9
September	4	4	4	4	4	20
October	4	4	4	3	3	18
November	4	4	3	4	4	19
December	1	1	1	1	0	4
Total	14	15	14	14	13	70

ACADEMIC CALENDAR

SPRING 2019 SEMESTER

Jan. 13	Sunday	Undergraduate halls open for move-in beginning at 9:00 a.m.
Jan. 14	Monday	Orientation and advising for new students Classes begin for Law and Graduate Business Classes begin for Saint Mary's College
Jan. 15	Tuesday	Classes begin for Notre Dame
Jan. 22	Tuesday	Last date for all class changes
Feb. 15	Friday	Last date to drop a class at Saint Mary's College
Feb. 15-17	Fri - Sun	Junior Parents Weekend at Notre Dame
Mar. 9-17	Sat - Sun	Mid-Term break
Mar. 11	Monday	Mid-Term deficiency reports submitted through insideND by 3:45 p.m. at Notre Dame
Mar. 12	Tuesday	Mid-Term deficiency reports due in PRISM by 8:00 a.m. at Saint Mary's College
Mar. 20	Wednesday	Registration begins for the 2019 Summer Session at Notre Dame
Mar. 22	Friday	Last day for course discontinuance at Notre Dame
Apr. 15-26	Mon - Fri	Registration appointments for the Fall 2019 semester
Apr. 19-22	Fri - Mon	Easter Holiday
Apr. 23-May 5	Tues - Sun	Course Instructor Feedback administered
April 25	Thursday	Deadline for 2019/2020 financial aid applications at ND (for returning students)
May 1	Wednesday	Last class day for Notre Dame
May 2	Thursday	Last class day for Saint Mary's College
May 2-5	Thur - Sun	Reading days for Notre Dame (no examinations permitted)
May 6-10	Mon - Fri	Final examinations (no review sessions permitted)
May 11	Saturday	Undergraduate halls close at 2:00 p.m.
May 13	Monday	All grades submitted through insideND by 3:45 p.m. at Notre Dame
May 14	Tuesday	All grades are due in PRISM by Noon at Saint Mary's College
May 17-19	Fri - Sun	Commencement Weekend

CLASS MEETINGS*

MWF	41
MW	28
TuTh	29

*The number of class meetings and class days differ for Saint Mary's College

NUMBER OF CLASS DAYS*

	Mon	Tues	Wed	Thur	Fri	Total
January	2	3	3	3	2	13
February	4	4	4	4	4	20
March	3	3	3	3	4	16
April	4	5	4	4	3	20
May	0	0	1	0	0	1
Total	13	15	15	14	13	70

2019 SUMMER SESSION

First Class Day - June 17; Last Class Day – July 26; Graduation Date (No Ceremony) – August 4

NOTE: Summer Session classes will not be held on July 4 for most programs

ACADEMIC CALENDAR

**UNIVERSITY OF NOTRE DAME AND SAINT MARY'S COLLEGE
JOINT ACADEMIC YEAR CALENDAR FOR 2019-2020**

FALL 2019 SEMESTER

Aug. 19-20	Mon - Tues	Orientation and advising for new graduate students
Aug. 21-23	Wed - Fri	Orientation for new international students
Aug. 22	Thursday	Transfer Welcome Weekend and advising for new undergraduate transfer students
Aug. 23	Friday	Undergraduate halls open for first-year student move-in beginning at 9:00 a.m.
Aug. 23-26	Fri - Mon	Welcome Weekend and advising for first-year undergraduate students
Aug. 25	Sunday	Undergraduate halls open for upperclass student move-in beginning at 9:00 a.m.
Aug. 26	Monday	Classes begin for Law and Graduate Business Classes begin for Saint Mary's College Orientation for readmitted students
Aug. 27	Tuesday	Classes begin for Notre Dame Mass - formal opening of school year at Notre Dame
Sept. 2	Monday	Labor Day - classes are in session
Sept. 3	Tuesday	Last date for all class changes
Sept. 27	Friday	Last date to drop a class at Saint Mary's College
Oct. 19-27	Sat - Sun	Mid-Term break
Oct. 21	Monday	Mid-Term deficiency reports submitted through insideND by 3:45 p.m. at Notre Dame
Oct. 22	Tuesday	Mid-Term deficiency reports due in PRISM by 8:00 a.m. at Saint Mary's College
Nov. 1	Friday	Last day for course discontinuance at Notre Dame
Nov. 18-Dec.4	Mon - Wed	Registration appointments for the Spring 2020 semester
Nov. 27-Dec.1	Wed - Sun	Thanksgiving Holiday
Dec. 3-15	Tues - Sun	Course Instructor Feedback administered
Dec. 12	Thursday	Last class day
Dec. 13-15	Fri - Sun	Reading days (no examinations permitted)
Dec. 16-20	Mon - Fri	Final examinations (no review sessions permitted)
Dec. 21	Saturday	Undergraduate halls close at 2:00 p.m.
Dec. 23	Monday	All grades submitted through insideND by 3:45 p.m. at Notre Dame
Dec. 24	Tuesday	All grades due in PRISM by Noon at Saint Mary's College
Jan. 5	Sunday	January 2020 graduation date (no ceremony)

CLASS MEETINGS*

MWF	41
MW	28
TuTh	29

*The number of class meetings and
class days differ for Saint Mary's College

NUMBER OF CLASS DAYS*

	<u>Mon</u>	<u>Tues</u>	<u>Wed</u>	<u>Thur</u>	<u>Fri</u>	<u>Total</u>
August	0	1	1	1	1	4
September	5	4	4	4	4	21
October	3	4	4	4	3	18
November	4	4	3	3	4	18
December	2	2	2	2	1	9
Total	14	15	14	14	13	70

ACADEMIC CALENDAR

SPRING 2020 SEMESTER

Jan. 12	Sunday	Undergraduate halls open for move-in beginning at 9:00 a.m.
Jan. 13	Monday	Orientation and advising for new students Classes begin for Law and Graduate Business Classes begin for Saint Mary's College
Jan. 14	Tuesday	Classes begin for Notre Dame
Jan. 21	Tuesday	Last date for all class changes
Feb. 14	Friday	Last date to drop a class at Saint Mary's College
Feb. 14-16	Fri - Sun	Junior Parents Weekend at Notre Dame
Mar. 7-15	Sat - Sun	Mid-Term break
Mar. 9	Monday	Mid-Term deficiency reports submitted through insideND by 3:45 p.m. at Notre Dame
Mar. 10	Tuesday	Mid-Term deficiency reports due in PRISM by 8:00 a.m. at Saint Mary's College
Mar. 18	Wednesday	Registration begins for the 2020 Summer Session at Notre Dame
Mar. 20	Friday	Last day for course discontinuance at Notre Dame
Apr. 10-13	Fri - Mon	Easter Holiday
Apr. 15-24	Wed - Fri	Registration appointments for the Fall 2020 semester
Apr. 21-May 3	Tues - Sun	Course Instructor Feedback administered
April 25	Saturday	Deadline for 2020/2021 financial aid applications at ND (for returning students)
April 29	Wednesday	Last class day for Notre Dame
April 30	Thursday	Last class day for Saint Mary's College
Apr. 30-May 3	Thur - Sun	Reading days for Notre Dame (no examinations permitted)
May 4-8	Mon - Fri	Final examinations (no review sessions permitted)
May 9	Saturday	Undergraduate halls close at 2:00 p.m.
May 11	Monday	All grades submitted through insideND by 3:45 p.m. at Notre Dame
May 12	Tuesday	All grades are due in PRISM by Noon at Saint Mary's College
May 15-17	Fri - Sun	Commencement Weekend

CLASS MEETINGS*

MWF	41
MW	28
TuTh	29

*The number of class meetings and class days differ for Saint Mary's College

NUMBER OF CLASS DAYS*

	Mon	Tues	Wed	Thur	Fri	Total
January	2	3	3	3	3	14
February	4	4	4	4	4	20
March	4	4	3	3	3	17
April	3	4	5	4	3	19
May	0	0	0	0	0	0
Total	13	15	15	14	13	70

2020 SUMMER SESSION

First Class Day - June 15; Last Class Day – July 24; Graduation Date (No Ceremony) – August 2

NOTE: Summer Session classes will not be held on July 4 for most programs

MISSION STATEMENT OF THE UNIVERSITY OF NOTRE DAME

Mission Statement of the University of Notre Dame

CONTEXT

This statement speaks of the University of Notre Dame as a place of teaching and research, of scholarship and publication, of service and community. These components flow from three characteristics of Roman Catholicism which image Jesus Christ, his Gospel, and his Spirit. A sacramental vision encounters God in the whole of creation. In and through the visible world in which we live, we come to know and experience the invisible God. In mediation the Catholic vision perceives God not only present in but also working through persons, events, and material things. There is an intelligibility and a coherence to all reality, discoverable through spirit, mind and imagination. God's grace prompts human activity to assist the world in creating justice grounded in love. God's way to us comes as communion, through the communities in which men and women live. This community includes the many theological traditions, liturgies, and spiritualities that fashion the life of the church. The emphasis on community in Catholicism explains why Notre Dame historically has fostered familial bonds in its institutional life.

A Catholic university draws its basic inspiration from Jesus Christ as the source of wisdom and from the conviction that in him all things can be brought to their completion. As a Catholic university, Notre Dame wishes to contribute to this educational mission.

THE MISSION

The University of Notre Dame is a Catholic academic community of higher learning, animated from its origins by the Congregation of Holy Cross. The University is dedicated to the pursuit and sharing of truth for its own sake. As a Catholic university, one of its distinctive goals is to provide a forum where through free inquiry and open discussion the various lines of Catholic thought may intersect with all the forms of knowledge found in the arts, sciences, professions, and every other area of human scholarship and creativity.

The intellectual interchange essential to a university requires, and is enriched by, the presence and voices of diverse scholars and students. The Catholic identity of the University depends upon, and is nurtured by, the continuing presence of a predominant number of Catholic intellectuals. This ideal has been consistently maintained by the University leadership throughout its history. What the University asks of all its scholars and students, however, is not a particular creedal affiliation but a respect for the objectives of Notre Dame and a willingness to enter into the conversation that gives it life and character. Therefore, the University insists upon academic

freedom, which makes open discussion and inquiry possible.

The University prides itself on being an environment of teaching and learning that fosters the development in its students of those disciplined habits of mind, body, and spirit that characterize educated, skilled, and free human beings. In addition, the University seeks to cultivate in its students not only an appreciation for the great achievements of human beings but also a disciplined sensibility to the poverty, injustice, and oppression that burden the lives of so many. The aim is to create a sense of human solidarity and concern for the common good that will bear fruit as learning becomes service to justice.

Notre Dame also has a responsibility to advance knowledge in a search for truth through original inquiry and publication. This responsibility engages the faculty and students in all areas of the University, but particularly in graduate and professional education and research. The University is committed to constructive and critical engagement with the whole of human culture.

The University encourages a way of living consonant with a Christian community and manifest in prayer, liturgy, and service. Residential life endeavors to develop that sense of community and of responsibility that prepares students for subsequent leadership in building a society that is at once more human and more divine.

Notre Dame's character as a Catholic academic community presupposes that no genuine search for the truth in the human or the cosmic order is alien to the life of faith. The University welcomes all areas of scholarly activity as consonant with its mission, subject to appropriate critical refinement. There is, however, a special obligation and opportunity, specifically as a *Catholic* university, to pursue the religious dimensions of all human learning. Only thus can Catholic intellectual life in all disciplines be animated and fostered. Notre Dame pursues its objectives through the formation of an authentic human community graced by the Spirit of Christ.

The University of Notre Dame

Notre Dame is at once a Catholic university, a national symbol, and an international community of religious faith, intellectual inquiry, and devotion to the powerless. Among its conspicuous features are its academic reputation, an elaborately designed and golden-domed administration building, a famous collegiate football team, a popular shrine to the Mother of God, two fascinating lakes, a pleasantly landscaped campus, and a spirited student body surrounded by an intensely loyal community of alumni and friends who unabashedly refer to themselves as the Notre Dame "family."

The institution was founded on the site of an old Catholic missionary outpost in 1842. The

founders were a small and impoverished band of French and Irish religious brothers whose leader was Rev. Edward F. Sorin, C.S.C., an impetuous, strong-willed, and apparently tireless priest. In a memoir titled *My Notre Dame*, Thomas Stritch, professor emeritus of American Studies and Notre Dame historian, wrote that Father Sorin "carved Notre Dame out of the Northern Indiana wilderness and by sheer strength of character made it go. He built and rebuilt, recruited students where he could, and gradually began the unique image Notre Dame still enjoys. In a college or university, reputation is everything. Somehow Sorin developed a favorable one for Notre Dame, one that reverberated throughout the American Catholic world, the Eastern Seaboard as well as the Midwest. Long before football was invented, Notre Dame caught the imagination of American Catholics."

Father Sorin was a member of the Congregation of Holy Cross, a then recently formed Catholic religious community that would own and administer the University from its foundation until 1967, when the University's governance was legally transferred to a two-tiered, mixed board of lay and religious trustees and fellows. The University's bylaws ensure that the Congregation will continue to exert a prominent influence on its administration. They stipulate, for example, that Notre Dame's presidents must always be chosen from among the priests of the Congregation. The Congregation also ministers to the University it founded through the many Holy Cross priests serving on the University's faculty, the counselors and chaplains who live with the undergraduate students in the residence halls, and the staff of the campus ministry office.

In 1972, five years after the change in governance, a new chapter of University history began to be written as the first undergraduate women were admitted to Notre Dame. A quarter of a century later, the majority of living Notre Dame alumni have been graduated from a fully coeducational institution.

Obviously, many other aspects of the University have been changed by more than a century and a half of turbulent and unpredictable happenings in the Catholic Church and in American life and culture. Fires, outbreaks of infectious diseases, the Civil War, waves of European immigrants and refugees, Church controversies, the Great Depression, two world wars and several smaller bloodlettings, the civil rights movement, and other social convulsions in America, all have involved members of the Notre Dame family and have left deep and indelible imprints on the character and rich tradition of the institution. Rev. William Corby, C.S.C., a successor to Father Sorin, played a memorable national role as a Union chaplain at the Battle of Gettysburg; Rev. Julius Nieuwland, C.S.C., a scientist and faculty member, invented synthetic rubber; Notre Dame students were participants in a nationally publicized scuffle with a resurgent Ku Klux Klan; the University's colorful football team and something of its campus atmosphere were enshrined in American history and

STUDENT LIFE

myth by a film featuring a memorable performance by an actor who later became a president. More recently, a second film dramatized the University's spirit and gave a new name to unheralded athletes—*Rudy*.

Most notably, Notre Dame's reputation, so zealously nurtured, sustained, and celebrated by Father Sorin and his successors, has become increasingly international in recent years because of the establishment of numerous academic and community service programs in the Holy Land, Mexico, Chile, Ireland, England, Austria, France, Italy, Spain, Australia, Japan, and other countries.

Despite these remarkable and generally welcome alterations in institutional shape and scope, Notre Dame's proud and self-conscious claim to be a Catholic university and its intent to be a great Catholic university remain unchanged from Father Sorin's day. The University boasts a core curriculum that includes required courses in theology and philosophy. In administrative and disciplinary affairs, Notre Dame holds itself responsible to the teaching of the Catholic Church, and it holds its students, faculty, and staff responsible for their own conduct, particularly in matters affecting the common good. Precisely because it is a Catholic university, it is a place where men and women from all faiths and backgrounds are to be made welcome. The staffs of the residence halls, campus ministry, the Center for Social Concerns, the Institute for Church Life, and the Alumni Association all continue to invite and encourage Notre Dame students, graduates, faculty, and administrators to pray together, to discuss and share their hopes, joys and sorrows, to bear with and sustain one another, and always to serve those most in need.

Notre Dame's Vision for Undergraduate Education

Notre Dame is a vibrant academic community dedicated to scholarship and the advancement of knowledge, where students find opportunities on campus and abroad to develop initiative and leadership, and to learn by being fully engaged in our classrooms, libraries, research laboratories, studios, and residence halls among other venues. Notre Dame seeks to nurture in its students intellectual passion and a keenly developed moral sense, goals attainable only where freedom of thought and expression flourishes in a culture built on respect, responsibility, and integrity.

Drawing on our Catholic intellectual tradition, which fosters the integration of faith and reason, Notre Dame offers an undergraduate education rooted in the fundamental belief that all truths participate in the Divine Truth, a belief that motivates the vigorous search for knowledge.

Notre Dame inspires students to pursue learning as a good in itself and to see that pursuit as involving the whole person. We cultivate each student's capacity to think creatively and critically while valuing the

rich inheritance that comes from our shared past. We expect our graduates to be conversant with and equipped to contribute to the best thinking across the disciplines. Notre Dame helps students acquire the virtues necessary for living a good human life and prepares them to become leaders in their professions, for their communities, the Church, and the world.

As a community committed to service, we challenge students to grow in their understanding of complex human realities, and we call them to respond to the needs of the world with compassion and committed action. By educating students to be engaged by both their intellectual labors and their faith, we aspire to offer an education that is Catholic in the broadest sense of the word, both in welcoming all persons of good will to our university community and turning outward to embrace the larger world.

Formed by a rich liberal education and possessed of mature faith in service to others, our graduates leave Notre Dame prepared to take their places at the forefront of discovery, innovation, and human achievement.

Student Life

Notre Dame offers its students a quality education, made possible by an excellent faculty, advanced research facilities, experienced administration, and a well-developed educational philosophy. Education here also extends far beyond coursework and research, to the development and formation facilitated by residential life, extracurricular activities, and a culture grounded in the University's Catholic, Holy Cross mission, which seeks to educate both the mind and the heart.

The Division of Student Affairs fosters a rich community life, encourages student development through programming and its support of student groups, and nurtures the physical and emotional well-being of our students through a variety of student resources and services, including:

Residential Life. The University's unique and cherished residential tradition is as old as the University itself. Our founder, Father Edward Sorin, C.S.C., established at Notre Dame the sort of residential ambience he had known at French universities. Nineteenth-century students slept, ate, studied, and attended classes en masse in wings of the Main Building. The regimen was strict: a prefect roused students at 6 a.m., supervised their prayer, meals, study, and recreation, and returned them to bed 16 hours later.

Each of Notre Dame's 30 undergraduate residence halls has an atmosphere and character of its own. Unique traditions in each hall generate a feeling of loyalty and camaraderie among its residents. Well-trained rectors, assistant rectors, and senior resident assistants provide multiple layers of pastoral care for the students who call a Notre Dame residence hall "home." The residence halls form the base of

many spiritual, athletic, social, and volunteer service activities.

First-year students, sophomores and juniors, beginning with the incoming class of 2018, are required to live on campus for six semesters. Study abroad facilitated through Notre Dame International automatically counts toward the fulfillment of the six-semester expectation, with other exceptions considered on an individual basis. Several hall leadership roles, along with incentives to stay in the halls, are available to seniors.

Spiritual Life. Notre Dame is a professedly Catholic place, which means—at its core—all are welcome. Beliefs are strengthened by commitment to God, to one another, and to the human family in love and service, while at Notre Dame and throughout life.

The Office of Campus Ministry is rooted in Catholic tradition and inspired by the charism and spirituality of the Congregation of Holy Cross, and works to bring education, the Catholic faith and the hope of the Cross to students and the broader Notre Dame community. The office is dedicated to inspiring students to engage others about their faith and discovering their gifts for exercising leadership while at Notre Dame and within the wider Church. The office ministers faithfully and fervently to all students, regardless of denomination, faith tradition, or level of education at the University.

Through undergraduate, graduate, liturgical, and music ministries, Campus Ministry fosters spiritual growth, encourages participation in sacramental and liturgical life, supports personal prayer, provides opportunities for retreats, pilgrimages and service, aids in discernment, and guides students to become leaders in the practice of their faith.

Clubs and Organizations. Notre Dame has over 400 clubs and organizations for interested students, which encompass academic, athletic, cultural, performing arts, social service and special interest pursuits. For a complete listing, visit sao.nd.edu.

Recreation Sports. The Department of Recreational Sports offers a variety of recreational programming and facilities open to Notre Dame students.

Club Sports. From rowing to volleyball, and rugby to boxing, club sports are a great way to engage in physical activity on and off campus. Club sports can challenge you to learn a new skill or improve your abilities in a sport you have played all your life. RecSports offers more than 45 club sports for Notre Dame students.

Family FuNDays. Family FuNDays are an integral part of RecSports. With roots tied deeply to Notre Dame's mission, Family FuNDays seek to meet the recreational needs of Notre Dame's families in order to help families grow stronger physically, mentally, and spiritually. Traditional opportunities include bowling, swimming, game nights, and bike rides.

Fitness & Instructional Programs. RecSports offers a variety of fitness classes such as Cardio Step, Indoor

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Cycling, Yoga, and Zumba®. In addition, RecSports offers Instructional Series for those looking to learn a new skill, such as Tai Chi or Partner Latin Dance, or gain a certification, like S.C.U.B.A. or lifeguarding.

Intramural Sports. One of the largest traditions on the campus of Notre Dame, Intramural Sports offers the opportunity for students to participate in various leagues and tournaments throughout the year. Notre Dame is considered to have one of the most unique Intramural Sports programs in the country with its baseball, curling, ice hockey, lacrosse, and tackle football.

RecSports Facilities:

- *Rolfs Sports Recreation Center (RSRC)* – The 78,000 sq. ft. Rolfs Sports Recreation Center has a large fitness room with more than 30 cardiovascular machines and a full complement of strength machines and free weights. The RSRC also has a three-lane, 1/8 mile track; three courts for basketball, volleyball, and badminton; a rink-style court for soccer and inline hockey; and two activity rooms for dance, aerobics, and martial arts. The RSRC was transformed into a practice facility for the men's and women's varsity basketball teams in January 2018, when the Smith Center for Recreational Sports in the Duncan Student Center became the new state-of-the-art recreational facility available for the Notre Dame community.

- *Rockne Memorial* – Located on North Quad, Rockne Memorial is legendary for its highly competitive pickup basketball games but also has 10 handball/racquetball courts, one combination squash/handball court, a swimming pool with a spectator gallery, a smaller pool for family use, a climbing wall, a weight room, a fitness room, and two rooms for dance and group exercise.

- *St. Joseph Beach* – Open annually from Memorial Day through Labor Day, St. Joseph Beach is located on St. Joseph Lake and offers a sandy beach, planked pier for sunbathing and canoe, kayak, and paddleboat rentals.

Career and Professional Development.

Notre Dame is committed to helping students thoughtfully consider their choice of major and weigh their professional aspirations with their personal values through the discernment process. Resources include our world class Center for Career Development, first-year courses, and other opportunities offered throughout the Notre Dame undergraduate experience in collaboration with many on-campus partners.

Health and Wellness. The University Counseling Center, the McDonald Center for Student Well-Being, the Office of Disability Services, and University Health Services aim to promote students' overall health and well-being through a broad range of services, treatment, prevention, and education.

Student Government. The unique blend of elements that gives the Notre Dame community its identity

has, over a period of years, shaped the character of the student government.

The greatest influence on the student government is the system of residence halls, which not only provides students with a place to live, but also serves as the principal center for social interaction on campus. Each hall has its own government, consisting of a hall president, vice president, cabinet, and judicial board, which works in cooperation with the hall staff to develop the best possible environment for its residents. As the basic unit of student government, the halls, and their needs, significantly shape the campus-wide student government.

The relatively simple structure of the student government has evolved gradually in response to changing attitudes and needs of the student body. At the head of the student government is its chief executive officer, the student body president. Although the duties of the job have tended to vary with the priorities of each officeholder, in general, the president represents the interests of the student body in all areas of life at Notre Dame.

The most representative student government groups are the Hall Presidents' Council and the Student Senate, both of which meet weekly to discuss the various aspects of residence and University life, and to coordinate activities among the halls and across campus.

The Campus Life Council was created by the University's Board of Trustees to allow for discussion among students, faculty, and administrators concerning life on campus. The council is empowered to pass resolutions recommending student life policy changes to the administration.

The programming arm of the Student Senate at Notre Dame is the Student Union Board. This board coordinates such events as lectures, plays, concerts, movies, and more. In addition, it coordinates major welcome back-to-school campus events and the Notre Dame Literary Festival (which were previously mentioned under "Annual Events"), as well as the Collegiate Jazz Fest, Acoustic Cafe, AnTostal, student bands, and other student performances, professional entertainment, and special events.

Student Conduct. A Catholic university is a society composed of faculty and students whose primary purpose is the pursuit of Christian wisdom. The society can exist only in an atmosphere of responsibility and good order. The University seeks, therefore, to provide those conditions and opportunities best suited for educating the student.

Students registering at the University of Notre Dame agree to abide by the regulations concerning student conduct set forth in *du Lac*, *A Guide to Student Life*. *du Lac* is available online at dulac.nd.edu.

The University reserves the right to deny the privilege of enrollment to any student whose conduct or attitude is believed to be detrimental to the welfare of the institution.

Intercollegiate Athletics

The University is committed to a well-rounded program for both men and women. The Fighting Irish athletic tradition, renowned throughout the United States, encompasses much more than football and basketball. Notre Dame boasts national contenders in many Olympic sports and since 2001, Notre Dame has won national championships in fencing ('05, '11, '17 and '18), women's basketball ('01 and '18), women's soccer ('04 and '10) and men's soccer ('13).

The women's intercollegiate athletic program, which has grown tremendously over the last 20 years, now includes 13 varsity sports (there are also 13 men's sports). Notre Dame women student-athletes compete in basketball, tennis, fencing, lacrosse, swimming and diving, volleyball, softball, golf, indoor and outdoor track and field, cross country, soccer and rowing.

The Notre Dame student body plays an important role in the success of teams that represent the University. Anyone who has attended a football pep rally or seen a top-ranked basketball team upset in the Purcell Pavilion knows why. The pride and loyalty displayed by "the greatest student body in the world" are a moving force that embodies the spirit of the Notre Dame community. Athletic contests at Notre Dame are an integral part of the social life as well as an opportunity for the athletically gifted to test their skills with the nation's best.

FACILITIES

Notre Dame Stadium, with its 80,795 seats, has been the home to Irish football since 1930. In the fall of 2017 the University debuted the Campus Crossroads Project, which enhanced fan experience at games as well as brought academic and student life closer to other campus facilities at the University. The project included the addition of a video board on top of the south end and ribbon boards around the east and west sides. Academic buildings connect to both the south, east and west sides of the stadium with stadium seating and media accommodations located on top. Installation of an artificial FieldTurf surface was completed prior to the 2014 football season.

Built in 1968, Notre Dame's Joyce Center has been called one of the most complete sports complexes in the country. Not only is there a 9,149-seat basketball/volleyball arena (Purcell Pavilion) but also boxing, weight rooms and five multi-use courts in the Fieldhouse. In 2012 the Castellan Family Fencing Center opened inside the Joyce Center Fieldhouse. The new fencing facility includes 15 fencing strips, new men's, women's and coaches' locker rooms, a team lounge, conference room and offices. The Rolfs Aquatic Center, with its Olympic-sized swimming pool, completes this complex.

Purcell Pavilion at the Joyce Center opened for the 2009–10 season. The arena was redone including

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the installation of chair-back seating throughout the arena. The construction encompasses a new three-story structure at the south end that includes a lobby, Notre Dame ticket operations, additional area for restrooms and concessions, and a varsity shop to sell apparel and souvenirs, in addition to a club seating and hospitality area.

The University of Notre Dame is enjoying its 12th full season with access to the Guglielmino Athletics Complex, affectionately referred to as “The Gug” (pronounced Goog). The Gug houses the football practice-week locker rooms, coaches’ offices and meeting rooms in addition to enhanced sports medicine, strength and conditioning and weight room equipment for all Notre Dame student-athletes.

Underwritten with a gift from the late Don F. Guglielmino and his wife Flora, the Gug provides the Irish football team with a central location for post-practice and pre-practice routines as well as daily positional meetings. Before the Gug opened, the Irish football facilities were spread between Notre Dame Stadium, the Joyce Center and the Loftus Sports Center.

The first floor of the 96,000-square-foot complex features the 25,000-square-foot Hagggar Fitness Center (gift of Ed and Patty Hagggar, Joe and Isabell Hagggar) with the latest state-of-the-art equipment that all student-athletes can use on a daily basis. The 8,300-square-foot Loftus Sports Medicine and Rehabilitation Center (a gift of John and Julie Lofus) services all Notre Dame student-athletes and also houses the athletic training staff. Also on the first floor are the Romano Family Locker Room (a gift of D.J. “Buddy” and Florence Romano), Isban Auditorium (a gift from Leonard and JoAnn Isban), the Allen Equipment Room (a gift of Marty and Sue Allen) and Hickey Coaches’ Locker Room (a gift of Jack and Rosemary Hickey).

The second floor houses the Smith Family Office Suites (a gift from the Smith family in honor of Francis W. and Rita C. Smith) with head coach Brian Kelly’s area overlooking the LaBar Practice Complex. Eleven banners hang in the Morse Recruiting Lounge (a gift of Jim and Leah Morse) commemorating Notre Dame’s 11 consecutive national championships.

Loftus Sports Center is now in its 30th full year of service at the University of Notre Dame, the Loftus Sports Center is one of the most integral athletics buildings on campus. Designed for use by all Notre Dame athletics teams as well as students, faculty and staff, the \$6.3-million center measures 614 feet by 210 feet and stands tucked in a forested area of campus just north of LaBar Practice Complex and connected to the Guglielmino Athletics Complex.

Dedicated on April 23, 1988, the Loftus Center saw its first football practice on Sept. 30 of that season. The facility is a gift of John R. Loftus, a member of Notre Dame’s basketball team in 1944, 1948 and 1949. The Irish football team practices on Meyo

Field (a gift of Raymond D. Meyo), a 100-yard Prestige Turf (newly installed for 2014) field complete with end zones.

Other facilities used by Irish athletic teams include:

Alumni Soccer Stadium. Notre Dame opened the Alumni Soccer Stadium (men’s and women’s soccer) in 2009. The approximately 3,000-seat facility, which sits side by side with the Irish lacrosse stadium, features a natural grass field, fully-equipped locker rooms, restrooms and concession areas, an expanded press box and a state-of-the-art light and sound system.

Arlotta Lacrosse Stadium. Arlotta Stadium is the home for men’s and women’s lacrosse programs. Located east of the Joyce Center, Arlotta Stadium features over 2,000 permanent seats with additional seating available on a grass berm opposite of the stands, lights, an artificial-turf field, locker rooms, player lounges, a press box with over 20 seats for media and support staff along with three broadcast booths, restrooms and concession areas. The first event in the new stadium was held Oct. 16, 2009, as the men’s lacrosse team played the Iroquois National team in an exhibition contest. Women’s lacrosse held its first event in the new stadium on March 7, 2010 vs Dartmouth.

Compton Family Ice Arena. Construction of this new, two-sheet ice facility began in March 2010. It is located just north of Angela Boulevard and just west of Leahy Drive. The ice surface (200’ x 90’) in the main arena (capacity ~5,000) is named the Charles W. “Lefty” Smith Jr. Rink, while the auxiliary rink is Olympic dimensions (200’ x 100’). The facility includes offices, locker rooms, strength, cardio and other training areas for the Notre Dame hockey program as well as locker rooms, service and support staff and areas necessary to operate campus and community hockey, skating and other recreational ice sport usage. For Irish games and other hospitality functions, O’Brien’s, a club area with adjacent premium seating is available on the mezzanine level. The facility opened on Oct. 18, 2011, and Notre Dame played its first hockey game in the new building Oct. 21 vs. RPI.

The Eck Tennis Pavilion, a 35,000-square-foot structure opened in 1987, is the place on campus for indoor tennis. Inside are six courts, coaches’ offices, showers and lockers, a repair shop, a vending lounge, and an observation deck. The pavilion is used by the varsity men’s and women’s tennis teams. It stands adjacent to its outdoor counterpart, the Courtney Tennis Center which features 12 courts for use during the warmer months.

Frank Eck Stadium, with its 2,500 seats, has been home to Irish baseball since 1994 and has undergone a series of improvements in that time. The clubhouse was remodeled in 2011, before an artificial surface was installed on the playing field in 2014. In 2017, an addition to the stadium will be completed,

adding a team room and study lounge to the existing clubhouse.

Harris Family Outdoor Track and Field Stadium.

The new nine-lane track is located southeast of the Joyce Center and is the competition and practice site for the men’s and women’s track and field teams. Throwing and jumping events are provided in two directions, and a warm-up area is located at one end of the track. The stadium features men’s and women’s locker rooms, a workout center and a team room.

LaBar Practice Complex, which enters its 10th season of use, is home to the outdoor practice fields of the Fighting Irish football team. A gift of Rees and Carol LaBar, the practice fields are located directly south of the Guglielmino Athletics Complex (on the former site of Moose Krause Stadium and Cartier Field). The LaBar Practice Complex features three football fields, lights, video towers, a maintenance building to provide storage and is secured with an eight-foot fence. Two of the three practice fields are FieldTurf fields (newly installed for 2015), allowing the Irish to practice year-round without fear of damaging grass fields due to inclement weather and general wear-and-tear. The third field is a natural grass field.

McConnell Family Boathouse, Located on the St. Joseph River in downtown South Bend, Indiana, the 15,00-square-foot McConnell Family Boathouse was dedicated on September 8, 2016. The boathouse features a team room, coach’s lockers and office, varsity locker room, laundry facilities, training room and spectator gallery on the upper level. The lower level includes three boat storage bays, one boat repair bay, boat trailer access, a 144-oar racking system and equipment storage space. A new dock was also constructed for the women’s varsity and the men’s club team to utilize.

Melissa Cook Softball Stadium opened for competition on April 12, 2008. This state-of-the-art venue honors the memory of former Irish softball player Melissa Cook. It features a brick/stucco exterior, Bluegrass sod outfield, a Daktronics scoreboard with full color message center, Musco lighting, heated dugouts, home and visitor locker rooms, training room, spacious press box, six batting cages, chair back and bleacher seating, interior restrooms, and concession stand.

Campus Security and Fire Safety

The security of all members of the campus community is of paramount concern to the University of Notre Dame. The University publishes an annual report outlining security and fire safety information and crime statistics for campus. This document provides suggestions regarding crime prevention strategies and important policy information about emergency procedures, reporting of crimes, law enforcement services on campus, fire safety, and information about support services for victims of sexual assault. The brochure also contains information about the University's policy on alcohol and other drugs, the SafeBouND program and campus shuttle service. You may view the document on the web at: <http://ndsp.nd.edu/crime-prevention-and-safety/yearly-security-fire-safety-reports/>. A printed copy of this brochure is available by sending an email request to ndsp@nd.edu or by writing to: Office of the Chief, University Security Police, 204 Hammes Mowbray Hall, Notre Dame, IN 46556.

The Spirit of Inclusion at Notre Dame

"Strangers and sojourners no longer." (Ephesians 2:19)

The University of Notre Dame strives for a spirit of inclusion among the members of this community for distinct reasons articulated in our Christian tradition. We prize the uniqueness of all persons as God's creatures. We welcome all people, regardless of color, gender, religion, ethnicity, sexual orientation, social or economic class, and nationality, for example, precisely because of Christ's calling to treat others as we desire to be treated. We value gay and lesbian members of this community as we value all members of this community. We condemn harassment of any kind, and University policies proscribe it. We consciously create an environment of mutual respect, hospitality and warmth in which none are strangers and all may flourish.

One of the essential tests of social justice within any Christian community is its abiding spirit of inclusion. Scriptural accounts of Jesus provide a constant witness of this inclusiveness. Jesus sought out and welcomed all people into the Kingdom of God—the gentile as well as the Jew, women as well as men, the poor as well as the wealthy, the slave as well as the free, the infirm as well as the healthy. The social teachings of the Catholic Church promote a society founded on justice and love, in which all persons possess inherent dignity as children of God. The individual and collective experiences of Christians have also provided strong warrants for the inclusion of all persons of good will in their communal living. Christians have found their life together enriched by the different qualities of their many members, and they have sought to increase this richness by welcoming others who bring additional gifts, talents and backgrounds to the community.

The spirit of inclusion at Notre Dame flows from our character as a community of scholarship, teaching, learning and service founded upon Jesus Christ. As the Word through whom all things were made, Christ is the source of the order of all creation and of the moral law which is written in our hearts. As the incarnate Word, Christ taught the law of love of God and sent the Holy Spirit that we might live lives of love and receive the gift of eternal life. For Notre Dame, Christ is the law by which all other laws are to be judged. As a Catholic institution of higher learning, in the governance of our common life we look to the teaching of Christ, which is proclaimed in Sacred Scripture and tradition, authoritatively interpreted by Church teaching, articulated in normative understandings of the human person, and continually deepened by the wisdom born of inquiry and experience. The rich heritage of the Catholic faith informs and transforms our search for truth and our understanding of contemporary challenges in higher education.

This statement was adopted by the officers of the University on August 27, 1997, in conjunction with an Open Letter to the Notre Dame community.

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Academic Profile

DEGREES AND ACADEMIC PROGRAMS

The University is organized into a First Year of Studies, four undergraduate colleges, an architecture school, a graduate school of four divisions, a graduate business school, a law school, and several graduate research study centers.

All incoming freshmen spend their first year in the First Year of Studies and then move into the college or school of their choice as sophomores—College of Arts and Letters, Mendoza College of Business, College of Engineering, College of Science, or School of Architecture.

In the 2017–18 academic year, the students enrolled in the College of Arts and Letters topped the undergraduate enrollment figures with approximately 1,966. There were 1,712 students in the Mendoza College of Business, 1,396 students in the College of Engineering, 1,198 students in the College of Science, and 147 students in the School of Architecture.

The College of Arts and Letters offers curricula leading to the degree of bachelor of fine arts in art studio or design and bachelor of arts majoring in:

- Africana Studies
- American Studies
- Anthropology
- Art, Art History, and Design
 - Art History
 - Art Studio
 - Design
- Classics
 - Arabic
 - Classics
 - Greek
 - Latin
 - Greek and Roman Civilization
- East Asian Languages & Cultures
 - Chinese
 - Japanese
- Economics
 - Economics
 - International Economics—Arabic
 - International Economics—Chinese
 - International Economics—German
 - International Economics—Japanese
 - International Economics—Romance Languages
 - International Economics—Russian
- English
- Film, Television, and Theatre
- Gender Studies
- German and Russian Languages and Literatures
 - German
 - Russian
- History
- Irish Language and Literature
- Mathematics (honors only)
- Medieval Studies

UNIVERSITY REQUIREMENTS

Music
 Neuroscience and Behavior
 Philosophy
 Philosophy/Theology (joint major)
 Political Science
 Program of Liberal Studies
 Psychology
 Romance Languages and Literatures
 French
 Italian
 Romance Languages and Literatures
 Spanish
 Sociology
 Theology

The Mendoza College of Business offers the degree of bachelor of business administration with majors in:

Accountancy
 Business Analytics
 Finance
 Information Technology Management
 Management Consulting
 Marketing

The College of Engineering offers curricula leading to degrees of:

B.S. in Aerospace Engineering
 B.S. in Chemical Engineering
 B.S. in Civil Engineering
 B.S. in Computer Engineering
 B.S. in Computer Science
 B.S. in Electrical Engineering
 B.S. in Environmental Earth Sciences
 B.S. in Environmental Engineering
 B.S. in Environmental Geosciences
 B.S. in Mechanical Engineering

The College of Science offers the degree of bachelor of science majoring in:

Applied and Computational Mathematics and Statistics
 Biochemistry
 Biological Sciences
 Chemistry
 Chemistry/Business
 Chemistry/Computing
 Environmental Sciences
 Mathematics
 Neuroscience and Behavior
 Physics
 Physics in Medicine
 Preprofessional Studies
 Science–Business
 Science–Computing
 Science–Education
 Statistics

The School of Architecture offers the degree of bachelor of architecture (five-year program).

Supplementary majors may be taken only in conjunction with a full major. The Arts and Letters supplementary pre-health studies major provides students with an opportunity to complete

a supplementary major in health-related science. Students may take supplementary majors/minors in departments of other colleges, but their dean may specify certain modifications in their curriculum. Undergraduates may obtain bachelor degrees in combination programs with other colleges in integrated five-year programs.

The course and program requirements for degrees are determined by the various colleges and schools.

These colleges are independent of one another and provide academic instruction within the various programs and departments. The dean of each college has authority, along with the college council, to determine minimum admission standards, requirements for a major and a degree from the program, and dismissal from the college and University.

The student who wishes to transfer from one college to another college within the University must have the approval of the deans of both colleges. The accepting dean has discretion regarding which credits are acceptable toward the degree in the new college.

Dual Degree. A program leading to two undergraduate degrees is distinct from a program in which a student receives one degree with two majors (such as a bachelor of business administration with a major in finance and a major in political science). Students should refer to the dual degree policies which are explained in each college's section of this *Bulletin*.

Academic Governance. The major source of academic governance within the University is the Academic Council, made up of administrators, faculty, and students from each of the four colleges and chaired by University President Rev. John I. Jenkins, C.S.C. All major decisions concerning academic policy and scheduling throughout the University are made by this board.

Along with the Academic Council, each college is served by a college council representing its faculty and students. The purpose of the council is to suggest and plan academic programs and to make decisions regarding academic policy within the college. Most of the colleges also have a student advisory council whose function is to elicit student ideas and concerns regarding college policy, to formulate those ideas, and to make suggestions to the college council.

Advising. All first-year students enter the First Year of Studies and are assigned an advisor from its faculty. The **First Year of Studies** offices are located at 219 Coleman-Morse Center. During their first year all students will receive the advising from their First Year of Studies advisor. Students will select the college in which they want to pursue their undergraduate degree by the end of their first year and will be directed to speak with an advisor in their intended college during their sophomore year. **Architecture**—110 Bond Hall; **Arts and Letters**—104 O'Shaughnessy Hall; **Business**—101 Mendoza College of Business; **Engineering**—257 Fitzpatrick Hall; **Science**—215 Jordan Hall. After

a major has been declared, students are assigned a departmental advisor as well.

Pre-Law Advising. Students planning to attend law school may consult with Anita Rees, Center for Career Development.

The Summer Session. Summer courses are offered by the faculty to students at all levels—undergraduate, graduate, and professional.

In addition to meeting the needs of the academic-year students who are continuing work on their degrees, the summer session also serves teachers, industry personnel, and professional and career groups. These students are provided an opportunity to work on advanced degrees, fulfill certification requirements, improve their professional position, or take enrichment courses. The summer session embraces not only the traditional six-week period of course work but also three-week subsessions.

University Requirements

Application must be made to the University Registrar for a degree.

The receipt of a baccalaureate degree from the University requires satisfactory completion of the undergraduate curriculum including the requirements of the University Core Curriculum. The following new undergraduate Core Curriculum becomes effective with the first-year students beginning their studies in the 2018–2019 academic year:

Six courses in the liberal arts:

- *1. Quantitative Reasoning
- *2. Science and Technology
- *3. An additional course in Quantitative Reasoning or Science and Technology
- *4. Arts and Literature or Advanced Languages and Cultures
- *5. History or Social Science
- *6. Integration, or a course from an area not yet chosen in 4 or 5

Four courses exploring explicitly Catholic dimensions of the liberal arts:

- *1. A foundational Theology course
- *2. A developmental Theology course
- *3. An introductory Philosophy course
- *4. An additional Philosophy course or a Catholicism and the Disciplines course

Two courses in writing:

1. A University Seminar
2. A Writing and Rhetoric course, or another writing-intensive course.

The two-semester Moreau First Year Experience

* One of these requirements must be designated as a University Seminar course typically numbered as 13180–13189.

- (a) Only courses identified as approved “Ways of Knowing” for the University Core Curriculum can be used to fulfill a University requirement.

UNIVERSITY REQUIREMENTS

Approved courses are administratively marked with a “WKxx” identifier in Class Search each semester to denote their approved status as a “Way of Knowing.” These courses can be viewed for a particular academic term by selecting the “Class Search” link within insideND or by visiting the home page of the Office of the Registrar website and clicking on the “Class Search” link.

- (b) In addition to these university requirements, each college has its own requirements that must be completed. Without prior permission from the appropriate college dean, special studies and directed readings do not satisfy college requirements.
- (c) First-year students are required to complete a University Seminar; the Writing & Rhetoric course; and two one-semester courses for the Moreau First Year Experience. The University Seminar may simultaneously satisfy another university requirement, e.g., a University Seminar offered by the History Department should also satisfy the History requirement.
- (d) Satisfactory work in a major or a concentration program of study.
- (e) A minimum cumulative average of 2.000.
- (f) Completion of a minimum of 50% of the degree credit hours at the University (not less than 60 credit hours) and a minimum of 75% of the degree credit hours (not less than 90 credit hours) must be earned after high school graduation through college and university courses.
- (g) Enrollment in the last semester on the main university campus. Under extraordinary circumstances this requirement can be waived by the dean (or the dean's designee) of the student's college.

Central to undergraduate education at Notre Dame is the core curriculum, a set of University required courses intended to provide every undergraduate with a common foundation in learning. Detailed rationales for each requirement can be found at <http://corecurriculum.nd.edu/>.

Writing. Students will take two writing courses, one of which is a University Seminar. With sufficient placement credit, the student may choose to take a second writing-intensive course instead of Writing and Rhetoric. The Writing and Rhetoric course prepares students to write college-level arguments. Students learn to identify an issue amid diverse and conflicting points of view; frame and sustain an ethical argument that not only includes the analysis and exposition of information but also establishes what is at stake in the issue; provide sufficient and relevant evidence to support their claims; identify and evaluate potential counterarguments; respond thoughtfully to the work of their peers; develop skills for writing a research proposal for conducting original research (e.g., through surveys or interviews) and for using the library's print and electronic information

resources; and learn to employ conventions of language in writing academic arguments. A second writing-intensive course may be an elective course with a substantial writing component or a course in the student's major field of study that emphasizes writing skills appropriate to the discipline.

University Seminars. The University Seminar is a distinctive opportunity for every first-year student to experience a small, writing-intensive seminar taught by a member of the University's teaching and research faculty. With a class size of no more than 18, students have the opportunity to regularly engage in class discussions around a particular issue, problem, or topic in a given field of study. Students study the paradigms, content, methodology, or problems of a particular discipline while learning the conventions for academic writing within the parameters or discourse of that field. Each seminar also fulfills one of the University requirements in fine arts, literature, history, social science, philosophy, theology, mathematics, or science.

Quantitative Reasoning. Students develop quantitative reasoning skills through the study of various aspects of mathematics, including analysis, logic, probability and statistics, and modeling. From each of these students derive techniques that are applicable to specific classes of problems. Students will use deductive reasoning in problem solving, apply the inductive process to draw conclusions through quantitative analysis, evaluate data and think probabilistically, assess the strength of numerical evidence, and mathematically model processes or systems to be able to predict (or change) their outcomes. By engaging in multiple mathematical ways of thinking, students will enhance their ability to make informed decisions as citizens and as potential leaders and will gain a deeper understanding of the vital role that Quantitative Reasoning plays in modern society.

Science and Technology. Through the study of science and engineering, students learn how knowledge of the natural world is built on observation, experiment, and evidence, and how these principles can be used to advance technology. They develop a basic understanding of the scientific method and the engineering design process, including an appreciation for the interplay between theory and experiment, and how an advance in one drives the other. In addition to acquiring a working knowledge of fundamental concepts and laws in a particular field of scientific study, students learn to analyze and interpret simple sets of quantitative data and to use mathematical structures to solve problems and create models. Finally, students gain an appreciation of the important interdependence among science, technology, and society.

History. In the study of history, students explore human beings as individuals, groups, nations, or even civilizations in an attempt to comprehend the human experience. Students come to appreciate and understand the processes of continuity and change over time, and they discover how people

shaped, altered, or succumbed to their environment or how, in turn, environment channeled historical experience. Thinking critically about the connections between specific events or processes and an array of contingent phenomena, students look for causes and effects, relationships, and relevance.

Social Science. Students discover the diversity of societies and world cultures, the complexity of the choices facing human beings, and the potential social and political consequences of the paths people take. Through lectures, classroom experiences, or local fieldwork, students gain an understanding of the research methods, processes and procedures used to examine human behavior. From the perspective of different social science disciplines, students uncover the competing organizations and institutional opportunities for realizing one's conceptions of justice and the good life.

Theology. Theology, the “science of God,” represents “faith seeking understanding.” Through the first required course, students arrive at an understanding of the distinctive nature of the discipline of theology; encounter the authoritative texts that serve to constitute the self-understanding of Christian tradition as a response to God's self-revelation; become aware of the constitution, transmission, and interpretation of these texts within the tradition; and, develop their own skills of textual interpretation in conversation with the tradition. Through the second required course, students are introduced to the riches of the Christian theological tradition; develop their theological skills, facilitating the critical retrieval of the Christian heritage; and, come to appreciate better their rootedness in the ongoing tradition of the believing community.

Philosophy. Students engage in logical reflection on the fundamental problems of human existence and prepare to take their place as citizens capable of critically evaluating arguments which bear on public affairs. In the first course in philosophy, students read philosophical texts and identify the main lines of argument and counter-argument, reason about philosophical questions, and defend their own philosophical positions. In the second course in philosophy, students explore a subset of philosophical questions or authors of special interest to them. By studying seminal philosophical texts like those that have contributed to the Catholic tradition and those that have presented challenges to it, students learn to think in depth about the problems posed by a life of faith.

Fine Arts and Literature. Students approach works of art and literature from critical perspectives—as viewers, readers, or listeners—and they apply the analytical tools needed to realize the insights and pleasures that artistic texts and works offer. Students may engage in the creative process, and in so doing gain insights as to how artists interact with their media and how creativity meshes with understanding. The critical analysis of others' creative practice will enable students to develop the analytical tools to

GRADING SYSTEM

recognize a work's formal dimensions and its ideas as well as the often-complex interaction between the two. Engagement with artworks will also lead students to reflect on how aesthetic forms of expression help us define ourselves and our world. Analysis of a work of art, be it through its production, through careful interpretation of the work, or through its reception, will lead students to a deeper reflection on how art and society interact, and how artistic expression reflects the position of the artist and the individual with respect to society at large.

Advanced Language and Culture. Exposure to literature, culture, thought, and political discourse in the original language of expression lends both an invaluable insight into the belief patterns of different cultures and a deepening understanding of those beliefs and traditions. Extensive reading, writing, and speaking in a different language requires students to place themselves into the idiom of the underlying culture and its way of thought. Through this intensive engagement with words and ideas, students gain a new perspective on differences of culture and thought, and, ultimately, on their place in a diverse world.

Integration. Integration courses are team-taught by faculty from two departments or academic units and have as a primary goal the pursuit of knowledge that integrates and synthesizes the perspective of two or more disciplines to address an issue of global importance or great existential depth that is too complex to be adequately addressed by a single field of study. In integration courses, students will learn to identify commonalities and differences, as well as strengths and weaknesses, among the various disciplinary perspectives and to devise a more complex approach to the question, problem, or issue that provides the theme for the course. By undertaking an active investigation of a complex topic, students will employ critical thinking and intellectual synthesis, as well as develop habits of inquiry and independent learning.

Catholicism and the Disciplines. Catholicism and the Disciplines (CAD) courses provide a forum where the various lines of Catholic thought intersect with all forms of knowledge and creativity found in the university. CAD courses are designed to engage ideas from the Catholic tradition with the perspective of one or more disciplines and to engage issues of faith or normative questions both critically and constructively. Students will become adept at examining faith questions or normative questions critically as they explore Catholic content from the perspective of one or more disciplines, and as they explore topics from the disciplines from a distinctively Catholic perspective. Students will be challenged to defend a position on selected issues of faith or normative questions raised by disciplinary considerations in light of competing alternatives, helping them develop their capacities to think critically and to speak and write effectively about matters of faith in a pluralistic world.

Grading System

The grading system employed in the evaluation of undergraduate student work is detailed in the Undergraduate Academic Code. The "descriptions" and "explanatory comments" are intended to be sufficiently general to apply across the University, but obviously have to be applied in a manner specific to each department.

<i>Letter Grade</i>	<i>Point Value</i>	<i>Description</i>	<i>Explanatory Comments</i>
A	4.000	Truly Exceptional	Work meets or exceeds the highest expectations for the course
A-	3.667	Outstanding	Superior work in all areas of the course
B+	3.333	Very Good	Superior work in most areas of the course
B	3.000	Good	Solid work across the board
B-	2.667	More than Acceptable	More than acceptable, but falls short of solid work
C+	2.333	Acceptable: Meets All Basic Standards	Work meets all the basic requirements and standards for the course
C	2.000	Acceptable: Meets Most Basic Standards	Work meets most of the basic requirements and standards in several areas
C-	1.667	Acceptable: Meets Some Basic Standards	While acceptable, work falls short of meeting basic standards in several areas
D	1.000	Minimally Passing Work	Work just over the threshold of acceptability
F	0	Failing	Unacceptable performance
X	0		Given with the approval of the student's dean (or the dean's designee) in extenuating circumstances beyond the control of the student. After consultation with the student's dean (or the dean's designee), the Registrar converts an X grade to an "F" if the grade is not otherwise resolved within 30 days after the beginning of the next semester.

The following grades may be assigned by the Registrar. They may not be given by a member of the faculty.

W	Discontinued with permission.	Discontinued with permission of the student's dean (or the dean's designee) following the last day for course discontinuance, per the Undergraduate Academic Code.
NR	Not Reported	Final grade(s) not reported by the instructor because of extenuating circumstances. No final grade reported for the course. It will revert to an "F" if not resolved by the beginning of final week in the next semester for which the student is enrolled.
F*	Not Reported	No final grade reported for an individual student. Assigned when the instructor has failed to report a grade for either an individual student or an entire class. It reverts to "F" if not changed within 30 days after the beginning of the next semester in which the student is enrolled.

The following letter grades may be given, but are not included in the computation of a student's Grade Point Average.

P	Pass (Pass/Fail Option): Junior or senior undergraduates may file with their academic dean [or the dean's designee], during the first six class days of the semester, the decision to take on a pass/fail basis one course per semester. Policy details are outlined in the Undergraduate Academic Code.)
S	Satisfactory work (courses with zero credit hours, as well as research courses, departmental seminars, colloquia or directed studies; workshops; field education and skill courses).
U	Unsatisfactory work (courses with zero credit hours, as well as research courses, departmental seminars, colloquia or directed studies; workshops; field education and skill courses).

GRADUATION RATE

Moreau First Year Experience. This two-semester course sequence helps new students to make a meaningful transition to collegiate life at Notre Dame by integrating their academic, co-curricular, and residential experiences. Through weekly small group discussions, students will explore university resources and opportunities and will examine topics such as: orientation to university life; community standards; health and wellness; strategies for academic success; spiritual life; discernment; and cultural competence.

Graduation Rate

Of the students entering a full-time, first-year bachelor degree-seeking program in the fall of 2011, 95 percent graduated within six years. The complete IPEDS Graduation Rate Survey may be found in the Office of Strategic Planning and Institutional Research. (<http://ospir.nd.edu>)

Honors at Graduation. In the undergraduate colleges, a degree will be granted with highest honors (*summa cum laude*) if the student's grade point average ranks among the top 5.000 percent of those students graduating from the student's college or school; for a student whose grade point average ranks among the top 15.000 percent of the student's college or school, a degree will be granted with high honors (*magna cum laude*); for a student whose grade-point average ranks among the top 30.000 percent of the student's college or school, a degree will be granted with honors (*cum laude*). A student who meets the requirements of more than one category of honors will be awarded only the highest honor for which that student qualifies.

Accreditation and Academic Association.

The University of Notre Dame is a member of the North Central Association of Colleges and Secondary Schools, the National Catholic Education Association, the Association of American Colleges, the American Council on Education, the National Commission on Accrediting (not an accrediting agency), the Council of Graduate Schools in the United States, and the Midwest Conference on Graduate Study and Research, and it is fully accredited by the Indiana State Board of Education. The University is also a member of the Indiana Conference of Higher Education, the International Association of Universities, the *Catholicarum Universitatum Foederatio* (Federation of Catholic Universities) and the Institute of International Education.

Academic Code of Honor

The University of Notre Dame is a scholarly community in which faculty and students share knowledge, ideas, and creative works. Notre Dame's Academic Code of Honor expresses our common commitment and moral responsibility to represent accurately and to credit the contributions of every individual.

The *Student Guide to the Academic Code of Honor* (honorcode.nd.edu) describes the standards of personal academic conduct that all Notre Dame undergraduates pledge to follow and also outlines the set of procedures by which violations of the Honor Code are reported and adjudicated.

Before matriculation, each entering student must pledge:

**As a Member of the Notre Dame community,
I will not participate in or tolerate academic dishonesty.**

The Undergraduate Academic Code

The Undergraduate Academic Code governs the attainment of academic credit and degrees by undergraduate students at the University of Notre Dame. The Academic Council of the University ratifies and retains both authority and responsibility for review and amendment of the Code. Its administration and interpretation fall under the aegis of the Officers, the Deans, and the Registrar of the University. A copy of the Undergraduate Academic Code can be found online at <http://provost.nd.edu/information-for-faculty/faculty-handbook-academic-codes/>.

Using Notre Dame Email

The University of Notre Dame uses its email system as the official means to communicate important information to students. Students are expected to check their email regularly and are responsible for reviewing the information and responding to any inquiries or action items that they receive via email. This is particularly important as traditionally paper-based processes are increasingly replaced by electronic communications. Further details about the University of Notre Dame's management of email can be found online at <https://oit.nd.edu/services/email-calendaring/>.

Notre Dame NetID Student Policy

The University of Notre Dame NetID accounts and related services are intended for faculty, staff, and currently enrolled students. "A student must register and enroll at the dates and times announced by the Registrar." (Academic Code 4.1) A student who fails to enroll by the announced date will forfeit his or her right to access his or her NetID account and related services. University computing resources supplied by way of the NetID are normally available to a student for up to 60 days after his or her graduation date. A student granted a leave of absence would normally retain access to University computing services for up to two semesters. A student who is separated from the University due to an academic suspension, academic dismissal, or withdrawal will no longer have access to University computing services, unless an extension has been approved by the dean of his or her college. A student attending Notre Dame for the summer only, with a non-degree seeking status will normally retain access to University computing service for up to 60 days after the August graduation date. A student who is separated from the University for other reasons will no longer have access to University computing services.

Hesburgh Libraries

The Hesburgh Libraries is a diverse system featuring a main library that houses specialty libraries and nine branch libraries located throughout the Notre Dame campus. In an effort to further its core mission of "connecting people to knowledge," the Libraries offer a vast array of expertise, services, resources and spaces to ensure the academic success of the student community. Whether through the expertise of subject librarians and specialty services or the access to various sources of knowledge, we continuously evolve to meet the ever-changing needs of Notre Dame students in the 21st century.

We often hear students say, "If only I had known sooner how much help I could get from the Libraries...my job as a student would have been much easier!" Reference and Subject Librarians offer research assistance in all academic disciplines and are available face-to-face, by email, phone and chat. Check out our website at library.nd.edu for a list of subject specialists, resource guides and special programs to help focus your efforts and develop your research skills. For example, *Pot of Gold*, an interactive web-based tutorial, is an important resource that helps students learn to efficiently locate, retrieve, evaluate and use new information. This is just one of our many programs that build information and digital literacy, essential lifelong skills for all students in every area of scholarship.

During the academic year, the Hesburgh Library is open every day, with 24-hour access 5 days per week. For more information about the services, spaces

HESBURGH LIBRARIES

and collections at the Hesburgh Libraries visit library.nd.edu.

Main Library. The iconic Theodore M. Hesburgh Library, which recently celebrated a milestone 50-year anniversary, opened in 1963 as “Memorial Library” and was one of the largest collegiate libraries of its day. Home to many core services and resources as well as reference and subject librarians, the Hesburgh Library continues to serve as the flagship building of the Hesburgh Libraries system here at Notre Dame. In addition to the general research collections on open stacks, three specialty Libraries and Centers reside within the Hesburgh Library building:

Hesburgh Library
(574) 631-6679
library.nd.edu

Center for Digital Scholarship
2nd Floor NE, Hesburgh Library
(574) 631-4900
library.nd.edu/cds

Medieval Institute Library
7th Floor, Hesburgh Library
(574) 631-5724
library.nd.edu/medieval

Rare Books and Special Collections
102 Hesburgh Library
(574) 631-0290
rarebooks.library.nd.edu

University Archives
607 Hesburgh Library
(574) 631-6448
archives.nd.edu

Branch Libraries. Library services have expanded beyond the building adorned with the Word of Life mural to include 8 branch libraries:

Architecture Library
117 Bond Hall
(574) 631-6654
library.nd.edu/architecture

Mahaffey Business Library
L001 Mendoza College of Business
(574) 631-9098
library.nd.edu/business

Chemistry-Physics Library
231 Nieuwland Science Hall
(574) 631-7203
library.nd.edu/chemistry

Engineering Library
149 Fitzpatrick Hall
(574) 631-6665
library.nd.edu/engineering

Kellogg Kroc Library
318 Hesburgh Center for International Studies
(574) 631-8534
library.nd.edu/kelloggkroc

O'Meara Mathematics Library
001 Hayes-Healy Center
(574) 631-7278
library.nd.edu/mathematics

Music Library
310 O'Neill Hall
(574) 631-8686
library.nd.edu/music

Radiation Chemistry Reading Room
105 Radiation Research Building
(574) 631-6163
library.nd.edu/radlab

Visual Resources Center
216 Riley Hall
(574) 631-4273
library.nd.edu/vrc

Subject Librarians. More than 40 Subject Librarians provide invaluable expertise and support services for the teaching, research and scholarship initiatives of the University community. library.nd.edu/subjects. Services offered by Subject Librarians include research consultations, materials purchase requests, and bibliographic instruction. They are responsible for collection development and management in one or more subject areas, including selection, communication with subject department faculty, de-selection, and preservation. Subject Librarians are also your liaison to specialty research services within the Hesburgh Libraries and throughout the campus community. Begin your student career at Notre Dame by initiating and building a relationship with your Subject Librarian as soon as possible. You can connect face-to-face, by email, phone or chat.

First Year of Studies Librarian. The Hesburgh Libraries has exceptional librarians dedicated to helping first-year students learn more about what it means for a college student to have information literacy. Information literacy is knowing how to: access information efficiently and effectively, evaluate information critically and competently, and use information appropriately for different purposes in a variety of contexts. Ultimately, this first year training helps students succeed in their academic work and in the world beyond Notre Dame. Learn more at firstyear.nd.edu/resources/academic-support/first-year-librarian.

Center for Digital Scholarship. The Center for Digital Scholarship is located in Hesburgh Library's northeast corner on the 2nd floor. The Center (CDS) leverages state-of-the-art technologies, enabling students and faculty to explore new methodologies, analyze complex data and share research results in ways never before possible. The Center is nimble, capable of rapidly adopting new technologies as they emerge—transforming how teaching, research and scholarship are performed here at Notre Dame.

With partnerships campus-wide, the Center for Digital Scholarship serves as a “hub” that enhances the teaching, learning, and research process in every academic discipline. The Center empowers and

equips our next generation of scientists and scholars to accelerate their research process, create new knowledge in a digital environment, and make a more profound impact in the world.

Center Expertise. The Center offers cross-disciplinary library expertise, including a Metadata Librarian, GIS Librarian, Data Analysis Librarian, and a Digital Initiatives Librarian. Subject Librarians are also important contributors to and conduits for the Center's impact. To meet specialty needs, The Center has developed partnerships with various campus research providers, such as the Center for Research Computing, the Center for Creative Computing, and the Office of Research. Our structure ensures that areas of expertise will evolve to meet the changing demands of our University community for research and scholarship in the 21st century.

Center Services. Current services include GIS (Geographic Information Systems) Consultation; Data Usage and Analysis; Text Mining and Analysis; Data Management Planning; Metadata Services; Copyright Services; Digitization Services and Referral Services. Workshops and introductory topic sessions will be available on a regular and recurring basis, or by request.

Interlibrary Loan. Interlibrary Loan (ILL) is a complimentary service for ND students that procures from other libraries research materials not available in the University's collection. Delivery of electronic materials is provided through your ILL account interface—be sure to take time to create your Interlibrary Loan account to ensure service when you need it.

Document Delivery. Document Delivery is a service that can be used to retrieve materials from any of our collection locations for delivery to your preferred library location for pickup at service desks at any of the above locations. Articles are delivered via email unless you indicate a preference for paper copies; paper copies are delivered to the service desk of your choice within the Hesburgh Libraries system.

Senior Thesis Camp. Thesis Research and Writing Camps are designed to provide structured and supported time for you to focus on your research output. The camps are 5-day events offered during fall midterm break. Meals are provided to allow your time and attention to be focused upon learning new research and writing techniques, applying time management tips, meeting members of your student community, exchanging ideas, and building your community beyond your own discipline.

Undergraduate Library Research Award (ULRA). The ULRA award honors undergraduate students at every level who demonstrate excellent research skills and who incorporate library services, resources and expertise into their scholarly works and creative projects. There are three levels (Senior and Honors Theses, 20000–40000 Level, and 10000 Level) and

ACADEMIC RESOURCES

six cash awards. For more information on how to apply and tips for submissions at library.nd.edu/ultra.

Writing Center Consultations. The Libraries feature an on-site partnership with the Writing Center. The Writing Center has evening hours within the Hesburgh Library Sunday–Thursday during the regular academic year.

Additional Services. In the Libraries we provide access to overhead and flatbed document scanning; ask-a-librarian online, phone and email services; remote access to research materials such as electronic books, journals and databases.

Academic Resources

Faculty. In 2018–19, Notre Dame’s instructional faculty numbered 1,188 full-time and 160 part-time. Other faculty, such as administrative, professional specialists, librarians, and research fellows, numbered 287 full-time and 8 part-time. Ninety percent of the full-time instructional faculty have terminal degrees; 92 percent of them have doctorates. Ninety-seven percent of the full-time instructional faculty are lay persons. (The faculty to student ratio is 1:10.)

Institutes and Centers

As the University of Notre Dame has grown, its institutional mission has also expanded and evolved. The establishment of institutes and centers has been a part of this development. Requiring approval by the Office of the Provost and organized according to their size and scope of operations, the diversity of Notre Dame’s institutes and centers speaks to the spectrum of scholarly activities available to students at the University.

The University Institutes at Notre Dame include the Center for Social Concerns, the Eck Institute for Global Health, the Institute for Educational Initiatives, the Joint Institute for Nuclear Astrophysics—Center for the Evolution of the Elements (JINA-CEE), the Kellogg Institute for International Studies, the Keough-Naughton Institute for Irish Studies, the Kroc Institute for International Peace Studies, the McGrath Institute for Church Life, the Medieval Institute, the Nanovic Institute for European Studies, the Notre Dame Radiation Laboratory, the Tantur Ecumenical Institute, and the W. M. Keck Center For Transgene Research.

The University Research Centers at Notre Dame include the Boler-Paraghean Center for Rare and Neglected Diseases; the Center for Civil and Human Rights; the Center for Informatics and Computational Science; the Center for Theology, Science, and Human Flourishing; the Interdisciplinary Center for Network Science and Applications; the ND Energy; and the Notre Dame Institute for Advanced Study

The College Institutes at Notre Dame include the Environmental Research Center (UNDERC), the Harper Cancer Research Institute, the Institute for

Flow Physics and Control, the Institute for Latino Studies, the Liu Institute for Asia and Asian Studies, the Midwest Institute for Nanoelectronics Discovery, the NDnano – Center for Nano Science and Technology, and the Wireless Institute.

The College Centers at Notre Dame include the Center for Accounting Research and Education (CARE), the Center for Astrophysics (CANDU), the Center for Entrepreneurship, the Center for Environmental Science and Technology, the Center for Ethics and Culture, the Center for Ethics and Religious Values in Business, the Center for Mathematics, the Center for Philosophy of Religion, the Center for Research on Educational Opportunity, the Center for Stem Cells and Regenerative Medicine, the Center for STEM Education, the Center for the Study of Religion and Society, the Center for the Study of Social Movements, the Cushwa Center for the Study of American Catholicism, the Eugene D. Fanning Center for Business Communication, the Institute for Structure and Nuclear Astrophysics (ISNAP), the Institute for Theoretical Sciences, the Interdisciplinary Center for the Study of Biocomplexity, the John J. Reilly Center for Science, Technology and Values, the Notre Dame Deloitte Center for Ethical Leadership, the QuarkNet Center, the Rooney Center for the Study of American Democracy, the Ruth M. Hillebrand Center for Compassionate Care in Medicine, the Warren Family Research Center for Drug Discovery & Development, and the William J. Shaw Center for Children and Families.

Other academic support units include the Center for Creative Computing, the Center for Digital Scholarship, the Center for Research Computing, the Center for Social Research, the Center for the Study of Languages and Cultures, the Flatley Center for Undergraduate Scholarly Engagement, the Institute for Scholarship in the Liberal Arts, the Kaneb Center for Teaching and Learning, the Notre Dame Integrated Imaging Facility, and the Writing Center.

Details about the centers and institutes at the University of Notre Dame can be found online at <https://www.nd.edu/academics/centers-institutes/>.

Notre Dame Research. At the University of Notre Dame, record-breaking research awards of more than 138 million have paved the way for new discoveries, unlocked knowledge, and improved technologies. Notre Dame Research is committed to supporting a culture of research, scholarship, and creative endeavor throughout campus, in order to help the University be a repository for knowledge and a powerful means for doing good in the world.

NDR provides support to these researchers in various aspects of research activity including administration and compliance. In addition, NDR supports and encourages innovation in more than 20 world-class core facilities and resources, as well as in a number of key areas of research, including

cancer, environmental change, global health, and many more.

At Notre Dame, more than one-third of undergraduate students participate in original research with a faculty mentor. The University’s low student-faculty ratio means that students from all Colleges and Schools are right alongside Notre Dame’s leading researchers as they conduct groundbreaking research in the field, on the bench, or at the policy table. In addition, students have the opportunity to pursue funding for independent research and creative projects through a number of organizations that can be conducted on campus and abroad.

More information regarding Notre Dame Research can be found at research.nd.edu or by following @UNDRResearch on Twitter.

IDEA Center. Standing for Innovation, De-Risking and Enterprise Acceleration, the IDEA Center is the fundamental resource for all commercialization and student entrepreneurial activities at the University of Notre Dame. Comprised of the Commercialization Engine (formerly the Office of Technology Transfer), Innovation Park, Network Engagement, and Student Entrepreneurship, it provides the necessary space, services and expertise for idea development, commercialization, business formation, prototyping, entrepreneurial education, and student entrepreneurial efforts. It is designed to bring the best Notre Dame faculty, staff, and student ideas and innovations to market. Learn more at ideacenter.nd.edu.

Snite Museum of Art. The museum features collections and a sculpture park that place it among the finest university art museums in the nation.

The Mesoamerican collection includes fine examples of early Mexican, Central, and South American cultures.

The Kress Study Collection has Italian Renaissance panel paintings and the Baroque collection contains works by Bloemaert, Coppel, and van Ruisdael.

Selections from the Feddersen Collection of over 70 notable Rembrandt van Rijn etchings are exhibited frequently; and the 18th-century collection includes such masters as Boucher, Vigée-LeBrun, Reynolds, de Mura, and West.

The critically acclaimed John D. Reilly Collection of Old Master to 19th-Century Drawings includes examples by Tintoretto, Tiepolo, Oudry, Ingres, Fragonard, Géricault, Millet, and Degas. The Noah and Muriel Butkin Collection of 19th-Century French Art is one of the museum’s major strengths, with paintings and drawings by Corot, Boudin, Couture, Courbet, and Gérôme.

The Ashbaugh Decorative and Design Arts Gallery spans the 18th through 20th centuries and exhibits early porcelains from Sèvres and Meissen. Exceptional ceramics, furniture, glass, and silver pieces represent both the Arts and Crafts and Art Nouveau styles of the 19th century in addition to

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the Art Deco and Bauhaus modern movements. Twentieth-century-designed pieces by Wright, Stickley, and Hoffman are also on view.

The Janos Scholz Collection of 19th-Century European Photography contains some 5,500 images of persons and places taken during the first 40 years of camera use.

Native American art focuses on early 19th-century, Plains Indian-painted war records and costumes; it also features Mimbres- and Anasazi-painted ceramics from the prehistoric Southwest.

The American Art collection has 19th-century landscapes by Durand and Inness and portraits by Eakins, Sargent, and Chase. Among highlights of the West and the Southwest regions are paintings by Higgins, Ufer, and Russell.

Traditional works of African art such as textiles, masks, and sculptures are in the collection as well.

Twentieth-century styles and movements are seen in paintings by Miro, O'Keeffe, Avery, Glackens, Pearlstein, and Scully. Modern sculptures by Barlach, Zorach, Cornell, Calder, and Rickey complement the paintings and drawings.

Croatian-American sculptor Ivan Mestrovic, who taught at Notre Dame from 1955 until his death in 1962, created many works displayed throughout campus. Major pieces can be seen in the museum, the Eck Visitors' Center, and the Basilica of the Sacred Heart.

There are ten permanent collection museum galleries open throughout the year, plus four galleries for special exhibitions such as the exhibition of art by MFA and BFA degree candidates.

The Snite Museum offers a wide range of interpretive programs including gallery talks and conversations about art, wellness programs like yoga and meditation, art-making workshops, concerts, lectures, and performances. Students can become more deeply involved in the Museum through opportunities like PhotoFutures, the student collecting group that acquires contemporary photography for the Museum; the Student Advisory Group, which helps connect the Museum to the student body; and the Gallery Teaching Program, in which undergraduate students learn to teach undergraduate classes that visit the Museum.

More information about the Museum's collections and programs is available by visiting sniteartmuseum.nd.edu.

Admission

This year we expect more than 20,000 students will apply for admission to Notre Dame's entering class. Most of the applicants will have the academic aptitude and preparation necessary to complete a degree program at the University. The Committee on Admissions will decide which applicants will be

among the 2,000 included in the class. To understand how this is done, it is first necessary to know the procedure for applying to Notre Dame.

ACADEMIC PREPARATION

Most applicants will have taken and successfully completed the most challenging program of studies available in their high schools. We strongly recommend a curriculum including four years each of English, mathematics, science, history, and foreign language.

All successful applicants are admitted to the First Year of Studies. However, entrance requirements differ slightly for students planning to pursue studies in science and engineering. Sixteen units are required of all students as described below.

For students intending to choose a major in the College of Arts and Letters or the Mendoza College of Business, *excluding* the Arts and Letters Prehealth or Neuroscience and Behavior program and the combined Arts and Letters/Engineering program, the 16 units must be distributed as follows:

English	4
Algebra, advanced algebra, trigonometry, and geometry	3
Foreign language	2
History	2
Science	2
Additional English, mathematics, science, history, social studies, and language courses	3

For students intending to major in the College of Science, the College of Engineering, the School of Architecture, the Arts and Letters Prehealth or Neuroscience and Behavior program or the combined Arts and Letters/Engineering program, the distribution must be:

English	4
Algebra, advanced algebra, trigonometry, and geometry	3
Advanced mathematics (calculus or precalculus)	1
Foreign language	2
History	2
Chemistry	1
Physics	1
Additional English, mathematics, science, history, social studies, and language courses	2

The unit is the credit for a year of satisfactory work in an accredited secondary school. The two language units required must be in the same language. In some cases, the Committee on Admissions waives the foreign-language requirement.

APPLICATION PROCESS

First-year students are admitted to the University of Notre Dame for *only the fall semester* of each academic year. A student who wishes to be considered must have the following items on file: (1)

a completed application, (2) an official high school transcript, (3) a letter of evaluation from a secondary school teacher and (4) an official report of scores on the SAT or ACT.

Application. The application is a student's opportunity to tell the Office of Undergraduate Admissions about him or herself. Applicants are advised to include any information about their personal and academic circumstances that may give the Committee on Admissions a more holistic view of their attributes.

The University of Notre Dame is a member of the Common Application and the Coalition Application. Prospective first-year students can access the online application and writing supplement at www.commonapp.org or www.coalitionforcollege-access.org, and may register for an account beginning August 1.

High School Transcript. Your high school must submit an official copy of your transcript, including a listing of your senior-year courses.

Evaluation. The Office of Undergraduate Admissions requires two letters of evaluation from every applicant. We do not encourage additional letters of recommendation. Your guidance counselor will complete a counselor evaluation, which helps us gauge your performance in your high school environment. Usually guidance counselors will include a short personal letter of evaluation. It will assess your performance in class as well as your character and personality. You may choose any high school teacher to write your letter of evaluation, as long as he or she has taught you in an academic subject area (math, science, English, social science, or foreign language) and knows you well.

Testing. All applicants are required to take the SAT or ACT. The test results are part of the evaluation process for admission. You must take one of these tests no later than January of your senior year.

The College Board code for the University of Notre Dame is 1841, and the ACT code for Notre Dame is 1252.

If you have taken other standardized tests (SAT Subject Tests, AP, IB, TOEFL), please include the results with your application. We will use these scores as supplementary information, although they cannot be used in place of the SAT or ACT.

Anyone who wishes to continue the study of French, German, Italian, or Spanish at Notre Dame can take the SAT Subject Test in that language. The results will be used for placement purposes.

Students enrolled in home-school programs or in high school programs that substitute certification of competencies for grades must take three SAT Subject Tests: science, history, and foreign language.

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DECISION AND NOTIFICATION PLANS

Students seeking admission to Notre Dame's entering class must choose to have their applications reviewed under one of two procedures.

Restrictive Early Action: November 1

Notre Dame has a Restrictive Early Action program.

- A student applying Restrictive Early Action to Notre Dame may apply to other Early Action programs.
- A student applying Restrictive Early Action *may not* apply to any college or university that has a binding Early Decision program.
- Students do not indicate a first-choice preference by applying early, and still may wait until May 1 to indicate their decision to attend.

Students who apply in the Restrictive Early Action process receive an admissions decision before Christmas. Three decisions are possible:

- Admission to the University
- Denial of admission to the University
- Deferral of decision until Regular Decision

Students admitted to Notre Dame have until the May 1 deadline to decide whether they would like to confirm their attendance at the University. If a student is denied admissions in Early Action, then the process ends and he/she cannot apply later during the Regular Decision process. If a student is deferred, the Admissions Committee has decided to review the application further in the Regular Action process, and so "rolls over" the application to Regular Decision.

Because the Admissions Committee is unable to extend all of its offers of admission in the Restrictive Early Action process, it is highly conservative when making Early Action admission decisions. The Admissions Committee advises students to apply in the Restrictive Early Action process only if they are in the very top ranges of our applicant pool. Further clarification of Restrictive Early Action standards for this year can be gained by seeing the Admissions Counselor who may travel near your area in the autumn or by contacting the Office of Undergraduate Admissions at admissions@nd.edu.

Regular Decision: January 1

The Regular Decision process at Notre Dame is also non-binding. Three decisions are possible following the Regular Decision process:

- Admission to the University
- Denial of Admission to the University
- Waitlist

Students will receive one of these decisions by the beginning of April and, if admitted, are required to send in a confirmation card and deposit by May 1. Students who are denied admission to the University may choose to attend another four year institution for one or two years and then apply to Notre Dame as a transfer student.

Waiting List. Some applicants will be notified that they have been placed on a waiting list and will receive a final decision during the period of mid-May

to mid-June. If placed on the waiting list, you should make plans to attend another institution because we cannot predict how many applicants will gain admission from the waiting list in a given year. Students admitted from the waiting list have two weeks to submit a \$500 advance payment, confirming their intention to enroll in the first-year class.

The Campus Visit. We welcome visits from prospective applicants. Our staff members meet with groups of students and parents to discuss admissions policies and procedures, degree programs, student life, financial aid, and other topics of interest.

Information Sessions are available from March through early December. Information Sessions for Saturday morning are available from early September to late April. Register online at least two weeks in advance of your visit. Campus Tours are available following Information Sessions when classes are in session and on most weekdays of the summer. Information Sessions and Campus Tours may be scheduled online at admissions.nd.edu/visits/.

The Office of Undergraduate Admissions is closed on certain holidays and holiday weekends.

THE SELECTION PROCESS

Notre Dame seeks to enroll intelligent, inquisitive, energetic, and compassionate students who will bring a diversity of talents and backgrounds to our campus. In selecting the class, the Committee on Admissions evaluates thoroughly each applicant's personal and academic credentials.

Academic Achievement. In evaluating a student's academic achievement, the Committee on Admissions considers a student's curriculum, class rank, concentration of talent in the high school, test scores, teacher evaluation, and essays. Most students admitted to Notre Dame have taken the most demanding courses available, rank among the top students in their schools, and have done quite well on standardized tests. We could cite the average rank and median test results of our admitted students, but a listing of such numbers is often misinterpreted. Each year, some applicants with high test scores and class rank are not admitted while some students with less impressive numbers are selected for admission based on their other outstanding academic and personal accomplishments.

Personal Qualities. The lifeblood of Notre Dame resides in its people: faculty, staff, and students. Each potential student's application is studied to determine what talents, skills, and interests that person might offer Notre Dame's community. We have a strong interest in people who can make unique contributions and will share their talents with us—talents as musicians, writers, technicians, tutors, athletes, artists, volunteer workers, actors, organizers, thinkers, conversationalists, poets, or dancers. There is need in each freshman class for a variety of talents and personalities. The listing of activities, written statements, and evaluations gives us a view of the

person represented by the application. It is important to present talents and intellectual interests on the application form.

MENDOZA COLLEGE OF BUSINESS

Applicants who indicate an intent to major in business will be informed, at the time of admission, whether they are "pre-approved" to do so at the end of their first year, should that remain their goal. If they are not pre-approved, students will be advised that they will be free to enroll in any other college or school, but that the chances of being approved to major in business after the first year will be extremely limited. Such students will be advised that they should reconsider enrolling in Notre Dame if they are only interested in majoring in business. If a student who is pre-approved to major in business later decides not to do so, she or he will be free to major in any other college or school at Notre Dame.

STUDENTS WITH DISABILITIES

Each year Notre Dame admits a number of academically talented students with various disabilities. Once enrolled here, students with disabilities may use a variety of services intended to reduce the effects that a disability may have on their educational experience. Services do not lower course standards or alter essential degree requirements but instead give students an equal opportunity to demonstrate their academic abilities. Students can initiate a request for services by registering with the Sara Bea Center For Students With Disabilities (OSD) and providing information that documents his or her disability. Individual assistance is provided in selecting the services that will provide access to academic programs and facilities of the University.

OSD provides services to students with mobility, hearing, or visual impairments, as well as students with learning disabilities. The services that are typically used include alternative formats of textbooks, modifications in the way students take exams, and readers, note takers, and academic aides. The University maintains accessible rooms in nine residence halls for students with physical disabilities.

All Notre Dame students must supply the necessary initiative and determination to discover and utilize the available campus resources. Students with disabilities will find that a truly creative ability to solve daily problems may be as important to success as developing alternative skills through academic experience. We invite admitted applicants to visit Notre Dame and become familiar with the facilities here before making a final college choice.

For more information, contact the Sara Bea Center For Students With Disabilities at 574-631-7157 or 574-631-7173 (TTY).

FEES AND EXPENSES

INTERNATIONAL STUDENTS

Notre Dame welcomes students from around the world. International students enhance the cultural and intellectual atmosphere of our community.

The admissions process for international students who are not Permanent Residents of the United States differs slightly from the process for U.S. citizens. To complete an application, an international student must submit a *Certification of Finances*. This document is provided on our website: <http://financialaid.nd.edu/prospective-students/applying/international-students/>. Additionally, as English proficiency is critical to a student's academic success at the University, students who do not speak fluent English must take the Test of English as a Foreign Language (TOEFL) or IELTS. The SAT or the ACT is also required for admission. Students who have difficulty locating a test center that administers the SAT or ACT should contact the American Embassy or an American school in their area.

International students wishing to apply for our limited need-based financial assistance must complete both the *Certification of Finances* and a *CSS Foreign Student Aid Application*. Based upon a review of academic credentials, financial need, and availability of scholarship resources, a student may be considered for financial assistance. Financial aid packages may include student loans, student employment, and University scholarship assistance.

TRANSFER ADMISSION

Some students are admitted to Notre Dame with advanced standing. If you wish to apply for admission as a transfer student, you must have obtained the equivalent of at least 27 semester hours of transferable credit, and maintained a cumulative "B" average in all courses. (The competition is such that the average GPA for admitted students is significantly higher.) The committee gives strong preference to applicants who have completed Notre Dame's first-year course requirements. Online courses, distance-learning courses, USAFI courses, and credits earned through the College Level Examination Program (CLEP) are not transferable.

To be eligible for an undergraduate degree, you must complete a minimum of 50% of the degree credit hours at the University (not less than 60 credit hours) and a minimum of 75% of the degree credit hours (not less than 90 credit hours) must be earned after high school graduation through college and university courses. Please consult the Academic Code for details.

As a transfer applicant you must provide the Office of Admissions with (1) a completed application form, (2) an official transcript from each college attended along with course descriptions, (3) a final high school transcript, (4) an official SAT or ACT score, and (5) college official report.

If you are interested in transferring to Notre Dame, please note that we cannot guarantee on-campus housing to transfer students. Off-campus housing close to the University is available; students are offered campus accommodations from a waiting list if rooms become available.

You must submit your transfer application for the fall semester by March 15. The Transfer Admissions Committee will notify you of its decision between June 1 and July 1.

The deadline for the spring semester is November 1. The committee will notify you of its decision between December 1 and January 5.

The University of Notre Dame uses the Common Application for transfer applicants. An application overview and a link to the online Common Application can be found at admissions.nd.edu.

Fees and Expenses

In the undergraduate colleges, the University is essentially a residence school for full-time students. As many students as accommodations will allow are housed in the campus residence halls. First-year students are obliged to live on campus. Permission to live off campus must be obtained from the dean of students. The fees listed below are for the academic year 2018–19 and are subject to change according to factors operating within the economy that affect universities as well as the country as a whole.

Campus Resident Student. The basic fee for the academic year 2018–19 ranges from \$34,400.50 to \$34,650.50 per semester. This fee entitles the student to instruction and tuition for the semester; meals in the University dining halls; a room in a residence hall; the use of the general library and the departmental libraries; admission to many lectures, concerts, and entertainment in Washington Hall and DeBartolo Performing Arts Center; the use of the Rockne Memorial, the Joyce Center, the Smith Center for Recreational Sports, the athletic fields, and the University golf course (there is a nominal fee for the use of the golf course); a copy of each issue of the *Scholastic* (the news magazine of the University) and a copy of the *Dome* (the yearbook of the University) in the second semester.

Off-Campus Student. The tuition and fees for the full-time off-campus student is \$26,695.50 per semester for the academic year 2018–19, which entitles the student to instruction for the semester and those things listed above under the total fee for the campus resident student. For the off-campus student requiring board and lodging at the University Health Services in time of illness, there is a daily charge.

Part-Time Undergraduate Student. An undergraduate degree-seeking student **must be in full-time status each semester**. Any undergraduate student who is enrolled in at least 12 credit hours is considered **full-time**. A student who believes that

special circumstances may require him or her to carry fewer than 12 semester hours in any semester (including a senior in his or her last semester) must seek approval to be part-time from his or her respective college. This request and conversion, if approved, must be made before the sixth class day of a fall or spring semester. If permission is granted, the dean will notify the Office of Student Accounts of the change of status and an adjustment to tuition will be made if necessary. There will be no adjustment of tuition unless permission is given by the dean and the class schedule is changed before the sixth class day of the fall or spring semester.

Undergraduate Fees.

- Technology Fee: \$125 per semester.
- Health Center Access Fee: \$75 per semester.
- Student Activity Fee: \$47.50 per semester.
- Observer Fee (daily student newspaper): \$6 per semester.

The above fees do not cover the cost of textbooks, stationery, etc., which is estimated at \$1,050 per year for the average undergraduate student.

The technology fee provides partial funding for the University's enterprise-wide technology infrastructure, which provides all students access to the Internet, e-mail, courseware, campus clusters, and a wide array of the latest software. This fee provides for the growth in student services, such as course and degree requirements, Web Registration, and value-added Internet related capabilities.

The health center access fee provides students access to all services at the University Health Center and University Counseling Center, including 24-hour medical assistance and counseling/mental health assistance, alcohol and drug education programs, and health-education and wellness programs. This fee provides partial funding to address increasing student health and wellness needs, along with funding to maintain health facilities.

Student Accident and Illness Insurance Plan. To assist in financing any medical or hospital bills, a student health insurance plan is available to students. Notre Dame requires all international students to have health insurance coverage comparable to the University Plan; therefore, they are automatically enrolled and charged for the student health insurance plan.

Students who do not wish to participate in this plan, and have other comparable health insurance coverage, may submit a request to waive the health insurance. Please note that the waiver request must be submitted annually by the published deadline or the student will be responsible for paying the cost of the insurance. For information on the current insurance rates and the waiver request process, please visit the University Health Services website at <https://uhs.nd.edu/insurance-billing/>.

Information regarding the University-sponsored plan is mailed to the student's home address in July

STUDENT FINANCIAL AID

and is also available online at: <https://uhs.nd.edu/insurance-billing/>. Additional information is available in University Health Services by calling the Office of Insurance and Accounts at 574-631-1882.

The cost of the premium for the 2018–19 academic year is detailed on the University Health Service website at uhs.nd.edu.

Payment Regulations. IRISHPAY is the University's online student account billing statement and payment system available to both students and their authorized payers. Statements are generated on a monthly basis. The fall semester student account statement is issued in mid-July; the spring statement is issued in early December. These statements list basic semester charges for tuition, fees, and room and meals. Additional statements for personal charges, including bookstore, health services, laundry and other miscellaneous charges are issued on a monthly basis. All fees and required deposits are to be paid in advance of each semester.

Secure online payment may be made using eCheck through IRISHPAY. Remittance should be made payable to the University of Notre Dame. The University does not accept credit card payments. Notre Dame students taking certain courses at Saint Mary's College that carry special fees will be billed for such charges according to Saint Mary's rates.

Separation Regulation. Any graduate, law, graduate business*, or undergraduate student who at any time within the school year wishes to separate from the University should contact the Office of the Registrar. To avoid failure in all classes for the semester and to receive any financial adjustment, the separating student must obtain the appropriate clearance from the dean of his or her college and from the Office of Student Affairs.

If the separation date is prior to the first day of classes, a full tuition credit will be made to the student's University account. If the separation date is on or after the first day of classes and before the last day for course discontinuance at the University, the tuition fee is subject to a prorated adjustment/credit, as explained below. In the special circumstance that a student is forced to separate for military service or separates because of protracted illness, the University will grant a financial credit to the student's University account for that portion of tuition charged for the semester in which he or she separated and did not receive academic credit, even if the separation occurs after the last day for course discontinuance.

Students receiving University and/or Federal Title IV financial assistance who separate from the University within the first sixty percent (60%) of the semester are not entitled to the use or benefit of University and/or Federal Title IV funds beyond their separation date. Such funds shall be returned promptly to the entity that issued them, on a pro rata basis, and the return of such funds to the issuing entity will be reflected on the student's University account. When

a student separates from the University after the first sixty percent (60%) of the semester, the student is entitled to the full benefit of the University and/or Federal Title IV funds awarded to him/her and no such funds are required to be returned to the issuing entity.

In order to determine the percentage of a semester that has been completed, count the number of days completed up to, and including, the separation date and then divide that number by the total days in the semester. (Any break of five days or more (e.g., Fall Break, Spring Break) is not counted as part of the days in the term.) The resultant percentage is the percentage of a semester that has been completed and also reflects the percentage of University and/or Federal Title IV aid earned by the student. The Academic Calendar posted on the Registrar's website is the authoritative source for counting total and completed semester days for the purpose of this calculation.

When Federal Title IV funds must be returned because the student has not completed more than 60% of the semester, the amount that must be returned is based on the percentage of the student's Federal Title IV aid that is unearned, as determined using the following formula:

- Federal Title IV aid to be returned = (100% minus the percentage of Federal Title IV aid earned by the student), multiplied by the total amount of Federal Title IV aid that could have been disbursed to the student during the semester if the student did not separate.

If a student earned less Federal Title IV aid than was disbursed as of the separation date, the University would be required to return a portion of the funds. Once Federal Title IV aid funds are returned by the University to the relevant federal program, the student borrower may have a remaining balance due to the University. A letter of explanation which specifies the amount owed and an updated statement are sent to the parent or student.

If a student earned more Federal Title IV aid than was disbursed to him/her by the University as of the separation date, the University would owe the student a post-withdrawal disbursement, which must be paid within 180 days of the student's separation date. A letter of explanation about the disbursement of funds due to the student and an updated statement is sent to the parent or student.

This Separation Regulation may change subject to federal regulations.

Room and meal charges will be adjusted/credited on a prorated basis throughout the entire semester.

Monthly Payment Plan. The University makes available a monthly payment plan administered by Cashnet. This plan allows families to make payments over a 9- or 10-month period rather than make two larger payments, one at the beginning of each semester.

The annual fee to enroll in the program is \$40. For additional information or to enroll in the plan, call Cashnet toll-free at 877-821-0625 or visit studentaccounts.nd.edu/payments.

Student Financial Aid

The Office of Student Financial Services, which includes the Offices of Financial Aid, Student Accounts, and Student Employment, administers all student financial aid programs.

Principles. Notre Dame subscribes to the principles of student financial aid administration as endorsed by the CSS/Financial Assistance Assembly of the College Board and the National Association of Student Financial Aid Administrators. Notre Dame, along with the hundreds of other institutions, states, and organizations that follow these principles, includes demonstrated financial need as a criterion in awarding financial aid. In addition to a student's academic and personal credentials, financial need is an essential factor in the awarding of the University's scholarship/grant programs.

Cost of Attendance. The estimated average 2018–2019 Notre Dame undergraduate student expense budget includes:

Direct Costs	
Tuition and Fees	\$53,391
Room & Meals*	15,410
Total	\$68,801

In addition to the direct costs listed above, each student should plan for the cost of books, supplies, transportation, and personal expenses. Annual increases in costs should be anticipated. Further details may be obtained from the Office of Financial Aid website.

**Typical residence hall accommodations provide for housing with one or more roommates. The current cost of a single room (no roommate) is approximately \$500 more annually.*

Family Responsibility. The University assumes parents will contribute to their children's education to the extent they are capable as long as the student is enrolled as an undergraduate. Notre Dame cannot accept financial responsibility for students whose parents discontinue this support for reasons other than ability to pay. It is important to note that the *family* includes both the parents *and* the student. Students seeking financial aid will be expected to contribute toward their educational expenses. This self-help may include resources from a portion of their own assets, as well as earnings resulting from work prior to and during their enrollment at Notre Dame. In a very real sense, students who borrow also contribute to their costs from their future earnings.

Financial Need. Financial need is the difference between the estimated cost of attendance for the school year and the estimated family responsibility. Because several factors in this evaluation are subject

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to change from one year to the next, this evaluation is made annually for each student who applies for financial aid.

Notre Dame is committed to offering financial aid that is designed to meet the demonstrated financial need of a student through our need-based aid programs. In most cases this may include opportunities for scholarships, loans, and/or work. The total financial aid received by a student may not exceed the total cost of attendance.

Financial Aid Application Process. The CSS Profile Application and the Free Application for Federal Student Aid (FAFSA) serve as the official applications for need-based financial aid, including University and club scholarship programs. Unless otherwise noted, additional applications are not required to be considered for all scholarship/grant programs the Office of Financial Aid administers.

A student should not wait for an admission decision before submitting the FAFSA and Profile. Applications for financial aid must be properly filed every year.

The FAFSA is available at fafsa.gov and should be filed according to the priority dates on the Office of Financial Aid website. The federal school code for identifying Notre Dame on the FAFSA is 001840.

The Profile is available at collegeboard.org and should be filed according to the priority dates on the Office of Financial Aid website. The Profile is required for University need-based scholarship consideration. Notre Dame's CSS code for the Profile is 1841. Profile students should complete the CSS Profile only.

If a student's parents are divorced or separated, the noncustodial parent must submit the CSS Noncustodial Profile application. The College Board will collect the noncustodial parent's information through an online process; details will be emailed to applicants by the College Board immediately following receipt of the Profile from the custodial parent.

Verification. Federal regulation requires the University to verify and document certain information provided by students and their families in relation to an application for assistance. The Office of Financial Aid reserves the right to request additional documentation and/or clarification of a family's financial situation. Additional information is available on the Office of Financial Aid website.

International Students. Financial aid opportunities for first-year international students are limited and there is no funding to assist international transfer students. International students should be prepared to finance, either privately or through a sponsor, the full cost of their Notre Dame education. The International Student Certification of Finances must be submitted at the time of application for admission, illustrating and documenting sufficient financial support to meet the projected cost of a Notre Dame undergraduate education. The

International Student Certification of Finances is available from the Office of Undergraduate Admissions website at admissions.nd.edu.

Prospective first-year students wishing to be considered for need-based financial assistance must first complete an International Certification of Finances along with a CSS Profile adapted for international students. Based upon a review of academic qualifications, financial need, and availability of student aid resources, an applicant may be considered for financial assistance, including a self-help component of a student loan and student employment, along with University scholarship assistance. The Certification of Finances and the CSS Profile will be reviewed along with the student's application for admission. Additional information is available on the Office of Admissions website.

FINANCIAL AID PROGRAMS

There are numerous types of financial aid opportunities for students. The process outlined above is that which the student follows for *all* aid programs administered by the University's Office of Financial Aid.

Most aid programs will fall into one of three categories of assistance: scholarships/grants, student employment, or loans.

SCHOLARSHIPS/GRANTS

Scholarship/grant assistance is a type of aid that is free of repayment obligation.

Merit Scholarships. Notre Dame offers a limited number of merit scholarships to students accepted for admission as a first-time incoming freshman. Recipients demonstrate exceptional accomplishment, leadership, commitment to service, and intellectual promise. Typically, these scholarships are renewable for four years and recipients may be invited to participate in leadership development and enrichment opportunities as an additional benefit of their awards.

Notre Dame Scholarships. All students accepted for admission, who have completed the financial aid process as outlined above, are automatically considered for University scholarships. The level of University assistance is first based on demonstrated financial need, and then academic performance, and will thus vary from student to student.

Renewal of University scholarship assistance is based upon a review of students' academic performance at the University and their annually demonstrated financial need. Based on the students' admitted class level, University scholarship consideration is given for a maximum of eight semesters (10 semesters for the Architecture program and combination five-year engineering program with the College of Arts and Letters). Students electing to remain at Notre Dame to pursue a second major, second degree, or

dual-degree program are not eligible for University scholarships.

Students not receiving scholarship/grant assistance may be considered in subsequent years based on financial need, academic performance, and the availability of University scholarship resources.

Notre Dame Club Scholarships. All applicants who complete the FAFSA and the CSS Profile are considered for club scholarships. Students will be advised by participating clubs if any additional steps (e.g., interview, essay) might be required by the local club.

Similar to University scholarships, club scholarships are awarded on the basis of demonstrated financial need. Since Notre Dame meets the demonstrated financial need of the student, the receipt of any club scholarship not listed in the Financial Aid Notification (FAN) will likely result in an adjustment to the financial aid award.

Federal Pell Grant. The Pell Grant is a nonrepayable grant made available by the federal government to eligible undergraduate students enrolled in a degree-granting program.

Notre Dame cooperates with the U.S. Department of Education in administering this program. Applicants must be U.S. citizens or permanent residents of the United States.

The FAFSA serves as the application for the Pell program. Eligibility is determined by the Federal Methodology formula uniformly applied to all applicants.

Federal SEO Grant. The Federal Supplemental Opportunity Grant (SEOG) assists students demonstrating exceptional financial need in accordance with guidelines and funding allocations established by the Department of Education and the Office of Financial Aid.

State Scholarships and Grants. The states that currently award scholarship/grant assistance to Notre Dame students are Indiana, Rhode Island, and Vermont.

Reserve Officer Training Corps (ROTC). Air Force, Army, and Naval (Navy & Marine Corps) ROTC scholarships are available on a competitive basis, and the military services award them based on merit and personal qualifications. ROTC scholarships may be awarded up to the full cost of tuition, books, and fees, plus an in-school subsistence. Students should apply during the fall semester of their high school senior year. Students who do not receive an ROTC scholarship as incoming first-year students may compete for a limited number of on-campus scholarships available to ROTC midshipmen or cadets. Further information is available through high school guidance offices, military recruiting offices, and the ROTC Departments of the University.

Veterans Educational Benefits. Veterans' benefits are approved by the Indiana State Approving Agency.

STANDARDS OF PROGRESS FOR RECIPIENTS OF FINANCIAL AID

Students who qualify to use educational benefits can find information on the certification process on the Office of the Registrar's website, https://registrar.nd.edu/students/veteran_affairs.php. Please note that due to the recent passing of the Harry W. Colmery Veterans Educational Assistance Act (Forever GI Bill), the monthly housing allowance will now be determined based on the physical location (zip code) where students attend the majority of their courses. This is particularly relevant for students who participate in internships, externships, student teaching, and practicums. Students participating in a Notre Dame study abroad program will receive the standard housing rate for a foreign institution. For specific information on how this will affect your VA educational benefits or housing rates, please contact the Primary School Certifying Official in the Office of the Registrar, 300 Grace Hall.

Other Federal Assistance Benefits. Certain students may be eligible for special forms of federal agency benefits. Among these agencies are Americorps, the Veterans Administration, the Office of Vocational Rehabilitation, and the Bureau of Indian Affairs. Further details may be obtained through the appropriate local office of the particular agency.

Private Scholarships. Many private organizations provide financial assistance to Notre Dame students. Scholarship information may be obtained by contacting civic, professional, religious and other community organizations. The College Board's Scholarship Search and fastweb.com provide scholarship search information. Caution is advised with respect to the use of fee-based scholarship search enterprises.

STUDENT EMPLOYMENT

Part-time employment opportunities, including those offered through the need-based federal work-study and paid community service programs, as well as other programs, are intended to help the student pay for personal and other related educational expenses.

The amount of employment eligibility indicated in the FAN is an estimate of potential earnings and not a guarantee of employment or earnings. Student employees average 10–12 hours of work per week.

LOANS

Borrowing a student loan is a matter that should be undertaken with the greatest of deliberation and with full knowledge of the responsibilities involved. In addition, all borrowers are advised of their loan repayment options and obligation upon entering and leaving the University. In an effort to provide additional information regarding a borrower's rights and responsibilities, the Office of Financial Aid offers general counseling to all borrowers.

Federal Direct Student Loan Program. Direct Loans, from the William D. Ford Federal Direct

Loan Program, are low-interest rate loans available to eligible students to help offset the cost of higher education. The lender is the U.S. Department of Education. The Direct Loan Program includes the subsidized and unsubsidized loans. For additional information on the terms and conditions of Direct Loans visit studentloans.gov.

Notre Dame Subsidized Loan. The Notre Dame Subsidized Loan is a need-based loan offered to students who demonstrate financial need. Additional information is available on the financial aid website.

Private Loans. After exhausting the opportunities available from the federal aid programs, many students will consider private loan programs as a source of funding. The terms and conditions of these programs vary, and as such, students are encouraged to review the details of the programs before selecting a private loan program. Additional information may be obtained from the Office of Financial Aid or its website.

OTHER

Monthly Payment Plan. The University makes available a monthly payment plan administered by Cashnet. This plan allows families to make payments over a 9- or 10-month period rather than make two larger payments, one at the beginning of each semester.

The annual fee to enroll in the program is \$40.

Federal Direct PLUS. Parents of dependent students who have a valid FAFSA on file and whose student is enrolled at least half-time may apply for the Direct PLUS Loan. The parent must be a U.S. citizen or permanent resident. Direct PLUS Loan applications are subject to Department of Education credit review. For additional information on the terms and conditions of Direct Loans visit studentloans.gov.

Note: program is subject to federal legislative changes.

Standards of Progress for Recipients of Financial Aid

The United States Department of Education requires students to maintain satisfactory progress toward completing their degree in order to receive financial aid. Recipients of federal, state, institutional and private resources, including grants, scholarships, work-study, and student and parent loans, are subject to these standards. *Satisfactory academic progress requirements for financial aid recipients are not the same as the University's requirements for academic good standing.*

Satisfactory academic progress is reviewed annually after spring grades are posted by the Registrar's Office to determine financial aid eligibility for the subsequent summer and academic year. Students returning to the University following a withdrawal or dismissal will be evaluated at the time of readmission.

Students are required to maintain the minimum cumulative grade point average, be on pace to graduate and complete their degree within a maximum time frame as defined below. All semesters of enrollment are reviewed regardless of whether aid was received for those semesters.

Minimum Cumulative Grade Point Average (GPA)

Students are required to meet the following minimum cumulative GPA requirements:

Classification	Minimum Cumulative GPA
First Year Freshmen	1.75
Upperclass Students	2.0

Pace to Graduate

Students are required to earn a minimum of 67% of cumulative hours attempted to stay on pace to graduate. Pace is calculated by dividing the cumulative number of hours earned by the cumulative number of hours attempted (this includes dropped classes).

Maximum Time Frame

Students are required to complete their degree requirements within a maximum time. Based on an undergraduate student's admitted class level, University scholarship consideration is given for a *maximum of eight semesters* (ten semesters for the architecture program and combination five-year engineering program with the College of Arts and Letters). Students needing additional time to complete their degree requirements due to a change in major, second major, dual degree or retaking coursework are not eligible for University scholarship.

Students may receive federal aid consideration for a maximum time frame measured by attempted credit

CENTER FOR SOCIAL CONCERNS

hours equal to 150% of the published length of their degree program. Once a student reaches his/her total maximum time frame, or it has been determined he/she cannot complete their degree within this time frame, they are no longer eligible to receive federal aid.

Credits and Grades Used to Determine Pace and Maximum Time Frame

All coursework attempted, including repeated and withdrawn coursework recorded on the student's academic record as of the seventh class day, is considered when calculating pace and maximum time frame and determining whether the student meets satisfactory academic progress.

<i>Course/Grade</i>	<i>Included in Earned Credits</i>	<i>Included in Attempted Credits</i>
AP (Advance Placement) Credits	X	X
Credit by Exam	X	X
Transfer Credits	X	X
Grades: A,A-,B+,B-, C+,C,C-,D,B,S	X	X
Grades: F,F*,I,NR,U,V,W,X		X
Withdrawn courses after seventh class day		X

The University's Grade Scale is available through the Office of the Registrar.

Failure to Maintain Satisfactory Academic Progress

Failure to maintain one or more of the requirements outlined above will result in financial aid ineligibility. Students will be notified via University email of their failure to meet satisfactory academic progress requirements and subsequent aid suspension.

Students can regain their financial aid eligibility once they have raised their cumulative GPA to 2.00 and have earned hours to put them back on pace to graduate (earned 67% of cumulative hours attempted) within the maximum time frame. Students can also regain financial aid eligibility if they have an appeal approved based on the process below.

Appeal Process

At the time of notification regarding failure to meet satisfactory academic progress requirements, the student will typically have 10 days to submit a written appeal outlining mitigating circumstances. The appeal letter should include the following:

- Mitigating circumstances that prevented the student from meeting the requirements of academic progress (e.g. death in the family, student illness or injury, other personal circumstances). Mitigating

circumstances do not include: withdrawing from classes to avoid failing grades, pursuing a second major or degree, etc.

- Documentation that supports the student's basis for the appeal
- Steps the student has taken/will take to ensure future academic success
- Anticipated graduation date
- If it is not possible for the student to achieve satisfactory academic progress with one successful probationary semester, the student must also submit an academic plan signed by their academic advisor. This plan should outline the student's academic goals for each semester (e.g. number of credit hours and cumulative GPA) that will enable the student to meet the requirements of academic progress at a specified future point in time.

Upon receipt of all completed appeal materials, the student will be considered for a probationary semester of financial aid in order to reestablish satisfactory academic progress. Students whose appeal is approved will be placed on financial aid probation. Academic progress will be evaluated at the conclusion of each enrolled term for students on financial aid probation.

Students who fail to meet the requirements for academic progress for their probationary semester or do not complete the requirements of their academic plan will again be ineligible for financial aid and subject to the appeal process.

Students who meet the requirements for academic progress for their probationary semester will resume good standing and again be evaluated at the conclusion of the following spring semester.

Denied Appeals/Students Who Choose Not to Appeal

If an appeal is denied, they will be notified via University email and remain ineligible for financial assistance until satisfactory academic progress is reestablished. Appeals typically will not be accepted after 10 days and the student will be responsible for all charges on their University account. Financial aid will not be provided retroactively.

Center for Social Concerns

The Center for Social Concerns brings students, faculty, and community partners together to address community needs through analysis and reflection that leads to ethical action and social relationship. Its extensive domestic and international programming provides students with opportunities for community-based learning, community-based research, and service addressing issues of poverty and injustice.

- Students examine social, moral, and ethical issues from various perspectives through the lens of Catholic Social Teaching.
- The Center supports two Arts and Letters minors: the Poverty Studies Interdisciplinary Minor (PSIM) and the Catholic Social Tradition minor (CST). Many of the Center's courses fulfill requirements for these minors.
- The Center offers three types of courses: social concerns seminars (1 credit), summer service-learning projects (3–4 credits), and community-based learning courses across the disciplines (3 credits). All courses can be found using the class search (ZCSC) course attribute filter.
- The Center welcomes applicants for its yearlong Rev. Don McNeill, C.S.C., Leadership Fellows Program.
- Students interested in community-based research work with faculty and community partners, as part of an existing course, an internship, a senior thesis, or special studies class on a research project that aims to generate social action and social change.
- The Center offers programs and seminars for senior transitions and career discernment (10 percent of seniors enter a year or more of full-time service or civic engagement following graduation).
- The Center leads and cosponsors justice education events, workshops, and panel discussions with campus partners.
- The Center partners with over 100 social service and advocacy organizations worldwide to offer students diverse learning opportunities.
- Visit the Center for Social Concerns at <http://socialconcerns.nd.edu/>

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Center for Social Concerns*. Course descriptions can be found by clicking on the subject code and course number in the search results.

RESERVE OFFICERS TRAINING CORPS PROGRAMS

Reserve Officers Training Corps Programs

The University of Notre Dame offers the opportunity to combine the pursuit of an academic degree with earning an officer's commission in either the United States Army, Navy, Marine Corps, or Air Force. Students enrolled in any of the colleges of the University may participate in the Reserve Officers Training Corps (ROTC). Selection of courses in the student's academic major is independent of those selected for ROTC.

The College of Arts and Letters and the College of Business Administration accept a maximum of 12 free elective credits from the 30000- and 40000-level military sciences only. Credit from the 10000- and 20000-level courses does not count toward the degree requirements and must be subtracted from the total number of degree credits listed on the transcript.

In the College of Engineering, ROTC students who complete the ROTC program are permitted a maximum of six credits of upper-level air, military or naval science as substitutes for specified degree requirements determined by the department. Not more than three credits may be substituted for history or social science. All air, military or naval science credits not so substituted are not credited toward degree requirements in programs.

In the School of Architecture, ROTC students are permitted a maximum of six credits of 40000-level air, military or naval science courses as substitutes for electives within the 163 credit hours required for the bachelor of architecture degree.

The College of Science will count a maximum of six credit hours of upper-level (30000- or 40000-level) ROTC courses toward the 124-credit-hour requirements. These courses will be counted as free electives.

MILITARY SCIENCE

Chair and Professor:

Lieutenant Colonel George P. Lachicotte III
Commandant of Cadets:

Master Sergeant Mark V. Lavender

Assistant Professors:

Captain Timothy K. Wilson

Captain Matthew T. Wheeler

Instructors:

Master Sergeant Peter A. Bracket

As one of the premier Army ROTC programs in the country, the department's mission is to educate, train, develop, and inspire participants to become officers and leaders of character for the U.S. Army and the nation. The program does this through a combination of classroom instruction, leadership labs, and experiential learning opportunities focused on developing the mind, body, and spirit of participants. These opportunities are designed specifically to enhance character and leadership ability in the Cadets and to allow them to practice the essential

components of leadership: influencing, acting, and improving. Participants become members of the Fighting Irish Cadet Battalion and complete a planned and managed sequence of classroom courses and practical exercises intended to develop each participant into what an officer must be—a leader of character, a leader with presence, and a leader of intelligence—to enable them to reach their full potential as individuals and as effective leaders of groups. The program affords students an excellent opportunity to serve and focuses on the role of Army officers in the preservation of peace and national security, with particular emphasis placed on ethical conduct and the officer's responsibility to society to lead, develop themselves and others, and achieve success. The experience culminates ideally with participants earning commissions as second lieutenants in the Active Army, Army Reserve, or Army National Guard. As an organization committed to lifelong learning, participants may elect to pursue one of the Army's numerous opportunities for follow-on postgraduate study as well.

Student Awards and Prizes.

The Dixon Award. Named in memory of an alumnus of the Notre Dame Army ROTC program, annually recognizes an outstanding senior who has exemplified the highest professionalism, dedication, and service to the Fighting Irish Battalion.

George C. Marshall Award. An award given annually to the top Cadets in Cadet Command. Winners participate in a national seminar with some of the nation's highest ranking leaders in Washington, D.C.

Commander's Award. A U.S. Army saber presented to the two Cadet Battalion Commanders in the Notre Dame Army ROTC program.

The Haley Award. Named in memory of an alumnus of the Notre Dame Army ROTC program, a wristwatch is presented annually to the Cadet who displays the Notre Dame Ethos of "God, Country, Notre Dame" and serves as a mentor for the junior Cadets in the program.

The McKee Award. Named in honor of an alumnus of the Notre Dame Army ROTC program, a U.S. Army saber is presented annually to an outstanding member of the Army ROTC Club.

The Brooks Award. Named in memory of a student and contributor to Notre Dame Army ROTC program, a commemorative plaque and knife is presented annually to an outstanding member of the Irish Rangers.

The Jordan Exemplar Award. Named in honor of a contributor to Notre Dame Army ROTC program, a U.S. Army saber is presented each year to an outstanding member of the Fighting Irish Battalion who best exemplifies the qualities of scholarship, leadership, and piety.

Numerous other awards are presented annually by various local and national organizations to recognize excellence in academic achievement and military aptitude.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Military Science (Army ROTC)*. Course descriptions can be found by clicking on the subject code and course number in the search results.

NAVAL SCIENCE

Chair and Professor:

CAPT Mark Prokopius, USN

Associate Professor:

CDR Charles Dittbenner II, USN

Assistant Professors:

Capt Matthew Brockelmeyer, USMC

LT Thomas Verbeeck III, USN

LT Brian VanMetre, USN

LT Brett Williams, USN

LT Mark Livengood, USN

The mission of NROTC is to educate, train, and screen officer candidates to ensure they possess the moral, intellectual, and physical qualities for commissioning and the leadership potential to serve successfully as company grade officers in the U.S. Navy and Marine Corps. The NROTC Scholarship Program fills a vital need in preparing mature young men and women for leadership and management positions in an increasingly technical Navy and Marine Corps.

Non-NROTC students should consult with their college dean or advisor to determine if a Naval Science course will count toward graduation.

Additional NROTC Curriculum Requirements.

In addition to the Naval Science requirements, NROTC scholarship students are required to complete other specified university courses. These additional requirements are taken as a part of the student's field of study or as degree electives, depending upon the college in which enrolled. Students will be notified of such requirements prior to joining the NROTC Program.

Student Organizations and Activities. All NROTC students are integrated into the Midshipman Battalion organization. In addition to participation in all other university organizations and activities for which eligible, NROTC students may participate in specific NROTC organizations and activities such as the Color Guard, intramural athletic teams, the NROTC Unit newspaper and yearbook, and the planning of the Naval Leadership Weekend national conference.

Student Awards and Prizes.

The Chief of Naval Operations Distinguished Graduate Award. The annual recognition of the top graduating midshipman.

The Edward Easby-Smith Award. A sword is awarded to one of the top graduating Navy or Marine Option Midshipmen who exemplified the characteristics of a

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naval officer while filling one of the senior midshipman staff positions during the past year.

The 1st LT. Vincent J. Naimoli, USMC Award. A sword is awarded to one of the top graduating Navy or Marine Option Midshipmen demonstrating 110 percent dedication and effort in academic achievement, student activities, and leadership.

The George C. Strake Award. A sword is awarded to the top graduating Navy Option Midshipman for his or her dedication, leadership, esprit, and positive attitude throughout the four years at Notre Dame.

The Colonel Brian C. Regan, USMCR Award. A sword is awarded to the top graduating Marine Option Midshipman for his or her superior leadership and esprit de corps throughout the four years at Notre Dame.

Gallagher-Snyder Award. A sword is awarded to a first class Navy or Marine Option Midshipman who displayed outstanding academic achievement, superior military bearing, and exceptional leadership and physical fitness throughout their four years at Notre Dame.

Numerous other awards are presented annually by various professional and patriotic organizations to recognize excellence in academic achievement and military aptitude.

COURSE DESCRIPTIONS

NROTC students take a total of 22 credits of Naval Science, one course one each semester. All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Naval Science (ROTC)*. Course descriptions can be found by clicking on the subject code and course number in the search results.

AEROSPACE STUDIES

Chair and Professor:

Colonel James E. Bowen, Jr., USAF

Assistant Professors:

Lieutenant Colonel Travis J. Brabec, USAF

Major James E. Thompson III, USAF

Captain Meaghan E. Balser, USAF

The Air Force Reserve Officer Training Corps (AFROTC) Detachment 225 is a premier educational and training program designed to give men and women the opportunity to become world-class leaders as Air Force officers while completing an undergraduate four-year academic degree. The AFROTC Program develops leadership and management skills students need to become effective and trusted leaders in the 21st century. In return for challenging and rewarding efforts, we offer the opportunity for advancement, education and training, and a sense of pride that comes from serving in the United States Air Force. Upon completion of the Air Force ROTC program students are

commissioned as second lieutenants in the United States Air Force. Following commissioning there are excellent opportunities for additional education in a wide variety of academic fields.

Student Organizations and Activities. All Air Force ROTC cadets are given opportunities to participate in a variety of extracurricular activities to develop their leadership skills. Activities available for AFROTC cadets include the Arnold Air Society (AAS), oriented toward service to the local community, AFROTC Career Day, Veterans Day Vigil, Junior Parents weekend, annual Flying Irish Basketball Tournament, intramural and varsity athletics, University bands and cheerleading activities as well as the Honor Guard. The Honor Guard performs at campus and community functions while developing individual drill proficiency. Foreign language programs, engineering programs, and cultural leadership studies are occasionally available during the summer.

Student Awards and Prizes.

The Notre Dame Air Force Award, and Air Force officer's sword, are presented to the top graduating senior in Air Force ROTC.

The Noël Dubé Award is presented to the senior class Arnold Air Society member who has contributed the most to furthering the ideals and goals of the society within the University and local community.

The Paul Robérge Award, named in memory of an alumnus of the Notre Dame ROTC program, annually recognizes the top pilot candidate in the Professional Officer's course.

Other awards are sponsored by various local and national organizations to recognize excellence within the cadet corps.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Air Force-Aerospace Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

** Leadership Laboratory is open to students who are members of ROTC or who are eligible to pursue a commission as determined by the professor of Aerospace Studies.*

Study Abroad

Notre Dame International's Study Abroad offers over 50 study abroad programs in more than 20 countries during both the academic year and summer.

For over 50 years, Notre Dame has made it possible for students to earn credits toward graduation by participating in study abroad programs. Study in another tradition, direct personal experience of another language and culture, and travel all broaden and deepen the liberal education of the whole person to which the University has always been committed. Study abroad programs are one of the many opportunities open to students seeking an international experience that will complement their study plan.

Without delaying graduation, international experiences make a unique contribution to the excellence of liberal education in the undergraduate colleges and frequently have proved an asset in career development. Students earn Notre Dame credit for courses taken in Notre Dame programs and their grades are included in the Notre Dame GPA.

During the semester abroad, students are expected to carry a course load of 15 credits. Some courses taught abroad fulfill core University requirements such as fine arts, history, literature, philosophy, social science, or theology. For major credit in any college department, students must consult with departmental advisors. Course descriptions for hundreds of courses taught in the listed programs are available on the Study Abroad website under *Courses Abroad* and also through *Class Search* on the Registrar's website.

Qualified students from all undergraduate colleges may apply to spend a semester or a year abroad in one of our study abroad programs. Participation is typically during the junior year, but some programs are designed to accommodate sophomores as well.

Admission into many of the programs can be quite competitive and students are encouraged to apply to more than one program. Offers of admission are made in accordance with program requirements, at the discretion of the Study Abroad staff in consultation with faculty and staff of the University.

Students considering more than a single semester or academic year program should carefully review their majors and minors to ensure that such study does not delay the completion of graduation requirements. Students who have previously participated in or been selected for a study abroad program may receive a lower priority in the selection process of a second program. Participation in a summer study abroad program does not affect a student's application to a semester or yearlong program.

Study abroad programs may sometimes be cancelled due to circumstances beyond the control of the University.

Students are eligible to apply for a leave of absence through their college for study in a program offered

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by another college or university. *They may not, however, take a leave of absence to attend international programs at sites (schools) where Notre Dame offers its own study abroad programs.*

ACADEMIC YEAR PROGRAMS

Notre Dame offers semester and yearlong study abroad programs around the world. In Europe, students may apply to go to Copenhagen, Denmark; Angers or Paris, France; Berlin or Heidelberg, Germany; Athens, Greece; Budapest, Hungary; Dublin or Galway, Ireland; Bologna or Rome, Italy; Alcoy or Toledo, Spain; Geneva, Switzerland; or London, Norwich, St Andrews, or Oxford, United Kingdom.

For a Latin American experience, undergraduates can study in Santiago, Chile, or Puebla, Mexico.

In Africa, the Middle East and Eastern Europe, students also have the option to participate in programs in Jerusalem, Israel; Amman, Jordan; Rabat, Morocco; Dakar, Senegal; Kigali, Rwanda; and Moscow, St. Petersburg, and Vladimir, Russia.

Notre Dame also offers programs in the Asian Pacific region in Fremantle, Perth, and Sydney, Australia; Shanghai, Beijing, and Hong Kong, China; Nagoya, Kyoto, and Tokyo, Japan; in Seoul, South Korea; and Singapore.

An additional semester option for Notre Dame students is the opportunity to petition for a program not listed above that best meets the specific academic needs of a student without need for a leave of absence. Check the Study Abroad website for the details of the *Study Abroad Petition* program.

Additional programs offered in 2018–19 include the *Kennedy Scholars* in the London Undergraduate Program who undertake independent research and a research seminar course in preparation for a senior thesis. The *Rome International Scholars* program offers a semester of specialized study in Rome and funding for disciplinary study and/or an internship during the summer following the semester of study.

Candidates for Alcoy, Amman, Angers, Beijing, Berlin, Bologna, Dakar, Geneva, Heidelberg, Nagoya, Paris, Puebla, Rome, Russia, Santiago, Shanghai, Tokyo, and Toledo study abroad programs must demonstrate skills in the language of the country sufficient to make their period of residence and study fully profitable. These skills may be developed through intensive or other language courses in the freshman or sophomore year. Previous study of the language in high school is mandatory for some programs.

Instruction is in *Arabic* and English in Amman; *Chinese* and English in Beijing, Shanghai, and Hong Kong; English in Athens, Dublin, Fremantle, Galway, Jerusalem, London, Norwich, Oxford, Perth, Seoul, Singapore, St. Andrews, and Sydney; *French* in Angers and Paris; *French* and English in Dakar; *German* in Berlin and Heidelberg; *Italian* in

Bologna; *Italian* and English in Rome; *Japanese* and English in Kyoto, Nagoya, and Tokyo; *Portuguese* in São Paulo; *Russian* in Russia; and *Spanish* in Alcoy, Puebla, Santiago, and Toledo.

SUMMER PROGRAMS

International summer programs for students who have completed at least one year of studies at Notre Dame are available in Berlin, Germany; Corinth, Greece; Dublin, Ireland; Jerusalem, Israel; Rome, Italy; Rabat, Morocco; Warsaw, Poland; Moscow, Russia; Cape Town, South Africa; Toledo, Spain; and London, United Kingdom.

Additional specialized summer programs include Global Professional Experience (internship); Japan Business & Culture; China Summer Engineering; China Summer Language; German Engineering, and International Economics Abroad (based in Germany).

The locations of the faculty-led summer programs may vary from year to year. The length of the programs and the credits offered also vary by program. See the Study Abroad website for detailed information about each summer program.

Additional programs abroad are sponsored by the School of Architecture in Rome (yearlong) and by the College of Engineering in Dublin (summer), London (summer), Rome (summer), and Alcoy, Spain (summer).

AUSTRALIA: FREMANTLE PROGRAM

Semester

University of Notre Dame Australia (NDA)
Study Abroad Office | 32 Mouat Street | Fremantle,
W. Australia 6160 | Australia

Students in the Colleges of Business and Arts and Letters enroll in courses at the University of Notre Dame Australia (NDA) through this program. Students enroll in five courses (15 credits) either semester in any combination depending on their major, college requirements, and individual need. All students may take *Australian History and Society* which includes an excursion to Broome. Additionally, business students are able to take *Business in Asia* in the fall semester. A list of course offerings for the fall normally is available around April and for the spring term around October.

AUSTRALIA: PERTH PROGRAM

Semester

University of Western Australia (UWA)
35 Stirling Highway | Crawley 6009 | Perth, Western
Australia | Australia

The Perth program is designed for juniors and is open to students from the colleges of Engineering and Science. Students in Arts and Letters, especially pre-professional and anthropology majors, may also apply. Engineering students may be able to

take a technical elective course at UWA and are encouraged to work closely with their advisors to identify appropriate options. All students will carry 30 UWA credit points, which translate to 15 Notre Dame credits. All students enroll in a self-guided, non-credit online course called *Indigenous Studies Essentials*, which all undergraduate students at UWA complete. Students will further their immersion in Western Australia through the program excursion *From the Desert to the Sea: Introduction to Western and Australia and its People*.

AUSTRALIA: SYDNEY PROGRAM

Semester

University of Sydney
Sydney Global Mobility | Level 4 Jane Foss Russell
Building G02 | NSW 2006, Australia

The Sydney exchange program is designed for juniors and is open to students from the colleges of Engineering and Science. Students in Arts and Letters, especially pre-professional and anthropology majors, may also apply. The University of Sydney is Australia's first university (opened in 1852) and it continues to provide strong academic programming and student support as a member of Australia's prestigious "Group of Eight" research-intensive universities. Engineering & IT, Health Science, Law, Medicine, Nursing, Pharmacy, Science, Agriculture, and Veterinary Science represent just a few of the disciplines that are represented at the University of Sydney and in their research centers. Students live and study in the heart of the vibrant city of Sydney.

CHILE: SANTIAGO PROGRAM

Semester

Pontificia Universidad Católica de Chile (PUC)
Campus San Joaquín | Av. Vicuña Mackenna 4860,
Macul | Santiago, Chile

All participants in the Chile program begin the semester with a two-week language and cultural immersion pre-program in rural Chile. After the pre-program, students travel to Santiago, Chile where they enroll in classes at the *Pontificia Universidad Católica* (PUC). Students enroll in two or three classes at the PUC in addition to two mandatory core courses: *Spanish for Foreigners* and *Chilean Politics and Society*. Students may also choose to apply to participate in a service-learning course, *Approaches to Poverty and Development* taught at *Universidad Alberto Hurtado*. All students live with host families in Santiago who are carefully selected by Notre Dame's on-site staff. The fall semester runs from mid-July through mid-December, and the spring program runs from early February through mid-July.

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CHINA: BEIJING PROGRAM**Semester or Academic Year**

Peking University (PKU) with CIEE
CIEE | Shao Yuan 2-110 Peking University | Beijing
100871 China

This option is offered in conjunction with the Council for International Educational Exchange (CIEE). Students may enroll in this intensive Chinese language program at Peking University. Organized group activities complement the classroom experience. All classes are taught in Mandarin Chinese with elective area studies courses offered in English by CIEE each semester. The Beijing program is strongly recommended for Chinese majors. Detailed program information is available at the Study Abroad website and the CIEE website.

Semester or Academic Year

Beijing-PKU | Peking University | 5 Yiheyuan Road |
Haidian Qu | Beijing Shi, China, 100080

Notre Dame also has a direct enroll exchange program at Peking University in which accepted students can directly enroll in both Chinese and English courses taught at PKU.

Semester

The Beijing Center (TBC)
University of International Business and Economics
The Beijing Center 4th Floor, Ningyuan Bldg. | No.
10 Huixin East Street | Chaoyang District | Beijing,
China, 100029

Participants in the Beijing Center program study China while living in China. There is no Chinese language prerequisite. All courses, except Chinese language courses, are taught in English by local professors and practitioners in the fields of Asian studies, business, communication, fine and performing arts, history, literature, philosophy, political science, sociology, and theology. Students are required to take a Chinese language class. Each semester students participate in a cultural excursion—Silk Road Excursion in fall and Yunnan Trip in spring—that explores and expands understanding of the history and cultures of China. Students live on the campus of University of International Business and Economics (UIBE) where the Beijing Center is located.

CHINA: HONG KONG PROGRAMS**Semester or Academic Year**

Chinese University of Hong Kong (CUHK)
Shatin, N.T. | Hong Kong, China

The CUHK program is an exchange program open to juniors and is particularly suited to students studying the humanities, business, engineering, or science. CUHK is a bilingual bicultural institution with local and international students and scholars. CUHK receives students from over 180 academic institutions worldwide. No Chinese language study is required, and students may choose from many courses that are taught in English or take courses taught in Chinese (if they meet the language

requirement). Students may choose courses from the faculty of arts, business administration, engineering, science, or social science. In addition to this, students may also take courses from the International Asian Studies Program. This program includes Chinese, Asian, and international studies courses and Chinese language courses.

Semester Program

University of Hong Kong (HKU)
Polfulam Road | Hong Kong, China

The HKU exchange program is open to juniors who wish to study in Hong Kong for one semester. The program is suited for students in arts and letters, business, engineering, or science. No Chinese language is required. All courses (except those offered by the Department of Chinese) are taught in English. The University of Hong Kong is a dynamic, comprehensive university of world-class standing and a leading international institution of higher learning in Asia. With a student body of over 22,000 undergraduates and postgraduates, it has a bilingual, bicultural population of local and international students and scholars.

Semester Program

Hong Kong University of Science and Technology (HKUST)
Clear Water Bay | Kowloon | Hong Kong, China

The HKUST program is an exchange program open to juniors and is particularly well-suited to students studying the sciences and technology. HKUST is a top-rated international research university dedicated to excellence in education and research. HKUST receives students from over 250 academic institutions worldwide. No Chinese language study is required, and students may choose from many courses that are taught in English or take courses taught in Chinese if they meet the language proficiency requirement.

CHINA: SHANGHAI PROGRAM**Semester or Academic Year**

East China Normal University
CIEE | 3663 North Zhongshan Road | Global
Education Building, 4th Floor | Shanghai 200062
China

Study Abroad offers this option in conjunction with the Council on International Educational Exchange (CIEE). The Shanghai Program at East China Normal University is intended for students who wish to accelerate their acquisition of Chinese and is strongly recommended for all Chinese majors and minors. There are two study tracks: *Business, Language, and Culture* and *China in a Global Context*. There is no language prerequisite, but all students must take a Chinese-language course and other courses on Chinese history, culture, and politics offered in English. Organized group activities complement the classroom experience. Detailed program information is available at the Study Abroad website or at CIEE's website.

DENMARK: COPENHAGEN PROGRAM**Semester**

DIS-Danish Institute for Study Abroad
DIS Copenhagen | Vestergade 7 | 1456 Copenhagen
| Denmark

DIS offers students engaging and challenging coursework taught by faculty practitioners in a variety of programs enriched by field studies, hands-on learning opportunities, and study tours across Europe. Cultural engagement opportunities integrate students into the local culture and students gain academic knowledge and intercultural skills to prepare for a globalized world. Students in pre-professional and science studies will find a variety of study programs with DIS. All courses are taught in English. Visit the Study Abroad office and website for detailed information.

FRANCE: ANGERS PROGRAM**Semester or Academic Year**

Université Catholique de l'Ouest (UCO)
SUNDEF Office |3, place André Leroy | BP 10808
|49008 Angers, France

The Angers program is open to sophomores and juniors in all colleges. Many Angers students decide to pursue a first or second major in French. Declared and prospective French majors must consult with the Department of Romance Languages and Literatures before they apply for the program. An academic year of two semesters begins with a month-long language-intensive summer session, the *préstage*. Most Angers students take the bulk of courses within the *Centre International d'Etudes Françaises* (CIDEF), UCO's language institute. CIDEF students with advanced French language skills may also register for a *cours universitaire* through one of the institutes at UCO. All instruction is in French.

FRANCE: PARIS PROGRAMS**Spring Semester or Academic Year**

Université Paris Diderot – Paris 7
5 rue de Thomas Mann | 75205 Paris, Cedex 13,
France

The University of Notre Dame has an exchange program with the *Université Paris Diderot* (Paris 7). This Paris program is limited to students with a high level of French, an excellent grade point average, and with preference for a major or supplementary major in French. Our host college within Paris Diderot, the *U.F.R. Lettres, Arts et Cinéma* (LAC), offers a broad variety of courses in film studies, French literature, comparative literature, French language and linguistics, literary history and theory, literary methods and history of art and aesthetics.

Spring Semester or Academic Year

Institut d'Études Politiques de Paris—Sciences-Po
13 rue de l'Université | 75007 Paris, France

STUDY ABROAD

In 1999, the University of Notre Dame began an exchange program with the *Institut d'Études Politiques de Paris (Sciences Po)*. Offered as a yearlong or a second-semester program, the Paris program is limited to students with a high level of French, an excellent grade point average, and a major in history or a social science. Students will take courses in European economics, politics, sociology, and history, and in French language. Successful completion of a year of study results in a certificate from *Sciences Po*, which is widely recognized in Europe and the United States.

GERMANY: BERLIN PROGRAM**Semester or Academic Year**

Freie Universität Berlin

Boltzmannstrasse 4 | D 14195 Berlin | Germany

The Berlin Program is part of the Consortium for German Studies (BCGS), which is administered by Columbia University. This program is designed for students with at least two years of university-level German language instruction and is, therefore, typically open only to juniors. This program provides in-depth study of German language, culture, and society, and the opportunity to observe first-hand the emerging impact of a reunited Berlin—now considered Germany's cultural, political, and economic center—on the rest of Europe.

The program begins with a six-week intensive language practicum; students then enroll in one course (taught by the BCGS directors) that reflects their academic interests, focusing on such topics as culture, politics, history, literature, theater, or cinema, in addition to at least two courses at the university. *Freie Universität Berlin* offers a wide range of courses in the humanities, social sciences, and natural sciences. All coursework will be in German.

GERMANY: HEIDELBERG PROGRAM**Semester or Academic Year**

Heidelberg Universität

AJY | Hauptstrasse 133 | 69117 Heidelberg | Germany

This program provides in-depth study of German language, culture and society. The program begins with a four-week intensive course *Aspects of Society and Culture in Contemporary Germany* which provides the students with at least 60 hours of intensive language training and excursions to various cultural institutions around Heidelberg. *Heidelberg Universität* offers a wide range of courses in the humanities, social sciences, and natural sciences. All coursework will be in German.

GREECE: ATHENS PROGRAM**Semester or Academic Year**

College Year in Athens (CYA)

CYA/DIKEMES | 5 Plateia Stadiou | GR-116 35 Athens | Greece

Sophomores and juniors study with other international students at the College Year in Athens. CYA offers an extensive range of academically outstanding courses and unique learning opportunities spanning a wide range of disciplines from Ancient to Contemporary studies, enriched by hands-on learning opportunities and on-site classes. In addition to Anthropology, Art History & Archaeology, and Classical Languages: Ancient Greek and Latin, students are offered classes in Communications, Economics, Environmental Studies, History, Literature, Modern Greek, Philosophy, Political Science & International Relations, Religion, and Urbanism & Sustainability.

HUNGARY: BUDAPEST PROGRAM**Semester**

Budapest Semesters in Mathematics (BSM)

Bethlen Gábor tér 2 | PO Box 51 | H-1406 |

Budapest 76, Hungary

In coordination with St. Olaf College, Budapest Semesters in Mathematics (BSM) provides a unique opportunity for North American undergraduates. Through this program, mathematics and computer science majors in their junior year may spend a semester in Budapest and study under the tutelage of eminent Hungarian scholar-teachers. Instruction is in English.

IRELAND: DUBLIN PROGRAMS**Semester or Academic Year**

University College Dublin (UCD) | Belfield | Dublin 4, Ireland

Trinity College Dublin (TCD) | College Green | Dublin 2, Ireland

The Dublin programs at University College Dublin and Trinity College Dublin are available to qualified juniors. Students will enroll in courses in their majors at one of the two Universities and will also take a course at Keough-Naughton Notre Dame Center. For course offerings at the Irish universities, check the Study Abroad website. The *Introduction to Ireland* course taught at Keough-Naughton Notre Dame Center is mandatory for all program participants. The Center may also offer an Irish Literature course during certain semesters. Students will live in dormitories at the respective Universities with Irish and other international students.

Spring Semester

Dublin City University (DCU)

International Office | John Hand Library | All Hallows Campus | Drumcondra | Dublin 9, Ireland

This new program has been developed for Computer Science Engineering students. In addition to required engineering-related courses at DCU, students are able to participate in courses offered at the Dublin Global Gateway, particularly the *Introduction to Ireland* course taught at O'Connell House.

IRELAND: GALWAY PROGRAM**Semester**

National University of Ireland-Galway (NUIG)
International Office | 7 Distillery Road | Galway, Ireland

Notre Dame students now have an opportunity to study in the cultural center of Ireland at NUIG, the largest and oldest university in the west of Ireland. It is a leading research university in biomedical science and engineering, marine science, energy and environmental science. Additionally, NUIG promotes study of the humanities, including Irish Studies, to provide for the study of modern and contemporary Irish literature, music, history, language and culture.

ISRAEL: JERUSALEM PROGRAM**Semester**

Tantur Ecumenical Institute

PO Box 11381 | 91113 Jerusalem, Israel

Notre Dame's program in Jerusalem at Tantur is located on a hilltop on the road from Jerusalem to Bethlehem. Fall students may take science courses through Hebrew University for science and pre-professional requirements. Students may also take some courses at Tantur. Spring students will choose from classes offered at Tantur and from local universities with courses offered in English. Arabic language classes are also available. The semester program also includes numerous excursions throughout Israel that enhance the material covered in the classroom.

ITALY: BOLOGNA PROGRAM**Semester or Academic Year**

Università di Bologna (UniBo)

Bologna Consortial Studies Program | Via Val d'Aposa, 7-ANT 15 | 40123 Bologna BO | Italy

Students matriculate at the *Università di Bologna (UniBo)* through Notre Dame's association with the Bologna Consortial Studies Program (BCSP), administered by Indiana University. Typically, students are juniors at the time of participation and have completed the equivalent of four, preferably five, college-level Italian courses. Students attend a four-week preparatory pre-session in September before beginning classes at UniBo. Organized group activities complement the classroom experience. Direct matriculation at the University of Bologna, one of Italy's premier universities, coupled with living in apartments with Italian students, provides a genuine experience of Italian university life and contributes to the attainment of oral and written fluency in Italian.

ITALY: ROME – AME PROGRAM**Spring Semester**

Rome Global Gateway and *Roma Sapienza*

Rome Global Gateway | Via Ostilia, 15 | 00184 Rome | Italy

STUDY ABROAD

The Rome Aerospace and Mechanical Engineering (AME) Program is taught by Notre Dame faculty at the Rome Global Gateway in cooperation with *La Sapienza*. Students will take three AME courses, one Global Gateway course, *All Roads Lead to Rome*, and one other course of their choice. Proficiency in Italian language is not required; instruction is in English. Participants are approved by the College of Engineering.

ITALY: ROME – ICCS PROGRAM**Semester**

The Intercollegiate Center for Classical Studies (ICCS)
ICCS & Duke University in Rome | Via A. Algardi,
19 | 00152, Rome | Italy

A select number of Notre Dame students can participate for one semester in the Intercollegiate Center for Classical Studies, a consortium of 90 colleges and universities under the management of Duke University. ICCS provides students with an opportunity in Rome to study ancient history and archaeology, Latin and Greek language and literature, and art history. Applicants must be at least sophomores majoring in classics, classical history, or archaeology, or must be art history majors with a strong classical background. Proficiency in Italian language is not required. Participants are nominated by members of the Notre Dame Classics department. Acceptance into the Rome-ICCS Program is highly selective.

ITALY: ROME PROGRAM**Semester or Academic Year**

John Cabot University (JCU)
Via della Lungara, 233 | 00165 Rome | Italy

Students from all colleges can enroll in classes at John Cabot University, an American university in Rome, which offers courses in art, business, classics, government, history, literature, philosophy, theology, and psychology. All courses are taught in English with the exception of Italian language classes. Many JCU courses have been approved by Notre Dame departments for major credit; however, students must consult with their department to confirm courses for their major and minor. All students are required to have at least one semester of college-level Italian or the equivalent prior to departure and to take one Italian-language course during the semester or year in Rome. For a listing of all courses offered at John Cabot, check the Study Abroad website. Additionally, all students are required to enroll in the course *All Roads Lead to Rome* taught at Notre Dame's Global Gateway in Rome. This course is taught by ND faculty on site.

JAPAN: KYOTO PROGRAM**Semester**

Kyoto University
Yoshida-honmachi, Sakyo-ku | Kyoto 606-8501
Japan

The Kyoto program offers immersion in the rich history and culture of the ancient imperial capital while providing students with academic opportunities at a top research institution. In the KU International Education Program (KUINEP), Notre Dame's exchange students can take liberal arts and science coursework conducted in English with other international and Kyoto University students. For students proficient in Japanese, mainstreamed classes are conducted in Japanese in the KU General Exchange program. In both programs, students may take Japanese language courses offered by the Education Center for Japanese Language and Culture. Students will live in one of the Kyoto University International Houses for international students and researchers.

JAPAN: NAGOYA PROGRAM**Semester or Academic Year**

Center for Japanese Studies, Nanzan University
18 Yamazato-Cho, Showa-ku | Nagoya 466-8673,
Japan

The Nagoya program is designed for Japanese language majors. Students are required to take an 8-credit Japanese course at the appropriate level each semester. Students choose their other courses in the areas of Japanese society, literature, religion, business, economics, and history. Except for Japanese language classes, content courses are taught in English, and the subject matter is often placed in a larger Asian context.

JAPAN: TOKYO PROGRAMS**Spring Semester**

Sophia University
CIEE Study Center | Yotsuya Campus | Building
11, Room 108 | 7-1 Kioi-cho Chiyoda-ku | Tokyo
102-8554 Japan

Study Abroad offers this option in conjunction with the Council on International Educational Exchange (CIEE). The Tokyo Program is open to sophomores and juniors who have completed a semester of Japanese. All students must take a Japanese language course and can choose from a wide variety of other courses offered in English including business, economics, history, literature, philosophy, and sociology. Organized group activities complement the classroom experience. Detailed program information is available at CIEE's website.

Spring Semester

Keio University
International Exchange Services Group | Office of
Student Services | 2-15-45 Mita, Minato-ku | Tokyo
108-8345 Japan

In this exchange program, students may choose to enroll in either the Japanese Language Program (JLP), with a focus on intensive language and culture studies, or the Keio International Program (KIP), with access to content classes taught in English. This comprehensive program is specially designed for exchange students who want to study about Japan

and East/Southeast Asia in English and to take Japanese language courses as well. Students with advanced Japanese proficiency may take full-time undergraduate courses taught in Japanese.

JORDAN: AMMAN PROGRAM**Academic Year or Semester**

CIEE Center | #1 Rifa Al-Ansari St. | Khalifeh Plaza
#505 | PO Box 13434 | Amman, 11942, Jordan

This program is offered in conjunction with the Council for International Educational Exchange (CIEE). Students choose to enroll in an intensive Advanced Arabic language program or Middle East Studies program. Housing options offer living with a host family or in an apartment. Organized group excursions complement the classroom experience. Arabic language classes are required with elective area studies courses offered in English each semester. The Amman program is recommended for Arabic majors. Detailed program information is available at the Study Abroad website and the CIEE website.

MEXICO: PUEBLA PROGRAM**Semester or Academic Year****Semester or Academic Year**

Universidad Popular Autónoma del Estado de Puebla (UPAEP)
21 sur #1103 Barrio de Santiago | CP 72410
| Puebla, Pue. Mexico

Tecnológico de Monterrey
Campus Puebla | Via Atlxícyotl 2301 | Reserve
Territorial Atlxícyotl | 72453 | Puebla, Pue. Mexico

Students may participate in the program for an academic year or a semester. The program is open to students from all colleges at Notre Dame with the equivalent of four semesters or better in Spanish language. Notre Dame offers a pre-medical program in the fall semester at UPAEP which includes the first semester of General Physics (taught in English) and internships with Mexican doctors. Spring students may take courses at the *Tec de Monterrey-Puebla* and will also have a variety of internship opportunities with a focus on business or the humanities. Excursions are coordinated by on site ND staff. Students live with a host family.

MOROCCO: RABAT PROGRAM**Semester**

School for International Training (SIT)
CCCL | Avenue Laalou, Derbjirari | Zankat
Elhassani, #11 | Rabat Medina, Morocco 10101

Through the School for International Training (SIT), students participate in one of three thematic courses of study: Journalism and New Media; Migration and Transnational Identity; or Multiculturalism and Human Rights. Each track includes a core course that focuses on the specific theme, language study, an independent study project, and program excursions that enrich an understanding of Morocco's history,

STUDY ABROAD

development issues, cultural diversity, environmental issues, and questions regarding civil society.

During the field study, students identify topics to investigate for the final Individual Study Project. Special program features include living with a host family and engaging in deep cultural and academic experiences through educational excursions.

RUSSIA: MOSCOW, ST. PETERSBURG, AND VLADIMIR PROGRAMS

Semester or Academic Year

American Council of Teachers of Russian (ACTR)
American Councils Main Office | Leninsky Prospect,
d2, kom 507 | Moscow, Russia 11709

Students enroll in a Russian language and area studies program through ACTR to study in Moscow, St. Petersburg, or Vladimir for one semester or an academic year. Students should have completed two years of Russian or the equivalent at the university level before participation. Participants take courses in grammar and contemporary Russian language, vocabulary, and conversation, as well as in literature, Russian and Soviet culture, history, politics, and the mass media. Course descriptions are available on the Study Abroad website.

RWANDA: KIGALI PROGRAM

Semester

School for International Training (SIT)
Kacyiru South, No 24, KG3 | Gasabo District,
Kacyiru Sector, Kamatamu Cell | Kigali, Rwanda

The Post-Genocide Restoration and Peacebuilding program examines the origins of conflict in Rwanda and the challenges and opportunities of post-conflict restoration and peacebuilding. The program combines course work with field study during which students identify topics of interest that they pursue for the final Individual Study Project. Special program features include living with a host family and engaging in deep cultural and academic experiences through educational excursions.

SENEGAL: DAKAR PROGRAM

Spring Semester

Council on International Education Exchange (CIEE)
CIEE Study Center | 4439 Amity 2 | B.P. 16423
Dakar Fann, Senegal

Students who are interested or majoring in French/Francophone studies, African studies, international relations, or development studies should consider the Dakar Program. The program offers the opportunity to live and study in a French-speaking West African country considered by many to be one of the most developed and democratic nations in the region. CIEE administers the academic program, selects host families, and conducts excursions.

Classes are conducted at CIEE Study Center in *Amity III* neighborhood near restaurants, shops,

cultural centers, and the largest public university in Senegal. Students live with a host family and study in French and English. Courses introduce them to Senegalese society and such issues as education, women's roles, the impact of Islam, and development and globalization from a West African perspective. Applicants must be Junior-level students with at least 2 semesters of college-level French or equivalent and are required to take 15 credits with 3 required courses and 2 elective courses. Senegalese professors teach program courses. For a listing of courses offered, check the CIEE website.

SINGAPORE: SINGAPORE PROGRAM

Semester

National University of Singapore (NUS)
21 Lower Kent Ridge Road | Singapore 119077

NUS offers a global approach to education and research, with a focus on Asian perspectives and expertise for select exchange students. NUS is a vibrant English-speaking comprehensive university with 16 faculties/schools offering courses from arts and social science to history and physics. A comprehensive English course list is announced every year and is available online for students to view. Areas of study include arts/design, business, engineering, English, foreign languages, global studies, health, humanities, journalism, law, life sciences, other physical sciences, social sciences, and sustainability. Students at this leading global university live on campus in dormitories.

SOUTH KOREA: SEOUL PROGRAM

Spring Semester or Academic Year

Yonsei University
50 Yonsei-ro, Seodaemun-gu | Seoul, Korea 120-749

The Seoul exchange program is open to juniors. It is particularly suited to students in Korean Studies. Yonsei is a private Christian research institution with local and international students and scholars and is one of the oldest universities in South Korea. Yonsei receives students from more than 290 academic institutions worldwide. Instruction is in Korean but students may also choose from many courses that are taught in English. While the majority of classes will be in Korean Studies, students may also choose courses from the various other faculties as well.

SPAIN: ALCOY PROGRAM

Spring Semester

Polytechnic University of Valencia-Alcoy
Campus de Alcoy | Plaza Ferradiz y Carbonell |
03801 Alcoi (Alicante) | Spain

This exchange program accepts Notre Dame undergraduate engineering students to study during the spring semester of their sophomore or junior academic year. The program is designed for undergraduate engineers, particularly those in chemical, electrical, and computer science. Courses are conducted through the Polytechnic University

of Valencia in Alcoy, Spain. Courses are taught in Spanish and the Polytechnic University of Valencia will provide a two-week Spanish refresher course prior to the semester, as needed.

SPAIN: TOLEDO PROGRAM

Semester or Academic Year

Fundación Ortega-Marañón
San Juan de la Penitencia | Callejon de San Justo |
45001 Toledo, Spain

The Toledo program is open to sophomores and juniors in all majors. Students may study for a semester or academic year in Toledo and all courses are taught in Spanish. Students must take five courses through the *Centro de Estudios Internacionales*. A philosophy course is offered in the fall only; a theology course is offered in the spring. Credit-bearing internships are available in Toledo. Students may apply for internships in several areas, including government, the arts, social service, and communications. Credit toward a major must be approved by an advisor in the major department. Students live with host families.

SWITZERLAND: GENEVA PROGRAM

Spring Semester

University of Geneva (UNIGE), CERN
24, rue du Général-Dufour | 1211 Geneve 4 |
Switzerland

Through Boston University's Geneva-Physics program, qualified students have the opportunity to study at the world's leading center for advanced research in particle physics. This program combines upper level coursework in quantum physics and electrodynamics at the University of Geneva (UNIGE), with directed research at the European Organization for Nuclear Research (CERN). Qualified candidates will be upper level Physics major with a minimum of two semesters of college-level French or the equivalent. Additionally, students will be required to enroll in and complete a scientific French-language tutorial during the semester prior to studying abroad. This is a very competitive program.

UNITED KINGDOM: LONDON UNDERGRADUATE PROGRAM

Semester

Notre Dame London Global Gateway
1 Suffolk Street | London SW1Y 4HG | United Kingdom

The London Undergraduate Program was initiated in 1981 as an Arts and Letters program and has since expanded to provide an opportunity for all Notre Dame undergraduates from the colleges of arts and letters, business, engineering, and science to spend one semester of their junior year in the London Undergraduate Program. While in London, students take classes offered by Notre Dame and British professors at the Notre Dame London Global Gateway near Trafalgar Square. Notre Dame's British

MOREAU FIRST YEAR EXPERIENCE

faculty is selected to include experts whose work is internationally recognized in their fields. Students participating in the program live as a group in Conway Hall, a Notre Dame residential facility with supervision provided by the program.

Arts and Letters students who are interested in independent research can apply to be a Kennedy Scholar. Those selected to be Kennedy Scholars participate in a 3-credit research seminar in which they examine research methodologies, visit prominent centers of research and culture, and ultimately prepare individual prospectuses for senior projects. Additionally, they take four other courses offered at the London Global Gateway. Kennedy Scholars will be eligible to apply for various research grants to begin or continue their research in the summer following their semester in London or early in their senior year. In particular, these students will be extremely qualified for a prestigious Kennedy UROP grant.

UNITED KINGDOM: NORWICH PROGRAM

Academic Year or Semester

University of East Anglia (UEA)
Norwich Research Park | Norwich NR4 7TJ |
United Kingdom

Notre Dame students can enroll in courses in UEA's American Studies Department, which offers a wide range of courses in American studies, American and English literature, and creative writing. The School of American Studies also has a special reputation in creative writing. The School houses the Arthur Miller Centre for American Studies, which hosts an annual international literary festival featuring notable writers. The UEA exchange program is open to juniors. English or American studies majors with a GPA of 3.0 or higher are eligible to participate. Other majors may be considered depending on student qualifications.

UNITED KINGDOM: OXFORD PROGRAM

Academic Year

New College and Oriel College, Oxford University
Oriel Square | Oxford, OX1 4EW

These programs provide juniors in the colleges of science, engineering, and arts and letters the opportunity to study at Oxford for a full academic year. Application is by invitation only. Each college dictates the fields in which they will accept students. It is required that candidates have an overall GPA of 3.7 at the time of application.

At Oxford, students participate in Oxford's celebrated tutorial system. Students work individually with a tutor to pursue their major courses of study in depth. Tutors are full-time faculty at Oxford. They include some of the most accomplished scholars in the world in their fields. Participating students live in New College or Oriel College accommodations.

UNITED KINGDOM: ST ANDREWS PROGRAM

Spring Semester

University of St Andrews
College Gate | St Andrews | KY16 9AJ | Fife,
Scotland, UK

The University of St Andrews is renowned for its academic strength in numerous disciplines but is particularly distinguished in Medieval Studies.

Students with a major, minor, or concentration in Medieval Studies are encouraged to apply. This selective program is open to other majors including psychology and other disciplines for students with a minimum 3.5 cumulative GPA.

Students apply in the fall semester of their sophomore year to study at St Andrews in the spring semester of their junior year.

Moreau First Year Experience

"[Education] is the art of helping young people to completeness..."

from Blessed Basil Moreau, Christian Education

The Moreau First Year Experience, a two-semester course sequence, is required of all first-year students. Taught in both fall and spring semesters, and integrating academic, co-curricular, and residential experiences of new students, the course is organized around multiple *foci* including: orientation to university life, health and wellness, community standards and cultural competence, academic success, spiritual life, and discernment. Students actively engage with the experience through a variety of methods such as large lectures, on-line modules, and small group discussions. Use of ePortfolios helps students to reflect on their own holistic development in intellectual, cultural, pre-professional, and social pursuits.

The Moreau First Year Experience resonates within the larger framework of the charism of the Congregation of the Holy Cross to educate in the faith. Similarly, drawing on the pedagogy of Blessed Basil Moreau, it builds upon the Five Pillars of a Holy Cross Education:

- *Mind*: seeking understanding through the integration of faith and reason
- *Heart*: discerning one's personal vocation in service to the Church and the world
- *Zeal*: enkindling the desire to use one's gifts to boldly proclaim God's Word
- *Family*: embracing Christian community as the context for lifelong formation
- *Hope*: trusting in the Cross and God's promise of the kingdom

Through the Moreau First Year Experience, students come to understand the complexity and expectations of the Notre Dame community; take advantage of

crucial academic and university resources; cultivate and maintain a healthy and well-balanced lifestyle; become aware of and engage with diverse communities; and think deeply about their academic, creative, professional and spiritual lives. The Moreau First Year Experience gives students the opportunity to begin forming life-long habits of the mind as well as an engagement in faith, service, arts, wellness, and community.

The First Year Experience is a collaborative effort between the First Year of Studies and the Division of Student Affairs. The course speaks to the imperatives of the University Strategic Plan for Undergraduate Education by ensuring that Catholic culture informs an integral part of new students' education; by nurturing the formation of students' mind, body, and spirit; by enriching the integration of students' intellectual, extracurricular, and residential experiences; and by deepening students' global engagement. The Moreau First Year Experience affirms the diversity and inclusion of the all first-year students.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *First Year of Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Information Technologies

The Office of Information Technologies (OIT) provides robust and highly reliable technology services that support the University's teaching, learning, research, scholarship, community service and administrative activities. Information technology services are designed to enable and empower, transform and benefit, and serve and support the entire Notre Dame community.

The OIT provides all Notre Dame students with an @nd.edu email account hosted by Google, file space and distributed printing services. Google also provides students with Google Apps and unlimited storage. For more information, visit: ntrda.me/google.

Students can find a variety of assistance and services at the OIT Help Desk located at 115 DeBartolo Hall. Trained support representatives provide information technology support services. They are available to answer questions and help guide computer users in diagnosing and resolving problems by phone, e-mail, chat and in person. For more information, go to: ntrda.me/oithelpdesk.

The OIT Help Desk also serves as a drop off and pick-up point for students with computers that need to be repaired. As an added convenience, the ND Computer Service Center is a fee-for-service repair facility available to students, faculty and staff. It is an authorized provider for warranty repairs on Apple, Dell and Lenovo computers. The Service Center can provide non-warranty service on these and other computer brands, as well as most HP monochrome laser printers. Students can also arrange to rent a laptop if their computer is being repaired. For information, go to: ntrda.me/computerservicecenter.

For classroom presentations or projects, students can check out a variety of small portable devices (cameras, audio recorders, microphones, etc.) at the OIT Help Desk. For details, visit: ntrda.me/avrental.

Each student living in undergraduate residence halls and graduate student residences has access to a dedicated ethernet jack, and wireless is available throughout campus. For more information, visit: ntrda.me/network.

All residence hall rooms have standard cable television service. Additional digital cable television services, including HD, DVR and OnDemand, can be ordered directly from XFINITY for an additional fee. Details are available at: ntrda.me/cabletv.

A distributed cellular antenna system (DAS) in various campus locations provides enhanced coverage for major cellular telephone providers, including AT&T, Verizon and Sprint. For more information on cellular telephone service, visit: ntrda.me/cellular.

Free computer training classes are available through the OIT to students on a wide range of software.

For more information on training programs, go to: ntrda.me/training.

There are student computer labs across campus supported by the OIT. Students, faculty, and staff have access to these labs that include Windows and Mac computers and printers. For computer lab locations and hours, go to: ntrda.me/labs.

Audio Video Technologies works closely with the Office of the Registrar to design, build and support technology enhanced learning spaces on campus. There are 168 classrooms equipped with audio video systems that allow students, faculty and guests to present information from a variety of digital sources. Audio and video conferencing is also available to students and faculty. Details are available at: ntrda.me/zoom.

Students and faculty can also take advantage of other through Notre Dame Studios, including video streaming, video and audio production, and post-production services, including media duplication. Details are available at: ntrda.me/academicmediasupport.

In addition to mainstream computing services, the OIT, in partnership with the Office of Research, works with the Center for Research Computing (CRC) to support computationally intensive work, large dataset management, and data visualization for the undergraduate, graduate and campus research communities. The University provides access to national supercomputing and data resource facilities via Internet2. It provides high bandwidth access to about 200 leading research universities and supercomputing centers. For more information, visit crc.nd.edu.

Anyone using Notre Dame computers and network resources must abide by the policies set forth in the document Responsible Use of Information Technology Resources. Additional information about this policy is available at: ntrda.me/responsibleusepolicy.

For complete information about OIT services and how to obtain them, please visit oit.nd.edu.

The Center for Career Development

The Center for Career Development provides undergraduate students with career counseling and career development services, self-assessments, workshops, presentations for academic departments, career fairs, and mock interviews, in addition to other services.

We encourage students to take ownership of their career direction, and be willing to devote the time and energy necessary to conduct a successful search for jobs, internships, fellowships, and/or the identification of graduate school programs.

OUR SERVICES

Individual Appointments

Our career counselors meet with students to assist with self-assessment, career decision-making, industry exploration, resumes, cover letters, job and internship searches, and interviewing. Walk-in appointments are available daily.

Assessment Tools

We offer the Myers-Briggs Type Indicator and Strong Interest Inventory to assist students in their career development process.

A sampling of workshops:

- Writing Your First Resume
- Preparing for the Career Fair
- Internship Search Strategies
- Effective Interviewing Strategies
- Job Search Beyond Campus
- Senior Transitions
- Making the Major Decision
- Career Fairs

We also participate in multiple off-campus and virtual career fairs.

On-Campus Recruiting and Go IRISH Database

Go IRISH is an online database that allows students access to employers' job and internship descriptions, applications, on-campus recruiting/interviewing dates, and information sessions, in addition to on-campus career fairs.

Center for Career Development Online Resources

Online subscriptions to career exploration resources and job and internship databases.

Career Experiential Education Programming

- Externship/Career Trek Programs
- Mentoring/Job Shadow Programs
- Arts and Letters Corporate Industry Boot Camp

Internship Funding Program

This program is designed to aid students who wish to enter into an internship whose pay does not meet the standard cost of living. It provides a stipend to cover expenses incurred during the summer. The Center for Career Development offers seven internship funding programs to students each school year.

For additional information, contact:

Center for Career Development
504 Duncan Student Center
Notre Dame, Indiana 46556
(574) 631-5200
careerdevelopment.nd.edu
ndcps@nd.edu

Hours of Operation

- Monday-Friday: 8:00 am to 5:00 pm
- Walk-in hours available daily when regular classes are in session. Check out our website for the most up-to-date information.

Holy Cross Seminary Formation

The Old College undergraduate seminary program is housed in the original campus structure built in 1843 by Notre Dame's founder, Rev. Edward Sorin, C.S.C. and seven Holy Cross brothers. It welcomes high school graduates and current undergraduates with a serious interest in exploring a vocation as a priest or brother in the Congregation of Holy Cross. With more than 50 men in formation at Notre Dame, Holy Cross is a growing, international religious community with 1,400 priests, brothers, and seminarians in 15 countries throughout the world.

Old College provides an introduction to religious life and ministry in Holy Cross through participation in daily Eucharist and prayer, service placements, spiritual direction, weekly community nights, retreats, and academic preparation, including courses in philosophy and theology. Students can select their own major and tailor the rest of their academic program according to their interests. Old Collegians take all classes with other Notre Dame students and actively participate in clubs, organizations, and other aspects of campus life. They are also encouraged to spend a semester or year abroad. Old College combines a challenging religious formation structure with a complete Notre Dame undergraduate experience.

Moreau Seminary, also located on the Notre Dame campus, is the primary formation house for the Congregation of Holy Cross in the United States. The one-year Postulant Program is a pre-novitiate year designed for those with a bachelor's degree in any field who discern a vocation to priesthood or brotherhood within vowed religious life. Postulants typically take 15 hours of philosophy and/or theology credits at the University each semester and have ministry placements supervised by seminary staff. Postulants reside at Moreau Seminary with other priests, brothers, and seminarians. They discern their vocation through spiritual direction and active participation in the community life of Moreau Seminary, which is centered around the daily celebration of the Eucharist and the Liturgy of the Hours. After returning from the Novitiate, newly professed seminarians begin their formal academic training in the Master of Divinity program at Notre Dame.

Applicants to Old College and Moreau Seminary must be practicing Roman Catholics in good standing with the Church and of solid personal character, with a demonstrated commitment to apostolic ministry. Admission is selective, and personal interviews are required for acceptance into both programs. Tuition scholarship assistance is provided.

For additional information, contact:

Director, Office of Vocations
PO Box 541
Notre Dame, IN 46556
vocation.1@nd.edu
holycrossvocations.org
574-631-6385

Saint Mary's College.

Because of the proximity and rich tradition common to Notre Dame and Saint Mary's, the two institutions share many activities in the area of academics as well as social events, student organizations, and community service projects. The two institutions maintain a cooperative program permitting a limited number of courses to be taken at the neighboring institution.

The First Year of Studies

Dean

Hugh R. Page, Jr.

Associate Dean

Holly Martin

Assistant Deans

Elly Brenner; Jennifer Fox

Advisors

James Creech; Laura Flynn; Darlene Hampton; Mallory Jagodzinski; Eve Kelly; Kristian Lax-Walker; Erin Lemrow; Cecilia Lucero; Ardea Russo; Kasey Swanke; Melvin Tardy; Leonor Wangenstein; Michelle Ware; Sean Wernert

Burke, Hofman, Kolman Postdoctoral Teaching Scholar

Katharine Mahon

Director, Learning Resource Center

Nahid Erfan

Director, Program for Academic Excellence

Philip Sakimoto

OVERVIEW

The First Year of Studies serves as the advising nexus for incoming first-year students. It utilizes an integrative paradigm for student engagement. Discernment, exploration, and academic planning are the essential touchstones for its work. Student-centered advising is one of the hallmarks of a Notre Dame education. Students are encouraged to think of their intellectual growth along a four-year arc, with required and elective courses providing an educational experience with substantial breadth and depth.

First Year Advisors challenge students to: think carefully about how to make the most of their learning opportunities; hone existing talents; acquire new competencies; and cultivate areas of specialization that reflect both their interests and passions. They also assist students in working toward realization of nine learning outcomes. Collectively, these objectives aim to help students communicate effectively; formulate appropriate learning goals and strategies; become good decision makers; gain proficiency in academic planning; engage in learning self-assessment; become integrative thinkers; develop resilience; prepare to become life-long learners; and cultivate those capacities requisite for discernment.

Starting in their first-year, students select [courses](#) that reflect their college or school intent, likely major (if already determined), emerging interests, and the University's [Core Curriculum](#). The goal of the Core Curriculum is to expose students to various intellectual modalities for comprehending and interacting with the larger world. These eleven "[ways of knowing](#)" are intellectual pathways reflective of several of the University's "[Learning Outcomes for Undergraduates](#)." The process of building such a schedule is undertaken with the assistance of members of our first-year advising teams. Specific information on course options for first-year students

is found on the First Year of Studies website at <https://firstyear.nd.edu/academics/>.

The First Year of Studies provides complementary academic support and other programming for intellectual enrichment and to foster connections between faculty members, staff, and students. Beginning in Academic Year 2018–2019, modifications to advising procedures and structures are anticipated that will significantly enhance all aspects of advising throughout the University.

MOREAU FIRST YEAR EXPERIENCE

A distinctive feature of our undergraduate curriculum is the Moreau First Year Experience, which exposes students to the values informing a Catholic education in the tradition of the Congregation of Holy Cross. Details can be found online at <https://corecurriculum.nd.edu/moreau-first-year-experience/>

VOLUNTARY COURSES

Each year, the First Year of Studies offers a number of voluntary courses for first-year students. Those projected to be offered in Academic Year 2018–19 can be found on the First Year of Studies website at <https://firstyear.nd.edu/academics/courses/areas/voluntary/>.

CREDIT AND/OR PLACEMENT BY EXAMINATION

Up-to-date information on Advanced Placement (AP), International Baccalaureate (IB), and other forms of exam-based course credit pertinent to first-year students is maintained on the First Year of Studies website at <https://firstyear.nd.edu/academics/advanced-placement-credit/>. Synoptic charts of exams and equivalences appear below.

ADVANCED PLACEMENT EXAMINATIONS—NOTRE DAME CREDIT

Advanced Placement Exam	AP Grade Required	Number of Credits Awarded	Notre Dame Equivalent Course	Notre Dame Exam Course Credited (if different)
Biology	5	8	Biological Sciences 10161 and 10162	Biological Sciences 10098 and 10099
Biology	4	3	Biological Sciences 10101	Biological Sciences 10091
Calculus AB	5	4	Mathematics 10550	Mathematics 10091
Calculus BC	5	8	Mathematics 10550 and 10560	Mathematics 10091 and 10092
Calculus BC/AB Subscore	5	4	Mathematics 10550	Mathematics 10091
Chemistry	5	4	Chemistry 10171	Chemistry 10097
Chemistry	4	3	Chemistry 10101	Chemistry 10091
Economics (Micro)	5	3	Economics 10010	Economics 10091
Economics (Macro)	5	3	Economics 10020	Economics 10092
English Language and Composition	4	3	Writing and Rhetoric 13100	
Government (American Politics)	5	3	Political Science 10100	Political Science 10098
Government (Comparative)	5	3	Political Science 10400	Political Science 10099
History				
European History	5	3	History 10020	History 10092
United States History	5	3	History 10010	History 10091
World History	5	3	History 10030	History 10093
Latin	4	8	Latin 10001 and 10002	
Latin	3	4	Latin 10001	
Music Theory	5	3	Music 10090	Music 10099
Physics I	5	3	Physics 10111	Physics 10091
Physics II	5	3	Physics 10222	Physics 10092
Physics C, Mechanics	5	4	Physics 10310	Physics 10093
Physics C, Mechanics	4	4	Physics 20210	Physics 10095
Physics C, Elec. & Magnetism	5	4	Physics 10320	Physics 10094
Physics C, Elec. & Magnetism	4	4	Physics 20220	Physics 10096
Psychology	5	3	Psychology 10000	Psychology 10091
Statistics	5	3	Applied and Computational Mathematics and Statistics 10145	Applied and Computational Mathematics and Statistics 10091

CREDIT AND/OR PLACEMENT BY EXAMINATION

ADVANCED PLACEMENT & SAT II SUBJECT TESTS FOR FRENCH, GERMAN, ITALIAN, AND SPANISH

SAT-II Subject Test Score	Advanced Placement Test Score	Credits (Courses)	Placement Level
French and French with listening			
790–800	5 (lang.)/4 (lit.)	6 (20201-20202)	30310 or 30320
690–780	4 (lang.)/3 (lit.)	6 (20201-20202)	20300 or 20600
590–680	3 (lang.)/2 (lit.)	7 (10102-20201)	20202
490–580	2 (lang.)/1 (lit.)	8 (10101-10102)	20201 or 20215
480	1 (lang.)	4 (10101)	10102 or 10115* or 10110*
German and German with listening			
790–800	5 (lang.)/4 (lit.)	7 (10102-20201)	20202 or 30000+
690–780	4 (lang.)/3 (lit.)	8 (10101-10102)	20201
570–680	3 (lang.)/2 (lit.)	4 (10101)	10102
Italian and Italian with listening			
790–800	5 (lang.)/4 (lit.)	6 (20201-20202)	30310
690–780	4 (lang.)/3 (lit.)	7 (10102-20201)	20202
590–680	3 (lang.)/2 (lit.)	8 (10101-10102)	20201 or 20215
490–580	2 (lang.)/1 (lit.)	4 (10101)	10102
Spanish and Spanish with listening			
800	5 (lang.)/4 (lit.)	6 (20201-20202)	30310 or 30320
690–790	4 (lang.)/3 (lit.)	6 (20201-20202)	20600
570–680	3 (lang.)/2 (lit.)	7 (10102-20201)	20202
460–560	2 (lang.)/1 (lit.)	8 (10101-10102)	20201 or 20215
450	1 (lang.)	4 (10101)	10102 or 10115* or 10110*

**If you have received credit for 10101 and you choose to take 10110 or 10115, the AP/SAT-II credit you received for 10101 will still show on your transcript, but will no longer count in the total credits required to earn the degree. This is because the course content of 10110 and 10115 incorporates the content of 10101.*

INTERNATIONAL BACCALAUREATE—NOTRE DAME CREDIT

IB Higher Level Exam	Grade Required	Number of Credits Awarded	Notre Dame Equivalent Course	Notre Dame Exam Course Credited (if different)
Biology	6	6	Biological Sciences 10101 and 10107	Biological Sciences 10091 and 10097
Biology	7	8	Biological Sciences 10161/ 11161 and 10162/11162	Biological Sciences 10098 and 10099
Chemistry	6	3	Chemistry 10101	Chemistry 10091
Chemistry	7	4	Chemistry 10171	Chemistry 10097
Economics	6	6	Economics 10010 and 10020	Economics 10091 and 10092
English	6	3	Writing and Rhetoric 13100	
Foreign Languages				
Arabic	6	10	Arabic 10001-10002	
Chinese	6	5	Chinese 10111	
French	6	8	French 10101-10102	
German	6	8	German 10101-10102	
Greek	6	8	Greek 10001-10002	
Italian	6	8	Italian 10101-10102	
Japanese	6	5	Japanese 10111	
Latin	6	8	Latin 10001-10002	
Russian	6	8	Russian 10101-10102	
Spanish	6	8	Spanish 10101-10102	
History of the Americas	6	3	History 10010	History 10091
Mathematics	7	8	Mathematics 10550 and 10560	Mathematics 10091 and 10092
Physics	6	6	Physics 10111 and 10222	Physics 10091 and 10092
Physics	7	8	Physics 10310 and 10320	Physics 10093 and 10094
Psychology	6	3	Psychology 10000	Psychology 10091
Social and Cultural Anthropology	6	3	Anthropology 10109	

CREDIT AND/OR PLACEMENT BY EXAMINATION

NOTRE DAME EXAMS COURSE CREDIT

Notre Dame Course	Course Title	Notre Dame Exam Course Credited	Qualifying Score
ACMS 10145	Statistics for Business I	ACMS 10091	80%
MATH 10250	Elements of Calculus I	MATH 10090	80%
MATH 10550	Calculus I	MATH 10091	80%
MATH 10560	Calculus II	MATH 10092	80%
MATH 20550	Calculus III	MATH 10093	80%
MATH 20580	Introduction to Linear Algebra and Differential Equations	MATH 10094	80%

School of Architecture

Francis and Kathleen Rooney Dean of the School of Architecture:

Michael N. Lykoudis

Associate Dean:

John W. Stamper

*Associate Dean for Research, Scholarship,
& Creative Work:*

Krupali Krusche

Assistant Dean and Academic Director/Rome Studies Program:

Rev. Richard S. Bullene, C.S.C.

Assistant Dean for Graduate Studies:

Samantha L. Salden Teach

Director of Graduate Studies for the Architecture and Urbanism Program:

Richard Economakis

Director of Graduate Studies for the Historic Preservation Program:

Steven Semes

Professors:

Philip H. Bess; Richard Economakis; Michael N. Lykoudis; Ingrid D. Rowland; Steven Semes; John W. Stamper; Duncan Stroik; Samir Younés

Associate Professors:

Aimee Buccellato; Krupali Krusche; David Mayernik; John Onyango; Lucien Steil

Assistant Professors:

Selena Anders; Lisa LoGuidice; Giuseppe Mazzone; Alessandro Pierattini; Kimberly Rollings

Professors of the Practice:

Robert Brandt; Rev. Richard S. Bullene, C.S.C.; Alan DeFrees; Douglas Duany; Julio Cesar Perez Hernandez; Giovanna Lenzi-Sandusky; Ettore Mazzola; John Mellor; Samantha L. Salden Teach

Concurrent Associate Professor:

Robin Rhodes

Concurrent Assistant Professional Specialist:

Brian Smith

Adjunct Professors:

Maddalena Scimemi; Paolo Vitti

Adjunct Associate Professors:

Marianne Cusato; Frank Huderwitz; Richard Piccolo; Todd Zeiger

Visiting Professor:

Judith DiMaio

Programs of Studies. The study of architecture has a long and distinguished history at the University of Notre Dame. Courses in architecture were taught at the University as early as 1869. Formal instruction in architecture began in 1898. The Department of Architecture, previously part of the College of Engineering, became the free-standing School of Architecture in 1994. The school offers a five-year program leading to the degree of Bachelor of Architecture, a two-year program leading to the degree of Master of Architectural Design and Urbanism, and two- and three-year programs leading to the degree of Master of Architecture. The professional degree programs (B.Arch. and M.Arch.) are accredited by the National Architectural Accrediting Board, and the curricula conform to NAAB requirements for the professional degree in architecture.

In the United States, most registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit professional degree programs in architecture offered by institutions with U.S. regional accreditation, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted an eight-year, three-year, or two-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture degree programs may require a preprofessional undergraduate degree in architecture for admission. However, the preprofessional degree is not, by itself, recognized as an accredited degree.

The University of Notre Dame School of Architecture offers the following NAAB-accredited degree programs:

B.Arch. (165 undergraduate credits)

M.Arch. (preprofessional degree + 54 graduate credits)

M.Arch. (non-preprofessional degree + 90 credits)

Next accreditation visit for all programs: 2024

While the primary objective of the curriculum is professional education, students have opportunities to explore fields such as business, engineering, environmental sciences, and the liberal arts through electives and building on University requirements.

In the spring of 2016 the School of Architecture completed its most recent NAAB accreditation evaluation and was granted a full 8-year term of accreditation.

Since the early 1990s, the school's curriculum has been based on education in traditional and classical architecture and urbanism. Instruction teaches

the skills, cultivates the talents, and imparts the knowledge necessary to produce buildings that represent innovation within long-standing traditions, use nature's materials responsibly, and contribute to building livable communities. The school believes this is best done by learning how recurring problems in designing and constructing buildings and fitting them into existing urban and rural settings have been addressed in the past and adapting those lessons to the ever-changing circumstances of the modern world.

The goals of the curriculum include developing competence in the design of individual buildings, understanding the relationship between individual buildings and their physical and cultural contexts, and recognizing the ethical dimensions of the professional practice of architecture. Architects play a primary role in shaping the built environment and have a professional responsibility to do so in a manner that contributes to the civil life of society. Their work must also help to renew and sustain the integrity of the natural world and promote social welfare.

In addition to the first professional degree of Bachelor of Architecture (B.Arch.), the School of Architecture offers multiple paths of study leading to one of three degrees.

The two-year post-professional graduate course of study leads to the Master of Architectural Design and Urbanism (MADU) degree, and is for those who already hold a professional degree in architecture (B.Arch. or M.Arch.).

The two-year professional graduate course of study leads to the Master of Architecture (M.Arch.) degree, and is for those who hold a four-year pre-professional degree (B.S. or B.A. in Architecture).

The three-year professional graduate course of study leads to the Master of Architecture (M.Arch.) degree, and is for those who hold an accredited undergraduate degree in a field other than architecture.

All of these graduate courses of study entail one of three foundational studio courses, a one-year advanced study of architecture and urban design including one semester in Rome, and conclude with a one-semester terminal design project.

Beginning in their penultimate year, graduate post-professional and professional degree students may apply for an additional year of scholarly study in which they develop an individualized curriculum with guidance from a faculty advisor as a foundation for further academic work in their professional careers. Students in this additional scholarly year present their work publicly at the end of that year and may publish or present at academic conferences. Students in the additional scholarly year from the professional degree program will receive both the

SCHOOL OF ARCHITECTURE

professional M.Arch degree and the post-professional Master of Architectural Design and Urbanism (M.ADU) degree.

The Master of Science in Historic Preservation program connects naturally to the professional degree programs within the School of Architecture as the school seeks to not only build on the living tradition of architectural language and support the future of the community, but to care for the structures, spaces, landscapes, crafts, bodies of knowledge, and traditions that represent the best of our varied cultural heritage. The Master of Science in Historic Preservation program covers two calendar years—four semesters (including one semester in Rome), one introductory summer course, and one summer course and/or professional experience.

The Master of Science in Historic Preservation program is open to recent graduates and working professionals with professional or non-professional degrees in architecture.

Concentrations in furniture design, in historic preservation and restoration, and in architectural practice and enterprise, are also options within the first professional (undergraduate) degree program.

Required courses for the concentration in furniture design are Beginning Furniture; Advanced Furniture Design; Special Studies in Furniture Design; and Special Studies in Furniture Design 2.

The concentration in historic preservation and restoration requires four courses: Research and Documentation of Historical Buildings, History of American Architecture (1630–1915), Historic Preservation and Traditional Construction, and History and Theory of Preservation.

Students in the concentration in practice and enterprise take four courses from the Mendoza College of Business: Accountancy I, Principles of Management, and two other courses chosen from offerings in various aspects of business.

Concentrations are declared at the end of the third year. The National Architectural Accrediting Board requires B. Arch students to take at least 45 credit hours outside of architecture. Students taking electives in architecture, either within a concentration or as random electives, may need additional credits outside of architecture to meet the minimum of 45.

All third-year undergraduate students spend the academic year in the school's Rome Studies Center in Italy. All graduate students spend a semester there. Some limited scholarship aid is available for the additional expenses incurred in Rome.

The initial phase of undergraduate architectural study is devoted to acquiring basic design and technical skills and developing an understanding of architectural concepts by learning canonical forms of classical architecture and applying them to design problems of increasing scale and complexity. This beginning study is reinforced in the third year, spent in Rome, where 2,500 years of building tradition

provide the context for contemporary design problems. Fourth-year students return to Notre Dame, where they are reintroduced to the American context. At this stage, students are encouraged to synthesize their interpretations of the historical legacy in the context of American urban centers and small cities. They are also challenged by projects that require them to engage architectural problems outside their Western focus. The undergraduate program culminates with a thesis design project completed in the fifth year.

In addition to studio instruction, students complete course work in structural, mechanical, and environmental systems and architectural history. History and theory courses in the School of Architecture include a two-semester survey of the history of architecture from the earliest times to the present and specialized upper-level course work in selected topics involving the history and theory of architecture.

Students are in contact with practicing professionals through collaboration between the School of Architecture and the Northern Indiana Chapter of the American Institute of Architects. The School of Architecture has an active chapter of the American Institute of Architecture Students.

Fall 2018 will be the School of Architecture's final semester in Bond Hall. The building, the former University Library, is a 60,000-square-foot space containing classrooms, an auditorium, library, computer lab, and studios that are both functional and designed in accord with the historical limestone structure. A workshop for the concentration in Furniture Design is located in Westlake Hall, a short walk from Bond Hall. In fall 2016, construction began for Walsh Family Hall of Architecture. Located in the southeast portion of the main campus, Walsh Family Hall will form part of the University's "Arts Campus." Walsh Family Hall is a 100,000 square foot facility featuring classrooms, studios, an auditorium, library, digital design lab, and furniture workshop, in addition to a Hall of Casts and public plaza. Occupancy is scheduled for January of 2019.

Richard H. Driehaus Prize in Classical Architecture

Richard H. Driehaus, the founder and chairman of Driehaus Capital Management in Chicago, initiated the Richard H. Driehaus Prize in Classical Architecture to honor a major contributor in the field of traditional and classical architecture or historic preservation. In 2004, he initiated the Henry Hope Reed prize to recognize outstanding contributions to the welfare of the traditional city and its architecture. The prizes were established through the University of Notre Dame's School of Architecture because of its reputation as a national leader in incorporating the ideals of traditional and classical architecture into the task of modern urban development.

First Year

First-year students intending to major in architecture take the following courses. Courses in italics need not be taken in the semester in which they are shown.

Course	First Semester Credits	Second Semester Credits
Writing and Rhetoric/ University Seminar	3	3
MATH 10250 and 10270	3	
PHYS 10111 and 10222	3	
2nd Calculus or 2nd Science*		3
History of Social Science or "Integration" course	3	3
ARCH 11011. Graphics I: Drawing	3	
ARCH 11021. Graphics II: Drafting		4
ARCH 10311. Architectural Writings		3
Moreau First Year Experience	1	1
	<hr/> 16	<hr/> 17

The courses listed below indicate the normal sequence for sophomore, junior, senior, and fifth year students majoring in architecture. Courses in italics need not be taken in the semester listed

Sophomore Year

First Semester

ARCH 21111. Design I	6
ARCH 20411. Building Technology I	3
ARCH 20211. Architectural History I	3
Theology I, Foundational	3
Philosophy I, Introductory	3
	<hr/> 18

Second Semester

ARCH 21121. Design II	6
ARCH 20221. Architectural History II	3
ARCH 20511. Structural Mechanics for Architects	3
ROIT 10110. Beginning Italian*	6
	<hr/> 18

Junior Year (Rome Studies Program)

First Semester

ARCH 34112. Design III	6
ARCH 34312. Architectural History III	3
ARCH 34212. Roman Urbanism and Architecture I	3
ARCH 34012. Advanced Graphics: Freehand Drawing	3
	<hr/> 15

STUDENT AWARDS AND PRIZES

Second Semester

ARCH 34122. Design IV	6
ARCH 34322 Architectural History IV	3
ARCH 34222. Roman Urbanism and Architecture II	3
ARCH 34022 Advanced Graphics: Watercolor	3
	<hr/>
	15

Senior Year*First Semester*

ARCH 40411. Environmental Systems I	3
ARCH 41111. Design V	6
ARCH 41011. Graphics V: Computers	3
ARCH 40511. Structural Design for Architects	3
<i>Elective</i>	3
	<hr/>
	18

Second Semester

ARCH 41121. Design VI	6
ARCH 40421. Building Technology II	3
ARCH 40521. Applied Structural Systems	3
<i>2nd Philosophy or a Catholicism in the Disciplines course</i>	3
<i>Elective</i>	3
	<hr/>
	18

Fifth Year*First Semester*

ARCH 51111. Design VII	6
ARCH 50419. Environmental Systems II	3
<i>2nd Theology: Developmental</i>	3
<i>Elective</i>	3
	<hr/>
	15

Second Semester

ARCH 51121. Design VIII (Thesis)	6
ARCH 50711. Professional Practice	3
<i>Elective</i>	3
<i>Elective</i>	3
	<hr/>
	15

***Notes:**

- *Courses in Calculus or Physics strengthen preparation for structures courses. Courses in environmental issues are often pertinent to architecture and may contribute to a sustainability minor.*
- *The four required courses in Architectural History do not count as University core requirement history courses, but do fulfill the "Art & Literature or Language & Culture" requirement.*
- *From the group of History or Social Science or "Integration" course requirements, students must take two of the three, e.g.: An Architecture student with a History minor can count only one History course toward the core, and must take either Social Science or an "Integration" course.*
- *The School of Architecture requires a minimum of 6 credit hours in Italian. This course is the only offering meeting that minimum. Many students opt for the two semester sequence of 4 and 4. Intermediate Italian is offered in Rome.*

Total for five years: 165 semester hours.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Architecture*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Student Awards and Prizes

Frank Montana Rome Scholarship Award. Recipients are selected by the dean, second-year design faculty and the office of financial aid. The Montana scholarships were endowed by Prof. Frank Montana, chair of the Department of Architecture for 25 years and founder of the Rome program. The scholarships are for tuition assistance in connection with the Notre Dame Rome Studies Program.

Nellie Wynn Kervick Award for Design and Drawing. Founded by Prof. Francis W. Kervick, former head of the School of Architecture in memory of his mother, this award, selected by the Rome Studies studio faculty, honors the student whose work in freehand drawing in the third year of study has been of the highest merit.

Alice Wesoloski Scholarship. For her decades of service to the School of Architecture, this award was established in honor of Ms. Wesoloski. Selected by the faculty and the Office of Financial Aid to provide tuition assistance to a student of particular ability, character and need.

The Association of Licensed Architects Undergraduate Student Merit Award. Selected by the fifth-year faculty, the ALA Undergraduate Student Merit Award goes to a graduating student recognized for exemplary achievements throughout the scholastic year.

Brian Crumlish Scholarship. Selected by the faculty, the Brian Crumlish Scholarship is awarded to the student who has displayed outstanding academic achievement in Building Technology and Structural Mechanics during the second year of study, and the Building Technology II and Structural Design during the fourth year of study.

Alliance Architects Scholarship. Selected by the faculty and the Office of Financial Aid to provide tuition assistance to minority students of particular ability and character.

Ray Stuermer Memorial Award for Excellence in Design. Given in memory of former Professor Ray Stuermer, this award, selected by faculty, is given on the basis of design work through the fourth year for overall improvement and design excellence.

Ruiz Award for Excellence in Accessibility Design. Awarded to a rising fifth-year student to recognize their inclusion of accessibility issues in their studio

work. Their work is well designed, demonstrates an awareness of ADA, and goes above and beyond the minimum design standard.

Robert Amico Studio Award. Selected by the dean and faculty for design excellence in the fourth or fifth year of study.

Andrew F. Kervick Award for Design and Drawing. Founded by Prof. Francis W. Kervick, former head of the School of Architecture in memory of his father, this award, selected by the fourth- and fifth-year faculty, honors the student whose work in freehand drawing in the fourth or fifth year has been of the highest merit.

Alpha Rho Chi. Selected by faculty, the Alpha Rho Chi Medal goes to the graduating student who has shown exceptional ability for leadership and has performed willing service for the School.

Ralph Thomas Sollitt Award. Founded in 1931 by Ralph Sollitt and Sons Construction Co., this award, selected by the fifth-year thesis jury, is given to the student who submits the best design as a solution to the thesis architecture problem.

Ferguson and Shamamian Undergraduate Prize. The prize is selected by the jury to recognize superior achievement in classical design for a thesis project and the related investigation of an architectural idea that may serve as an enduring source of architectural inspiration.

Gertrude S. Sollitt Prize for Architectural Structure. Founded in 1931 by Ralph Sollitt and Sons Construction Co., this award, selected by the School's jury, goes to the student who submits the best work as a solution to a special problem in structure assigned in the scholastic year.

Bond Hall Civic Award in Architecture and Urbanism. Given to a graduating student for contribution to a culture of environmental sustainability and civic virtue within the School of Architecture.

Jane Jacobs Award. Selected by the thesis faculty and the dean, this award is for demonstrated commitment to community and urban planning.

Liang Su-Ch'eng Award. Selected by the fifth-year thesis jurors and the dean, this award recognizes excellence in non-Western architecture.

Michael and Julie Hanahan Architecture Prize. Selected by the students, this prize recognizes overall excellence in the study of architecture.

Norman A. Crowe Award. Given to a graduating student for their contributions to the idea of sustainability with respect to architecture and urbanism. Selected by the dean and faculty.

Dean's Award for Design Excellence in Architecture. Selected by the fifth-year thesis jurors and the dean, this award goes to overall excellence in a fifth-year thesis project.

STUDENT ORGANIZATIONS

Rome, Paris, Athens Prize. Selected by the fifth-year thesis faculty and the dean, this award is for the scope of exploration and the quality of individual buildings that successfully unite architecture and urban design.

The Noel Blank Design Awards. Founded by Leon W. Blank in memory of his brother, Noel, this high honor goes to the top two thesis projects as selected by the fifth-year thesis jurors.

Rambusch Prize in Religious Architecture. Selected by the fifth-year thesis jury and faculty, the Rambusch Prize is given for the best solution to a problem related to a religious architecture project.

Tau Sigma Delta Bronze Medal Winner. The Tau Sigma Delta medal is awarded to a graduating student selected by his or her peers in recognition of design excellence.

The St. Joseph Award in Furniture. Selected by the furniture design professor for excellence in furniture design and construction.

Henry Adams Medal. This American Institute of Architecture (AIA) award honors the graduating Bachelor of Architecture and Master of Architecture student who has the highest grade-point average for the complete course of study.

David M. Schwarz/Architectural Services, Inc. Internship and Traveling Fellowship Award. A two-month paid internship for a fourth-year student and for a graduate student entering the final year of his or her program with David M. Schwarz/ Architectural Services, Inc. and a one-month travel fellowship involving independent research and study.

Ferguson & Shamamian Graduate Prize. The prize is selected by the jury to recognize superior achievement in classical design for a thesis project and the related investigation of an architectural idea that may serve as an enduring source of architectural inspiration.

Dean's Graduate Award for Design Excellence in Architecture. Selected by the graduate thesis jurors and the dean, this award goes to overall excellence in a graduate thesis project.

The Association of Licensed Architects Graduate Student Merit Award. Selected by the graduate faculty, the ALA Graduate Student Merit Award goes to a graduating student recognized for exemplary achievements throughout the scholastic year.

Leon Battista Alberti Award. For the graduate student with the highest grade-point average for the complete course of study in the post-professional degree program.

Student Organizations

The American Institute of Architecture Students – Notre Dame Chapter (AIAS-ND). The American Institute for Architecture Students chapter at the University of Notre Dame enlivens the educational and social life of Bond Hall. AIAS-ND enhances the educational process by scheduling visits to active construction sites on campus with the cooperation of the University Architect and inviting guest speakers from nearby AIA chapters. AIAS-ND encourages the culture of hand-drafting and watercolor rendering at the school with an architectural supply closet so members can get what materials they need conveniently and at a discounted rate. In addition to these educational aspects, the club sponsors trips to national and regional events, plans interclass mixers, and holds an annual Beaux Arts Ball in the spring. The goal of AIAS-ND is to spur conversation, curiosity, and passion in this chosen field of study.

The Frank Montana Sketching Club of Notre Dame (FMSCND). The Frank Montana Sketching Club was founded in 2016 to encourage the passion and scholarly collaboration that results from drawing and sketching. Inspired by the travel paintings done abroad by Frank Montana, the Club seeks to instill a love of drawing cultivated not only at school and while in Rome, but throughout one's life. All students at Notre Dame are welcome, and the School of Architecture will be the general headquarters for the club's main activities, including: visits to the Snite Art Museum, sketching and measuring buildings on campus, lectures, and social events.

The National Organization of Minority Architecture Students – Notre Dame (NOMAS-ND). The National Organization of Minority Architecture Students is an organization established to support and encourage students of different races, genders and sexual orientations. NOMAS ND provides mentorship as well as interaction with NOMAS clubs at other schools across the country. The goal of the club is to give minority students a sense of community and provide role models to encourage, inspire, and provide them with a sense of belonging in the field of architecture.

Student Association for Women in Architecture – Notre Dame (SAWA-ND). Student Association for Women in Architecture was founded in 2007 by Mollie Code and Danielle Potts through a grant from the Beverly Willis foundation. The club is open to both undergraduates and graduates in the School of Architecture who support the presence of women and promote gender equality in the industry. SAWA meets throughout the academic year with faculty to discuss current topics relating to the field, foster inter-class mentoring relationship between student, and host panel lectures.

Students for Classical Architecture – Notre Dame (SCA-ND). Students for Classical Architecture's Notre Dame Chapter is a student group focusing on classical architecture in the architectural practice and education of the 21st century. Our Mission

Statement includes: Architecture has its roots in hundreds of years of tradition. Yet, it is common in today's architectural academies that the teaching of this tradition be willfully neglected. As students, we want to learn the fundamentals that have arisen from this tradition so that we might incorporate those principles into our own, contemporary, architecture. SCA will promote discussion regarding how best to incorporate architectural fundamentals into a contemporary curriculum. The Students for Classical Architecture will also support local chapters of this organization at all institutions of higher learning. It is our hope that collaboration between these chapters will encourage dialogue between their respective academic programs, fostering a gradual rebirth of tradition in education.

Students for New Urbanism – Notre Dame Chapter (SNU-ND). Students for New Urbanism (SNU-ND) provides education on the New Urbanist planning approach. The chapter also supports New Urbanism initiatives in the local community. Recently SNU-ND worked with the city of South Bend to develop a renovation plan for the city's Ravina Park. The club also supports student participation in city forums related to downtown revitalization projects including the St. Joseph County Public Library renovation and the South Bend Riverfront redesign. Every year, the club brings planners, architects, and real-estate personnel to give lectures and engage in discussion with the Notre Dame students and faculty to encourage thought and enthusiasm for traditional city-planning.

Tau Sigma Delta. In 1961 the Sigma Chapter of Tau Sigma Delta, the national architectural honor society, was established at Notre Dame. The constitution of Tau Sigma Delta stresses as its sole function the encouragement of high scholastic standing. Election to membership is limited to the top 20 percent of the students in the School of Architecture who have completed 60 percent of their requirements for the professional degree.

ADVISORY COUNCIL

Advisory Council

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College of Arts and Letters

The College of Arts and Letters is the oldest, and traditionally the largest, of the four undergraduate colleges of the University of Notre Dame. It houses 21 departments and several programs through which students at both undergraduate and graduate levels pursue the study of the fine arts, the humanities and the social sciences.

Liberal Education. The College of Arts and Letters provides a contemporary version of a traditional liberal arts educational program. In the college, students have the opportunity to understand themselves as heirs of a rich intellectual and spiritual tradition and as members of a complex national and international society. The faculty of the college are committed to the life of the mind, to the critical and constructive engagement with the whole of human experience. On the basis of a firm yet broad foundation, graduates of the college are equipped for a lifetime of learning in an ever-changing world. The overall curriculum and the specific major programs encourage students to approach issues reflectively, to analyze them carefully and to express their reasoned conclusions with clarity.

The intellectual quest conducted in the College of Arts and Letters takes place in an explicitly Catholic environment. Here ultimate questions of the meaning and value of human life before God are welcome, and efforts to deal with such questions utilize the immense resources of the Catholic tradition. Inquiry and faith are seen not as opposing forces but as complementary elements of the fully human pursuit of truth.

Organization. The college's administrative center is the Office for Undergraduate Studies, located in 104 O'Shaughnessy Hall. All undergraduates in arts and letters are invited to consult with the assistant deans regarding questions about their academic progress, educational and career goals, and any other concerns of an academic or administrative nature. Pre-law, pre-med, and pre-graduate school advising are available in this office. In particular, sophomores in the college who have not yet declared a major should begin their pursuit for academic advising in this office.

Because education is not limited to the classroom, the college also sponsors or helps to subsidize events which are intended to enrich the undergraduate experience and facilitate faculty-student interaction both on and off campus.

Curricula and Degrees. The College of Arts and Letters offers curricula leading to the degree of bachelor of fine arts in Art (Studio and Design) and of bachelor of arts in:

Africana Studies
American Studies

Anthropology
Art
Art History
Art Studio
Design
Classics:
Arabic
Classics
Greek
Latin
Greek and Roman Civilization
East Asian Languages & Cultures:
Chinese
Japanese
Economics
Economics
International Economics—Arabic
International Economics—Chinese
International Economics—German
International Economics—Japanese
International Economics—Romance Languages
International Economics—Russian
English
Film, Television, and Theatre
Gender Studies
German and Russian Languages and Literatures:
German
Russian
History
Irish Language and Literature
Mathematics (honors only)
Medieval Studies
Music
Neuroscience and Behavior
Philosophy
Philosophy/Theology (joint major)
Political Science
Program of Liberal Studies
Psychology
Romance Languages and Literatures:
French and Francophone Studies
Italian
Romance Languages and Literatures
Spanish
Sociology
Theology

The college also offers supplementary majors, but not stand-alone first or degree-yielding majors, in:
Africana Studies (24 hours)
Arts and Letters Pre-health Studies (49 hours)
Art History (24 hours)
Asian Studies (24 hours)
Chinese (24 hours)
Classics (24 hours)
French (24 hours)
Gender Studies (24 hours)
German (24 hours)
Greek and Roman Civilization (24 hours)

Irish Language and Literature (24 hours)
Italian (24 hours)
Japanese (24 hours)
Latino Studies (24 hours)
Medieval Studies (24 hours)
Peace Studies (24 hours)
Russian (24 hours)
Russian and East European Studies (24 hours)
Spanish (24 hours)
Theology (25 hours)

Admission Policies. Admission to the College of Arts and Letters takes place at the end of the first year. The student body of the College of Arts and Letters thus comprises sophomores, juniors and seniors.

A prerequisite for admission of sophomores into the College of Arts and Letters is good standing at the end of the student's first year.

The student must have completed at least 24 credit hours and must have satisfied all of the specified course requirements of the First Year of Studies Program on pages 15–16. A student who does not meet these conditions is retained in the First Year of Studies until the conditions are met. The deficiencies must be removed at the Notre Dame Summer Session or in the student's third semester at Notre Dame.

ADVANCED PLACEMENT / INTERNATIONAL BACCALAUREATE CREDIT:

While the University will not accept AP/IB credit in lieu of University Core requirements, the College of Arts & Letters will accept AP/IB credit in lieu of College requirements. Certain departments will accept AP/IB credit in lieu of major or minor requirements. See the individual department entries for specific details. AP/IB scores may also be used in lieu of a departmental placement exam to place students into upper-level courses.

Degree requirements for the College of Arts and Letters

Students in the College of Arts and Letters are required to complete 122 degree-countable credits. They must also complete all University and College requirements as well as the requirements for one major program of study.

Multi Counting: *College and University requirements* are intended to expose students to a broad range of fundamental courses in multiple disciplines or "ways of knowing" deemed essential for a liberal arts education within the context of a Catholic university. Exposure to these disciplines is normally defined as taking a limited number of courses (typically one or two) within that field or way of knowing. Hence, the College offers a generous multi-counting policy

COLLEGE OF ARTS AND LETTERS

between a student's major(s) or minor(s) and college and/or university general requirements. That is, students will be able to multi-count a course taken to satisfy a college requirement to fulfill a University core requirement; moreover, students will be able to multi-count University or college requirements towards their major and minor requirements. It is further understood that University Seminars and writing-intensive courses are designed to satisfy a Collegiate or University requirement or to be part of a major program of study and thus would be expected to count both towards the University writing requirement and another general requirement and are not discrete required courses.

Cross Counting: A major within the college is intended to provide the student with an in-depth knowledge of a given field. Departments are free to determine the design of the required curriculum for the majors they offer. The College requires only that each major consist of a minimum of 10 courses (30 credit hours) though these courses may multi-count for any University or College requirement, as described above.

Furthermore, if a student chooses to pursue an additional program of study leading towards a second major or a minor within the College, individual courses may cross-count among these programs provided that each major consists of a minimum of 10 discrete courses (or 30 discrete credit hours) and each minor of a minimum of 5 discrete courses (or 15 discrete credit hours). That is to say, *with departmental approval(s)*, students may cross-count courses between a major and a minor, two majors, or two minors in order to satisfy area/field requirements within a major. A single course can therefore form part of multiple majors or minors if it is deemed to provide some skill or knowledge that is essential for each program. For example, a student majoring in two disciplines that require statistics would need (with departmental approval) to take only one such course for the two majors. However, it is required that students substitute another course within one of the majors for the cross-counted course, such that each major will always comprise at least 10 unique courses (or 30 credit hours) in accordance with major requirements. The same obtains for minors: if a course is cross-counted between majors and/or minors, it is expected that each minor will nevertheless consist of a minimum of 5 unique courses (15 credit hours), with another appropriate course replacing the cross-counted course. In each case, however, courses may still multi-count between University or College requirements and major/minor requirements.

SUMMARY OF COLLEGE REQUIREMENTS:

Students in the College of Arts and Letters must fulfill the following specific requirements.

University requirements are described under "University Requirements," in the front section of this *Bulletin*.

Collegiate Requirements

Arts and Letters students are required to take one of each of the following courses, three of which may be double-counted, as appropriate, towards the University Core Requirements designated as Liberal Arts 4, Liberal Arts 5, and Liberal Arts 6:

Literature
Fine Arts
History
Social Science

Such courses must carry the University attribute attesting to its ability to fulfill a requirement in one of those three core categories. The University Core describes one of the options in Liberal Arts as "Art & Literature" meaning one course that is either art or literature. Arts and Letters students need to take both art AND literature.

No courses in logic will satisfy the University philosophy requirement.

Additionally, students must fulfill the following signature requirements of the College of Arts and Letters:

College Seminar
Foreign Language (1–4 courses)

Foreign Language Requirement

The College recognizes that students come to Notre Dame with some foreign language competency, as this is usually a requirement for admissions. Accordingly, students who choose to continue the language they have previously studied will be able to place out of lower-level language courses but must take **at least one language course at the appropriate level** during their undergraduate career at Notre Dame. The foreign language requirement may be satisfied through the study of any modern or classical language offered at the University up to and including **four semesters** (or similar exposure). This will *normally* be a **minimum of 14 credit hours** over four semesters.

Students cannot be exempted from this requirement by placing at a higher level: all students must take **at least one semester** of a foreign language at the appropriate level. Such a requirement recognizes the importance of foreign languages and cultures in our increasingly global society.

Students who enter the University from a high school program where the language of instruction is other than English may be exempted from the foreign language requirement. Such students should petition the dean of the college (or the dean's designate) and may be subject to an oral interview and/or a written exam in the relevant language before the exemption is granted.

Students with disabilities that preclude the oral performance component of a modern foreign language will be expected to take a classical language through the fourth semester (or similar exposure).

College Seminar: Students with significant oral communication disabilities may petition to be exempted from the College Seminar requirement.

Writing Requirement. Students in arts and letters are required to complete one course in their major at the 30xxx or 40xxx level designated as a writing-intensive course. This course may satisfy other distributional requirements within the major. Writing intensive courses require the student to work closely with a professor throughout the semester on a significant written project.

Activity and Experiential Learning Courses. Three elective credits of the required 122 hours can be derived/obtained from the following activity courses:

Band (Marching and Concert)
Orchestra
Chorale
Glee Club
Liturgical Choir
Folk Choir
Music Lessons and Ensembles
Ballet
Debate
Social Concerns Seminars

Exceptions will be made for music majors for music lessons and ensembles. If students complete more than three of these courses, these will appear on a student's transcript, but the extra credits will be subtracted from the student's total number of hours at the time the graduation check is made; hence, these will not count toward the 122 hours needed to graduate.

Pass-Fail. With permission from the academic dean, juniors and seniors may take one non-major, non-required elective course each semester on a pass-fail grading basis. Only the chronologically first course in a student's minor may be taken on a pass/fail basis. These declarations must be made during the enrollment period of each semester, and once made, these declarations are irreversible. No Mendoza College of Business (MCOB) course may be taken pass-fail.

Arts and Letters Degree Credit. Students may not count both examination and degree credit for the same course toward graduation hours. For example, a student who has advanced placement credit for ROSP 20201 may not take ROSP 20201 and count both toward the 122 hours required in arts and letters. Students also may not count for degree credit both of two equivalent courses taught at Notre Dame. For example, PHIL 10101 and 20201 are considered to be equivalent courses, as are ECON 10015 and 20015. Students should take only one of each pair but not both. In cases where a student has double credit for the same course, the credits for only one course will be counted toward the student's degree credit, despite the fact that credits for both will appear on the student's transcript. A list of equivalent math and science courses can be found at the end of the College of Science section

STUDENT AWARDS AND PRIZES

of the *Bulletin*. The same rules about double credit apply to them.

ROTC. Credits received for 10xxx- and 20xxx-level ROTC courses do not count toward a student's 122 required credit hours, despite being recorded on the transcript. They will be manually subtracted from the student's total number of hours in the graduation check and/or electronically in the Graduation Progress System (GPS) software. The College of Arts and Letters accepts a maximum of 12 free elective credits only for ROTC students from the 30xxx- and 40xxx-level military sciences only. Non-ROTC students may not take ROTC courses for credit toward graduation except by special permission obtained in advance of registering for the course from the deans in the Office for Undergraduate Studies. If a non-ROTC student registers in ROTC classes without first acquiring permission, these credits will appear on the student's transcript, but the credits will be subtracted manually from the student's total hours at the time the graduation check is made.

Combination Five-Year Program with the College of Engineering. In 1952, in cooperation with the College of Engineering of the University, the College of Arts and Letters instituted a five-year program that combines a liberal arts program with the requirements of the various engineering programs. Students who complete the combination program will earn two degrees: the degree of bachelor of arts and the degree of bachelor of science in the engineering major pursued. Dual degree students are eligible to join the Reilly Program in Engineering and Arts and Letters described at <http://reilly.nd.edu/reilly-dual-degree-in-arts-and-letters-and-engineering/>.

Study Abroad. In light of the expansion of Notre Dame's education abroad opportunities, students are encouraged to participate in University programs whenever possible. For students whose academic or programmatic needs cannot be met through existing Notre Dame programs, limited exceptions to allow a student to attend non-Notre Dame programs abroad will be made on an individual basis after extensive consultation among the students, their faculty advisors, and the deans.

Student Awards and Prizes

COLLEGIATE AWARD IN MODERN AND CLASSICAL LANGUAGES

The Robert D. Nuner Modern and Classical Language Award—presented to the graduating senior in the College of Arts and Letters with a first or second major in any classical or modern foreign language, who has earned the highest cumulative grade point average.

AFRICANA STUDIES

The Wright, Flint-Hamilton & Mason Directors Award—recognizing excellence in research on a topic exploring social, political, economic and/or cultural aspects of the African and African American Diaspora.

AMERICAN STUDIES

The J. Sinnott Meyer Award for Outstanding Service to the Community—J. Sinnott Meyer was to have graduated from Notre Dame in the spring of 1920. Instead, he died in February of that year. Mr. and Mrs. A.R. Meyer of Paducah, Kentucky, established the J. Sinnott Meyer "Burse" in memory of their beloved son. The Meyer Award is given for outstanding service to the community here at Notre Dame and beyond (i.e., local, state, and national levels of service). This award is available to an American Studies senior major.

The James E. and Barbara Murphy Award for Exceptional Journalism—A 1947 graduate of Notre Dame, James E. Murphy entered the world of journalism while doing graduate work at the Medill School of Journalism, Northwestern University. He then joined ABC News Radio Network as a writer/editor. Murphy migrated to the field of public relations, returning to his alma mater as director of public information. From that day until his last assignment overseeing Notre Dames' 150th birthday commemoration, Murphy's influence was felt over the entire panoply of activities advancing the image of the University. After serving as the guiding hand of public relations for more than four decades, he retired as associate vice president for university relations. The Murphy award is given for exceptionally submitted journalism. This award is available to any American Studies major or journalism minor.

The Paul Neville Award for Excellence in Journalism—After graduating from Notre Dame in 1942, Paul Neville joined the *South Bend Tribune* as chief political reporter, then served as sports and managing editor. In 1957 he left to become managing editor of the *Buffalo Evening News*. Eventually, he was named executive editor of that paper. The Neville Award is for excellence in journalism. This award is available to an American Studies major or journalism minor.

The Professor James Withey Award for Notable Achievement in Writing—The Professor James Withey Award is given for notable achievement in writing. The department conducts a writing contest for seniors in honor of a legendary teacher of writing at Notre Dame. According to Thomas Stritch, professor emeritus and a former student of Withey, "Withey was the best teacher I ever saw in action. He was not a prophet, like Frank O'Malley or Joe Evans, and he would not let a coterie or cult develop around him. He taught as a charity, God's work, and while he had the strongest likes and dislikes I ever saw, he gave each student his money's worth." This award is available to an American Studies major.

ANTHROPOLOGY

The Peter Brown Professional Achievement Award—awarded to the anthropology student with outstanding performance in the tasks of a professional academic in one or more of the following areas: publication, presentation at professional meetings, grants, and fellowships.

The David Huffman Scholar/Athlete Award in Anthropology—awarded to the student with outstanding performance in the major and in athletics.

The Irwin Press Prize in Medical Anthropology—awarded for the best paper in medical anthropology.

The Father Murray Integrative Award in Anthropology Paper Award—awarded to the best student paper that crosses traditional boundaries and draws from a range of different areas of scholarship to develop a fuller understanding of being and becoming human.

The Julian Samora Award—awarded to the student demonstrating broad engagement with academic life.

ART, ART HISTORY, AND DESIGN

The Walter Beardsley Award—awarded for excellence in the MFA/BFA show.

Grief/Art Awards—awarded to outstanding senior BFA students to defray the cost of their thesis exhibitions.

Emil Jacques Medals for Work in the Fine Arts—a gold and a silver medal are awarded for excellence in studio art to undergraduates pursuing a BFA.

Mabel L. Mountain Memorial Art Award—awarded for excellence in studio art.

The Radwan and Allan Riley Prize in Design—awarded to a senior design major for excellence in his or her respective field.

The Radwan and Allan Riley Prize in Studio Art—awarded to a senior studio art major for excellence in his or her respective field.

The Radwan and Allan Riley Prize in Art History and Criticism—awarded for the best essay in art history or criticism submitted by an undergraduate or graduate student.

Eugene M. Riley Prize in Photography—awarded to an undergraduate or graduate photography major for excellence in photography.

Father Anthony J. Lauck, C.S.C. Award—awarded to a senior BA for excellence in his or her respective field.

Judith A. Wrappe Memorial Award—awarded to an outstanding junior studio/design major. It is presented at the beginning of the student's senior year of study.

STUDENT AWARDS AND PRIZES

ARTS AND LETTERS PRE-HEALTH

The Dr. Robert Joseph Barnet Award—presented to an outstanding Arts and Letters pre-health senior who has demonstrated, in addition to excellent character, superior academic achievement across the arts and sciences.

The Dr. John E. Burke Award—presented to an outstanding Arts and Letters pre-health senior who has demonstrated, in addition to excellent academic achievement, outstanding leadership qualities through service within and/or beyond the Notre Dame community.

ASIAN STUDIES

The Liu Family Distinguished Achievement Award in Asian Studies—awarded to a senior for excellence in Asian Studies.

CLASSICS

Departmental Award in Greek, Latin, or Arabic—awarded when merited to a graduating senior for excellence in the study of Greek, Latin or Arabic.

The Helen Hritzu and Jewell Erickson Award—for excellence in Classics/Arabic Studies.

EAST ASIAN LANGUAGES & CULTURES

Liu Institute for Asia and Asian Studies Undergraduate Essay Award—awarded to the student with the best undergraduate essay in Asian Studies.

East Asian Languages and Cultures Award—awarded to a senior for excellence in the study of Chinese.

East Asian Languages and Cultures Award—awarded to a senior for excellence in the study of Japanese.

East Asian Languages and Cultures Award—awarded to a senior for excellence in the study of Korean.

ECONOMICS

The John Joyce Award on the American Worker—given as merited to the best undergraduate short story or poem on the “American Worker,” by the Higgins Labor Studies Program and the Economics Department. (There is also a graduate award for the best graduate essay).

John Harold Sheehan Prize Essay Award—given to the senior economics major who has written the best senior honors essay in economics.

The Weber Award—awarded to the senior economics major who has achieved the highest academic average.

ENGLISH

The Billy Maich Academy of American Poets Award—awarded to the undergraduate or graduate student submitting the best collection of original poetry.

Eleanor Meehan Medal for Literary Merit—presented to the English major who submits the best original critical essay written for an English course.

The James E. Robinson Award—presented to the outstanding senior English major.

The Ernest Sandeen Poetry Award—awarded to the undergraduate submitting the best original poetry.

The Richard T. Sullivan Award for Fiction Writing—awarded to the undergraduate who submits the best original fiction manuscript.

FILM, TELEVISION, AND THEATRE

The Reginald Bain Award—awarded to a Notre Dame student who produced remarkable theatre projects from any area of theatre during the academic year.

Catherine Hicks Award—awarded to an outstanding graduating senior in theatre.

Joseph P. O'Toole Jr. Award—awarded to the outstanding graduating senior in film studies.

The Award in Television Studies—awarded to a graduating senior for outstanding work in television studies.

GENDER STUDIES

The Boehnen Fund for Excellence in Gender Studies Summer Internship Grant—awarded to gender studies students to support summer internships.

The Genevieve D. Willis Endowment for Excellence Research Grant—awarded to gender studies students to support senior thesis research.

The Genevieve D. Willis Senior Thesis Prize—awarded for the best thesis written by an undergraduate at Notre Dame on a topic related to gender studies.

The Philip L. Quinn Essay Prize—Awarded for the best academic essay written by an undergraduate at Notre Dame on a topic related to gender studies.

GERMAN AND RUSSIAN LANGUAGES AND LITERATURES

The Rev. Lawrence G. Broestl, C.S.C., Award—presented to the graduating senior with the best academic achievement in German.

Delta Phi Alpha German Honor Society Award—awarded to a graduating senior for outstanding achievement in the study of German language and literature.

Jeffrey Engelmeier Award—presented to an outstanding student of German whose leadership and contribution to the life of the department are especially conspicuous.

The Russian Senior Award—presented to the graduating senior with the best academic achievement in Russian.

The Lauren B. Thomas Scholarship—awarded by the Russian faculty to an outstanding Russian major who exhibits financial need.

HISTORY

The Monsignor Francis A. O'Brien Prize—presented to the senior who has achieved distinction with the best essay in history.

The O'Connell Award—an annual award for the best sophomore or junior essay in history.

The O'Hagan Award—awarded to the undergraduate who has submitted the best original essay on a phase of Irish history.

The Senior Honors Thesis Award—awarded for the best history thesis by a senior history major.

IRISH LANGUAGES AND LITERATURE

The Brother Simeon Prize for Distinction in Irish—for excellence in Irish language and literature.

IRISH STUDIES

The Donald and Marilyn Keough Award—for excellence in Irish Studies.

JOHN J. REILLY CENTER

John Jay Reilly Scholar in Arts and Letters and Engineering Dual Degree Award—for exhibiting high standards of excellence and outstanding academic achievement.

MEDIEVAL STUDIES

Robert M. Conway Prize in Medieval Studies—given to a graduating senior who has written the best essay on a medieval subject.

MUSIC

Department of Music Senior Award—awarded to an outstanding senior in the Music Department.

PHILOSOPHY

The Dockweiler Medal for Philosophy—presented to the senior submitting the best essay on a philosophical subject.

The John A. Oesterle Award in Philosophy—awards given when merited to graduating philosophy majors for excellence in philosophy.

POLITICAL SCIENCE

The Gary F. Barnabo Political Science Writing Award—awarded for the best paper contributing to nonviolent solutions to world conflicts.

Paul Bartholomew Essay Prize—awarded to the senior major submitting the best senior honors essay in the fields of American politics or political theory.

SERVICE AWARDS

The Guillermo O'Donnell Prize—for the best senior thesis in the field of comparative politics.

The Stephen Kertesz Prize—awarded to a senior major submitting the best senior honors essay in the field of international relations or comparative politics.

The Rooney Center for the Study of American Democracy Award—awarded to the student who submits the best senior honors thesis in the field of American politics.

PROGRAM OF LIBERAL STUDIES

The Otto A. Bird Award—awarded to the Program of Liberal Studies student who submits the best senior essay.

The Susan Marie Clements Award—awarded to a woman among the Program of Liberal Studies graduating seniors who exemplifies outstanding qualities of scholarly achievement, industry, compassion, and service.

The Edward J. Cronin Award—awarded annually to a student who submits the best essay in a Program of Liberal Studies course.

The Willis D. Nutting Award—given to the senior major who best embodies the department's high teaching and learning ideals.

The Stephen Rogers Award—presented to an outstanding Program of Liberal Studies senior pursuing graduate study.

PSYCHOLOGY

The John F. Santos Award for Distinctive Achievement in Psychology—to a senior psychology major in recognition of outstanding achievement in research, academic performance, and student-life activities.

Senior Recognition Award in Psychology—given in recognition of outstanding achievement in research, academic performance, and student-life activities, while pursuing a major course of study in psychology.

ROMANCE LANGUAGES AND LITERATURES

Robert D. Nuner Award—presented to the graduating senior in the College of Arts and Letters with a first or second major in any classical or modern foreign language who has earned the highest cumulative grade point average.

Endowment for Excellence Award in Romance Languages and Literatures—presented to a graduating senior for excellence in Romance languages and literatures.

Walter Langford Awards for Excellence in Spanish Literature and Excellence in French Literature—two awards—to the graduating senior majors in French and Spanish literature whose work was deemed most outstanding by the Romance languages and literatures faculty.

The Joseph Italo Bosco Senior Award—awarded to a graduating senior for excellence in Italian Studies.

SOCIOLOGY

The Margaret Eisch Memorial Prize in Sociology—awarded to an outstanding graduating senior majoring in sociology.

The Sociology Major Essay Award—presented to the senior sociology major who has written the best essay.

THEOLOGY

The Gertrude Austin Marti Award in Theology—presented to a graduating senior who has evidenced qualities of personal character and academic achievement in theological studies.

The Rev. Joseph H. Cavanaugh, C.S.C., Award—awarded to the senior who has evidenced high qualities of personal character and academic achievement, particularly in theological studies.

Service Awards

AMERICAN STUDIES

J. Sinnott Meyers Award—awarded to a senior in American Studies for outstanding service to the academic community.

ECONOMICS

Lawrence J. Lewis Award—awarded to the senior in the Department of Economics who has best distinguished himself or herself in community service.

MUSIC

Band Vice President Prize—annual award to the elected vice president of the band.

Terry Baum Secretary Prize—awarded to the secretary of the band and presented by the University of Notre Dame.

Halland President's Prize—annual award for the outgoing president of the band.

Thomas J. Kirschner Band Treasurer Prize—annual award to the elected band treasurer.

The Kobak Memorial Scholarship—for outstanding instrument achievement for band.

Robert F. O'Brien Award—for outstanding service and dedication to the band.

Outstanding Band Member Award—for loyalty, dedication, and leadership.

Outstanding Marching Band Award—awarded for dedication, ability, and leadership during marching band season.

The Daniel H. Pektke Memorial Award—presented to two underclassmen in the Notre Dame Glee Club

in recognition of musical leadership, exemplary personal character and overall contribution to the success of the group.

Gerald J. Smith Memorial Award—awarded for citizenship and loyalty to band.

Social Chairperson Award—plaque given annually to the social chairperson in appreciation for dedication and service to the Notre Dame bands.

PEACE STUDIES

The Peter Yarrow Award in Peace Studies—awarded to an outstanding student in Peace Studies with a commitment to justice and service work.

POLITICAL SCIENCE

George Brinkley Service Award—awarded to the student who best exemplifies the Political Science Department's ideal of public service through service to the department, the University, or the wider community.

ROMANCE LANGUAGES AND LITERATURES

Carlos Aballi Award in Hispanic Cultural Awareness—given to a graduating Hispanic student who has taken Spanish at Notre Dame and has been active in promoting Hispanic cultural awareness at Notre Dame.

The Mara Fox Award for Service to the Hispanic Community—awarded to a graduating senior who has performed outstanding service benefiting the Hispanic community.

William Richardson Award in Hispanic Culture for an African American Student—given to a graduating African American student who has shown an unusually strong interest in Hispanic culture through his or her active participation in campus and/or community projects or activities.

José Tito Sigenza Award for Service to Hispanic Youth—awarded to the senior who has studied Spanish at Notre Dame and contributed outstanding service to Hispanic youth.

SPECIAL ARTS AND LETTERS REQUIREMENTS

Special Arts and Letters Requirements

Language Requirement. Students without Advanced Placement or SAT II credit, but who come with some background in the language they elect will be placed by examinations given during first-year orientation and prior to spring preregistration. Departmental placement exams will not be credit-bearing. Students may receive up to 8 hours of credit based on their scores on the AP and SAT II tests. If, for some reason, more than 8 hours of credit appear on the transcript, the credits beyond 8 will be non-counted and will be manually subtracted from the total number of degree credits counting for graduation. Regardless of the scores on these exams, it is impossible for a student to test out of the language requirement in the College of Arts and Letters. Every student in arts and letters must take at least one course at the appropriate level that deals with texts in the original language. For the specific details of a given language offering or program, check with the relevant department.

College Seminar. The College Seminar is a unique one-semester course shared by all students majoring in the College of Arts and Letters. Typically taken in the sophomore year, the course offers students an introduction to the diversity and distinctive focus of arts and letters at the University of Notre Dame. Specific sections of the College Seminars vary in their topics and texts, but all feature an interdisciplinary approach, commitment to engaging important questions, employment of major works, and emphasis on the development of oral skills. Every College Seminar syllabus will include works that approach the topic from the perspective of each of the three divisions of the college: the arts, humanities, and social sciences.

Arts and Letters Programs

The programs offered by the College of Arts and Letters include majors, supplementary majors, and minors, which may be either departmental or interdisciplinary. Every student in the college must complete one major sequence. Supplementary majors and minors are optional and may be taken to supplement or enhance a student's major but do not lead to graduation in and of themselves.

Majors

A major sequence is a carefully chosen combination of courses from an individual department or program that stands alone in qualifying students for an undergraduate degree. It usually consists of between 8 and 12 courses. In contrast to the University and college requirements that provide students with broad exposure to a variety of the liberal arts and sciences, the major affords the student an opportunity

to gain more specialized knowledge of a particular field or discipline.

The major in liberal arts programs is normally declared during the sophomore year and is completed during the junior and senior years. Arts and Letters students must declare at least one major no later than the sixth class day of first semester of senior year. Each spring before preregistration, the college holds a series of programs and meetings to inform the students about the various majors so that they may make informed choices. Students pursue their majors under the direction of the departmental or program chair and its advising staff.

Supplementary majors are those that cannot stand alone in qualifying a student for an undergraduate degree but must be taken in conjunction with a primary major. They include both interdisciplinary and departmental offerings.

Minors

Minors are typically five-course sequences, and the college offers two categories of minors: Departmental and Interdisciplinary.

Departmental:

Africana Studies
 Anthropology
 Art History
 Art Studio
 Business Economics
 Chinese
 Classics
 Mediterranean/Middle Eastern Studies
 Collaborative Innovation
 Gender Studies
 German
 Greek
 History
 Irish Language and Literature
 Italian
 Japanese
 Korean
 Latin
 Philosophy
 Portuguese and Brazilian Studies
 Russian
 Russian Studies
 Sociology
 Data Science
 Theology

For details, see the departmental descriptions in the section "Programs of Study."

Interdisciplinary:

Catholic Social Tradition
 Computing & Digital Technology
 Constitutional Studies
 Education, Schooling, and Society
 Hesburgh Program in Public Service
 Journalism, Ethics, and Democracy
 Latino Studies
 Linguistics

Liturgical Music Ministry
 Medieval Studies
 Musical Theatre
 Philosophy, Politics, and Economics
 Philosophy, Religion, and Literature
 Philosophy, Science, and Mathematics
 Poverty Studies
 Science, Technology, and Values
 Teaching English to Speakers of Other Languages

Electives

In addition to the university and college requirements and the major requirements, the balance of a student's usual five-course-per-semester program consists of elective courses, which can be drawn from the offerings of any department or college that are open to non-majors who have met the necessary prerequisites.

AFRICANA STUDIES

Africana Studies

Chair:

Dianne Pinderhughes, Professor, Political Science and Africana Studies

Joint Faculty:

Paulinus Odozor, Associate Professor, Theology and Africana Studies

(The Rev.) Hugh R. Page Jr., Dean, First Year of Studies; Vice President and Associate Provost for Undergraduate Studies; Professor, Theology and Africana Studies

Richard B. Pierce, John Cardinal O'Hara, C.S.C., Associate Professor, History and Africana Studies

Dianne Pinderhughes, Professor, Africana Studies and Political Science

Maria McKenna, Associate Professor of the Practice, Africana Studies and Education, Schooling, and Society

Ernest Morrell, Professor, Africana Studies, English, and IEL; Coyle Professor of Literacy Education

Mark Sanders, Professor, Africana Studies and English

Emeritus Faculty:

Stuart Greene, Africana Studies and English

Affiliated, Concurrent, and Adjunct Faculty:

Jaimie Bleck, Associate Professor, Political Science

Catherine Bolten, Associate Professor, Fellow, Kellogg Institute for International Studies

Darren Davis, Professor, Political Science

Robert A. Dowd C.S.C., Associate Professor, Political Science

Cyrainna Johnson-Roullier, Associate Professor, English

Paul V. Kollman C.S.C., Associate Professor, Theology; Fellow, Kroc Institute for International Peace Studies; Director, Center for Social Concerns

Erin McDonnell, Assistant Professor, Sociology

Rory M. McVeigh, Professor, Sociology

Paul Ocobock, Associate Professor, History

Rahul Oka, Assistant Professor, Anthropology; Fellow, Kellogg Institute for International Studies; Fellow, Joan B. Kroc Institute for International Peace

Jacquetta Page, Adjunct Assistant Professor, Africana Studies

Jason M. Ruiz, Associate Professor, American Studies; Fellow, Institute for Latino Studies

Todd David Whitmore, Associate Professor, Theology; Fellow, Joan B. Kroc Institute for International Peace Studies

Office Coordinator:

Gayle Wilson, Africana Studies

Please contact the Department of Africana Studies at 631-0397 or contact Maria McKenna at mmckenn9@nd.edu.

The Department of Africana Studies at the University of Notre Dame is dedicated to the holistic and integrative study of Africans and people of African descent in the Americas and the global diaspora. Building on the legacy of the former African and African American Studies Program (1967–2005), the department emphasizes a cross-regional, cross-cultural perspective, a comparative analysis of and between different diasporan groups and the national and global contexts they inhabit. This multidisciplinary department seeks to explore the history, society, politics, economic development, philosophical, theological and theoretical perspectives, literature, arts, religions, and cultures of the peoples of Africa and the African diaspora. Its comparative and relational foci highlight the connections between culture, race, gender, class, nationality, and other categories of identity and experience.

The Department of Africana Studies aspires to become a center for academic and community activity, an innovative centerpiece for the University of Notre Dame. Undergraduates draw on a range of academic and community activities designed to stimulate intellectual inquiry, excellence in scholarship, and creative engagement.

Program of Studies. The major, supplementary major, and minor in Africana Studies offer: (1) a disciplined and rigorous intellectual environment to study the histories, literatures, languages, and cultures of African and Afrodiasporan peoples; and (2) an intellectual appreciation of the richness, diversity, and complexity of the African American experience—particularly when it is viewed within national and global contexts.

The department also has opportunities for dialogue, reflection, and social engagement within and beyond the classroom. Upon completion of all requirements, students will have received both a solid introduction to the discipline of Africana Studies and an appreciation of how it interfaces with other areas in the humanities, arts, social sciences, and theological disciplines.

Africana Studies degree options for Notre Dame undergraduates consist of a major (30 credit hours), including a “capstone” experience consisting of a senior project or thesis, an interdisciplinary minor (15 credit hours) and a supplementary major (24 credit hours).

Beginning in the fall of 2018, the Department of Africana Studies will accept one University Seminar taught in Africana Studies (AFST 13181/13184) as an elective course for our majors and minors. Additionally, the Department will accept the AP Research Seminar: African Diaspora course with a score of five for one elective course for our majors and minors. Students may multi-count an unlimited number of major and minor requirements with college and university requirements where applicable attributes apply.

Major (30 credit hours)

Introduction to Africana Studies (3 credit hours)

Interdisciplinary Requirement (9 credit hours)

Students will choose one AFST course from each of the following disciplines: literature/fine arts, history, and social science.

Senior Project or Senior Thesis (6 credit hours)

Four elective AFST courses (12 credit hours)

Supplementary Major (24 credit hours)

Introduction to Africana Studies (3 credit hours)

Interdisciplinary Requirement (9 credit hours)

Students will choose one AFST course from each of the following disciplines: literature/fine arts, history, and social science.

Four elective AFST courses (12 credit hours)

Minor (15 credit hours)

Introduction to Africana Studies (3 credit hours)

Interdisciplinary Requirement (9 credit hours)

Students will choose one course from each of the following disciplines: literature/fine arts, history, and social science.

One elective AFST course (3 credit hours)

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Africana Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

AMERICAN STUDIES

American Studies

Interim Chair:

Jason Ruiz

Director of Undergraduate Studies:

Sophie White

W. Harold and Martha Welch Professor America Studies

Thomas Tweed

Professors:

Erika Doss; Thomas Tweed; Robert Schmuhl

Professor Emeritus:

Thomas J. Schlereth; Ronald Weber; Robert Schmuhl

Associate Professors:

Annie Gilbert Coleman; Jason Ruiz; Kathleen Sprows Cummings; Benedict Giamo; Sophie White

Assistant Professors:

Perin Gurel; Korey Garibaldi; Jennifer Huynh

Associate Professional Specialist:

Richard Jones

Assistant Professional Specialist:

Robert Walls

Adjunct Assistant Professor:

Victoria St. Martin

Adjunct Associate Professor:

Jack Colwell

Concurrent Faculty:

Gail Bederman (History); Catherine Cangany (History); Jon Coleman (History); Brian Collier (ACE); James Collins (Film, Television and Theatre); Dennis Doordan (Architecture); Stephen Fredman (English, emeritus); Patrick Griffin (History); Sandra Gustafson (English); Eugene Halton (Sociology); Darlene Hampton (FYS); Cyra Johnson-Roullier (English); Michael Kackman (FTT); Mary Kearney (FTT); Kate Marshall (English); Timothy Matovina (Theology); Terry McDonnell (Sociology); John McGreevy (History); Rebecca McKenna (History); Susan Ohmer (Film, Television, and Theatre); Richard Pierce (History); Dianne Pinderhughes (History); Valerie Sayers (English); Kerry Temple (*Notre Dame Magazine*); Laura Dasso Walls (English); Matthew Wilkens (English); Pamela Wojcik (Film, Television and Theatre).

The Discipline. Since its inception in the late 1930s, the discipline of American Studies has aimed to foster new understandings of America and its multiple peoples and cultures in a rapidly changing world. Its focus on the historical and intellectual underpinnings of the cultures, societies, religions, and politics of colonial America and the United States has continually returned to one central question: What does it mean to be an American? As the answers to this question have changed in response to demographic, economic, and political transformations, the discipline of American Studies has continually re-examined its methods and central questions. Shifting from an earlier emphasis on American uniqueness, or exceptionalism, American

Studies has been for the past several decades the academic discipline most creatively and rigorously engaged in analyzing the complex and multi-layered expressions of American pluralism and diversity.

Program of Studies. American Studies offers interdisciplinary perspectives on American cultures and societies, American identities, and American political cultures and institutions. The curriculum introduces students to the major ideas and methods of the discipline, hones critical understandings of these methods in advanced courses, and ends with senior level seminars aimed at the highest level of research. To add stature and credibility to the major, a 6-credit Senior Thesis is offered, allowing exceptional students the opportunity to sharpen their critical abilities and improve their research techniques by developing a year-long project.

Students are introduced to the themes and issues dominant in American Studies (AMST) in Introduction to American Studies, taken at the freshman or sophomore level and intended as a gateway to the major. This required course, which explores key concepts, texts, and methods in American Studies and familiarizes students with the discipline's working vocabulary and practices, is offered in the fall semester, and should be taken before students take AMST courses at the 30000 level. It may be taken concurrently with a 30000-level course in AMST, pending approval of a faculty advisor in American Studies.

The introductory course is followed by eight different upper-level courses in AMST, each of which continues to explore concepts, texts, and methods particular to the discipline of American Studies.

Of the eight upper-level courses, up to two "outside" courses may be taken from different departments, either on campus or through an off-campus Notre Dame program, as long as they are cross-listed with American Studies or otherwise approved by the Director of Undergraduate Studies.

Finally, AMST majors complete their coursework with the Senior Seminar in American Studies, a required 40000-level course which serves as a capstone to the major. Requirements include seminar-style discussions and a significant research project.

American Studies Major Requirements:

Students must complete the general requirements of the College of Arts and Letters and 30 credit hours in American Studies, including the introduction to American Studies, 8 upper-level courses, and a senior seminar.

Internships. Students are encouraged to pursue internships over the summer and during the semester that enhance and apply their coursework in American Studies. If the internship is not paid and relates to American Studies, students may earn elective credit for that experience, upon approval from the Director of Undergraduate Studies. For further

details, please review the description for the course AMST 25001 "Internship in American Studies."

Study Abroad. Upon approval of the Director of Undergraduate Studies, students may take up to 6 credit hours of course work abroad towards the major.

American Studies Senior Thesis. A senior thesis is a year-long research project developed with a faculty advisor that attempts to make a contribution to the field of American Studies. The final project may take on a variety of forms, including a scholarly paper, narrative nonfiction essay, journalistic article or series of articles, documentary film, or museum exhibition. The opportunity to write a Senior Thesis in American Studies is open to any major with a GPA of 3.5 or higher within the major as of January of their junior year. In exceptional circumstances students with a GPA below 3.5 may apply. Writing a thesis is a chance to do original research and explore a topic of your choice, to develop a deeper relationship with a faculty member, and to put what you've learned as an American Studies major into practice. It is also a significant commitment. Students need one if they want to earn departmental honors in American Studies, but they do not need one to satisfy the requirements for the major. Students writing a senior thesis must register for 6 credit hours in addition to the 30 required for the major, distributed as noted below. **Note:** Students writing a senior thesis may substitute the senior seminar requirement with one additional 30000-level course.

Students choosing to write a senior thesis will submit a formal application to the department by April 1 of their junior year, which requires: 1) An idea for the project, including central research questions, sources and research that will answer those questions, the student's method or approach, and the shape of the final project; 2) A primary advisor who has agreed to help with the project. The primary advisor must be a full-time tenured or tenure-track faculty member in AMST and will be the instructor of record for the thesis project; 3) Information on grants applied for and won. Application forms and additional information are available through the departmental website.

Once accepted, students should confirm their plans with their primary advisor and be sure to register in the fall for the **Senior Thesis AMST 43909** (3 credit hours). This course is limited to thesis writers, will meet during a regular class time, and is required. It is designed to help students develop their thesis projects, conduct research, and think about how their work relates to the field of American Studies. Students will work closely with the instructor and their primary advisor, and less formally with a secondary advisor of their choice. Students writing a thesis and thus enrolled in The Senior Thesis AMST 43909 have the option to take, as their tenth class required for the major, either a senior seminar or an additional "inside" 30000-level class. In the spring students will register for **Senior Thesis Writing AMST 47910** (3 credit hours). This course

ANTHROPOLOGY

is independent work with the primary advisor; students will complete their research and writing, as well as plan and give presentations of their work. The final senior thesis project is due in early April.

Thesis writers are expected to fulfill all the requirements for the major and remain in good academic standing. Those who fail to show good progress or maintain a satisfactory GPA will be asked to abandon their thesis project. Theses will be evaluated by both the primary and secondary advisors. Students will present their projects to students and faculty in April at the departmental celebration of research; presentation at the Notre Dame Undergraduate Scholar's Conference is encouraged. Every thesis will be honored at the departmental commencement event and recognized on the departmental website.

Departmental Honors. Completion of a senior thesis is a central requirement for earning departmental honors, but not the only one. Honors in American Studies will be conferred upon graduating seniors in three levels: highest honors, high honors, and honors, based on 1) the originality and significance of the student's senior thesis; 2) the excellence of the student's GPA in the major as of January senior year; and 3) the student's degree of engagement with the field of American Studies, as demonstrated by participation in relevant lectures, conferences, internships, grants and fellowships, conversations with scholars, and completion of additional advanced courses. All students receiving honors will be recognized at the departmental commencement ceremony. For more information see the departmental website or contact the Director of Undergraduate Studies.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting one or more of the following subjects:

- *American Studies*
- *Journalism, Ethics & Democracy*

Course descriptions can be found by clicking on the subject code and course number in the search results.

Anthropology

Chair:

Agustín Fuentes

Edmund P. Joyce Professors of Anthropology:

Roberto A. DaMatta (emeritus); James J.

McKenna

Professors:

Susan Blum; Leo A. Despres (emeritus); Agustín Fuentes; Ian Kuijt; Carolyn Nordstrom (emerita); Irwin Press (emeritus); Mark R. Schurr

Associate Professors:

Maurizio Albahari; James O. Bellis (emeritus); Catherine Bolten; Meredith S. Chesson; Rev. Patrick D. Gaffney, C.S.C. (emeritus); Donna Glowacki; Joanne M. Mack (emerita); Kenneth E. Moore (emeritus); Susan G. Sheridan; Vania Smith-Oka

Assistant Professors:

Christopher Ball; Alex Chávez; Lee T. Gettler; Mark Golitko; Rahul Oka; Natalie Porter

Director of Graduate Studies

Vania Smith-Oka

Director of Undergraduate Studies

Eric Haanstad

Affiliated Faculty

Ann-Marie Conrado, Concurrent Assistant Professor, Art, Art History and Design; Paulette Curtis, Associate Professional Specialist; Diarmuid Ó Giolláin, Professor, Department of Irish Language and Literature; David Hernandez, Assistant Professor, Department of Classics; Carlos Jáuregui, Associate Professor, Romance Languages; Peter Jeffery, Professor, Department of Music; José Limón, Professor, Department of English, Fellow, Institute for Latino Studies; Matthew Ravosa, Professor, Department of Biological Sciences; Karen Richman, Director, Associate, Professional Specialist, Border and Interamerican Affairs; Deborah Rotman, Associate Professional Specialist; John Sherry, Professor, Department Chair Marketing; Lawrence Sullivan, Professor, Department of Theology; Robert Walls, Concurrent Assistant Professor, Department of American Studies; Todd Whitmore, Associate Professor, Department of Theology

Program of Studies. The undergraduate program in anthropology is designed to provide each student with a broad, holistic, integrated and species-wide perspective on contemporary human behavior. Anthropology may be the only major that provides significant intellectual and professional links with the humanities and other social science fields, while also providing separate bridges into both the natural sciences and the field of business. In so doing the anthropology major prepares students for successful entry into any number of fields and disciplines and their appropriate professional graduate schools, including medical schools, public health, and law. Human evolutionary models, critical comparative analyses, ethnographic methods, and a variety of developmental approaches are taught and applied in

our classes to such diverse topics and research areas as: health; illness; addiction; human communication (verbal and non-verbal); human origins; the nature of social groups; the family; worldwide political and socio-economic systems; religion; warfare; infancy and childhood; non-human primate ecology and behavior; archaeology, prehistory, and ethnology; sexuality; museum studies; evolutionary medicine; transnationalism; sex and gender; food; and medical anthropology. Geographic specialties of the faculty include China, Southeast Asia, North America, Latin America, Russia, Italy, Ireland, Egypt, Central and Southern Africa, and the Middle East.

In moving toward our goal to achieve national prominence as one of the top undergraduate research and teaching departments in the nation, our faculty stress the importance of innovative and significant undergraduate research. We aim to provide as many majors as is possible with hands-on research experiences in both the field and laboratory. Smithsonian and Chicago Field Museum summer research internships created by the department are available to majors. The department also administers a paid summer internship with J.F. New Environmental Consultants. It is common throughout the school year and summer that the faculty pair up with students to conceptualize and work together on research projects both here and abroad. Often this collaborative research leads to joint publications. Our undergraduate students receive many undergraduate research awards from the University and regularly attend national professional meetings to stand alongside graduate students and professors from around the nation to present the results of their research. Our anthropology minors also participate to a high degree.

Aside from its applicability and relevance across different disciplines, professions, and careers, one of the truly unique aspects of anthropology is that it changes in a most profound and insightful way the manner in which our students experience and come to interpret their own lives. The subject of anthropology is humankind as viewed not through a local lens limited by the biases or world view of one's own culture, but by a view that attempts to reconcile and understand the intersecting and sometimes conflicting, yet, often logical alternative ways by which our fellow human beings live and think.

Perhaps it is the result of this very personal encounter, experienced alongside exposure to the very best scholarship, that permits our anthropology students to connect so easily and successfully with diverse professional communities. This relative fluidity by which our graduates make the transition into so many varied fields, the knowledge and skills gained by studying anthropology, in addition to providing keen insights into others, enriches one's understanding of one's self. In this way anthropology maximizes the chances of personal achievement and self-fulfillment, and offers a powerful holistic core of experience for excellent cutting-edge jobs in any career path.

Writing-Intensive Requirements: All courses taught in the department include writing components, which are both informal and formal and vary by course level. These assignments may include response papers, journals, in-class writing, analyses, field research, or research papers. Courses offered in anthropology develop both critical thinking skills and global awareness through written and other assignments. Every major is required to take an advanced theory seminar (ANTH 40400, *Perspectives in Anthropological Analysis*) where they develop analytical and synthetic skills through intensive writing assignments combined with class discussion.

PROGRAMS

1. **The Major.** There are no prerequisites to the major. **The major requires 30 credits, six of which must be in the sequence of fundamentals, including ANTH 20201 (Fundamentals of Biological Anthropology), ANTH 20202 (Fundamentals of Archaeology), ANTH 20203 (Fundamentals of Social and Cultural Anthropology), and ANTH 20204 (Fundamentals of Linguistic Anthropology).** In addition, majors must take ANTH 40400 (*Perspectives in Anthropological Analysis*), one methods course (3 credits), and 18 credits of electives. At least six credits of the electives must be at the 40000 level. It is recommended that students take the fundamentals by the end of their sophomore year, whereas ANTH 40400 is usually taken as a junior or senior.

2. **The Honors Track.** The honors track requires 36 credits and a minimum anthropology GPA of 3.5, or faculty recommendation with vote of the department. In addition to the above program, the honors student will take one additional methods course (3 credits) and ANTH 48900 *Anthropology Senior Thesis* (3 credits) or equivalent.

3. **The Minor.** The minor requires 15 credit hours. There are no prerequisites. Students must take two of the four fundamentals, ANTH 20201, 20202, 20203, and 20204. In addition, students must take nine credits of electives.

Courses taken for pass-fail credit will not satisfy requirements for the major, the honors track, or the minor.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Anthropology*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Courses in which graduate students may enroll and for which graduate credit may be obtained are at the 40000 level and higher. Special requirements are made of graduate students who enroll in these courses.

Art, Art History, and Design

Chair:

Richard Gray

Professors:

Rev. Austin Collins, C.S.C.; Heather Hyde
Minor; William Kremer; Martina Lopez; Scott Shim; Maria Tomasula

Associate Professors:

Richard Gray; Jason Lahr; Rev. Martin Lam
Nguyen, C.S.C.; Robin Rhodes; Michael Schreffler; Neeta Verma

Assistant Professors:

Ann-Marie Conrado; Marius Hauknes; Tatiana Reinoza; Nicole Woods

Associate Professional Specialists:

Emily Beck; Elyse Speaks

Website: <http://artdept.nd.edu/>

The Department. The Department of Art, Art History, and Design at the University of Notre Dame, is a multidisciplinary department offering programs of study in studio art, art history, and design. The mission of the department is to provide students with intellectually informed, hands-on instruction in creative studies within the context of a liberal arts university. An active lecture and visiting artist series and the extensive collections of the Snite Museum of Art strengthen and broaden the work in the classroom and studio. The South Bend and Chicago areas provide additional cultural activities and experiences.

The department has fifteen studio art and design faculty, and eight art history faculty. Undergraduate students may pursue coursework leading to one of two degrees: the bachelor of arts (BA) in studio art, art history or design; or the bachelor of fine arts (BFA) in studio art or design. A minor in studio art is also offered to those students who wish to add experience in visual art to their undergraduate studies.

The departmental office is located in Riley Hall along with all studio art facilities, classrooms, and studio faculty offices. The art history classrooms are on the first floor of O'Shaughnessy Hall and the art history faculty offices are in Decio Faculty Hall. The design classrooms, studios, and design faculty offices are located in West Lake Hall. Skilled technical staff and support facilities are available as appropriate for each medium that is offered. The Center for Creative Computing operates five specialized computing labs for studio and design work including a professional digital printing studio in Riley Hall.

Students with a degree in creative studies are uniquely competitive among job-seeking graduates today. It is well recognized that creative study fosters methods of scholarship and production that employers and research institutions alike find compelling. A creative person draws on innovative approaches to solve problems; is willing to take initiatives in

the face of ambiguity and uncertainty; is able to accept critical feedback to revise or expand an idea; can successfully communicate the value of their approach to others; and has the ability to mobilize resources to realize their ideas in an original form. In short, creative study is essential to the educational preparation needed to compete in the complex world culture we work and live in today.

Writing-Intensive Requirement: The Department of Art, Art History, and Design fulfills the College of Arts and Letters writing-intensive requirement by requiring all majors in each of the three departmental areas (ARST, DESN, and ARHI) to enroll in at least one upper-level (3xxxx or 4xxxx) art history course. All upper-level ARHI courses include a writing component that satisfies the College of Arts and Letters writing-intensive requirement.

THE STUDIO ART AND DESIGN MAJOR AND MINOR IN STUDIO ART

Bachelor of Arts Degree in Studio Art and Design

The Bachelor of Arts degree program in art and design is defined as a general liberal arts degree. The BA degree is ideal for the student who desires a liberal education with a strong emphasis in art. Students enrolling in the BA degree program are required to complete a five-course core curriculum during their first three semesters. These courses are Drawing I, 2D Foundations, 3D Foundations, one course treating material from before 1600 taught by a regular full-time art historian in the department, and one course that treats material from after 1600 taught by a regular full-time art historian in the department. Students are not required to select a major concentration for the BA degree, but some focus of study is encouraged. The BA degree consists of 36 hours in art and design, of which 27–30 are in studio and 6–9 in art history.

Bachelor of Arts with Honors

The BA with Honors is comprised of two additional 3-credit independent study courses taken in sequence, fall/spring of the senior year. It is a special two-semester course sequence designed for the most talented and motivated department majors who wish to develop a capstone project during their senior year. The BA with Honors consists of 39 hours in art and design, of which 30–33 are in studio and 6–9 in art history.

Bachelor of Fine Arts Degree in Studio Art and Design

The BFA program in art and design is intended for the student who wishes to pursue a professional career in the visual arts. The program is organized into a four-year sequence of study that provides a solid understanding of art and art history. The student has an opportunity to explore a variety of curricular options and then chooses an intensive and professional major concentration. In addition to a primary concentration, BFA students are encouraged to select a secondary area of interest to broaden their thinking and to enrich their creative study. BFA candidates share a close working relationship

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with the department's faculty who are active professional artists and designers. Intensive studio work is complemented by an academic education with strong art history and liberal arts component. The BFA degree consists of 66 credit hours in art, of which 54–57 are in studio and 9–12 in art history.

BFA Freshman and Sophomore Years

Students beginning in the program are required to complete a studio core curriculum during their first two years. Five of these courses are mandated: Drawing I, Figure Drawing, 2D Foundations, 3D Foundations and Photography I. The remaining two studio courses are optional, based on the student's interest. This intensive curriculum establishes a base for the studio practices and principles for all visual art expression. At the end of the fourth semester, students who have earned a minimum 3.25 grade point average in their studio courses will be accepted as candidates for the BFA degree. Students who do not qualify are eligible for the BA degree.

BFA Junior and Senior Years

Students accepted into the BFA program begin a two-year primary concentration in one of the following areas: ceramics, graphic design, industrial design, painting, photography, printmaking, or sculpture. The concentration requires 15 hours of study in a major concentration area during the last four semesters. Teaching in the major is highly individualized and stresses the creative development and preparation of the student for the professional world. In addition to pursuing a concentration, all BFA majors must enroll in the BFA Seminar and the Senior Thesis courses. The culmination of the BFA degree is the completion of a senior thesis. This two-semester senior project, directed by a faculty member, will be exhibited and approved by the faculty as a requirement for graduation.

MINOR IN STUDIO ART

The minor in studio art is intended for the student who wishes to add studio art experience to their undergraduate studies. Freshmen, Sophomores and Juniors are eligible to declare a minor in studio art, which requires 15 credit hours, or 5 courses in studio art. Before being able to declare a minor, a student must be enrolled in or have already taken one of the following: Drawing I, 2D Foundations, or 3D Foundations.

As with the major, students seeking the minor may elect either a general or focused course of study; that is, students may take the four studio courses selected from among any of the studio disciplines (ceramics, painting, photography, printmaking, sculpture) or they may take four studio courses from within a single discipline. Because the Department offers multiple entry-level courses, students are able to enter the program at a variety of points.

STUDIO ART AND DESIGN CONCENTRATIONS

Studio Art Concentration

The Studio Art major is designed both for the student artist and the student interested in art as a second major or minor. Courses are offered in painting and drawing, ceramics, photography and video, printmaking, and sculpture. The Studio Art major provides an excellent basis for continuing work in graduate school and pursuing art-related fields such as design, art criticism, teaching, museum and auction house work, art therapy, media and publishing, commercial photography, exhibition design, and advertising.

The Studio Art major provides students with an opportunity to develop the techniques, visual sensibility, and historical understanding necessary for working with various materials. The mission of the major is to provide students with intellectually informed, hands-on instruction in creative studies within the context of a liberal arts university. One of the inherent values of visual art is that by giving tangible form to the social, political, and private aspects of human existence, it makes visible the invisible; it provokes the expansion of intellectual boundaries, gives form to complex ideas, reveals deep but abstract emotions and extends our capacity to comprehend the lives of others. Each of the programs in our department offers a distinct means of confronting and understanding the important visual aspects of our wider engagement with and construction of the world.

Ceramics Concentration

Ceramics is a concentration emphasizing clay and glaze as the primary vehicles for expression. Traditional pottery, vessel making, and sculpture may be addressed through a variety of processes that include hand building, throwing, and casting. Students are encouraged to develop technical skills and a direction of their own choosing. In addition to traditional ceramic materials and processes, students will be encouraged to study and utilize other sculptural media, as well as become familiar with contemporary and historical source material that will inform their own directions in ceramics.

Painting Concentration

Painting, with its many traditions, is a medium put to an extraordinary diversity of contemporary uses. Capable of representing everything from the material to the intangible, painting continues to be a means for artists of vastly different interests to address their subjects in highly individual ways. The painting concentration at Notre Dame fosters the aesthetic, critical, and technical development of each student through a program of course work, independent study, and regular critiques. Emphasis is placed on being well-versed in contemporary critical issues, on articulating individual themes, and on developing the technical means to give visual form to thematic concerns.

Photography Concentration

Images are arguably the most important documents of the 21st century, operating at the intersection of communication, commerce and culture. The photography program educates students to be technically skilled, visually literate and creatively prepared for a world where photography, video and streaming media permeate our everyday experiences. Beginning with foundation work through senior thesis, courses are designed to inform students about photographic traditions while engaging them in the critical issues and methodologies of contemporary practice. The photography major prepares students for a career in visual media (including fine art, media communications or advertising), education or institutional professions at galleries, museums or auction houses.

Printmaking Concentration

Printmaking is a vital, visual, graphic process by which one may engage in a conversation with the world. In fact, printmakers all over the world are in constant contact, exchanging exciting information and keeping current with the ever-shifting flow of ideas.

Printmakers' work encompasses a wide range of practice: from stenciled art spray painted on a sidewalk to very fine prints made on paper, from a one-inch square print to wrapping an entire building in a print. Printmakers are involved with a very dynamic form of art.

At Notre Dame, students learn about current cultural and critical issues and how printmaking addresses them. As students learn about the various matrixes, techniques and technologies of a wide range of printmaking (including relief, photolithography, intaglio, screen-printing, digital processes, papermaking and the making of books), they will develop their aesthetic, critical and technical skills.

Sculpture Concentration

Sculpture today encompasses diverse materials and contexts for the expression of ideas in space. Within this broad description, students are encouraged to develop the technical skills that will help them expand their ideas into thoughtful individual expression. We embrace a breadth of vision and experience, which will challenge the student to investigate and respond to contemporary issues through problem-solving. A full range of traditional and non-traditional media are available in specific courses and through individual mentoring. By blending required and elective courses and independent study, students can experience a curriculum that responds to their particular needs and direction.

Design

Design is the order of form and the control of function; it is what designers do. Humans are conditioned to make decisions on the basis of appearance and contextual input, accepting or rejecting information and material goods in response to a variety of visual cues. Effective, user-centered design can do more than attract interest or manipulate

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perception: it can enable people. Good design and careful planning can promote understanding, simplify use, improve safety, instill confidence, add value, and create community.

At Notre Dame, undergraduate design education begins with immersion into the liberal arts curriculum. This social, philosophical, critical, ethical, and historical experience helps build a foundation of cultural understanding that naturally informs the creative and problem-solving methods. Responsible designers, consequently, approach the development process with sensitivity for human need, human aspiration, and the functional requirements for both production and implementation. At its best, design serves the spectrum of needs from individuals to constituencies in industry, society and the global environment.

Though design has been part of the Notre Dame curriculum since the early 1950s, students enjoy the advantages of a campus that provides access to current technologies. Technically advanced collaborative teaching spaces and digital labs support all student design activities, including an on-site 20-station 2D computer studio, a 16-station 3D computer studio, and a high performance digital imaging studio, all maintained by the services from Notre Dame's Center for Creative Computing. In addition, a model shop provides rapid prototyping capabilities ranging from traditional hand tools to precision computer controlled fabrication and 3D printing. Intermediate and advanced level undergraduate students share an energized design community with defined studio spaces located in close proximity to all design-related resources and facilities in the Design Center at West Lake Hall.

Visual Communication Design Concentration

At its most basic level, visual communication design is a creative process that combines the visual arts and technology to communicate ideas. In the hands of a talented designer, these ideas are transformed into visual communication that transcends mere words and pictures. By controlling color, type, movement, symbols, and images, the designer creates and manages the production of visuals designed to inform and persuade a specific audience. By combining aesthetic judgment with project management skills, designers develop visual solutions and communications strategies. The professional designer works with writers, editors, illustrators, photographers, code writers, and printers to complete compelling designs that effectively communicate a message.

At Notre Dame, the undergraduate visual communication design curriculum begins with a foundation in the liberal arts. Such a basis is a design student's best path to meet and solve the varied communication challenges inherent in today's complex world. Because a design solution may emerge from the humanities, an algorithm, or a scientific discovery, the curriculum provides a student with the opportunity to be firmly grounded in the fundamentals of design and the visual arts, while also taking courses

in science, math, history, philosophy, and theology. As students progress through the tiered design program, they develop as a designer, as an intellectual, and as a moral person, prepared to address the social, ethical, and political circumstances influenced by the design profession.

At its core, the Notre Dame visual communication design program asserts that the designer can make a difference not only in the strategic plan of a business but also in the world. During their time on campus, students develop projects that aspire to positively influence the lives of culturally diverse people, critique the ethical dimensions of contemporary culture, and give visual form to complex social issues. As design professionals, Notre Dame graduates will be responsible for the future of our visual culture.

Industrial Design Concentration

Industrial designers give form to virtually all mass-manufactured products in our culture. They seek opportunity and advantage through identifying and solving problems. Their creative contributions impact the utility, appearance, and value of our tools and environment. Their most innovative solutions lie at an intersection of what is knowable and what is possible.

The industrial design profession demands excellent organizational skills, an awareness of visual and tactile aesthetics, human behavior, human proportion, material, process, and the responsible appropriation of resource, during and after use. Designers express conceptual proposals through a combination of well-developed drawing, physical modeling, computer modeling, writing, and verbal skills. Designers best serve the consumer through sensitive and innovative collaboration with art, science, engineering, anthropology, marketing, manufacturing, and ecology. Properly implemented, industrial design affords greater benefit, safety, and economy to all participants and recipients impacted by the product development cycle.

Notre Dame's Industrial Design Program (NDID) is accredited by the National Association of Schools of Art and Design (NASAD) and maintains student chapter affiliation with the Industrial Designers Society of America (IDSA). NDID interacts with regional, national, and international corporate design and consulting offices in the form of annual conferences, sponsored projects, field trips, and internships.

MINOR IN COLLABORATIVE INNOVATION

The Minor in Collaborative Innovation offers students a dynamic catalyst for process-based, cross-disciplinary collaboration and learning between various academic departments in Arts & Letters, and wider disciplinary interests across the university. The minor seeks to build a strong core competency in design thinking and collaborative innovation to meet the growing demand for this skill among these various communities, attracting broad and diverse student enrollment and re-establishing the primacy of a humanistic, collaborative approach to the

complex problems and integrated challenges facing a rapidly changing world.

The minor offers a five-course sequence starting with *Design Matters*, a large, introductory, lecture-based design-thinking. Declared minors will then cycle through a series of four additional courses introducing students to the various skillsets implicated in design thinking including research methods, visualization, and entrepreneurship. The minor culminates in the capstone course *Collaborative Product Development*, bringing the minor's various disciplines (1st majors) together in fruitful collaboration with design majors to address industry sponsored projects addressing real world questions.

Fifteen credit hours are required for completion of this minor:

- 3 credits—DESN 20203 "Design Matters—Introduction to Design Thinking" (Students may not declare the minor until they are enrolled in or have completed this course.)
- 3 credits—DESN 41201/41202 "Collaborative Product Development" (capstone course required for all minors)
- 9 credits—designated Collaborative Innovation courses.

THE ART HISTORY MAJOR

Notre Dame's art history major is designed to equip our students with a broad overview of the development of Western art and to provide them with an in-depth knowledge of particular periods, problems, and research methods. The diversity and scholarly strength of our faculty and the research facilities of the Hesburgh Library, including the Medieval Institute, are supplemented by the rich resource of the Snite Museum of Art. With a permanent collection of over 21,000 works, the Snite Museum not only gives our students an invaluable firsthand acquaintance with important examples from all periods and many cultures—including distinguished collections of old master drawings, 19th- and early-20th-century photographs, and Pre-Columbian art—but also provides a wide range of opportunities for our students to gain practical museum experience in both volunteer and paid positions.

The University of Notre Dame offers a 33-hour Honors Program (11 courses), a 30-hour first major (10 courses), a 24-hour (8 courses) supplementary major in art history, and a 15-hour minor (5 courses). These degrees are intended not only for students who are already intent upon pursuing a career in an art museum or gallery or as a college or university professor, but also for those individuals who simply wish to learn more about Western civilization through the examination of some of its most beautiful, provocative, and informative objects.

CLASSICS

DEPARTMENTAL HONORS IN ART HISTORY AND THE SENIOR THESIS

The Honors Program will consist of 33 hours, as compared to 30 hours in the regular first major. First majors with a grade point average of 3.667 or above in Art History courses may petition the faculty for permission to enter the Art History Honors Program contingent upon maintaining this GPA level and the successful completion of an Honors Thesis. The student who wishes to be considered for departmental honors must select a thesis advisor with whom the student has taken courses in the area of specialization for the thesis. The student must petition the faculty with a one-page letter by the 10th week of the spring semester of the student's junior year. The letter should be addressed to the Director of Undergraduate Studies for Art History. In the letter the student should give a brief indication of with whom and on what they are proposing to write her/his thesis and a brief account of her/his future plans. If the faculty approves, then in place of one of the elective art history courses or seminars the student will sign up for six credit hours of Honors Thesis credit, taking three hours in the fall semester of their senior year and three hours in the spring semester of their senior year.

Students who maintain the required 3.667 or higher GPA and successfully complete a senior thesis with a grade of A– or higher will earn Honors in Art History.

Art History First Major

Art history first majors are required to take two 20000-level courses, four 30000-level courses, and one 40000-level course. Additionally, students must also take three art history courses at any level.

Art History Supplemental Major

Students wishing to complete a second major in art history must take two 20000-level courses, four 30000-level courses, one 40000-level course, and one art history course at any level.

Art History Minor

Students wishing to minor in art history can do so by taking five art history courses (15 credit hours total). Courses consist of two 20000-level courses and three 30000-level courses.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting one or more of the following subjects:

- *Art History*
- *Art Studio*
- *Design*

Course descriptions can be found by clicking on the subject code and course number in the search results.

Classics*Chair:*

Brian A. Krostenko

Professors:

W. Martin Bloomer; Li Guo (Arabic)

Associate Professors:

Christopher Baron; Luca Grillo; David Hernandez; Elizabeth Forbis Mazurek; Brian A. Krostenko; Hildegund Müller; Catherine M. Schlegel; Aldo Tagliabue

Concurrent Professors:

David O'Connor; Gretchen Reydam-Schils; Christopher Shields

Concurrent Associate Professors:

Blake Leyerle; Robin Rhodes

Assistant Professor:

Hussein Abdulsater (Arabic)

Teaching Professor:

Ghada Bualuan (Arabic)

Associate Teaching Professors:

Tadeusz Mazurek

Assistant Teaching Professor:

Catherine Bronson (Arabic)

Visiting Assistant Professors:

Randolf Ford; Amy Pistone

Visiting Assistant Teaching Professor:

Ahmad Muezzin (Arabic)

The department. The Department of Classics offers courses in the languages, literatures, archaeology, history, religions, and civilization of the ancient world. Cooperation with other departments of the college makes available to Classics students additional courses in the art, philosophy, and political theory of antiquity. Visit us online at classics.nd.edu.

The department also provides the administrative home for the Program in Arabic and Middle Eastern Studies.

MAJORS IN CLASSICS

Classics majors encounter at their sources the perennial cultures of Greece and Rome, cultures that continue to exercise a profound influence on Euro-American civilization. Classical training imparts enhanced skills in close reading and analysis of literary and rhetorical forms, as well as repeated experience of the integration of literature, history and ancillary studies. Thus, a major in Classics provides the archetypal humanistic education and an ideal preparation for entry into any of the professions that require mastery of language, close analysis of documents and integration of multiple details.

The lower-level courses equip the student with basic knowledge of languages and with a conspectus of ancient history and culture. Advanced courses in Latin and Greek literature and Ancient Civilization provide opportunities for more focused and detailed study and are conducted in a seminar format with emphasis on research and writing.

In addition to the other University requirements, students majoring in Classics will, under normal circumstances, complete at least 10 courses (30 credit hours) in one of two areas of concentration: Classics or Greek and Roman Civilization.

Classics Major

5 courses in Greek or Latin language/literature: 20003 and above*	15
2 courses in non-primary language (Greek or Latin)	6
1 course in Greek or Roman History	3
2 Classics courses in English translation (CLAS)	6
	<hr/> 30

*Students will typically choose one of the two classical languages, ancient Greek or Latin, in which to fulfill the language requirement at the advanced level. They will be required to take at least two semesters in the other language at the appropriate level. If students have sufficient background in both languages, it should be possible for them to complete the requirements of the major through a combination of intermediate and advanced courses in both languages, as long as the total number of language courses equals seven (21 credit hours) for the first major and five (15 credit hours) for the supplementary major.

Supplementary majors in Classics will be exempt from the two courses in the second classical language.

Greek and Roman Civilization Major

The History of Ancient Greece	3
The History of Ancient Rome	3
1 course in ancient archaeology	3
1 course in ancient literature	3
6 Classics courses in English translation (CLAS) or Greek and Latin language offerings*	18
	<hr/> 30

*Students will be strongly encouraged, but not required, to include some language study in their six elective courses.

Supplementary majors in Greek and Roman Civilization are required to take only four elective classics (CLAS) courses in English translation or in Greek/Latin language.

MINORS IN CLASSICS

Minors provide students majoring in other areas with structure and certification for a variety of approaches to the study of Greek and Latin language, literature, and civilization.

Latin Minor

The Latin Minor provides a solid grounding in the philological and literary study of Latin texts of the classical period, or, for those who prefer, of Christian Latin literature. It consists ordinarily of five courses (15 hours) in intermediate or advanced Latin (CLLA 20003 and above). Students interested in

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later Latin texts are directed to the joint offerings of the department and the Medieval Institute.

Greek Minor

The Greek Minor provides a solid grounding in the philological and literary study of Greek texts of the classical and Hellenistic periods. It consists ordinarily of five courses (15 hours) in intermediate or advanced Greek (CLGR 20003 and above).

Minor in Classical Studies: Greek and Roman Civilization

The Classical Studies (Greek and Roman Civilization) minor focuses on the history and culture of the classical world. The minor consists of three required courses (one in Greek history, one in Roman history, one in ancient archaeology) and two electives from CLAS courses, whether offered by the department or cross-listed by other programs, or from Greek and Latin language courses, and may include classes in philosophy, art, architecture, political theory, literature or law, at the discretion of the Director of Undergraduate Studies.

Minor in Classical Studies: the Classical Heritage

The Classical Studies (Classical Heritage) minor allows students to connect the study of classical antiquity with other disciplines and periods and especially to study the inheritance and transformation of the classical tradition in areas like patristics, philosophy, late antiquity, and later Western art and literature. The minor consists of five courses: one with a chiefly historical orientation; one with a chiefly literary orientation; and three others approved by the Director of Undergraduate Studies, which may be taken from inside or outside the department.

SENIOR THESIS/HONORS TRACK

Classics majors are admitted into the honors track by approval of the Director of Undergraduate Studies. To receive honors, a student must (1) complete all requirements for the major; (2) maintain a GPA of at least 3.65 in the major; (3) complete the Honors Seminar for the senior year; (4) and receive a grade of A– or higher for a 5,000–6,000 word honors thesis. Honors students work closely with a member of the Classics faculty, who guides their research project. For more information see <http://classics.nd.edu/undergraduates/honors-and-research/>.

PROGRAM IN ARABIC AND MIDDLE EASTERN STUDIES

The program in Arabic and Middle Eastern studies offers a full range of courses in Modern Standard Arabic, and is geared toward proficiency in listening, speaking, reading, and writing. Courses in the regional dialects and Classical Arabic are also offered. Courses in the history, literature, cultures, and religions of the Middle East complement the language component and give students the opportunity for a broad-based and comprehensive understanding of the Arab world.

Major in Arabic

A total of 36 credit hours distributed in the following areas:

6 courses in Arabic	24
1 course in literature, taught by the Arabic faculty	3
1 course in Middle East history, taught by the Arabic faculty	3
1 course in Islam, taught by the Arabic faculty	3
1 elective, subject to departmental approval	3
	<hr/> 36

MAJOR IN INTERNATIONAL ECONOMICS IN ARABIC

The new undergraduate major in International Economics in Arabic is a collaborative effort between the Department of Economics and the Classics Department. In pursuing this major, students take a minimum of eight economics courses and are also required to enroll in a one-credit “Exploring International Economics” course, preferably in their sophomore year, designed to foster the integration of the study of culture with the study of economics. Details about the requirements for this major can be found online at economics.nd.edu/undergraduate-program/academic-programs/majors/ie/.

MINOR IN MEDITERRANEAN/MIDDLE EAST STUDIES

An interdisciplinary focus defines this broad-based program that encourages a multidimensional approach to the Mediterranean world. This is achieved through a wide variety of courses and activities offered by departments that study southern Europe, North Africa, or the Middle East.

While language courses may serve as a component of the minor, students are offered opportunities to view the region in its full historical, cultural, and political context. In this way, students are given the opportunity to assemble a course of studies that best reflects their own interests.

Typical areas of focus might include the rich culture that developed in southern Spain as a result of the Christian, Muslim, and Jewish interactions there; the impact of the French language and culture on North Africa and the Middle East; or the contemporary Israeli-Palestinian conflict.

Requirements: (1) Intermediate Arabic (MEAR 20003); (2) the student’s choice of three courses that relate to the region of southern Europe, North Africa, or the Middle East; and (3) a final research thesis in consultation with the Arabic faculty that integrates coursework related to the student’s area of interest.

STUDY ABROAD

Our students are encouraged to study abroad for a semester, especially in the Mediterranean basin at Notre Dame’s Rome Global Gateway. The

Department also supports programs offered by the Intercollegiate Center for Classical Studies in Rome, College Year in Athens, through the Jerusalem Global Gateway, and in Arab-speaking countries. Credits earned for course work taken in approved programs can be used to fulfill our major and minor requirements. Studying abroad during the summer is also possible. Grants are available on a competitive basis for summer language study through the Center for the Study of Languages and Cultures and the Nanovic Institute for European Studies. For more information see classics.nd.edu/summer-programs/ or arabic.nd.edu/undergraduate-program/beyond-the-classroom/.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting one or more of the following subjects:

- *Classics in Translation*
- *Greek Language and Literature*
- *Latin Language and Literature*
- *Arabic Language and Literature*
- *Middle East Studies*

Course descriptions can be found by clicking on the subject code and course number in the search results.

East Asian Languages & Cultures

Chair:

Yongping Zhu

Professors:

Liangyan Ge; Michael Hockx

Associate Professors:

Michael C. Brownstein; Lionel M. Jensen;

Xiaoshan Yang; Yongping Zhu

Assistant Professor:

Xian Wang

Professional Specialists:

Noriko Hanabusa; Yeonhee Yoon

Associate Professional Specialists:

Hana Kang; Chengxu Yin

Assistant Professional Specialists:

Congcong Ma; Wei Wang; Weibing Ye

Mission Statement: The peoples of East Asia comprise one quarter of the world's population and account for a similar proportion of the world's production and consumption. This, along with the contemporary fusion of Asia and the West politically and economically, makes knowledge of the diverse languages and cultures of East Asia vital to an understanding of our global community and indispensable for the preparation of careers in the Pacific Rim. The Department of East Asian Languages & Cultures provides the resources and instruction necessary for success in these areas. The department is dedicated to providing rigorous language training in Chinese, Japanese, and Korean, as well as courses taught in English on Chinese, Japanese, and Korean philosophy, religion, literature, and culture. Complementary courses in other disciplines are listed in this *Bulletin* under departments such as history, philosophy, theology, political science, economics, and anthropology.

Completion of First-Year Chinese, Korean, or Japanese (10 credits) will satisfy the language requirement for both the College of Arts and Letters and the College of Science. Although the College of Business does not have a language requirement, it strongly supports integration of language courses into its curriculum and encourages students to participate in the study abroad programs (See "Study Abroad" under Mendoza College of Business).

Placement and Language Requirement. Students who wish to enroll in a Chinese, Japanese, or Korean language course beyond the 10111 or 10112 level must take a placement examination administered by the Department. Students testing out of 10xxx-level language courses must complete at least one course at the 20xxx level or higher to satisfy the language requirement.

PROGRAM IN CHINESE AND CLASSICAL CHINESE

The program in Chinese offers language classes in Mandarin Chinese at the first-, second-, third-, fourth-year and advanced levels and classical Chinese, and readings in Chinese modern classics as well as courses in English on classical and modern Chinese literature and culture. Qualified students also have the opportunity to attend East China Normal University in Shanghai; Peking University in Beijing, People's Republic of China; and Fu Jen University in Taipei, Taiwan.

The Chinese program offers first and supplementary majors and a minor.

Basic requirements: For the major, students must complete 30 credit hours, including third-year Chinese. For the supplementary major, students must complete 24 credit hours, including third-year Chinese. For the minor, students must complete 15 credit hours, including two semesters of language classes beyond the first-year. 10xxx-level language courses and University seminars on China-related topics do not count toward the major, supplementary major, or minor.

Other requirements: In addition to the language course requirements described above, all majors must take three upper-division courses in residence in Chinese literature and culture, including one course in Chinese literature, which must be taught by a department faculty member. Remaining credit hours may be satisfied by taking additional Chinese language and culture courses, or other East Asia-related courses approved by the Director of Undergraduate Studies.

THE HONORS TRACK IN CHINESE

Majors in Chinese are strongly encouraged to pursue the honors track. Those who are interested must meet the following criteria:

1. Fulfillment of all the requirements for a first major of 30 credit hours in Chinese;
2. A cumulative GPA of at least 3.3 and a GPA of at least 3.7 in the major, or permission from the department chair;
3. Completion of fourth-year Chinese.

Program Requirements: In addition to the 30 hours required for a major, the honors track requires the completion of a senior honors thesis that demonstrates the student's originality and ability to do research in the target field. For this endeavor, the student will receive 3 hours of graded credit. This means to graduate with departmental honors, the student must earn 33 hours of credit in the major.

Students are admitted into the honors track in the spring semester of their junior year. The senior honors thesis is a year-long, one-on-one experience with a faculty mentor that comprises two semester courses of 3 credit hours each.

PROGRAM IN JAPANESE

The program in Japanese offers language classes in modern Japanese at the first-, second-, third-, and fourth-year and advanced levels, as well as courses in English on classical and modern Japanese literature and culture. Qualified students also have the opportunity to attend Nanzan University in Nagoya, and Sophia University in Tokyo, Japan.

The Japanese program offers first and supplementary majors and a minor.

Basic requirements: For the major, students must complete 30 credit hours, including two semesters of third-year Japanese. For the supplementary major, students must complete 24 credit hours, including third-year Japanese. For the minor, students must complete 15 credit hours, including two semesters of language classes beyond the first year. 10xxx-level language courses and University seminars on Japan-related topics do not count toward the major, supplementary major, or minor.

Other requirements: In addition to the language course requirements described above, all majors and minors must take three upper-division courses in residence in Japanese literature and culture, including one course in Japanese literature, which must be taught by a department faculty member. Remaining credit hours may be satisfied by taking additional Japanese language and literature courses, or other East Asia-related courses approved by the Director of Undergraduate Studies.

THE HONORS TRACK IN JAPANESE

Majors in Japanese are strongly encouraged to pursue the honors track. Those who are interested must meet the following criteria:

1. Fulfillment of all the requirements for a first major of 30 credit hours in Japanese;
2. A cumulative GPA of at least 3.3 and a GPA of at least 3.7 in the major, or permission from the department chair;
3. Completion of fourth-year Japanese.

Program Requirements: In addition to the 30 hours required for a major, the honors track requires the completion of a senior honors thesis that demonstrates the student's originality and ability to do research in the target field. For this endeavor, the student will receive 3 hours of graded credit. This means to graduate with departmental honors, the student must earn 33 hours of credit in the major.

Students are admitted into the honors track in the spring semester of their junior year. The senior honors thesis is a year-long, one-on-one experience with a faculty mentor that comprises two semester courses of 3 credit hours each.

EAST ASIAN LANGUAGES & CULTURES

MAJOR IN INTERNATIONAL ECONOMICS IN CHINESE

The undergraduate major in International Economics is a collaborative effort between the Department of Economics and affiliated departments of languages and literature. In pursuing this major, students take a minimum of eight economics courses and are also required to enroll in a one-credit “Exploring International Economics”, preferably their sophomore year, designed to foster the integration of the study of culture with the study of economics. Students must complete a minimum of four semesters of Chinese language courses through the fourth-year level, including the two one-credit fourth year supplements in Business Chinese.

Students must also take a minimum of three upper division courses in Chinese literature and culture, including at least one literature course taught by EALC faculty.

In their senior year, students have the option of writing a senior capstone essay that integrates their economic and language and culture study or taking the two-semester sequence in advanced Chinese. The senior capstone project may be a senior thesis under the guidance of a faculty member from Economics or East Asian Languages and Cultures or a research seminar paper that focuses on a topic or topics related to the economic, linguistic, and cultural characteristics of a country or countries where Chinese is spoken.

Refer to the Department of Economics for the relevant course requirements in economics, which include satisfying a mathematics requirement of Calculus I and II and successful completion of ECON 10010/20010; ECON 10020/20020; ECON 30010; ECON 30020; ECON 30331; and two of the following: ECON 40700, ECON 40800, ECON 40710 and ECON 40720.

MAJOR IN INTERNATIONAL ECONOMICS IN JAPANESE

The undergraduate major in International Economics is a collaborative effort between the Department of Economics and affiliated departments of languages and literature. In pursuing this major, students take a minimum of eight economics courses and are also required to enroll in a one-credit “Exploring International Economics”, preferably their sophomore year, designed to foster the integration of the study of culture with the study of economics. Students must complete a minimum of four semesters of Japanese language courses through the fourth-year level, including the two one-credit fourth year supplements in Business Japanese.

Students must also take a minimum of three upper division courses in Japanese literature and culture, including at least one literature course taught by EALJ faculty.

In their senior year, students have the option of writing a senior capstone essay that integrates their economic and language and culture study or taking the two-semester sequence in advanced Japanese. The senior capstone project may be a senior thesis under the guidance of a faculty member from Economics or East Asian Languages and Cultures or a research seminar paper that focuses on a topic or topics related to the economic, linguistic, and cultural characteristics of a country or countries where Japanese is spoken.

Refer to the Department of Economics for the relevant course requirements in economics, which include satisfying a mathematics requirement of Calculus I and II and successful completion of ECON 10010/20010; ECON 10020/20020; ECON 30010; ECON 30020; ECON 30331; and two of the following: ECON 40700, ECON 40800, ECON 40710 and ECON 40720.

PROGRAM IN KOREAN

The University offers four years of Korean language instruction and a number of courses relating to Korean culture. Students who finish the sequence at Notre Dame are encouraged to continue their language study abroad. For the minor in Korean, students must complete 15 credit hours, including at least two semesters of Korean language beyond the first year, and one course in Korean culture. The remaining credit hours may be filled by additional courses in Korean language or culture courses offered by the department, or by courses approved by the Director of Undergraduate Studies.

ASIAN STUDIES MINOR

This minor provides opportunities for students to develop an interdisciplinary understanding of Asia. For details, see the Keough School Global Affairs section of the *Undergraduate Bulletin*.

EAST ASIAN LANGUAGES & CULTURES STUDY-ABROAD PROGRAMS

Students have opportunities to study abroad for a summer, a semester, or a year in the People's Republic of China and Japan at the following locations:

Beijing, China: The program at Peking University affords students an opportunity to improve their fluency in spoken and written Mandarin Chinese through intensive training. Participants must have completed at least two semesters of college-level Mandarin or the equivalent. The summer language program is run by Notre Dame.

Shanghai, China: The program at East China Normal University is generally designed for a semester (but it may be extended) that affords students courses in Chinese language, literature, and culture.

Nagoya, Japan: The program at the Catholic Nanzan University offers mandatory courses in intensive Japanese, as well as related courses in literature, religion, business, economics, history, art, and politics. The program is designed for sophomores who have taken a minimum of first-year, intensive Japanese (at the University of Notre Dame) or its equivalent.

Tokyo, Japan: The program at the Catholic Sophia University enables language majors to focus on their language courses while, at the same time, affording a wide-ranging selection of English-language offerings in Asian Studies, international business, economics, history, political science, art history, literature, religion, philosophy, anthropology, and sociology. Sophomores and juniors may participate.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting one or more of the following subjects:

- *East Asian Languages & Literature*
- *Chinese*
- *Japanese*
- *Korean*

Course descriptions can be found by clicking on the subject code and course number in the search results.

ECONOMICS

Economics

Chair:

William Evans

Director of Graduate Studies:

Daniel Hungerman

Associate Chair and Director of Undergraduate Studies:

Mary Flannery

David R. and Erin M. Seng Jr. Chair:

Joseph Kaboski

DeCrane Professor of International Economics:

Nelson C. Mark

Keough-Hesburgh Professor:

William Evans

Rev. Thomas J. McDonagh Collegiate Chair:~

James Sullivan

Stepan Family Associate Professor of Economics:

Ruediger Bachmann

Robert and Irene Bozzone Collegiate Chair:

Christiane Baumeister

Brian and Jeannelle Brady Associate Professor:

Kasey Buckles

Michael P. Grace II Associate Professor of Economics:

Eric R. Sims

Henkels Family Associate Professor Collegiate Chair:

Kirk Doran

Gilbert F. Shafer Assistant Professor:

Marinho Bertanha

Professors:

William Evans; Thomas Gresik; Daniel

Hungerman; William Leahy; Nelson C. Mark;

James Sullivan

Associate Professors:

Ruediger Bachmann; Christiane Baumeister;

Kasey Buckles; Drew Creal; Kirk Doran;

Lakshmi Iyer; Joseph Kaboski; Byung-Joo Lee;

Michael Pries; Kali P. Rath; Eric R. Sims; Abigail

Wozniak; Jing Wu

Assistant Professors:

Marinho Bertanha; Wyatt Brooks; Kirsten

Cornelson; Christopher Cronin; Jeroen

Dalderop; Taryn L. Dinkelman; Kevin Donovan;

Felix Feng; A. Niles Fernando; Chloe R.

Gibbs; Robert C. Johnson; Terence Johnson;

Illenin Kondo; Ethan Lieber; Benjamin Pugsley;

Michèle Muller-Irten; Zachary Stangebye; Jeff

Thurk; Jasmine Xiao

Professors of the Practice:

Timothy Dunne; Mary Flannery

Associate Professor of the Practice:

Eva Dziadula

Assistant Professor of the Practice:

Forrest Spence

Undergraduate Advisors:

Timothy Dunne; Eva Dziadula; William Leahy;

Forrest Spence

Program of Studies. The major is designed to make a unique contribution to the student's liberal education. The program provides students with the insights of scientific analysis and social perspective to deepen their understanding of the complex economic forces at work in society. Such an understanding is an essential ingredient in the

development of an educated person. The program is also designed to prepare the student for a variety of options after graduation, including graduate programs and managerial programs in business and finance.

Requirements for the Economics Major

(i) Total Course Requirement

Students must complete the two-semester Principles of Economics sequence (10010/10011/20010/20011 and 10020/20020 or equivalent). Beyond the Principles courses, the major requires a minimum of eight (8) additional course (24 credits) in economics at the junior/senior level (numbered 3xxxx or 4xxxx).

(ii) Math Requirement

A course in Calculus (MATH 10360 or equivalent) is a prerequisite for both of the intermediate theory courses. (See core requirement below). Simultaneous enrollment in Calculus II is permitted but not recommended.

Recommendation: It is strongly recommended that students, especially prospective economic majors, who have not had a course in Calculus I (MATH 10250 or equivalent) enroll in the calculus course during their first year of study.

(iii) Core Requirement

Students must include the following four courses among their minimum of eight courses in economics beyond the Principles course.

30010 Intermediate Economic Theory Micro

30020 Intermediate Economic Theory Macro

30330 Statistics for Economists

30331 Econometrics

(iv) Advanced Course Requirement

Students must include a minimum of two courses (6 credits) at the senior level (numbered 4xxxx) that have either of the intermediate theory courses (30010, 30020) and/or Econometrics (30331) as a prerequisite.

(v) Writing-Intensive Requirement

In completing the minimum of 24 credits at the junior/senior 3xxxx/4xxxx level, the student must fulfill a writing-intensive requirement. This requirement can be satisfied in one of the following three ways: by taking a junior or senior 3xxxx/4xxxx-level economics seminar course; by taking a three credit special studies course consistent with the college's writing-intensive guidelines under the direction of an economic faculty member; or by writing a senior honors essay under the direction of an economic faculty member.

Departmental advisors will assist students in designing a program of study that meets their educational and career goals. Students are also encouraged to pursue related courses in other departments of the College of Arts and Letters, The Mendoza College of Business and the College of Science. Materials relating to professional work or graduate study in economics, law, business, public policy, foreign service are available from the director of undergraduate studies.

Undergraduate Economics Honors Program

Entry Gate.

To be eligible for admission to the Undergraduate Economic Honors Program, the student must:

(i) Complete Intermediate Economic Theory-Micro (ECON 30010), Intermediate Macro Theory (ECON 30020), and Econometrics (ECON 30331) with minimum grade point average in these courses of A– (3.667).

or

(ii) Have a minimum cumulative GPA of 3.4 and minimum GPA of A– (3.667) in Principles of Microeconomics (ECON 10010/10011/20010/20011), Principles of Macroeconomics (ECON 10020/20021) Intermediate Economic Theory-Micro (ECON 30010), Intermediate Macro Theory (ECON 30020), Statistics for Economists (30330), and Econometrics (ECON 30331).

To apply for admission, the student must complete an application form, available from the director of undergraduate studies in Economics, between the end of the sophomore year and the end of the junior year. The application will include: (1) a paragraph explaining why the student wishes to enroll in the honors program, and (2) a signature by a member of the economics faculty who endorse this student's application. The application will be returned to the director of undergraduate studies in Economics who will make recommendations for admission to the Undergraduate Studies Committee, which is responsible for the final decisions.

Enriching Experience.

The Undergraduate Economics Honors Program requires that the student complete an enriching experience. The following qualify as an enriching experience:

(i) Completion with a grade B+ or higher of an "advanced methods" course, defined as a 4xxxx-level course in which students are required to apply methods of modern economic research. A list of these courses is available from the director of undergraduate studies.

(ii) Completion with a grade of B or higher of a course in the core of the graduate program in economics.

(iii) Completion of some substantive out of classroom activity directly related to the study of economics, such as presentation of the student's own original research at an external conference, an undergraduate research assistantship, an internship, or community service.

All of these activities need to be pre-approved. Students who want pre-approval for a specific activity should submit a written request with other supporting material to the director of undergraduate students in Economics who will notify applicants of the committee's decision.

ECONOMICS

Capstone experience.

The capstone experience represents the final requirement for the Undergraduate Economic Honors Program. This experience involves three elements:

- (i) Completion of a one-credit honors seminar (ECON 47961) in each semester of the senior year. The seminar not only provides instructional support for these students, but also requires each student to present progress reports to their peers at regular intervals. These seminar credits do not count as regular major (i.e., do not substitute for 3xxx or 4xxx-level elective economics courses) and are graded on a Satisfactory/Unsatisfactory basis. These seminars are open to juniors in the honors program who want advanced insight to what the honors essay entails.
- (II) Completion of a six credit senior honors essay (with a grade of B+ or higher). The essay is directed by an economics faculty member and represents a significant research effort. The writing of the essay is accomplished over the two semesters of the student's senior year with three credits awarded each semester (ECON 47960). These credits can be counted as economics electives toward the major and can be used to satisfy the major's writing-intensive requirement. The results of the essay must be presented at the economics seminar open to the public during the end of the second semester of each academic year.
- (ii) Participation in all College of Arts and Letters events for departmental honors students.

MAJOR IN INTERNATIONAL ECONOMICS

The undergraduate major in International Economics is a collaborative effort between the Department of Economics and the departments of languages and literatures affiliated with the International Economics major. In pursuing this major, students take a minimum of eight economics courses and seven to ten intermediate and advanced courses in one of the following languages: Arabic, Chinese, French, German, Italian, Japanese, Russian and Spanish. Students are also required to enroll in a one-credit course "Exploring International Economics" designed to foster the integration of the study of culture with the study of economics. Students must also complete a senior research project or equivalent designed to integrate their economic and language and culture study. The senior research project is intended to provide an experience that integrates the analytical aspects of economics with the linguistic and cultural aspects of a language. Details about the thesis/capstone project are determined by the relevant language department.

Students must satisfy a mathematics requirement of Calculus (MATH 10360 or equivalent) and successfully complete ECON 10010/20010; ECON 10020/20020; ECON 30010; ECON 30020; ECON 30330; ECON 30331; and two of the following: ECON 40700, ECON 40800, ECON 40710 and ECON 40720 or other international economics courses as approved by the Director of

Undergraduate Studies. Students should refer to their language department for specific language, literature and culture requirements.

Through the major, the collaborating departments seek to blend the programs of study to ensure that students will achieve advanced linguistic and cultural competency in a foreign language as well as excellent preparation in Economics. The balance of economics with languages and culture courses should attract motivated students and inspire them to undertake a challenging course of study that will prepare them for post-graduate studies and/or professional career opportunities in the international arena. International Economics majors will learn how aesthetic and cultural categories and value judgments are shaped by economic trends and political conditions and how political conditions and economic trends are influenced by aesthetic and cultural trends.

CONCENTRATIONS IN FINANCIAL ECONOMICS AND ECONOMETRICS

The Economics department also offers a concentration in Financial Economics and Econometrics. This selective program fills a need for additional training in applied quantitative economic reasoning. The coursework for the concentration will provide a fast-paced and rigorous training in financial economics that will prepare students for careers in investment management, banking, research, and policy-making.

Admission to the concentration will be selective, and Economics and International Economics majors in the College of Arts and Letters may apply. Applications for admission to the concentration should be submitted to the Economics Department by February 15 of a student's sophomore year. The department will evaluate all applicants and will make admission decisions by March 15. Admission decisions will be based on factors including overall GPA, performance in prior economics courses, and mathematical background. Students should have completed intermediate microeconomic theory by the end of their sophomore year.

Students pursuing this concentration will be required to fulfill the core requirements of the Economics or International Economics majors, along with the additional requirement of the five classes—three core classes and two electives. These classes would jointly satisfy the electives requirements within the Economics or International Economics majors.

Core Classes

All students must take the following three courses:

Financial Economics (ECON 40354)
Asset Pricing
Financial Econometrics

Upper level electives

All students are required to take two of the following electives:

International Money (ECON 40720)

Monetary Policy (ECON 40362)
Monetary Theory and Policy (ECON 40364)
Fixed Income Markets (future course)
Forecasting for Economics and Business (ECON 43330)
Options Pricing (future course)
Corporate Finance (future course)
Introduction to Financial Mathematics (MATH 30610)
Mathematical Methods in Financial Economics (MATH 40570/FIN 40820)
Statistical Methods in Financial Risk Management (ACMS 40890)
Other electives as approved by Director of Undergraduate Studies

The concentration will also offer additional out-of-classroom enrichment opportunities, such as presentations by outside researchers and practitioners. These events will complement the coursework by offering insights into the world of finance and of policymaking, and will be natural opportunities for networking and for career advancement.

THE MINOR IN BUSINESS ECONOMICS

The minor in Business Economics comprises 15 credits. It is open to students in the College of Arts and Letters. All students are required to take Principles of Microeconomics; Principles of Macroeconomics; Statistics; Introductory Accountancy and Introductory Finance. Students may count one of the above courses to fulfill a University requirement. Students may not double-count any of the above courses to fulfill the requirements of their major—but Psychology or Sociology majors can use their respective departmental statistics course to fulfill the statistics requirement of the minor. No more than one course in the minor maybe taken at another institution. Prior approval is required for this and for transfer credit that is applied to satisfy the requirements of the minor. No AP credit will be accepted as a substitute for courses in the minor but may qualify a student for a higher level course. The minor is not open to students majoring in Economics.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Economics*. Course descriptions can be found by clicking on the subject code and course number in the search results.

English

Department Chair:

Jesse Lander

Director of Undergraduate Studies:

Laura Betz

Director of Graduate Studies:

Christopher Abram

Director of Creative Writing:

Johannes Göransson

John and Barbara Glynn Family Professor of Literature:

Margaret Anne Doody

Reverend John J. Cavanaugh, C.S.C. Professor of the Humanities:

Stephen M. Fallon

Notre Dame Professor of English, Emeritus:

Kathryn Kerby-Fulton

Donald and Marilyn Keough Professor of Irish Studies:

Declan Kiberd

Donald R. Keough Family Professor of Irish Studies:

Barry McCrea

Notre Dame Endowed Professor in Urban Catholic Education:

Ernest Morrell

Mary Lee Duda Professor of Literature:

John Sitter

William P. and Hazel B. White Professor of English:

Laura Dassow Walls

William R. Keenan Jr., Professor of English, Emeritus:

Joseph A. Buttigieg

William R. Keenan Jr., Professor of English:

Valerie Sayers

George N. Shuster Professor of English Literature:

Laura L. Knoppers

Professors:

Jacqueline Vaught Brogan (emerita); James M. Collins (concurrent); Christopher B. Fox; Stephen A. Fredman (emeritus); Dolores W. Frese (emerita); Sandra Gustafson; Peter Holland (concurrent); Laura Knoppers; Greg P. Kucich; Tim Machan; John E. Matthias (emeritus); Joyelle McSweeney; Orlando Menes; William O'Rourke (emeritus); Mark Sanders; Steve Tomasula; Henry Weinfield (concurrent)

Associate Professors:

Christopher Abram; John Duffy; Johannes Göransson; Barbara J. Green; Stuart Greene (emeritus); Susan Harris; Romana Huk; Cyraia Johnson-Roullier; Michelle Karnes; William J. Krier (emeritus); Jesse Lander; Kate Marshall; Sara Maurer; Susannah Monta; Yasmin Solomonescu; David Thomas; Matthew Wilkins; Elliott Visconsi

Assistant Professors:

Nan Da; Ian Newman; Sarah Quesada; Francisco Robles; Roy Scranton; Azareen Van der Vliet Oloomi

Professional Specialists:

Laura Betz; Noreen Deane-Moran

Program of Studies. The English major features small classes in which students read, analyze, and discuss literary works, studying issues of literacy and rhetoric, investigating the symbolic systems that

shape cultural meaning, and exploring the broad range of human experience. Majors enjoy an atmosphere of immediate contact with the department's regular teaching and research faculty, who advise students on their course of study. English courses give close attention to student writing, and nearly every majors-level English course is writing-intensive.

English majors choose careers in any field valuing the ability to read, write, and analyze with intelligence and subtlety. Many of our majors find careers in law, business, education, publishing, journalism, marketing, politics, and medicine, as well as myriad other fields. An increasing number of English majors go into service projects and programs such as Teach for America.

Major Requirements. The English major requires a minimum of 10 courses (30 credit hours). In completing the 10 courses, students must satisfy the following requirements:

Introduction to Literary Studies (ENGL 30101).

This course, which introduces students to college-level study of literature, is a concurrent prerequisite for the major (i.e., students cannot take a major elective unless they have completed this course or are currently enrolled in it).

Research Seminar. In the research seminar (numbered ENGL 43xxx), students complete an original and substantial research project. With the approval of the director of undergraduate studies and the instructor, students may take a graduate course in place of the research seminar. The research seminar does not fulfill a distribution requirement.

Elective courses. Eight English courses at the 30xxx or above.

Distribution requirement. In selecting elective courses, students must fulfill the following distribution requirements:

History:

1 course in the period before 1500
1 course in the period 1500–1700
2 courses in the period 1700–1900
1 course after 1900

Culture:

1 course in British literature
1 course in American literature
1 course in a literature in English outside of Britain and the United States or in American ethnic minority literature

Genre:

1 course predominately concerned with poetry
2 courses predominantly concerned with 2 genres from the following list: fiction, drama or film, critical theory, nonfiction

A single course can fulfill the requirement in more than one distribution category, but it cannot fulfill more than one area within a single distribution category. For example, a survey of Renaissance literature might count for 1500–1700 (history),

British literature (culture), and drama (genre), but would not count for both poetry and drama (two genre categories).

Creative writing courses may satisfy the genre requirement, but no more than two may count toward the major.

The number of courses needed to satisfy the distribution requirement will vary, depending on the courses the student selects, but not all electives need fulfill a distribution requirement.

Research seminars do not fulfill the distribution requirement.

Concentration in Creative Writing. The philosophy of the Department of English is that in order to produce good literature, you must know good literature. In order to complete the concentration, therefore, the student must be an English major and complete all of the requirements for the major.

Requirements. In addition to completing the requirements for the major, students must take four creative writing courses from a list approved by the department, two of which, if taken at the 30xxx or 40xxx level, may count towards the ten courses required for the English major (meaning that at its completion students will have taken a minimum of twelve English courses at the 30xxx or 40xxx level). One 20xxx-level creative writing course may count toward the concentration. One of the four creative writing courses must be Advanced Fiction Writing (40850), Advanced Poetry Writing (40851), or Advanced Creative Nonfiction.

Admission to the Concentration. Students wishing to complete the concentration must apply to the department after taking two creative writing courses in accord with the guidelines above. The Creative Writing Committee will determine whether to admit students to the concentration on the basis of the recommendations of the instructors of those two courses. In cases in which it is not possible to obtain such recommendations, a student may supplement his or her application with a portfolio of creative writing.

Honors Concentration. In the English Honors Concentration, select majors create programs tailored to their own particular interest. A faculty mentor guides each of these students through this intensive experience. The English Honors Concentration is particularly beneficial to students wishing to pursue graduate studies in English. The main feature of the concentration is writing an honors thesis consisting of a work of literary scholarship.

Eligibility. During the junior year, students are invited to apply to the Honors Concentration after being identified in one of two ways: achieving a GPA of 3.78 or higher in three or more English classes, or 3.6 or higher with a faculty nomination. Invited students declare their interest in the Honors Concentration by completing a Statement of Purpose, a 300-word statement describing what the

FILM, TELEVISION, AND THEATRE

student intends to focus on during the time in the Honors Concentration.

Requirements. The requirements for the Honors Concentration are slightly different from the prior listing of English major requirements. In the fall of senior year, the student enrolls in ENGL 53001, the Honors Colloquium (which replaces the research seminar); in the spring of senior year, the student enrolls in ENGL 52999, Honors Thesis to complete the writing of the thesis. The latter is in addition to the 30 hours required for the major.

English Major Honors Concentration in Creative Writing. Students in Creative Writing Honors complete a thesis consisting of a work of creative writing and a reflection on the process of producing it.

Eligibility. During the junior year, students are invited to apply to the Honors Concentration after being identified in one of two ways: achieving a GPA of 3.78 or higher in three or more English courses, or 3.6 or higher with a faculty nomination. Invited students declare their interest by completing a 300-word Statement of Purpose describing the project the student intends to complete. Students may also self-nominate for Creative Writing Honors by contacting the Director of Creative Writing and/or using the online application form.

Requirements. Students must complete all of the requirements for the Honors Concentration. In the fall of their senior year, students take the Creative Writing Honors Thesis Colloquium (ENGL 53002); in the spring of the senior year, the student enrolls in ENGL 52999 (Honors Thesis) to complete the writing of the thesis. The thesis will consist of an abstract, a critical essay on the writing project (10–15 pages), approximately forty pages of prose (e.g., a section of a novel or a selection of short stories) or twenty pages of poetry, and a works cited.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *English*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Film, Television, and Theatre

Department Chair:

James M. Collins

Endowed Professors:

McMeel Family Chair in Shakespeare Studies:

Peter Holland

Endowed Associate Professors:

The William and Helen Carey Chair in Modern Communication:

Susan Ohmer

Thomas J. and Robert T. Rolfs Associate Professor of Film, Television, and Theatre:

Anne García-Romero

Professors:

James M. Collins; Donald Crafton (emeritus); Briona Nic Dhiarmada (concurrent); William Donahue (concurrent); Jill Godmilow (emerita); Peter Holland; Anton Juan; Mark C. Pilkinton (emeritus); Pamela Wojcik

Associate Professors:

Reginald F. Bain (emeritus); Christine Becker; Kevin C. Dreyer; Anne García-Romero; Mary Celeste Kearney; Susan Ohmer; Matthew Payne; Frederic W. Syburg (emeritus)

Assistant Professors:

David Barba; Tarryn Li-Min Chun; La Donna Forsgren; Olivier Morel; Jeff Spoonhower; Nicole L. Woods (concurrent)

Professional Specialists (Teaching Professors):

William Donaruma; Richard E. Donnelly; Siiri Scott

Associate Professional Specialists:

C. Ken Cole; Michael Kackman; Theodore E. Mandell; Marcus Stephens

Assistant Professional Specialists:

Matt Hawkins

Ryan Producing Artistic Director, Notre Dame

Shakespeare Festival:

Grant Mudge (concurrent Assistant Professional Specialist)

Adjunct Assistant Professional Specialist, Internship

Coordinator:

Karen Heisler

Instructor:

Gary Sieber (adjunct); William L. Wilson (adjunct)

The Department. The Department of Film, Television, and Theatre curriculum includes study of the arts of theatre and performance, film and video, and television. Our goal is to provide students with intellectual and intuitive resources for analysis and production of these performing and media arts. We seek both to encourage and inspire intellectual discipline and curiosity as well as to discover and nurture student creativity. We offer, therefore, both a scholarly and creative context for education of the general liberal arts student at Notre Dame as well as the individual seeking an intensive preparation for advanced study in these fields. In an interdisciplinary spirit of collaboration, students in this department

investigate film, television, and theatre (and occasionally other media) as complex cultural phenomena to develop skills in analysis, evaluation, and theory formation as well as to engage in creative production.

Students graduating from this department have numerous postgraduate choices. Many of our graduates seek careers in law, medicine, business, education, public service, or other professions. Others will pursue careers in theatre, film, or television. However, we are not a professional training program. Rather, we seek to provide the creative and technological tools for student scholar/artists to build a basis for advanced study and professional careers in the arts should they so desire. It is our hope that those whose work and determination lead them to seek careers in these fields will be challenged and assisted by their liberal arts curriculum. Our courses provide tools to understand the analytical, technical and imaginative processes of the field, whether pursued as future work, study, or as an enhancement of intellectual life.

For more information and up-to-date listings of courses and FTT events, visit ftt.nd.edu.

Program of Studies. Students interested in the major are encouraged to visit the departmental office (230 Marie P. DeBartolo Performing Arts Center) for information about the programs and department faculty. Step-by-step instructions for becoming a major are available on our website at ftt.nd.edu. Students may elect to major in the department as either a first or second major in accordance with college guidelines.

Students concentrate in either film, television or in theatre. Ten courses are needed to complete the major. Each concentration has a core of required classes; subsequent electives may be taken from across the department. All majors are required to take at least one course primarily focused on non-US media or performance cultures or the study of identity and cultural power. Courses meeting this International/Identity requirement cover such topics as national cinemas or performance traditions, global and transnational cultural flows, migration and diaspora, and the study of race and ethnicity, gender and sexuality, dis/ability, nationality and citizenship, religion, and/or age and generation.

The Department of Film, Television, and Theatre participates in several international programs by cross-listing courses and sponsoring internships. For more information, see the Bulletin descriptions for the international programs. Several courses are offered in the summer session, including Introduction to Film and Video Production. See the Summer Session Bulletin for availability and further information.

FTT majors are invited to apply during their junior year to complete a two-semester Senior Thesis project during their senior year. Upon completion of the project, as well as a one-credit writing workshop in

FILM, TELEVISION, AND THEATRE

the fall of their senior year, students will be eligible to receive the Honors designation upon graduation, provided their project is approved for that designation by the department Honors Committee.

FILM CONCENTRATION

10 courses (30 credit hours):

4 required core courses:

Basics of Film and Television

Global Cinema I

Global Cinema II

Critical Approaches to Screen Cultures

6 electives (3 at the 40000 level; one that carries International/Identity attribute)

TELEVISION STUDIES CONCENTRATION

10 courses (30 credit hours):

3 required core courses:

Basics of Film and Television

History of Television

Critical Approaches to Television

7 electives (4 at the 40000 level; one that carries International/Identity attribute)

THEATRE CONCENTRATION

10 courses (30 credit hours):

4 required core courses:

Theatrical Production

Script Analysis

Theatre, History, and Society (either section)

Performance Analysis

6 electives (including one that carries International/Identity attribute)

FILM AND TELEVISION ELECTIVES

Introduction to Film and Television Production

Film and Digital Culture

History of Documentary Film

Film and Popular Music

Digital Devices

Screenwriting

Media Internship

Writing the Short Film

La Telenovela

Shakespeare and Film

Intermediate Filmmaking

Digital Cinema Production

Advanced Digital Cinema Production

Walt Disney in Film and Culture

Contemporary Hollywood

Postmodern Narrative

Documentary Video Production

Sinatra

3D Digital Production for Animation & Video

Games

Advanced 3D Digital Production

Sound & Music Design for Digital Media

Broadcast Journalism

The Business of Television

Sports & Television

Entertainment and Arts Law

Media Ethics

Media and the Presidency

The Digital Newsroom

Ireland On Screen

Culture of Italian Immigration

The West of Ireland

Girls Media & Cultural Studies

The Film Producer

Internet Television Production

Media Stardom and Celebrity Culture

Contemporary Hollywood

Media, History, and Memory

The Politics of Style: 1980s Film & TV Culture

Cold War Media Culture

Gender and Rock

Media & Identity

Makin' Em Move

TV as a Storytelling Medium

The Telly in Transition: British TV Today

Media Industries

Transmedia Storytelling

Interactive Storytelling

Germany in Postwar Cinema

Women and Media Culture

Cinemasculinites

The Movie Musical

The Child in Cinema

The Apartment Plot

Queer Media Studies

New Trends in European Non-Fiction Film

THEATRE ELECTIVES

Introduction to Theatre

Latin American Theatre

History of Costume

Shakespeare on the Big Screen

Scene Design

Lighting Design

Costume Design

Shadow Puppetry

Spectacular Asia

Performing Blackness

Musical Theatre History

Creating the Musical

Stage Combat

Devised Performance

Documentary Theatre

Acting: Process

Viewpoints for Actors and Directors

Voice and Movement

Stage Management

Playwriting

Story Structure

Make-up for the Stage

Scenic Painting

Draping and Flat Patternmaking

Acting: Character

Acting: Text and Technique

Directing: Process

CAD for the Stage

Advanced Technical Production

Broadway Theatre Experience

MUSICAL THEATRE

This interdisciplinary minor is meant to engage the student who has multiple interests in Musical Theatre. Some students will structure their program around singing and acting, but others around song-writing, or work as conductor/impresario, or stage directing, or scholarship, etc. Admission to introductory classes will not be based on performance ability.

5 courses (15 credit hours):

3 credits - Musical Theatre History

3 credits of course work in FTT courses

3 credits of course work in MUSIC

3 credits from either FTT or MUSIC, with the

Musical Theatre Minor Designation

3 credits for a CAPSTONE PROJECT

Current Department of Film, Television, and Theatre courses for the Musical Theatre minor:

Musical Theatre History (required)

Musical Theatre Movement/Dance

Performance Techniques

Production and Performance

The Movie Musical

Disney in Film and Culture

Musical Theatre Lab

Current Department of Music courses for the Musical Theatre minor:

American Popular Song

Voice Lessons for Non-Majors

Theory for Non-Majors

Intro. To Harmony and Voice Leading

Musicianship I

Musicianship II

Musicianship III

Conducting I

Opera in Production

Opera Workshop

Vocal Pedagogy

Voice Science

Complementary Nature of Departmental Concentrations.

There is a strong creative and scholarly relationship in the mix of courses and activities of the department of which students should be aware. The concentrations offered by this department can provide many complementary areas of creative and technical study for students involved in film and television production, as well as overlapping historical, theoretical and critical concerns. Similarly, those concentrating in theatre are urged to avail themselves of the many opportunities for production experience and critical, cultural and theoretical studies offered by the theatre faculty.

Cocurricular Activities. The department encourages non-majors to elect courses, participate as audience in our extensive film and theatre series, and involve themselves in film, television, and theatre production as a means of informing and complementing their liberal arts education at Notre Dame. Occasional guest artists and lecturers are also sponsored by

GENDER STUDIES

the department. Information on all department-sponsored activities is available in the department office and on the department's website.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Film, Television, and Theatre*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Gender Studies*Director:*

Mary Celeste Kearney

Associate Director:

Pamela Wynne Butler

Program Coordinator:

Linnie Caye

Concurrent Faculty:

Gail Bederman, Associate Professor, Department of History; Eileen Hunt Botting, Professor, Department of Political Science; Pamela Wynne Butler, Assistant Professional Specialist, Gender Studies Program; Kasey Buckles, Associate Professor, Department of Economics; Meredith Chesson, Associate Professor, Department of Anthropology; Kathleen Cummings, Associate Professor, Department of American Studies; Elizabeth Evans, Assistant Special Professional, Department of English; La Donna Forsgren, Assistant Professor, Department of Film, Television and Theatre; Barbara Green, Associate Professor, Department of English; Perin Gurel, Assistant Professor, Department of American Studies; Susan Harris, Professor, Department of English; Cyraina Johnson-Roullier, Associate Professor, Department of English; Mary Celeste Kearney, Associate Professor, Department of Film, Television and Theatre; Janet Kourany, Associate Professor, Department of Philosophy; Sarah McKibben, Associate Professor, Department of Irish Language and Literature; Paul Ocobock, Assistant Professor, Department of History; Emily Remus, Assistant Professor, Department of History; Alison Rice, Associate Professor of French, Department of Romance Languages and Literatures; Francisco Robles, Assistant Professor, Department of English; Jason Ruiz, Associate Professor, Department of American Studies; Sonja Stojanovic, Assistant Professor, Department of Romance Languages and Literatures; Sophie White, Associate Professor, Department of American Studies; Pamela Wojcik, Professor, Department of Film, Television and Theatre; Nicole Woods, Assistant Professor, Department of Art, Art History and Design

GENDER STUDIES MAJOR, SUPPLEMENTARY MAJOR AND MINOR

Objectives. Gender Studies is an interdisciplinary academic program in the College of Arts and Letters at Notre Dame. Gender Studies analyzes the significance of gender—and the cognate subjects of sex, sexuality, race, ethnicity, class, religion, and nationality—in all areas of human life, especially in the social formation of human identities, practices, and institutions. Gender Studies gives scholars the methodological and theoretical tools to analyze gender and its cognates in their chosen disciplines in the arts, humanities, social sciences, and natural sciences. Gender Studies also provides its students and alumni with an intellectual framework in which the analysis of gender and its cognates can be creatively and critically applied to their personal, familial, professional, and civic roles. In the context of the Catholic identity of Notre Dame, Gender Studies facilitates the study of the intersection of gender and religion in the shaping of ethics, culture, and politics. Alongside our diverse array of courses drawn from across the University, our summer internship and academic-credit internship programs emphasize the holistic and practical life applications of a Gender Studies education at Notre Dame.

Gender Studies offers students a major, a supplementary major and a minor. In the major and supplementary major, students choose a concentration in Arts and Culture, Religion and Family, or Gender and Society. These concentrations allow students to focus their study of gender to prepare them for their senior capstone project.

Requirements for Primary Major:

10 courses, 30 credit hours

2 required courses:

Introduction to Gender Studies
Perspectives on Gender: Theory and Practice

4 courses in one of the following concentrations:

Arts and Culture
Religion and Family
Gender and Society

*2–3 electives**1 senior capstone project:*

regular track: Interdisciplinary Seminar
thesis track: senior thesis (6 credits—must be in student's area of concentration)

Requirements for Supplementary Major:

8 Courses, 24 credit hours

2 required courses:

Introduction to Gender Studies
Perspectives on Gender: Theory and Practice

3 courses in one of the following concentrations:

Arts and Culture
Religion and Family
Gender and Society

*2 electives**1 senior capstone project:*

Interdisciplinary Seminar
capstone essay (must be in student's area of concentration)

Requirements for Interdisciplinary Minor:

5 courses, 15 credit hours

2 required courses:

Introduction to Gender Studies
Perspectives on Gender: Theory and Practice

*3 electives***COURSE DESCRIPTIONS**

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Gender Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

German and Russian Languages and Literatures*Chair:*

William C. Donahue

Rev. Edmund P. Joyce, C.S.C., Professor of German Language and Literature:

Mark W. Roche

Paul G. Kimball Professor of Arts and Letters:

Vittorio Hösle

John J. Cavanaugh, C.S.C., Professor of Humanities:

William C. Donahue

Professors:

William C. Donahue; Vittorio Hösle; Randolph J. Klawiter (emeritus); Klaus Lanzinger (emeritus); Thomas G. Marullo; Robert E. Norton; Vera B. Profit (emerita); Mark W. Roche; Konrad Schaum (emeritus)

Associate Professors:

Tobias Boes; David W. Gasperetti; Albert K. Wimmer (emeritus)

Assistant Professors:

Carsten Dutt; Claire Taylor Jones; Emily Wang

Teaching Professors:

Denise M. Della Rossa; Hannelore Weber

Assistant Teaching Professors:

Melissa Miller; Steffen Kaupp

Program of Studies. The study of German and Russian languages and literatures provides educational opportunities relevant to an increasingly interdependent world. The acquisition of foreign language skills in general is an important component of liberal education because it enhances students' powers of communication and serves to introduce them to enduring cultural achievements of other peoples. In this sense, the study of German and Russian widens students' intellectual horizons, stimulates the understanding of several significant

GERMAN AND RUSSIAN LANGUAGES AND LITERATURES

cultural traditions, and facilitates the examination of these traditions in a more sophisticated and cosmopolitan manner.

The goal of all levels of language courses are oral and reading competence and linguistic and stylistic mastery. Courses in advanced German or Russian language, literature, culture and civilization expose the student to a wealth of literary, cultural and humanistic traditions as well as foster a better understanding of the rich national cultures of the German- and Russian-speaking countries.

The Department. The Department of German and Russian Languages and Literatures offers instruction in German and Russian at all levels of competence, from beginning language courses at the 10000 level to literature and civilization courses on the 30000 and 40000 levels.

THE GERMAN PROGRAM

Director of Undergraduate Studies:

Denise M. Della Rossa

REQUIREMENTS: FIRST MAJOR, SUPPLEMENTARY MAJOR, AND MINOR

Major in German Language and Literature

Successful completion of 10 courses (30 credit hours) beyond the three-semester language sequence.

These 10 courses must include successful completion of 20202, 30304, and 30305 and an additional 7 electives. 20202 is a prerequisite to 30304 and 30305, which may be taken in any order. At least one of these courses, preferably both, must be completed before taking an elective.

Of these 10 courses, 4 must be upper-division courses at the home institution from departmental offerings; 2 must be at the 40000 level; and 2 may be in English.

Supplementary Major in German Language and Literature

Successful completion of 8 courses (24 credit hours) beyond the three-semester language sequence.

These 8 courses must include successful completion of 20202, 30304, and 30305 and an additional 5 electives. 20202 is a prerequisite to 30304 and 30305, which may be taken in any order. At least one of these courses, preferably both, must be completed before taking an elective.

Of these 8 courses, 3 must be upper-division courses at the home institution from departmental offerings; 1 must be at the 40000 level; and 2 may be in English.

Major in International Economics in German

The undergraduate major in International Economics is a collaborative effort between the Department of Economics and affiliated departments of languages and literature. In pursuing this major, students take a minimum of eight economics courses and six courses in German beyond the language

requirement. Students are also required to enroll in a one-credit "Exploring International Economics" course, preferably their sophomore year, designed to foster the integration of the study of culture with the study of economics. Under the guidance of a faculty mentor, international economics majors in German integrate their economic and language and culture study into a senior research project or senior thesis. This project or thesis is intended to provide an experience that integrates the analytical aspects of economics with the linguistic and cultural aspects of German studies.

German Requirements: Successful completion of 6 courses (18 credit hours) beyond the three-semester language sequence. All students are required to take GE 33000: Exploring International Economics (one credit).

These 6 courses must include successful completion of 20202, 20113, 30304 and 30305 and an additional 2 electives; one of which must be at the 40000 level; one of which may be taught in English. 20202 is a prerequisite to 30304 and 30305, which may be taken in any order. At least one of these courses, preferably both, must be completed before taking an elective.

Of these 6 courses, 2 must be upper-division courses at the home institution from departmental offerings.

Refer to the Department of Economics for the relevant course requirements in economics which include satisfying a mathematics requirement of Calculus I and II and successful completion of ECON 10011/20011; ECON 10020/20020; ECON 30010; ECON 30020; ECON 30330; ECON 30331; and two of the following: ECON 40700, ECON 40800, ECON 40710 and ECON 40720.

Minor in German Language and Literature

Successful completion of 5 courses (15 credit hours) beyond the three-semester language sequence.

These 5 courses must include successful completion of 20202, 30304, and 30305 and an additional 2 electives. 20202 is a prerequisite to 30304 and 30305, which may be taken in any order. At least one of these courses, preferably both, must be completed before taking an elective.

Of these 5 courses, 2 must be upper-division courses at the home institution from departmental offerings; and 1 may be in English.

Major in German Studies

Successful completion of 10 courses (30 credit hours) beyond the three-semester language sequence.

These 10 courses must include successful completion of 20202, 30304, and 30305 and an additional 7 electives. 20202 is a prerequisite to 30304 and 30305, which may be taken in any order. At least one of these courses, preferably both, must be completed before taking an elective.

Of these 10 courses, 4 must be upper-division courses at the home institution; 3 must be in German and up to 4 may be in English; 2 must be at the 40000 level.

Supplementary Major in German Studies

Successful completion of 8 courses (24 credit hours) beyond the three-semester language requirement.

These 8 courses must include successful completion of 20202, 30304, and 30305 and an additional 5 electives. 20202 is a prerequisite to 30304 and 30305, which may be taken in any order. At least one of these courses, preferably both, must be completed before taking an elective.

Of these 8 courses, 3 must be upper-division courses at the home institution; 2 must be in German and up to 3 may be in English; 1 must be at the 40000 level.

Study Abroad: Students who participate in a study abroad program during the academic year must take at least 1 course from departmental offerings after their return to the home campus. Only one intensive language course taken abroad, whether completed during a summer program or the academic year, will count as an elective toward the first major, supplementary major, or minor.

Senior Thesis and Departmental Honors

German first or secondary majors who elect to write a *Senior Thesis* must meet the following requirements:

1. The student must have a GPA of 3.0 or higher in the major;
2. Should be nominated by two members of the German faculty during the spring semester of his or her junior year and no later than the first week of classes fall semester of the senior year; and
3. The thesis may be written in either German or English with a length of between 25–35 pages, including notes and references. (Exceptions beyond 35 pages require advisor approval.) Two bound copies of the final document are to be submitted to the Department of German

For the fall semester the student will receive a satisfactory/unsatisfactory grade (3 credits) for GE 48499. At the completion of the thesis in the spring semester, the student will be given a letter grade (3 credits) for GE 48499. These credits do not count toward the 30-credit hour requirement for the first major.

German first majors who wish to receive *Departmental Honors* must meet the above criteria as well as the following:

1. The student will present his or her thesis work in a public forum, such as Notre Dame's *Undergraduate Scholar's Conference* held each May or at a similar conference, and
2. The student must maintain a departmental GPA of 3.5 and receive no lower than an A– on the Senior Thesis.

THE RUSSIAN PROGRAM

Director of Undergraduate Studies:

David Gasperetti

The Major in Russian

Majors in Russian must complete ten courses (thirty credit hours) at the 20000 level and above, including at least six courses taught by departmental faculty. Intermediate Russian I and II and Advanced Russian I and II are required courses. However, participants in an approved semester-long program in Russia are automatically exempted from the language course that is offered concurrently with their semester abroad. In addition, students are required to take four three-credit literature or culture courses offered by the department at the 30000 level or above, including at least one course each at the 30000 and 40000 levels. With the permission of the Director of Undergraduate Studies, one course on a Russian subject taught in another department, such as Anthropology, History, Political Science, or Theology, may be counted toward the Russian major.

The Supplementary Major in Russian

Supplementary majors in Russian must complete eight courses (twenty-four credit hours) at the 20000 level and above, including at least four courses taught by departmental faculty. Intermediate Russian I and II and Advanced Russian I and II are required courses. However, participants in an approved semester-long program in Russia are automatically exempted from the language course that is offered concurrently with their semester abroad. In addition, students are required to take two three-credit literature or culture courses offered by the department, one at the 30000 level and one at the 40000 level. With the permission of the Director of Undergraduate Studies, one course on a Russian subject taught in another department, such as Anthropology, History, Political Science, or Theology, may be counted toward the Russian supplementary major.

The Major in International Economics in Russian

Combining the study of economics with the knowledge of another country's language and culture can be a powerful advantage in business. The Major in International Economics in Russian is designed to provide this edge by preparing students for the challenges of an ever more interconnected global economy. The requirements for the major include the following: RU 33000 "Exploring International Economics" (one credit, preferably taken in the sophomore year), which fosters an integrated approach to the study of culture and economics; seven courses (21 credits) from Russian departmental offerings at the 20000 level and above, including RU 20101: Intermediate Russian I, RU 20102: Intermediate Russian II, RU 40101: Advanced Russian I, RU 40102: Advanced Russian II, one literature/culture elective each at the 30000 and 40000 levels, and one additional three-credit literature or Russian history elective at the 30000 or 40000 level; and eight courses in economics. In addition, all

international economics majors combine their study of economics and language, literature, and culture in a senior research project or senior thesis written under the guidance of a faculty mentor.

Refer to the Department of Economics for the relevant course requirements in economics, which include satisfying a mathematics requirement of Calculus I and II and successful completion of ECON 10011/20011; ECON 10020/20020; ECON 30010; ECON 30020; ECON 30330; ECON 30331; and two of the following: ECON 40700, ECON 40800, ECON 40710 and ECON 40720.

The Minor in Russian

The Russian minor consists of five courses (fifteen credits) at the 20000 level or above taught by departmental faculty. Course selection must include at least two language courses at the student's appropriate level and three additional three-credit courses at either the 30000 or the 40000 level.

The Minor in Russian Studies

The Minor in Russian Studies allows students interested in Russian, East European, and Eurasian culture an opportunity to develop cultural competency in the region without a focus on language study. It consists of sixteen credits: a one-credit introductory course and five three-credit courses at the 30000 level or above, three of which will be taught by faculty in the Department of German and Russian. In order to expose students to diverse analytical approaches and a richer variety of cultural data, they are encouraged to take courses that engage with literature, history, and political science. Students may apply courses taken away from Notre Dame towards this minor with the approval of the Directory of Undergraduate Studies.

Study Abroad

Our students are encouraged to experience firsthand the excitement of being immersed in Russian culture through participation in a study program in Russia. Programs are available during the summer (five to nine weeks) or for an entire semester or academic year. Credits earned for course work taken in an approved program may be applied toward a Russian major or minor at Notre Dame. Grants are available on a competitive basis for summer language study through the Center for the Study of Languages and Cultures and the Nanovic Institute for European Studies.

Senior Thesis/Honors Track

Russian majors are admitted into the honors track by application. To receive honors, a student must (1) complete all requirements for the major; (2) maintain a GPA of at least 3.5 in the major; (3) register for two 1-credit enrichment courses (RU 47100) in the senior year; (4) register for two 40000-level literature courses in the senior year; and (5) receive a grade of A- or higher for a substantial honors thesis written in English. Closely supervised by one of the Russian faculty in the Department of German and Russian Languages and Literatures,

the Russian honors thesis is to be the product of a 6-credit honors track directed readings course taken in the senior year. The student will receive 3 credits in the fall semester for preparation of the thesis and 3 credits in the spring semester for writing the thesis. For more information, see germanandrussian.nd.edu.

Placement and Language Requirement

At the beginning of each semester, placement tests in German and Russian will be administered that will allow students to enroll in a course commensurate with their language proficiency. The placement test is mandatory for students who had German or Russian in high school.

Students testing out of four semesters must complete an additional course at the 20000 level or higher before fulfilling the language requirement. This includes students who have taken an AP or SAT II exam.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes in German or Russian for a given semester may be found by clicking on "Class Search" and selecting either German or Russian from the Subject menu. The scheduled classes in Russian and East European Studies for a given semester may be found by clicking on "Class Search" and selecting REES from the Attribute menu. Course descriptions can be found by clicking on the subject code and course number in the search results.

HISTORY

History

Chair:

Jon Coleman

Director of Undergraduate Studies:

James (Jake) Lundberg

Director of Graduate Studies:

Jaime Pensado

Ignatius A. O'Shaughnessy Dean of the College of Arts and Letters:

John T. McGreevy

Andrew V. Tackes Professor of History:

John H. Van Engen

Madden-Hennebry Professor of Irish American History:

Patrick Griffin

Dorothy S. Griffin Professor of History:

Brad Gregory

Marilyn Keough Dean of the Donald R. Keough School of Global Affairs:

R. Scott Appleby

Professors:

R. Scott Appleby; Ted Beatty; Tom Burman; Jon Coleman; Felipe Fernández-Armesto; Brad Gregory; Patrick Griffin; Christopher S. Hamlin; Asher Kaufman; Semion Lyandres; Alexander Martin; John T. McGreevy; Rev. Wilson D. Miscamble, C.S.C.; Rev. Robert Sullivan; Tom Tweed

Professors Emeritus:

Rev. Thomas Blantz, C.S.C.; Jay P. Dolan; J. Philip Gleason; Rev. Robert L. Kerby; Thomas A. Kselman; George Marsden; Dian H. Murray; Thomas Noble; Mark Noll; Walter Nugent; Rev. Marvin R. O'Connell; James Turner; John H. Van Engen; Andrzej Walicki

Associate Professors:

Gail Bederman; Alexander Beihammer; Mariana Candido; Catherine Cangany; Kathleen Cummings; John Deak; Darren Dochuk; Karen Graubart; Daniel Hobbins; Elisabeth Köll; Margaret Meserve; Jaime Pensado; Richard Pierce; Linda Przybyszewski; Rory Rapple; Julia Adeney Thomas; Deborah Tor

Assistant Professors:

Mike Amezcua; Liang Cai; Yacine Daddi Addain; Katie Jarvis; Rebecca McKenna; Paul Ocobock; Evan Ragland; Emily Remus; Sarah Shortall

Professional Specialist:

Daniel A. Graff; James (Jake) Lundberg

Concurrent Faculty:

Christopher Baron (Classics); Jessica Baron (Political Science); Francesca Bordogna (Program of Liberal Studies); Steven Brady (First Year of Studies); Annie Gilbert Coleman (American Studies); Kathleen Sprows Cummings (American Studies and Cushwa Center); Barry Cushman (Law School); Erika Doss (American Studies); Melinda Gormley (John J. Reilly Center); Robert Goulding (Program of Liberal Studies); Lionel Jensen (East Asian Languages & Cultures); Robert (Jay) Malone (History of Science Society); John Soares; Thomas A. Stapleford (History and Philosophy of Science); Kevin Whelan (Keough Institute for Irish Studies); Sophie White (American Studies)

Program of Studies. The Department of History offers courses for undergraduates designed to expose them to life in the past as it was experienced and understood in the Americas, Europe, Asia, Africa, and Australia. Courses offered consist of lectures and seminars that require students to develop both a critical appreciation of primary and secondary texts and skills in historical thinking and writing.

The Major in History. For students interested in pursuing a history major, the department offers a rigorous program consisting of ten 3-credit courses. The sequence begins with an exciting introductory seminar (HIST 33000—History Workshop), which plunges students into the work of writing history from the moment they join the major through intensive interpretation of primary source documents. To encourage breadth of historical knowledge, standard majors also take a variety of courses emphasizing different chronological periods and geographical areas. More specifically, they must take one course from four of six primary fields: Africa/Asia/Middle East; Ancient/Medieval Europe (to 1500); Modern Europe (from 1500); United States; Latin America; Special (for courses focusing on other geographical areas or courses primarily comparative or global in approach). In addition, to encourage depth in a particular field of interest, standard majors also declare a concentration consisting of three courses. (These concentrations must be approved by the major's advisor by the beginning of the senior year.) Standard majors also take an elective in any field they choose. To complete their course work, standard majors take a departmental seminar (HIST 43xxx), which offers the opportunity to conduct primary research and produce a substantial paper.

Majors above may count up to two lower-level courses toward the major program (courses beginning with a 1 or a 2). All others must be "major-level" courses that begin with a 3 or higher. These lower-level courses may be counted toward breadth requirements, electives, or concentration area courses.

Majors must take at least one *writing-intensive course* in the form of the departmental seminar (HIST 43xxx). In addition to prioritizing research in primary sources, these courses also emphasize writing as a process, with students encouraged to perform continual revisions and share their writing with their peers.

Application of AP Credits to the Major in History.

Beginning with the class of 2022, students who received a score of 5 on an AP history subject test (US, European, or World) may apply 3 credits toward the major in history. No more than 3 AP credits may be applied to the major.

The Minor in History. The minor in history is designed to offer a formal program and pedagogical structure to those students who have an interest in history, but do not have room to be full majors. The program is designed to be flexible while offering students an introduction to the discipline of history.

The minor in history consists of five 3-credit hour courses with no prerequisites: History Workshop (HIST 33000) and four general electives, one of which must include a research component (with no more than one course taken abroad, and no more than one taken at the 10000 level, including history university seminars).

History Honors Program. The History Department offers a special program of study, the History Honors Program, for the most talented and motivated history majors. Students are invited to apply in the fall semester of the junior year; the program begins in the spring of the junior year. A student in the History Honors Program will take 11 three-credit history courses to satisfy both the Honors Program and standard history major requirements. In addition to taking the introductory gateway course (HIST 33000, History Workshop) and a variety of courses emphasizing geographical and chronological breadth, the student will also take two special honors seminars. Instead of completing a departmental seminar, the student will research and write a yearlong senior thesis, receiving three credits in each semester of the senior year. Each history honors student will select an area of concentration tailored to his or her thesis topic and will take two additional courses in this field to complete the program.

In the spring of the junior year, the student will enroll in an Honors Program Methodology Seminar (HIST 53001), designed to introduce the student to the various methods historians utilize to analyze and write about the past. [Students admitted to the Honors Program, but studying abroad during the spring semester junior year, will be exempt from HIST 53001. They must, however, register a thesis topic and advisor with the director of Undergraduate Studies by the end of that semester.] In the fall of the senior year, the student will enroll in the Honors Program Historiography Colloquium (HIST 53002), intended to introduce the student to basic issues of critical interpretation and historiography through a specific field. In the fall and spring of the senior year, the student will work on a thesis (40 to 80 pages) under the supervision of a specific faculty member. The student will register for HIST 58003 (three senior thesis credits) in the fall and HIST 58004 (three senior thesis credits) in the spring of the senior year.

Phi Theta Alpha. Students who have completed at least four major courses in history, earning a grade point average of 3.8 or above are eligible for the Notre Dame chapter of Phi Alpha Theta, a national history honor society. The History Department initiates new members once per year in the spring.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *History*. Course descriptions can be found by clicking on the subject code and course number in the search results.

IRISH LANGUAGE AND LITERATURE

Irish Language and Literature

Chair:

Diarmuid Ó Giolláin, Ph.D.

The only one of its kind in North America, the Department of Irish Language and Literature began offering a major and a supplemental major in Irish Language and Literature in the fall 2012 semester. The department also gives undergraduates the opportunity to complete a minor in the field. These programs teach students Irish, the indigenous language of Ireland and the voice of the oldest vernacular literature in Europe. It also allows them to engage Irish culture in its native language.

Officially launched on October 1, 2004, by His Excellency Noel Fahey, Irish Ambassador to the United States of America, the Department of Irish Language and Literature recognizes Notre Dame's commitment to the Irish language and the centrality of Irish to the academic discipline of Irish Studies.

Requirements for a Major in Irish Language and Literature (with a language-intensive concentration) In addition to Intermediate Irish I, a student must take

- Intermediate Irish II
- Advanced Irish I & II
- 2 survey courses—covering medieval to 18th-century, and 19th- to 21st-century literature, respectively
- 4 electives—3 of which must be taken at a 30000/40000 level
- 1 elective taken at a 40000 level and taught in the Irish language

Supplemental Major (with a language-intensive concentration) Requirements are the same as those for the major except only 2 elective courses, 1 of which must be taken at the 30000/40000 level, are required.

Requirements for a Major in Irish Language and Literature (with a literature-intensive concentration) In addition to Intermediate Irish I, a student must take

- Intermediate Irish II
- 2 survey courses—covering medieval to 18th-century, and 19th- to 21st-century literature, respectively
- 7 electives—6 of which must be taken at a 30000/40000 level

Supplemental Major (with a literature-intensive concentration) Requirements same as those for the major except only 5 elective courses, of which 4 must be at the 30000/40000 level, are required.

Senior Thesis and Honors Guidelines

Students with a passion for Irish language and literature may choose to write a senior thesis or a senior honors thesis to crown their studies at Notre Dame. Students should identify a topic in spring of junior

year in consultation with a faculty advisor, and then arrange to take a two-course sequence of directed readings with their advisor, doing research and reading in fall and writing the thesis in early spring.

Students pursuing a **minor in Irish language and literature** are required to complete the following courses:

1. Take and pass the following Irish language courses: Beginning Irish I & II, Intermediate Irish and Intermediate Irish II.
2. Take and pass three Irish literature courses offered by the Department of Irish Language and Literature, two of which must be a 30000 level or above.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Irish Language and Literature*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Mathematics

Chair:

Jeffrey Diller

Associate Chair:

Richard Hind

Director of Graduate Studies:

Peter A. Cholak

Director of Undergraduate Studies:

Sonja Mapes-Székelyhidi

William J. Hank Family Professor of Mathematics:

Anand Pillay

Charles L. Huisking Professor of Mathematics:

Julia F. Knight

John and Margaret McAndrews Professor of Mathematics:

Mark Behrens

John A. Zahm, C.S.C., Professor of Mathematics

Stephen A. Stolz

Rev. Howard J. Kenna, C.S.C., Professor of Mathematics

Karsten Grove

Glynn Family Honors Collegiate Professor:

Claudia Polini

Notre Dame Professor of Mathematics:

Gabor Székelyhidi

Professors:

Peter A. Cholak; Francis X. Connolly (emeritus); Jeffrey A. Diller; William G. Dwyer (emeritus); Matthew J. Dyer; Samuel R. Evens; Leonid Faybusovich; Michael Gekhtman; Matthew Gursky; Alexander J. Hahn (emeritus); Brian C. Hall; Qing Han; David Hansen (emeritus); Alex A. Himonas; Richard Hind; Alan Howard (emeritus); Francois Ledrappier (emeritus); Juan Migliore; Gerard K. Misiolek; Liviu Nicolaescu; Timothy O'Meara (Kenna Professor of Mathematics, emeritus, and provost emeritus); Richard R. Otter (emeritus); Barth Pollak (emeritus); Andrew Putman; Mei-Chi Shaw; Roxanne Smarandache; Brian Smyth (emeritus); Dennis M. Snow; Nancy K. Stanton; Sergei Starchenko; Laurence R. Taylor; Warren J. Wong (emeritus); Frederico Xavier (emeritus)

Associate Professors:

Katrina Barron; Mario Borelli (emeritus); John E. Derwent (emeritus); David Galvin; Cladiu Raicu

Assistant Professors:

Andrei Jorza; Pavel Mnev; Annette Pilkington; Marco Radeschi; Christopher Schommer-Pries

Special Professional Faculty:

Arthur Lim

Associate Special Professional Faculty:

Sonja Mapes-Székelyhidi

Program of Studies. Students in the College of Arts and Letters may pursue a major in mathematics with a concentration in honors. (Note that this program should not be confused with the Arts and Letters/Science Honors program and that several concentrations, including Honors, are available with a major in mathematics in the College of Science.) The mathematics major in arts and letters aims to give the student a thorough liberal intellectual

MATHEMATICS

discipline and to furnish an adequate background for other fields of study. At the same time it prepares the student for graduate work in mathematics, and many of those who have taken the program have entered graduate schools in that field. Others have entered philosophy, medicine, law, economics and industrial management.

Students intending to follow this major in the College of Arts and Letters must declare their intention to the advisor indicated by the mathematics department and the dean of arts and letters at advance registration in the spring of their freshman year. Students must have completed or be completing satisfactory work in MATH 10850 and 10860. The program of their studies is subject in its entirety to approval by the advisor.

Students whose first major is in the College of Arts and Letters may also pursue a second major in mathematics. See "Mathematics as a Second Major" in the College of Science section of this *Bulletin*.

THE PROGRAM OF COURSES

First Year

First Semester

English	3
University Requirement	3
MATH 10850. Honors Calculus I	4
Natural Science	3
Language: (French, German or Russian recommended)	3
Moreau First Year Experience	1
	<hr/>

17

Second Semester

Language: French, German or Russian	3
University Seminar	3
MATH 10860. Honors Calculus II	4
Natural Science	3
Electives	3
Moreau First Year Experience	1
	<hr/>

17

Sophomore Year

First Semester

College Seminar	3
Language: French, German or Russian	3
University Requirement	3
MATH 20810. Honors Algebra I	3
MATH 20850. Honors Calculus III	4
	<hr/>

16

Second Semester

Introduction to Philosophy	3
University Requirement	3
Theology	3
MATH 20820. Honors Algebra II	3
MATH 20860. Honors Calculus IV	4
	<hr/>

16

Junior Year

First Semester

Theology	3
MATH 30810. Honors Algebra III	3
MATH 30850. Honors Analysis I	3
Elective	5
University Requirement	3
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17

Second Semester

Philosophy	3
MATH 30820. Honors Algebra IV	3
MATH 30860. Honors Analysis II	3
English/American Literature	3
Elective	3
	<hr/>

15

Senior Year

First Semester

Mathematics Electives	6
Electives	9
	<hr/>

15

Second Semester

Mathematics Electives	6
Electives	9
	<hr/>

15

(At least six credits of mathematics electives must be at the 40xxx level.)

The Senior Thesis for Mathematics Majors

Students in the mathematics program have the option of writing a thesis on a subject in mathematics, or in an interdisciplinary area connected to mathematics. Such a thesis is strongly encouraged for math honors students and required of students in the SUMR program. This project is intended to give the student a better sense of how mathematics is done and used, and to develop in the student the habit of learning mathematics and its applications in an independent setting. In most cases, this work would be expected to be expository, but based on advanced-level readings. It should represent an effort that goes beyond what is found in an undergraduate course. It is especially desirable for a student to present a somewhat novel approach to an established subject, or to explore one of the many interesting connections that mathematics has with other disciplines.

During the second semester of the junior year and the first semester of the senior year, the student will work closely with a faculty advisor on a program of readings in preparation for the thesis, receiving 2 credits for each of these two semesters of work, under MATH 48800.

The thesis is to be crafted during the second semester of the senior year. The thesis must be submitted to the director of undergraduate studies by April 15 of the senior year. If the thesis is approved, the student will receive 2 credits under MATH 48900 and the citation of "Graduation with Senior Thesis" will appear on the transcript.

Students interested in writing a senior thesis should contact the director of undergraduate studies in the Department of Mathematics.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Mathematics*. Course descriptions can be found by clicking on the subject code and course number in the search results.

MEDIEVAL STUDIES

Medieval Studies

Robert M. Conway Director of the Medieval Institute:

John Burman (History)

Director of Undergraduate Studies:

Linda Major

Fellows of the Medieval Institute:

Christopher Abram (English); Rev. Joseph P. Amar (Classics: Arabic); Ann Astell (Theology); Rev. Yury Avvakumov (Theology); Zygmunt G. Baranski (Romance Languages: Italian); Alexander Blachly (Music); W. Martin Bloomer (Classics: Latin); Maureen B. McCann Boulton (Romance Languages: French, emerita); Theodore J. Cachey (Romance Languages: Italian); Peter Casarella (Theology); John C. Cavadini (Theology); Robert R. Coleman (Art History); Richard Cross (Philosophy); Rev. Brian E. Daley, S.J. (Theology); JoAnn DellaNeva (Romance Languages: French); Rev. Michael S. Driscoll (Theology); Stephen D. Dumont (Philosophy); Kent Emery, Jr. (Liberal Studies; Philosophy); Margot Fassler (Music, Theology); Felipe Fernández-Armesto (History); Alfred Freddoso (Philosophy, emeritus); Stephen E. Gersh (Philosophy, emeritus); Robert Goulding (History and Philosophy of Science); Karen Graubart (History); Brad S. Gregory (History); Li Guo (Classics: Arabic); Daniel Hobbins (History); Peter Holland (Theater); Peter Jeffery (Music); Rev. John I. Jenkins, C.S.C. (Philosophy); Claire Taylor Jones (German); Encarnación Juárez-Almendros (Romance Languages: Spanish); Kathryn Kerby-Fulton (English); Mary M. Keys (Political Science); Brian Krostenko (Classics: Latin); Ian Kuijt (Anthropology); Blake Leyerle (Theology); Tim Machan (English); Julia Marvin (Liberal Studies); Peter McQuillan (Irish Language and Literature); Margaret Meserve (History); Christian R. Moevs (Romance Languages: Italian); Hildegund Müller (Classics: Latin); Amy Mulligan (Irish Language and Literature); David O'Connor (Philosophy; Classics); Mark C. Pilkinton (Theatre, emeritus); Jean Porter (Theology); Rory Rapple (History); Gretchen Reydam-Schils (Liberal Studies; Philosophy); Gabriel Said Reynolds (Theology); Denis Robichaud (Liberal Studies); Dayle Seidenspinner-Núñez (Romance Languages: Spanish, emerita); Susan Guise Sheridan (Anthropology); Deborah Tor (History); Joseph P. Wawrykow (Theology)

Program of Studies. The Medieval Institute is one of Notre Dame's oldest and most renowned centers of learning. Established in 1946, it was envisaged from the start to be a premier locus for the study of the European Middle Ages. Over the decades its scope has broadened to where it now includes Islamic, Jewish, Eastern, and Western Christian studies. The academic strength and stature of the institute are due not only to its faculty, students, and library, but also to its ongoing commitment to the original liberal arts ideal.

Medieval Studies prepares students to enter graduate school, law school, medical school, or various careers such as business, government, education, publishing, ministry, curatorship, and research. With an emphasis on close reading, precise textual analysis, careful writing, and vigorous discussion, the program is designed to foster critical thinking, oral and written communication skills, and a heightened appreciation for history, religion, and culture.

Far from being the "dark ages," medieval civilization witnessed the dawn of many of today's institutions including universities, hospitals, legal and economic systems, religious communities and doctrine, architecture, engineering, science, art, and literature. Contemporary society is indebted to the Middle Ages not only for its inheritance, but also for its relevance.

The Medieval Studies program offers four undergraduate tracks, each based on an interdisciplinary model. It draws courses from Anthropology; Art, Art History, and Design; Classics; English; German and Russian Languages and Literatures; History; Irish Language and Literature; Music; Philosophy; Political Science; Romance Languages and Literatures; and Theology. From these 12 disciplines, students are encouraged to build a unique program of study, in consultation with a faculty advisor, around an area of concentration that captures an interest, prepares for a field, or contributes to an academic pursuit.

Students interested in Medieval Studies may elect one of the following four options:

1. Major in Medieval Studies
2. Honors Major in Medieval Studies
3. Supplementary Major in Medieval Studies
4. Minor in Medieval Studies

All three major tracks include two common components. Each student's curriculum is built around a concentration chosen by the individual (from the 12 participating departments), in conjunction with a faculty advisor. The concentration requires a minimum of four interrelated courses reflecting an intellectual and curricular coherence. An advanced seminar (3 credits) is the second common element in each of the major tracks. Students in the seminar are expected to read widely and discuss vigorously a set of sources that present a particular issue from several points of view. In addition, they are also expected to write a substantial research paper. The goal of the seminar is to engage students in thinking critically and knowledgeably across the boundaries of traditional disciplines while maintaining a focus on a particular time, place, or issue.

The three major tracks and the minor track also have an introductory required course (3 credits), MI 20001, The World of the Middle Ages.

Following are brief outlines of the basic requirements for the three major tracks and the minor track. Further details can be obtained from the director of undergraduate studies in the Medieval Institute.

Medieval Studies Major (30 credits)

- The World of the Middle Ages course
- Four courses drawn from two or more departments representing a concentration
- Four electives in Medieval Studies drawn from at least two departments
- One advanced seminar (4xxxx-level or above) in Medieval Studies

Medieval Studies Honors Major (36 credits)

- Same requirements as major in Medieval Studies (see above)
- EXCEPT one intermediate Latin course and one advanced Latin course are required in lieu of two medieval electives
- PLUS an honors thesis for 6 credits

Medieval Studies Supp. Major (24 credits)

- The World of the Middle Ages course
- Four courses drawn from two or more departments representing a concentration
- Two or three electives in Medieval Studies
- Medieval Studies seminar (on a space-available basis and in conjunction with MI electives option)

Medieval Studies Minor (15 credits)

- The World of the Middle Ages course
- Three or four electives in Medieval Studies drawn from at least two departments
- Medieval Studies seminar (on a space-available basis and in conjunction with MI electives option)

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Medieval Institute*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Music

Music

Chair:

Peter H. Smith

Keough-Hesburgh Professor of Music History and

Liturgist:

Margot Fassler

Michael P. Grace Chair in Medieval Studies:

Peter Jeffery

J.W. Van Gorkom Professor of Music:

Susan L. Youens (emerita)

Professors:

Alexander Blachly; John Blacklow; Calvin M. Bower (emeritus); William Cerny (emeritus); Craig J. Cramer; Kenneth W. Dye; Ethan T. Haimo (emeritus); Georgine Resick (emerita); Carmen Tellez

Associate Professors:

Karen L. Buranskas (emerita); Mary E. Frandsen; Paul G. Johnson (emeritus); Rev. Patrick Maloney, C.S.C. (emeritus); Carolyn R. Plummer (emerita)

Assistant Professor:

John Liberatore

Associate Professional Specialists:

Kiera Duffy; Lawrence H. Dwyer; Stephen Lancaster; Tricia Park; Daniel Schlosberg; Daniel C. Stowe; Paul Walker

Assistant Professional Specialist:

Alek Shrader

Concurrent Faculty:

Mark Doerries

Band Staff:

Justin McManus; Matthew Merten; Sam Sanchez; Alison Thigpen

Program of Studies. The Department of Music offers students a variety of musical experiences in accordance with its two objectives: (1) to provide all students, regardless of their major, knowledge and training in music through introductory, historical and theoretical courses, through participation in large and small ensembles, and through applied instrumental or vocal study; and (2) to provide intensive curriculum and training for the student who chooses music as a major. Students majoring in music will choose a concentration in Theory and History or in Performance. Each concentration offers an honors option for students intending to pursue professional study in the field after graduation. These students should also continue to study at least one non-native language beyond the college's language requirement. All the concentrations have requirements beyond the course work. These may include recitals, ensembles, juries, and so forth.

Students considering these programs should contact the department as early as possible, preferably in the first year of study. This is especially important if study abroad is anticipated.

Advising. Each major will be assigned a faculty advisor who must be consulted in person to discuss the program of study before a student may register for classes.

Lessons. Music majors in the Performance concentration qualify for a 100 percent discount on weekly one-hour applied music lessons on their primary instrument and a 50 percent discount on a secondary instrument. Students in the Theory and History concentration qualify for a 50 percent discount on lessons on a primary instrument and no discount for lessons on a secondary instrument. Applied music lessons are also available for non-majors for a fee. Lessons may count as "activity" elective credits. (The College of Arts and Letters accepts up to three activity credits toward graduation.) The fee is charged to the students' accounts, and no refunds are made after the second lesson. Lessons do not count toward the University fine arts requirement.

Interdisciplinary Minor in Liturgical Music. This 18-credit minor consists of three 3-credit courses in theology and two 3-credit courses in music, plus three credits of music lessons or approved ensembles, to be selected in consultation with the student's music advisor. Contact the director of undergraduate studies in the Department of Theology.

Master of Sacred Music degree. The Master of Sacred Music (MSM) is a degree program situated in the Department of Theology at the University of Notre Dame with major participation from faculty in the Department of Music. For information, contact Janet Rudasics at (574) 631-5349.

Doctor of Musical Arts degree. The Doctor of Musical Arts (DMA) is a degree program situated in the College of Arts and Letters at the University of Notre Dame with major participation from faculty in the Departments of Music and Theology. For more information, contact Janet Rudasics at (574) 631-5349.

HISTORY/THEORY

The requirements for a 33-credit major with a concentration in theory and history are:

Class	Credits
Harmony and Voice Leading (Theory I) (Prerequisite course; 3 credits count as University elective)	0
Advanced Harmony and Voice Leading (Theory II)	3
Chromatic Harmony (Theory III)	3
Twentieth-Century Music: Structure and Style (Theory/History IV)	3
Musicianship I–III	9
Four 3-credit courses in history and theory, 30xxx level and above	12
Music Total	33

Collegiate/University Requirements and Electives	87
Total	120
Honors in Music (optional) (One additional 3-credit course in music history or theory, 30xxx-level or above, and a senior project, to be determined with advisor)	6

Students who have had previous music education may place out of Harmony and Voice Leading (Theory I) and Musicianship Labs, by examination.

Students with a music GPA of 3.7 or higher may be invited to participate in the honors program at the end of their sophomore year.

Applied lessons and ensembles are encouraged, but not required. Students intending to continue the study of music after graduation should maintain a rigorous program of lessons and applied music.

PERFORMANCE

Students who wish to major in performance must have had a minimum of four years of instruction on their instrument prior to their enrollment at Notre Dame.

The requirements for a 42-credit major with a concentration in performance are:

Class	Credits
Harmony and Voice Leading (Theory I) (Prerequisite course; 3 credits count as University elective)	0
Musicianship I (prerequisite course)	0
Advanced Harmony and Voice Leading (Theory II)	3
Chromatic Harmony (Theory III)	3
Twentieth-Century Music: Structure and Style (Theory/History IV)	3
History I–III	9
Two MUS 30xxx-level or above courses in music theory or history that carry 3 credits each	6
Three additional elective credits in music	3
Advanced Performance Studio (1 credit per semester for the first year; 2 credits for the six semesters thereafter)	14
1 recital	1
Total Music	42
Collegiate/University Requirements and Electives	78
Total	120
Honors in Music (optional) (Additional electives at the 30xxx-level or higher and/or applied music study (5 credits total) and an additional recital (1 credit).)	6

Students with a music GPA of 3.7 or higher may be invited to participate in the honors program at the end of their sophomore year.

NEUROSCIENCE AND BEHAVIOR

In order to remain in the performance program, students must be approved by faculty. In the spring semester of the freshman, sophomore, and junior years, all performance majors must participate in juries. Afterwards, the faculty will assess the level of their performance to determine if they are qualified to continue in the program. Students who demonstrate a high level of achievement in the sophomore juries will be candidates for the honors program.

Students in the performance concentrate may take proficiency exams to pass out of one or more of the musicianship courses; however, if they do not pass the proficiencies, they must enroll in Musicianship I–III.

Performance concentrators must present a senior recital. (Honors majors must present an additional recital.)

Participation in ensembles (e.g., chamber music class, large ensembles, chorale, opera, etc.) is required each semester. (No credit toward the major, but may be applied toward graduation as “activity” credits.)

Students who have had previous music education may place out of Harmony and Voice Leading (Theory I), by examination.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Music*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Neuroscience and Behavior

Director of Undergraduate Studies:
Anré Venter

Program of Studies. Neuroscience is a relatively young, exciting, and fundamentally interdisciplinary field devoted to the scientific study of the nervous system. Neuroscience encompasses the study of problems from multiple disciplinary perspectives at different levels of analysis in human and non-human organisms. It includes, for example, the study of molecular mechanisms in individual neurons and the coordination of millions of neurons into neural systems. Problems range from investigation of the evolution of nervous systems in basal vertebrates to the application of neuroscience to education and law. Neuroscientists also seek to develop neurologically plausible models of human thinking, affect and behavior.

Neuroscience creates a context for scholarly conversation about the nature of mind, brain and behavior. It engages experts in collaboration across diverse fields, including biological sciences, chemistry, computer science, engineering, linguistics, mathematics, medicine, philosophy, physics and psychology. Reflecting the interdisciplinary nature of the major, the curriculum includes flexibility such that it can be customized to best prepare students for a variety of future careers. Students studying neuroscience will be prepared to pursue professional degree programs (medical, dental, veterinary, clinical psychology, or other health professions) and graduate programs in areas such as neuroscience, biological sciences or psychology.

The neuroscience and behavior major is an interdisciplinary program that includes both Bachelor of Science and Bachelor of Arts tracks. The requirements for the major are similar for both tracks, with a foundational requirement of an introductory neuroscience course with a laboratory in the spring of the sophomore year. The two tracks differ in how they satisfy college level requirements. Both required courses and electives that satisfy the major credit requirements are drawn primarily from the Departments of Biological Sciences and Psychology. Undergraduate research and approved electives in other departments are also encouraged. The following description covers the BA track only (see page 162 for description of the BS track).

Major Requirements. The general BA in Neuroscience and Behavior consists 94 to 97 credits of required courses (including University: 40 credits; College: 12–15 credits depending on which level language course students place into; and Major requirements: 44–46 credits depending on the number of 3 versus 4 credit required courses elected) leaving a range of free electives (23 to 26) for a total of 120 credits. The specific major requirements are as follows:

Core Major Requirements:

14/15 credit hours (depending on which statistics course is completed)

PSY 10000/20000. Introductory Psychology	3
PSY 30100. Experimental Psychology I: Statistics (or equivalent)	4
BIOS 10171. Biological Sciences I & Lab (11173)	4
BIOS 20450. Neuroscience & Behavior & Lab (21450) (NOT BIOS 30338)	4

Foundational Science Category:

One course required (3–5 credits depending on which course is selected)

PSY 30160. Experimental Psychology II: Research methods	4
BIOS 10162. Biological Sciences II & Lab (11162) (or 20202 / 21202)	4
CHEM 20273. Organic Chemistry II & Lab (21273) (or 20283 / 21283)	4
PHYS 10310. Physics I & Lab (11310) (or 30210 / 31210 or 10411 / 11411 or 20210 / 21210)	4
BIOS 20250. Genetics—taken together with 21250 (or 20303)	4–5
BIOS 20241. Cell Biology (or 30341)	3
CHEM 40420. Biochemistry	3
ACMS 20210. Scientific Computing	3.5
ACMS 20550. Intro to Applied Math Methods	3.5
MATH 20480 Intro to Dynamical Systems	3
MATH 20630 Intro to Math Reasoning	3

Biological Science Elective Category:

Three courses required (9 credits)

BIOS 30344. Human Physiology	3
BIOS 30339. Comparative Neurobiology	3
BIOS 30407. Animal Behavior	3
BIOS 30301. Embryology	3
BIOS 40339. Human Gross Anatomy	3
BIOS 60522. Behavioral Ecology	Variable
BIOS 60571. Topics in Physiology	Variable
BIOS 60572. Topics in Neuroscience	Variable

Psychology Elective Category:

Three courses required (9 credits)

PSY 30160. Experimental Psychology II: Research methods	4
PSY 30220. Adolescent Development	3
PSY 30253. Introduction to Cognitive Development	3
PSY 30310. Abnormal Psychology	3
PSY 30358. Behavioral Medicine	3
PSY 30400. Cognitive Psychology	3
PSY 30430. Learning & Memory	3
PSY 30501. Intro to Biopsychology	3
PSY 30440. Sensation & Perception	3
PSY 30520. Introduction to Cognitive Neuroscience	3

NEUROSCIENCE AND BEHAVIOR

PSY 40126. Introduction to Quantitative Neuroscience	3
PSY 40675. Artificial Intelligence	3
PSY 43250. Cognitive Development	3
PSY 43357. Food and the Brain	3
PSY 43360. Health Psychology	3
PSY 43526. The Sleeping Brain	3
PSY 43533. Neurophysiology of Stress	3
PSY 43540. Applied Hormones & Behavior	3

Additional Elective Category:**Three courses required (9 credits)**

Maximum of 6 credits of undergrad research with preapproved faculty advisors OR free choice from the Biological Sciences Elective Category OR the Psychology Elective Category listed above OR additional electives in other departments listed below:

BIOS 20401. Biological Anthropology	3
ANTH 20105. Human Ethology	3
ANTH 30140. Primatology	3
ANTH 35106. Primate Behavior	3
ANTH 35110. Primate Behavior & Ecology	3
PSY 43531. Psychology and Medicine	3
PHIL 34353. Philosophy of Mind	3

SAMPLE CURRICULUM:**First Year***Fall Semester*

Calculus A	4
General Chemistry I & Lab	4
Social Science**	3
Writing & Rhetoric/Writing Intensive	3
Theology*	3

17

Spring Semester

Calculus B	4
Organic Chemistry I & Lab	4
Philosophy*	3
Fine Art/Literature*	3
Elective	3

17

Sophomore Year*Fall Semester*

Biological Sciences I & Lab	4
Statistics	3-4
CSEM	3
Psychology Major Elective***	3
Language	3-4

17-18

Spring Semester

Biological Sciences II & Lab	4
Neuroscience & Behavior (& Lab)	4
Psychology Major Elective	3
Language	3-4
Research Lab	3

17-18

Junior Year*Fall Semester – ABROAD*

Philosophy/CAD*	3
Fine Art/Literature*	3
History*	3
Elective	3
Elective	3

15

Spring Semester

Biological Sciences Major Elective	3
Additional Major Elective	3
Research Lab	3
Elective	3
Elective	3

15

Senior Year*Fall Semester*

Psychology Major Elective	3
Additional Major Elective	3
Biological Sciences Major Elective	3
Research Lab	3
Elective	3

15

Spring Semester

Additional Major Elective	3
Biological Sciences Major Elective	3
Theology*	3
Research Lab	3
Elective	3

15

* These courses also fulfill the University Seminar Requirement

** Introductory Psychology fulfills this requirement as well as the Core Neuroscience & Behavior Major requirement

*** One of the Psychology Major Elective courses also fulfills the College Social Science Requirement

• This curriculum assumes 2 semesters of language at Notre Dame

PREMED CONCENTRATION

In addition to the general BA undergraduates interested in attending Medical School are offered the option of completing a BA in Neuroscience & Behavior with a Premed concentration. The BA in Neuroscience and Behavior with the Premed Concentration consists 110 to 111 credits of required courses (including University Requirements: 40 credits; College Requirements: 12–15 credits depending on which level language course students place into; and Major Requirements including the Premed courses: 61–62 credits depending on the number of 3 versus 4 credit required courses elected) leaving a range of free electives (10 to 11) for a total of 120 credits. It should be noted that Pre-health (or Premed) students in the College of Arts & Letters typically graduate with approximately 134 credit hours so students completing this concentration

do have the opportunity to take additional elective courses. The specific major requirements are as follows:

Core Major Requirements:

14/15 credit hours (depending on which statistics course is completed)

PSY 10000/20000. Introductory Psychology	3
PSY 30100. Experimental Psychology I: Statistics	4
(or equivalent)	
BIOS 10171. Biological Sciences I & Lab (11173)	4
BIOS 20450. Neuroscience & Behavior & Lab (21450)	4
(NOT BIOS 30338)	

Foundational Science Category:

4 credits—comprising a single required course

BIOS 10172. Biological Sciences II & Lab (11174)	4
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Medical School/MCAT Required Course Category:

4 courses required (16 credits)

CHEM 20172. General Chemistry II & Lab (21172)	4
CHEM 20273. Organic Chemistry II & Lab (21273)	4
(or 20283 / 21283)	
PHYS 10310. Physics I & Lab (11310)	4
(or 30210 / 31211 or 10411 / 11411 or 20210 / 21210)	
PHYS 10320. Physics II & Lab (11320)	4
(or 20435 / 21435 or 30220 / 31220 or 20220 / 21220)	

COURSE DESCRIPTIONS

For a list of approved courses, contact the Director of Undergraduate Studies in the College of Science for this program (Nancy Michael, nmichael@nd.edu). All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and searching within the home department of the course listing. Course descriptions can be found by clicking on the subject code and course number in the search results.

Biological Science Elective Category:

3 Courses required (9 credits)

BIOS 30344. Human Physiology	3
AND two (2) of the following courses:	
BIOS 30339. Comparative Neurobiology	3
BIOS 30407. Animal Behavior	3
BIOS 30301. Embryology	3
BIOS 40339. Human Gross Anatomy	3
BIOS 60522. Behavioral Ecology	Variable
BIOS 60571. Topics in Physiology	Variable
BIOS 60572. Topics in Neuroscience	Variable

NEUROSCIENCE AND BEHAVIOR

Psychology Elective Category:**3 Courses required (9 credits)**

PSY 30160. Experimental Psychology II:	
Research methods	4
PSY 30220. Adolescent Development	3
PSY 30253. Introduction to Cognitive Development	3
PSY 30310. Abnormal Psychology	3
PSY 30358. Behavioral Medicine	3
PSY 30400. Cognitive Psychology	3
PSY 30430. Learning & Memory	3
PSY 30501. Intro to Biopsychology	3
PSY 30440. Sensation & Perception	3
PSY 30520. Introduction to Cognitive Neuroscience	3
PSY 40126. Introduction to Quantitative Neuroscience	3
PSY 40675. Artificial Intelligence	3
PSY 43250. Cognitive Development	3
PSY 43357. Food and the Brain	3
PSY 43360. Health Psychology	3
PSY 43526. The Sleeping Brain	3
PSY 63533. Neurophysiology of Stress	3
PSY 43540. Applied Hormones & Behavior	3

Additional Elective Category:**3 Courses required (9 credits)**

CHEM 40420. Biochemistry 3

AND a maximum of 6 credits of undergrad research with preapproved faculty advisors OR free choice from the Biological Sciences Elective Category OR the Psychology Elective Category listed above OR additional electives in other departments listed below:

BIOS 20401: Biological Anthropology	3
ANTH 20105: Human Ethology	3
ANTH 30140: Primatology	3
ANTH 35106: Primate Behavior	3
ANTH 35110: Primate Behavior & Ecology	3
PSY 43531: Psychology and Medicine	3
PHIL 34353: Philosophy of Mind	3

Note: In addition, though not required here, students intending to go to medical school are highly encouraged to complete the Experimental Psychology II: Research Methods course in preparation for the MCAT exam.

SAMPLE CURRICULUM:**First Year***Fall Semester*

Calculus A	4
General Chemistry I & Lab	4
Social Science**	3
Writing & Rhetoric/Writing Intensive	3
Theology*	3
	17

Spring Semester

Calculus B	4
Organic Chemistry I & Lab	4
Philosophy*	3
Fine Art/Literature*	3
Elective	3
	17

Sophomore Year*Fall Semester*

Biological Sciences I & Lab	4
Organic Chemistry II & Lab	4
CSEM	3
Psychology Major Elective***	3
Language	3-4
	17-18

Spring Semester

Biological Sciences II & Lab	4
General Chemistry II & Lab	4
Psychology Major Elective	3
Language	3-4
Research Lab	3
	17-18

Junior Year*Fall Semester – ABROAD*

Physics I & Lab	4
Philosophy/CAD*	3
Fine Art/Literature*	3
History*	3
Elective	3
	16

Spring Semester

Physics II & Lab	4
Neuroscience & Behavior (& Lab)	4
Additional Major Elective	3
Research Lab	3
Elective	3
	17

Senior Year*Fall Semester*

Statistics	3-4
Psychology Major Elective	3
Biochemistry (Additional Major Elective)	3
Biological Sciences Major Elective	3
Research Lab	3
	15-16

Spring Semester

Additional Major Elective	3
Human Physiology (Biological Sciences Major Elective)	3
Biological Sciences Major Elective	3
Theology*	3
Research Lab	3
	15

* These courses also fulfill the University Seminar Requirement

** Introductory Psychology fulfills this requirement as well as the Core Neuroscience & Behavior Major requirement

*** One of the Psychology Major Elective courses also fulfills the College Social Science Requirement

• This curriculum assumes 2 semesters of language at Notre Dame

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Neuroscience and Behavior*. Course descriptions can be found by clicking on the subject code and course number in the search results.

PHILOSOPHY

Philosophy

Chair:

Jeffrey Speaks

F.J. and H.M. O'Neill Professor of Science, Technology and Values:

Kristin Shrader-Frechette

Rev. Theodore M. Hesburgh Professor Emeritus of Arts and Letters:

Rev. David Burrell, C.S.C. (emeritus)

McMahon/Hank Professors of Philosophy:

Karl Ameriks (emeritus); Michael Detlefsen

Notre Dame Professor of Philosophy:

Gary Gutting (emeritus)

Rev. John A. O'Brien Professor of Philosophy:

Robert Audi; Richard Cross; Alvin Plantinga (emeritus); Michael Rea

John Cardinal O'Hara Professor of Philosophy:

Peter Van Inwagen

George N. Shuster Professor of Philosophy:

Michael J. Loux (emeritus); Christopher Shields

Rev. John A. O'Brien Senior Research Professor (Emeritus):

Alasdair C. MacIntyre (emeritus)

John and Jean Oesterle Professor of Thomistic Studies:

Alfred Freddoso (emeritus)

Glynn Family Honors II Professor of Philosophy:

Paul Weithman

William J. and Dorothy K. O'Neill Collegiate

Associate Professor of Philosophy:

Samuel Newlands

Professors:

Patricia Blanchette; Fred Dallmayr (emeritus); Cornelius F. Delaney; Michael R. DePaul (emeritus); Stephen Dumont; John Finnis (concurrent); Thomas P. Flint; Stephen Gersh (concurrent, emeritus); Vittorio Hösle (concurrent); Don A. Howard; Rev. John I. Jenkins, C.S.C.; Lynn Joy (emerita); Edward Manier (emeritus); G. Felicitas Munzel (concurrent); Robert Norton (concurrent); David O'Connor; Gretchen Reydam-Schils (concurrent); Jeffrey Speaks; Mark Roche (concurrent); Fred Rush; Kenneth Sayre (emeritus); James P. Sterba; Meghan Sullivan; Ted A. Warfield; Stephen H. Watson

Associate Professors:

Timothy Bays; Sheilah Brennan (emerita); Therese Cory; Curtis Franks; Sean Kelsey; Janet A. Kourany; Vaughn R. McKim (emeritus); John O'Callaghan; David Solomon (emeritus); Leopold Stubenberg (emeritus); Nicholas Teh

Assistant Professors:

Blake Roeber; Hannah Rubin; Nicholas Teh

Assistant Professional Specialists:

Shane Duarte; Alexander Jech

Program of Studies. There are two ways to major in philosophy: The courses required for **regular philosophy majors** are distributed as follows: Either the two-course University Requirement, or (for students who took course in Catholicism Across the Disciplines in place of the 2nd University Requirement) the first University Requirement and an elective at 2xxxx-level or higher; three specific

core courses: a two-semester sequence in the history of philosophy, Ancient and Medieval Philosophy (PHIL 30301) and History of Modern Philosophy (PHIL 30302), and a course in formal logic (PHIL 30313; the logic requirement can also be fulfilled by PHIL 43907 or MATH 10130, but the latter does not count toward the classes required for the major: students taking it must take an additional elective); at least two seminars at the 4xxxx-level; and three electives at the 3xxxx- or 4xxxx-level.

Students pursuing a major in philosophy with a **concentration in Philosophy, Science, and Mathematics** follow an overlapping, but distinct, course of study. The courses required for a concentration in Philosophy, Science, and Mathematics are distributed as follows: Either the two-course University Requirement or (for students who took course in Catholicism Across the Disciplines in place of the 2nd University Requirement) the first University Requirement and an elective at 2xxxx-level or higher; the Core Seminar in Philosophy, Science, and Mathematics (an intensive team-taught seminar offered every fall); a course in logic (PHIL 30313 Formal Logic or a more advanced option); a survey of the history of philosophy (either Ancient & Medieval Philosophy, PHIL 30301, or History of Modern Philosophy, PHIL 30302); two other upper-level philosophy courses, taught at the 3xxxx- or 4xxxx-level, at least one of which will be in the philosophy of science, philosophy of mathematics, or logic; and three majors-level electives in science or mathematics.

Students who are pursuing either a regular philosophy major, or the major with concentration in philosophy, science, and mathematics, may also elect to pursue the **Honors Track**. Honors philosophy majors complete all the requirements for the regular major and in addition write a senior thesis. Students writing the senior thesis enroll in PHIL 48499 Senior Thesis in both semesters of the senior year (the equivalent of two regular 3-hour seminars). To be eligible for the honors major, and thus for the senior thesis, a student must ordinarily maintain a GPA of 3.5 or above in courses in the major. Students considering the senior thesis are encouraged to have completed at least two of the three core courses (the two history surveys and formal logic) AND three 4xxxx-level seminars by the end of the junior year.

Students majoring in other departments may **take a minor in philosophy** by completing the following course of study: the two University Required Philosophy courses or (for students who took course in Catholicism Across the Disciplines in place of the 2nd University Requirement) the first University Requirement and an elective at 2xxxx-level or higher; the two-course sequence in the history of philosophy (Ancient and Medieval Philosophy, PHIL 30301, and History of Modern Philosophy, PHIL 30302); one elective at the 3xxxx- or the 4xxxx-level; and one elective at the 4xxxx-level.

All 4xxxx-level philosophy courses are writing-intensive, requiring at least 20 pages of written work that may take various forms: reflections on readings, class presentations, or shorter or longer research papers. Students planning to go on to graduate studies in philosophy or related disciplines typically write a senior thesis as well.

PHILOSOPHY AND THEOLOGY JOINT MAJOR

Director:

Gabriel Reynolds, Theology

Faculty:

Additional faculty for the joint major are drawn from the departments of philosophy and theology.

Program of Studies. The joint major is intended for undergraduates who are intrigued by philosophical and theological ideas and who have an equal commitment to both disciplines. It seeks to equip such students to handle theology and philosophy adeptly. The major is structured, providing undergraduates with a suitable introduction to the study of both disciplines, but also flexible, granting students considerable scope for the pursuit of their own interests.

The joint major offers the opportunity for an informed investigation of religious and philosophical ideas and should appeal especially to those who intend to pursue graduate work in philosophy or theology.

The joint major incorporates the University requirements in the two departments and most of the formal requirements of the first majors in theology and philosophy. Students in the joint major will take the two-semester sequence in Christian Traditions and an upper-level course in Scripture. The joint major, however, does not require the one-credit proseminar in theology.

Other formal requirements are peculiar to the joint major. Students will study a classical language for two semesters. (For practical as well as pedagogical reasons, this will normally be Greek.) Majors will also be expected to take one joint seminar. Led by a theologian and a philosopher, the joint seminars are offered every spring and will examine an issue in which the differing approaches of philosophy and theology may prove fruitful. The topic and instructors will change from year to year. Finally, each major will submit a senior thesis prepared under the direction of two advisors, drawn from each department. At the option of the directors, this thesis may be presented and discussed in an informal colloquium consisting of the other students in the joint major.

The remaining courses in the joint major will be at the discretion of the student. Normally taken at the 40xxx level, there should be an equal distribution in the electives between theology and philosophy. However, students who wish may devote up to six hours within the joint major to additional language

POLITICAL SCIENCE

work. These hours may add to the classical language previously studied, or used to begin another language of significance for philosophical and theological work.

The joint major differs from a first major in one discipline and a supplementary major in the other in that the latter requires 55 credit hours, whereas the joint major requires 60. Furthermore, the joint major calls for language instruction beyond what the University requires for all undergraduates. Finally, the joint seminars should prove especially challenging, inviting students to explore important topics in an interdisciplinary way. These features should make the joint major particularly attractive to students preparing for advanced study.

Requirements in Philosophy:

Either the two-course University Requirement, or (for students who took course in Catholicism Across the Disciplines in place of the 2nd University Requirement) the first University Requirement and an elective at 2xxxx-level or higher.

PHIL 30301 and 30302. History of Philosophy I and II.

PHIL 30313. Formal Logic.

Requirements in Theology:

THEO 10001, 10002, 10003 or 13183 (Foundations) and a 20000 (development level) course (University-required courses).

THEO 40201 and 40202. Christian Traditions I and II.

THEO 40101 or 40108. Upper-division scripture course.

Plus:

Classical language (normally Greek)—two semesters.

Joint seminar(s).

Senior thesis.

18 credit hours of electives (up to six of these may be additional hours in language study).

MINOR IN PHILOSOPHY, SCIENCE, AND MATHEMATICS

In many cases, conceptual or foundational questions about mathematics and science cannot be pursued in a responsible way without competence in the relevant scientific or mathematical discipline. For this reason, the minor in Philosophy, Science, and Mathematics is open only to students who have significant scientific and/or mathematical training. The minor requires students to take six courses: either the two-course University Requirement or (for students who took course in Catholicism Across the Disciplines in place of the 2nd University Requirement) the first University Requirement and an elective at 2xxxx-level or higher; the Core Seminar in Philosophy, Science, and Mathematics (offered every fall semester); three electives at the 3xxxx- or 4xxxx-level. (If a student has opted to take

a Catholicism Across the Disciplines course instead of the second University Philosophy Requirement, then that student must take an extra elective at the 3xxxx- or 4xxxx-level.) At least one elective must be in the philosophy of science, philosophy of mathematics, logic, or the philosophy of logic. At least one elective must be at the 4xxxx-level.

Interested students should apply in the spring semester.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Philosophy*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Political Science

Chair:

David Campbell

Director of Graduate Studies:

Karrie Koesel

Director of Undergraduate Studies:

Joshua B. Kaplan

Packey J. Dee Professor of American Democracy:

David Campbell

Packey J. Dee Professor Emeritus of Political Science

Fred R. Dallmayr

Packey J. Dee Professor of Political Science

Dana Villa

Packey J. Dee Professor of Political Science:

Michael Desch

Nancy Reeves Dreux Professor of Political Science:

Catherine H. Zuckert (emerita)

Nancy Reeves Dreux Professor of Political Science:

Michael P. Zuckert

Joseph and Elizabeth Robbie Emeritus Professor of Political Science:

Donald P. Kommers

Rev. Donald P. McNeill, C.S.C., Professor of Transformational Latino Leadership and Joseph and Elizabeth Robbie Professor of Political Science:

Luis R. Fraga

William M. Scholl Professor of International Affairs:

A. James McAdams (on leave fall 2018)

The Rev. Theodore M. Hesburgh, C.S.C., Professor Emeritus of Peace Studies:

George A. Lopez

David A. Potenziani Memorial Professor of Constitutional Studies:

Patrick Deneen

Professors:

Ruth Abbey; Peri E. Arnold (emeritus); Sotirios A. Barber; Eileen Hunt Botting (on leave spring 2019); George A. Brinkley (emeritus); David E. Campbell; Michael Coppedge; Fred R. Dallmayr (emeritus); Darren Davis; Alan K. Dowty (emeritus); Amitava Dutt; Michael J. Francis (emeritus); Gary Goertz; Vittorio G. Hösle (concurrent); Robert Johansen (emeritus); Geoffrey Layman; David C. Leege (emeritus); Gilbert D. Loescher (emeritus); Peter R. Moody Jr. (emeritus); Daniel Philpott (on leave 2018–19); Dianne Pinderhughes (on leave fall 2018); Benjamin Radcliff; Patrick Regan; L. John Roos (emeritus); Rev. Timothy R. Scully, C.S.C.; A. Peter Walshe (emeritus); Christina Wolbrecht

Associate Professors:

Jamie Bleck (on leave 2018–19); Susan D. Collins (on leave 2018–19); Rev. Robert A. Dowd, C.S.C.; Eugene Gholz; Andrew C. Gould; Matthew Hall; Jeffrey Harden; Victoria Hui; Debra Javeline (on leave fall 2018); Mary Keys; Karrie Koesel; Daniel A. Lindley III; Vincent P. Munoz (on leave spring 2019); Joseph Parent; Anibal Pérez-Liñán; Emilia Powell; Ricardo Ramirez; Sebastian Rosato (on leave 2018–19); Guillermo Trejo; Ernesto Verdeja

POLITICAL SCIENCE

Assistant Professors:

David Cortez; Michael Hoffman; Theodore B. Ivanus (emeritus); Rose Kelanic; Rev. Sean McGraw, C.S.C.; Fiorella Sierra; Susanne Wengle (on leave 2018–19)

Associate Professional Specialists:

Carolina Arroyo; Joshua B. Kaplan;
Rev. William Lies, C.S.C. (concurrent);
Luc Reydam

Assistant Professional Specialist:

Susan Rosato

Program of Studies. The political science major combines breadth and depth, helping students develop a general foundation for the study of politics and offering opportunities to explore particular areas of interest. Courses give students both a strong knowledge base and facility with the tools of political analysis. The department offers a substantial number of courses in all four fields of the discipline—American politics, international relations, comparative politics, and political theory—covering a range of topics and analytical perspectives. The major can prepare students for a wide variety of vocations. After graduation, many students go to law school or graduate school, or work for service organizations, government, or business.

Requirements. The major requires a minimum of 10 courses:

- four breadth requirements, consisting of a course in each of the four fields of political science: American politics, international relations, comparative politics, and political theory. Two of these must be introductory courses. The other two can be introductory courses or intermediate-level courses.
- four intermediate-level courses: students may specialize in one field or take courses in a combination of fields that suits their interests.
- two seminars. These seminars (POLS 33001/2, 43001/2, or 53001/2) fulfill the Arts and Letters directive that all majors include a writing-intensive requirement.

Senior Thesis. Students with a grade point average of 3.5 or above are encouraged to write a senior thesis. This two-semester project involves working closely with a faculty supervisor, and offers the opportunity to explore more deeply and independently a research project of the student's choice.

Pi Sigma Alpha. Students who have taken a minimum of four political science courses, with a grade no lower than a B in their political science courses, and who are on the Dean's List are eligible to join Notre Dame's chapter of Pi Sigma Alpha, the national honor society for political science majors.

Graduate Courses

Many graduate courses are open to qualified undergraduates by permission.

Departmental Honors in Political Science

The honors track in political science does not involve additional political science courses, but is designed

to encourage students to make better use of their courses both within and outside the major, and prepare them for research in their senior year, and advanced study and work after graduation.

To graduate with departmental honors, a student will:

1. take a cluster of four recommended enrichment courses in consultation with their advisor, including:
 - a) a dedicated methodology course such as Research Design, Quantitative Political Analysis, or How to Do Political Research;
 - b) Principles of Microeconomics and Principles of Macroeconomics. A student would need a compelling reason to offer a substitute for one of these two;
 - c) an upper-level course related to the student's senior thesis, such as a graduate course in political science, language proficiency beyond level 3, or another course in the department or in another department chosen in conjunction with the student's advisor.
2. complete a senior thesis with a grade of B+ or higher;
3. graduate with a cumulative grade point average of 3.55 or higher. This number is subject to change from year to year.

For example:

A student primarily interested in American politics or international relations might take 1) Quantitative Political Analysis, Research Design; 2) Principles of Microeconomics; 3) Principles of Macroeconomics; and 4) a graduate political science course or an upper-level history course related to their senior thesis.

A student interested in comparative politics might take 1) Quantitative Political Analysis, Research Design; 2) Principles of Microeconomics; 3) Principles of Macroeconomics; and 4) a graduate course in political science or an upper-level history, sociology, or anthropology course related to their senior thesis, language proficiency above level 3, or a second language.

A student interested in political theory might take 1) Research Design; 2) Principles of Microeconomics; 3) a graduate course in political theory, language proficiency above level 3 or a second language; and 4) an upper-level philosophy or literature course related to their senior thesis.

The key to doing the honors track is meeting with a department advisor each semester to discuss a more careful selection of courses within the major and a better use of electives outside the major that will both complement and supplement your political science courses. The selection of recommended courses will depend in part on your own interests and career goals, so it is important to discuss these with your advisor.

The Political Science Department does not accept AP credit toward the major, but encourages students with a strong background in the field to meet with a departmental adviser to discuss ways of using it as a foundation to build on in their courses.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting one or more of the following subjects:

- *Constitutional Studies*
- *Political Science*

Course descriptions can be found by clicking on the subject code and course number in the search results.

PROGRAM OF LIBERAL STUDIES

Program of Liberal Studies

Chair:

Tom Stapleford

Rev. John J. Cavanaugh, C.S.C., Professors of Humanities:

Stephen M. Fallon; Michael J. Crowe (emeritus);

Professors:

Rev. Nicholas Ayo, C.S.C. (emeritus); Kent Emery Jr.; G. Felicitas Munzel; Walter J. Nicgorski (emeritus); F. Clark Power; Gretchen Reydam-Schils; Phillip R. Sloan (emeritus); M. Katherine Tillman (emerita); Henry M. Weinfield

Associate Professors:

Francesca Bordogna; Robert Goulding; Julia Marvin; Thomas Stapleford

Assistant Professors:

Christopher Chowrimootoo; Jennifer Newsome Martin; Emma Planinc; Andrew Radde-Gallwitz; Denis Robichaud

Assistant Professional Specialist:

Joseph Elkanah Rosenberg

Program of Studies. The Program of Liberal Studies, Notre Dame's Great Books program, offers an integrated three-year sequence of studies leading to the bachelor of arts degree. Students enter the Program at the end of the First Year of Studies.

Fundamental to the Program is a conception of a liberal arts education that aims to avoid the separation of the humanities into isolated disciplines. The Program seeks to provide a unified undergraduate education in all of the liberal arts, including music and the natural sciences. For this reason, the Program is not to be equated with a "general humanities" educational Program. The study of literature, philosophy, natural and social science, theology, history, and the fine arts will take place within a larger unifying conception of the liberal arts that cuts across many of the disciplinary boundaries suggested by these terms. Because the goal of the Program is to provide more than an introduction to various subject matters, none of the tutorials or seminars stands alone in the Program. The curriculum grows organically over the three years, with each course presuming all of its predecessors.

Although the Program provides education in the liberal arts, it also considers the liberal arts in themselves as insufficient for a complete education. The liberal arts are the critical tools of learning, but they are also to be related to the larger search for genuine understanding and philosophic wisdom. Philosophy, which explores the basic questions of epistemology, ethics, and politics, is also related to the claims of the Christian tradition. The Program maintains specific tutorials in the various disciplines to enable the relationships among them to develop systematically and also to foster a concern with what unifies or transcends them.

The normal method of instruction in the Program is through the reading and discussion of primary texts. The student is asked to take an active role in the learning process. Particularly in the seminar, the authors of the great books are considered to be the primary teachers.

The Program requires writing throughout the curriculum, especially in the tutorial classes. In the final year, all students are required to write a senior thesis, usually involving extensive research, under the direction of a faculty advisor. The senior thesis offers students a particularly intensive writing experience and an opportunity to investigate in depth a specialized topic of interest.

Despite the Program's 68-credit curriculum, Program students may carry second majors, supplementary majors, minors, and concentrations, and they may participate in study abroad programs. When necessary, students may satisfy a limited number of Program requirements by taking non-departmental courses with comparable content. Such exemptions are granted only with the permission of the Program's Director of Undergraduate Studies and are subject to strict limitations.

Students normally declare a PLS major by the beginning of April of the first year. Declaration of major forms are available by early March in the department office (215 O'Shaughnessy) and website (pls.nd.edu). Students interested in entering the Program are urged to complete the University science and mathematics requirements in the first year. Students may join the Program after the beginning of the sophomore year, although this requires one to make up one or more courses.

SEQUENCE OF COURSES

Sophomore Year

First Semester

20201. Literature I: The Lyric Poem	3
20301. Philosophical Inquiry	3
23101. Great Books Seminar I	4
Elective	3
Elective	3
	16

Second Semester

20302. Bible and Its Interpretation	3
20412. Fundamental Concepts of Natural Science	3
23102. Great Books Seminar II	4
Elective	3
Elective	3
	16

Junior Year

First Semester

30301. Ethics	3
30411. Scientific Inquiry: Theories and Practices	3
30501. Music as a Liberal Art	3
33101. Great Books Seminar III	4
Elective	3
	16

Second Semester

30202. Literature II: Shakespeare and Milton	3
30302. Political and Constitutional Theory: Ancient and Modern	3
33102. Great Books Seminar IV	4
Elective	3
Elective	3
	16

Senior Year

First Semester

40301. Christian Theological Traditions	3
40601. Intellectual and Cultural History	3
43101. Great Books Seminar V	4
48701. Essay Tutorial	3
Elective	3
	16

Second Semester

40302. Metaphysics and Epistemology	3
40412. Science, Society, and the Human Person	3
43102. Great Books Seminar VI	4
48702. Essay Tutorial	2
Elective	3
	15

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Program of Liberal Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

PSYCHOLOGY

Psychology

Chair:

Lee Anna Clark

Director of Graduate Studies:

Kathleen M. Eberhard

Director of Undergraduate Studies:

Anré Venter

Andrew J. McKenna Professor of Psychology:

David Watson

Notre Dame Chair in Psychology:

E. Mark Cummings

Warren Foundation Professor of Psychology:

Scott M. Monroe

William J. and Dorothy K. O'Neill Professor of Psychology:

Lee Anna Clark

Professors:

Cindy S. Bergeman; Julia M. Braungart-Rieker; James Brockmole; Thomas Burish; Laura Carlson; Lee Anna Clark; Charles R. Crowell; E. Mark Cummings; Bradley S. Gibson; Dawn M. Gondoli; Anita E. Kelly; Daniel K. Lapsley; Gitta Lubke; Nicole McNeil; Thomas W. Merluzzi; Scott M. Monroe; Darcia Fe Narvaez; G.A. Radvansky; David A. Smith; David Watson; Ke-Hai Yuan

Associate Professors:

Ying (Alison) Cheng; Kathleen Eberhard; Gerald Haefel; Jessica Payne; Kristin Valentino; Lijuan (Peggy) Wang; Lira Yoon; Guangjian Zhang; Zhiyong (Johnny) Zhang

Assistant Professors:

Jill Lany; Laura Miller; Nathan Rose

Professional Specialists:

Anré Venter; Mike Villano

BACHELOR OF ARTS IN PSYCHOLOGY

Program of Studies. Psychology is the scientific study of the behavior of organisms with a primary focus on human behavior. It is concerned with the biological and environmental determinants of behavior as reflected in the study of physiological, sensory, perceptual, cognitive, motivational, learning, developmental, aging, and social processes. The undergraduate program seeks a balance between exposure to basic psychological principles and theories and their extension to the applied areas such as child education, counseling, mental retardation, and behavioral deviancy.

The undergraduate courses are intended to meet the needs of students who plan to (1) major in psychology and later attend graduate school in psychology or affiliated fields, (2) major in psychology as part of a general cultural program, (3) obtain training in psychology as a special supplement to their major interest or (4) use psychology to satisfy social science requirements or electives.

One of the department's main features is an emphasis on opportunities for close faculty-student involvement in research projects at the undergraduate

level. The research specialties in which majors may become involved range from basic research in such areas as psychophysics, human and animal learning, child development, aging, and psycholinguistics, to applied research in a community setting. Students planning to do graduate work in psychology will plan their program in close coordination with their faculty advisors.

Major Requirements. All majors are required to take the Introductory Psychology Course (3 credits from either PSY 10000 for first year students or PSY 20000 for upper-class students). This course serves as a prerequisite or corequisite for the Psychology Major courses. Students who have achieved a 5 on the AP Psychology exam are not required to take the Introductory Psychology course. The specific major requirements are as follows:

Required Courses:

9 credit hours—exception: APH2 supplementary majors are not required to take PSY 20010

PSY 20010. Psychology: Science, Practice & Policy	1
PSY 30100. Experimental Psychology I: Statistics	4
PSY 30160. Experimental Psychology II: Research methods	4

30000 Content Area Courses:

A minimum of 2 courses (6 credits) from each of the following categories (**total of 12 credits minimum**)

Category A

PSY 30200. Developmental Psychology
PSY 30220. Adolescent Development
PSY 30300. Psychology of Personality
PSY 30310. Abnormal Psychology
PSY 30314. Introduction to Clinical Psychology
PSY 30340. Cross Cultural Psychology
PSY 30600. Social Psychology
PSY 30634. Psychology of Peace
PSY 33651. Educational Effectiveness
PSY 33694. Cybercrime and the Law

Category B

PSY 30253. Introduction to Cognitive Development
PSY 30358. Behavioral Medicine
PSY 30400. Cognitive Psychology
PSY 30430. Learning & memory
PSY 30440. Sensation & Perception
PSY 30500. Physiological Psychology
PSY 30501. Introduction to Biopsychology
PSY 30510. Behavioral Genetics
PSY 30520. Introduction to Cognitive Neuroscience

40000 Senior Seminar Courses:

A minimum of 2 courses (6 credits) from this category. These are small, in-depth discussion-oriented seminars generally in the instructor's specific area of expertise and the options may vary from semester to semester or year to year. All 40000 level seminars are designated writing-intensive courses, satisfying the College of Arts and Letters writing requirement. (See the introductory portion of the Arts and Letters section.)

Note:

- *Introductory Psychology does not fulfill any of the 30-credit-hour requirements for the major.*
- *PSY 27800 Research Lab credits are strongly recommended for any students' intent on pursuing a graduate career in psychology.*
- *In some cases students for whom psychology is their second major may complete another statistics course (BAMG 20150; ECON 30330, ACMS 20340 or BIOS 40411) in place of the PSY 30100 course. However, these students will be required to complete an additional psychology course (from the 30000 or 40000 level categories) to complete the requisite number of psychology courses to graduate with the major.*

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject **Psychology**. Course descriptions can be found by clicking on the subject code and course number in the search results.

Romance Languages and Literatures

Chair:

Thomas F. Anderson

Director of Graduate Studies:

Josh Lund

Assistant Chair and Director of Undergraduate Studies:

Shauna Williams

Notre Dame Professor of Dante and Italian Studies:

Zygmunt G. Baranski

Professors:

Thomas F. Anderson; Theodore J. Cachey Jr.;

JoAnn DellaNeva; Joshua Lund; María Rosa

Olivera-Williams; Alain Toumayan

Associate Professors:

Sabrina Ferri; Ben Heller; Carlos Jáuregui;

Encarnación Juárez-Almendros; Louis

MacKenzie; Christian R. Moevs; Marisel C.

Moreno; Alison Rice; Juan Vitulli

Assistant Professors:

Fr. Gregory Haake; Vanessa Miseres; Olivier

Morel

Professional Specialists:

Alessia Blad; Shauna Williams

Associate Professional Specialists and Concurrent

Lecturers:

Tatiana Botero-Jáuregui; María Coloma; Marcio

de Bahia; Monica Jancha; Elena Mangione-Lora;

Ivis Menes; Rachel Parroquin; Andrea Topash

Ríos; Sandra Teixeira; Patrick Vivirito

Assistant Professional Specialists and Concurrent

Lecturers:

Azeb Haileselassie; Alisha Reaves; Kathleen

Werner

Program of Studies. The Romance languages derive from Vulgar Latin spoken throughout the Roman Empire. A major course of study is offered in French, Italian, and Spanish. Minors are offered in French, Italian, and Portuguese. The study of foreign languages, literatures, and cultures provides educational opportunities relevant to an increasingly interdependent world. A crucial component of a liberal education, the acquisition of foreign-language skills enhances our powers of communication and serves to introduce us to the enduring cultural achievements of other peoples. Moreover, the study of a foreign language broadens our mental horizons, encourages us to think and act more globally, and stimulates our understanding of the traditions of other nations. Elementary and intermediate courses develop the students' ability to understand, speak, read, and write a foreign language with facility and confidence.

Upper-division courses present a wealth of literary, historical, and cultural traditions and emphasize the nature and development of national cultures. Many courses focus on the literature and culture of certain historical periods. Others trace the development of literary genres or examine a theme across periods and genres. And still others inculcate the critical

and analytical skills necessary for an informed interpretation of foreign language texts. Participation in Notre Dame's international study programs in Brazil, Chile, France, Italy, Mexico, and Spain (see the International Study Programs section of this *Bulletin*) is highly recommended although not required to pursue a major in Romance languages and literatures. Majors and supplementary majors in French, Italian, and Spanish must complete 50 percent of their credit hours in the major in residency at Notre Dame and meet the following program requirements. For current information visit the department website: <http://romancelanguages.nd.edu/>.

PROGRAM IN FRENCH AND FRANCOPHONE STUDIES

The Major in French and Francophone Studies

The requirements for a major in French and Francophone Studies consist of successful completion of 30 credit hours or 10 courses above ROFR 20201. Of these 10 courses, no more than three may be at the 20xxx level (20202 and above), six must be in literature/culture studies, and at least half must be taken in residence at Notre Dame. Required among these 10 courses are ROFR 30310 (The Art of Interpretation), ROFR 30710 and ROFR 30720 (French Literature and Culture I & II), at least two courses at the 40xxx level, and the Senior Seminar (ROFR 53000). ROFR 30310 (The Art of Interpretation) is the recommended prerequisite for the survey courses (ROFR 30710 and ROFR 30720) and must be completed by the end of junior year. The requirement of ROFR 30720 (French Literature and Culture II) may be waived if students take both ROFR 373AF and ROFR 374AF in Angers—that is, two advanced courses on 19th- and 20th-century French literature. Preapproved courses at the Université Catholique de l'Ouest in Angers (IALH 1.1, 1.2, 4.2, and 6.1) may also fulfill the required courses ROFR 30310, ROFR 30710, and/or ROFR 30720 (see the Angers pages in this *Bulletin* for a description of those courses and their equivalencies at Notre Dame). Any other substitution will require the approval of the Undergraduate Coordinator in French. ROFR 30320 (Advanced Composition: The Art of Writing) is strongly encouraged. AP credit may not be applied to the major.

Faculty in the Program in French and Francophone Studies are glad to serve as directors to students seeking to write a senior thesis. The thesis can be either in ROFR or in International Economics, and can be written in English or in French. Interested students should make contact during the junior year to pursue this option.

The Supplementary Major in French and Francophone Studies: Two Tracks

There are two tracks available for students seeking a supplementary major: The "Language and Literature" track and the "Language and Culture" track.

Language and Literature Track

Requirements for the "Language and Literature" track consist of successful completion of 24 credit hours or eight courses above ROFR 20202. Of these eight courses, no more than two may be at the 20xxx level (20202 or above), one must be ROFR 206xx or above, and six must be in literature/culture studies, and at least half must be taken in residence at Notre Dame. Required among these eight courses are ROFR 30310 (The Art of Interpretation), ROFR 30710 and ROFR 30720 (French Literature and Culture I & II), and at least two courses at the 40xxx level or above, one of which may be the Senior Seminar (ROFR 53000). ROFR 30310 (The Art of Interpretation) is the recommended prerequisite for the survey courses (ROFR 30710 and ROFR 30720) and must be completed by the end of junior year.

The requirement of ROFR 30720 (French Literature and Culture II) may be waived if students take both ROFR 373AF and ROFR 374AF in Angers—that is, two advanced courses on 19th- and 20th-century French literature. Preapproved courses at the Université Catholique de l'Ouest in Angers (IALH 1.1, 1.2, 4.2, and 6.1) may also fulfill the required courses ROFR 30310, ROFR 30710, and/or ROFR 30720 (see the Angers pages in this *Bulletin* for a description of those courses and their equivalencies at Notre Dame). Any other substitution will require the approval of the Undergraduate Coordinator in French. ROFR 30320 (Advanced Composition: The Art of Writing) is strongly encouraged. AP credit may not be applied to the major.

Language and Culture Track

Requirements for the "Language and Culture" track consist of successful completion of 24 credit hours or eight courses above ROFR 20202. Of these eight courses, no more than two may be at the 20xxx level (20202 or above), one must be ROFR 206xx or above, and six must be in language/culture/literature studies, and at least half must be taken in residence at Notre Dame. Required among the eight courses are: ROFR 30310 (The Art of Interpretation) or ROFR 30320 (Advanced Composition: The Art of Writing); one survey class of French literature (ROFR 30710 or ROFR 30720); and ROFR 306xx. The survey class of French literature may be waived if students take both ROFR 373AF and ROFR 374AF in Angers—that is, two advanced courses on 19th- and 20th-century French literature. Some courses at the Université Catholique de l'Ouest in Angers may also fulfill the required courses, as in the "Language and Literature" track (see above). Any other substitutions will require the approval of the Undergraduate Coordinator in French. AP credit may not be applied to the major.

The Honors Track in French

The honors track major consists of 33 credits or 11 courses. In addition to the general requirements for the major, honors track students must complete an 11th course at the graduate level with a grade of A- or higher, in which they will write a substantive research paper, normally in French, which constitutes the honors thesis. By invitation only,

ROMANCE LANGUAGES AND LITERATURES

highly motivated students may consider the option of taking a semester-long directed reading tutorial as the 11th course, completing an honors thesis under faculty direction.

French majors are admitted to the honors track by invitation, although qualified students may petition for admission in the second semester of their junior year. To be eligible for the honors track, students must be first majors with a minimum GPA of 3.8 in French and have completed at least seven courses toward the major by the end of their junior year. They must also receive the written support of a professor in one of the required language, culture, or literature courses (ROFR 30310, ROFR 30320, ROFR 30710, ROFR 30720, ROFR 306XX or ROFR 37500). For full consideration, students should contact the Assistant Chair of the Department of Romance Languages and Literatures no later than March 15 of their junior year; applications from eligible seniors will be accepted through October 1. In order to graduate with honors, students admitted to the honors track should maintain a minimum GPA of 3.7 in French.

Combined B.A./M.A. Program in French

The Department of Romance Languages and Literatures offers its majors in French the opportunity to participate in its graduate program through a combination B.A./M.A. degree in French. This program requires students to take 30 credit hours during the normal four-year undergraduate period, followed by a total of 30 credit hours of graduate courses taken during the fourth and fifth years of residence. Six credit hours can be counted toward both the undergraduate and graduate degrees. During their senior year, participants in this program take two graduate courses, take the qualifying exam given to all first-year graduate students, and apply to the Graduate School for admission during the Spring semester. B.A./M.A. Students are eligible for a teaching fellowship during their fifth year that includes a tuition waiver and a generous teaching stipend. Well qualified students who are interested in this program should contact the Director of Graduate Studies and/or the graduate coordinator in French at the beginning of their junior year.

PROGRAM IN ITALIAN LITERATURE AND CULTURE

The undergraduate program in Italian offers a major, a supplementary major, and an honors track major in each of two possible concentrations: (1) Italian literature and culture; (2) Italian Studies. In addition, the program also offers (3) a minor in Italian, as well as the opportunity to focus on Italian through (4) the Romance Languages major or (5) the International Economics major (discussed separately in the *Bulletin*). The Italian program does not cap double-counting from other requirements.

(1) Literature and Culture Concentration

The Major in Italian: Literature and Culture Concentration

The major in Italian with a concentration in literature and culture requires 30 credits or 10 courses at the 20000 level or above, including no more than two 20000-level courses (ROIT 20215 counts as two courses for the major), ROIT 30711 (Medieval-Renaissance Italian Literature and Culture), ROIT 30721 (Modern Italian Literature and Culture), ROIT 53000 (Italian Seminar), and a minimum of five elective ROIT courses in Italian literature or culture at the 30000 or 40000 level or above. ROIT 30310 (Passage to Italy) is recommended for all majors. A maximum of two of these elective ROIT courses may be conducted in English or with texts in translation, or may be substituted by courses on Italian subjects originating in other disciplines or departments (for example, architecture, art history, music, or history). Equivalent Italian language, literature, or culture courses from foreign study programs or other universities may be substituted for any of the courses by permission. Fifty percent of the credits for the major must be taken in residence at Notre Dame. AP credit may not be applied toward the major.

The Supplementary Major in Italian: Literature and Culture Concentration

Supplementary majors in Italian with a concentration in literature and culture are expected to demonstrate competency in the language and to complete 24 credits or eight courses at the 20xxx level or above, including no more than two 20xxx-level courses (ROIT 20215 counts as two courses for the supplementary major), ROIT 30711 (Medieval-Renaissance Italian Literature and Culture), ROIT 30721 (Modern Italian Literature and Culture), ROIT 53000 (Italian Seminar), and a minimum of three elective ROIT courses in Italian literature or culture at the 30xxx or 40xxx level or above. ROIT 30310 (Passage to Italy) is recommended for all supplementary majors. A maximum of two of these elective ROIT courses may be conducted in English or with texts in translation, or may be substituted by courses on Italian subjects originating in other disciplines or departments (for example, architecture, art history, music, or history). Equivalent Italian language, literature, or culture courses from foreign study programs or other universities may be substituted for any of the courses by permission. Fifty percent of the credits for the major must be taken in residence at Notre Dame. AP credit may not be applied toward the major.

The Honors Track Major in Italian: Literature and Culture Concentration

The honors track major in Italian with a concentration in literature and culture consists of 33 credits or 11 courses, including all the requirements for the major, a GPA in the major of at least 3.6, plus a substantial final essay, to be written in Italian for a graduate course or for ROIT 58000, Honors Thesis Direction, which will constitute the 11th course. All

honors track majors should enroll in ROIT 53000 Italian Seminar in the fall semester of the year they write their thesis. No students will be accepted to the honors track after September 15 of their senior year.

(2) Italian Studies Concentration

The Major in Italian: Italian Studies Concentration

The major in Italian with a concentration in Italian Studies requires 30 credits or 10 courses at the 20000 level or above, to be chosen as follows: Five courses must be ROIT courses in Italian language, literature, and culture and taught in Italian, including at least one of ROIT 30711 (Medieval-Renaissance Italian Literature and Culture) or ROIT 30721 (Modern Italian Literature and Culture), and one course at the 40000 level or above; ROIT 41590 (Italian Theatre Workshop) does not count toward this major. No more than two of these five courses may be at the 20000 level (ROIT 20215 counts as two courses for the major). The other five courses must be on Italian subjects or strictly relevant to Italian culture, and together they must not be drawn from more than three disciplines or departments, such as history, art history, classics, FTT, music, or political science (the courses may of course be listed under ROIT). Four of these five courses must be at the 30000 level or above, and include at least one course at the 40000 level or above; no more than one of the five may be at the 20000 level. In order to create a coherent program, the selection of courses must be approved by the student's ROIT adviser (or committee, if appropriate). Equivalent courses from foreign study programs or other universities may be substituted by permission. Fifty percent of the credits for the major must be taken in residence at Notre Dame. AP credit may not be applied toward the major.

The Supplementary Major in Italian: Italian Studies Concentration

The supplementary major in Italian with a concentration in Italian Studies requires 24 credits or eight courses at the 20000 level or above, to be chosen as follows: Four courses must be ROIT courses in Italian language, literature, and culture and taught in Italian, including no more than two courses at the 20000 level; ROIT 41590, Italian Theatre Workshop, does not count toward this supplementary major. The other four courses must be on Italian subjects or strictly relevant to Italian culture, and must not be drawn from more than three disciplines or departments, such as history, art history, classics, FTT, music, or political science (the courses may of course be listed under ROIT). Three of these four courses must be at the 30000 level or above; no more than one may be at the 20000 level. In order to create a coherent program, the selection of courses must be approved by the student's ROIT adviser (or committee, if appropriate). Equivalent courses from study abroad programs or other universities may be substituted by permission. Fifty percent of the credits for the major must be taken in residence at Notre Dame. AP credit may not be applied toward the major.

ROMANCE LANGUAGES AND LITERATURES

The Honors Track Major in Italian: Italian Studies Concentration

The honors track major with a concentration in Italian Studies consists of 33 credits or 11 courses, including all the requirements for the major in Italian with a concentration in Italian Studies, a GPA in the major of at least 3.6, plus a substantial final essay, to be written for a graduate course or for ROIT 58000, Honors Thesis Direction, which will constitute the 11th course. The course or topic will be selected in consultation with the student's advisory committee for the major. All honors track majors should enroll in ROIT 53000 Italian Seminar in the fall semester of the year they write their thesis. No students will be accepted to the honors track after September 15 of their senior year.

(3) The Minor in Italian

The minor in Italian comprises 15 credits or five courses at the 20000 level or above, including at least three courses at the 30000 or 40000 level. Three of the five courses must be ROIT courses in Italian language, literature, and culture, and taught in Italian; the fourth and fifth courses may be on Italian literature and culture taught in English or with texts in translation, or may be courses on Italian subjects originating in other disciplines or departments (for example, LLRO, art history, architecture, or history). Courses from study abroad programs or other universities may be substituted by permission, but at least two courses for the Italian minor must be taken in residence at Notre Dame. AP credit may not be applied toward the major.

PROGRAM IN IBERIAN AND LATIN AMERICAN STUDIES

All majors and supplementary majors in Spanish are required to take a core sequence consisting of ROSP 30310 (Introduction to Hispanic Literature and Cultures) and one course each in three of the four following areas of Spanish and Spanish American Literature: Early Peninsular, Modern Peninsular, Early Spanish American and Modern Spanish American. AP credit may not be applied toward the major.

The Major in Spanish

The major in Spanish requires 30 credits or 10 courses 20202 and above, including the required core sequence described above, two senior-level courses, and the Senior Seminar. Equivalent literature and culture courses from international study abroad programs or other universities may be substituted with departmental approval. Fifty percent of the credits for the major must be taken in residence at Notre Dame. AP credit may not be applied toward the major.

Students are allowed to take one related course in English outside of the Department of Romance Languages and Literatures (for example, Colonial Latin American History, taken in the History Department) and one course in Spanish outside of the discipline of literature and culture (for example,

a theology course taken in Spanish in a study abroad program), with the approval of their advisor and the Undergraduate Coordinator, and with notification of the Assistant Chair.

The Supplementary Major in Spanish

Supplementary majors in Spanish are required to complete 24 hours or eight courses 20202 and above, including the required core sequence described above and one senior-level course. Equivalent literature and culture courses from international study abroad programs or other universities may be substituted with departmental approval. Fifty percent of the credits for the supplementary major must be taken in residence at Notre Dame. AP credit may not be applied toward the major.

Students are allowed to take one related course in English outside of the Department of Romance Languages and Literatures (for example, Colonial Latin American History, taken in the History Department) and one course in Spanish outside of the discipline of literature and culture (for example, a theology course taken in Spanish in a study abroad program), with the approval of their advisor and the Undergraduate Coordinator, and with notification of the Assistant Chair.

The Honors Track in Spanish

The honors track major consists of the general requirements for the major (30 credits or 10 courses) plus 3 extra credits which may be completed in one of two ways. First, after taking the Senior Research Seminar the student may take a semester-long Honors Thesis tutorial in the spring as the 11th course, completing an honors thesis under faculty direction. Or, second, the student may take an 11th course at the graduate level, in which they must complete a substantial research paper and receive a grade of A- or higher to graduate with honors.

Spanish majors are admitted to the honors track by invitation, although qualified students may petition for admission in the second semester of their junior year. To be eligible for the honors track, students must be first majors with a minimum GPA of 3.7 and at least seven courses toward the major. For full consideration, students should contact the Undergraduate Coordinator no later than March 15 of their junior year; applications from eligible seniors will be accepted through October 1.

The Combined B.A./M.A. Program in Spanish

The Department of Romance Languages and Literatures offers its majors in Spanish the opportunity to participate in its graduate program through a combination B.A./M.A. degree in Spanish. This accelerated program requires students to take 30 credit hours 20202 and above during the normal four-year undergraduate period, followed by a total of 30 credit hours of graduate courses taken during the fourth and fifth years of residence. Six credit hours can be counted toward both the undergraduate and graduate degrees. During their senior year, participants in this program take two graduate courses, applying to the Graduate School

for admission during the spring semester. During their fifth year, B.A./M.A. students are eligible for a teaching fellowship, which includes a tuition waiver and a generous teaching stipend. Students should have a strong academic record and should have made substantial progress toward their Spanish major by the second semester of their junior year. It is imperative that students interested in this program contact the director of Graduate Studies and/or the graduate coordinator in Spanish at the beginning of their junior year.

Minor in Portuguese

The minor in Portuguese and Brazilian Studies consists of 15 credits, five courses, 3 credits each. Prerequisites are ROPO 10101 and 10102, or 10103 and 10104, or 10105 and 10106. Requirements include five courses in Portuguese language and Luso-Brazilian literature beyond the prerequisites, ROPO 20201 and 20202, and three additional courses at the 30000/40000 level. Three of the five courses must be in Portuguese language and/or Luso-Brazilian literature, film, and culture taught in Portuguese; the fourth and fifth courses may be on Luso-Brazilian literature, film, and culture taught in English. The fourth and fifth courses may also be on a Portuguese or Brazilian subject in another discipline (for example, anthropology, history, FTT, political science, Romance languages and literatures, theology, etc.). Courses from study abroad programs or other universities may be substituted by permission, but at least three courses for the Portuguese minor must be taken in residence at Notre Dame. AP credit may not be applied toward the minor.

Interdisciplinary Minors

Spanish majors are encouraged to pursue allied courses offered through other interdisciplinary minors. Spanish courses offer a particularly appropriate complement to the Latino Studies and European Studies programs. See the section on Interdisciplinary Minors in this *Bulletin* for more details. Majors may also apply one senior-level ROPO course in Luso-Brazilian culture and literature toward their elective credits.

MAJOR IN ROMANCE LANGUAGES AND LITERATURES

The undergraduate major in Romance Languages and Literatures is designed for qualified students who wish to major in two programs (French, Italian, or Spanish). Cross-cultural in focus, the major recognizes the importance of studying the correspondences and differences among various Romance literatures and cultures and of reexamining traditional disciplinary boundaries. The requirements for a major in Romance languages and literatures include competency in two languages and successful completion of 36 credit hours or 12 courses, which must be distributed equally between the two respective language programs as follows:

- (1) Two survey courses in each language and literature program (French or Italian); Spanish

ROMANCE LANGUAGES AND LITERATURES

requires either four area courses (two in Peninsular and two in Latin American) or a combination of two area courses and two senior-level courses in the other areas;

(2) 30310 in one program;

(3) Two 40xxx-level courses in each program (if the area requirement in Spanish is fulfilled with two senior-level courses, these courses may count for the senior-level requirement in Spanish);

(4) One Senior Seminar (530000) in one program;

(5) Two elective courses at the 20202 or above level, one in each program (any exception requires permission).

The Honors Track in Romance Languages and Literatures

To be eligible for the honors track, students in Romance Languages and Literatures must be first majors with a minimum GPA of 3.7 in the major, and will have completed at least eight courses toward the major. It is strongly recommended that students take at least one 40000-level class in the major at Notre Dame by the end of their junior year. In addition to the general requirements for the major, honors track students will maintain a 3.7 GPA in the major through graduation and complete one graduate-level course in one of the Romance languages with a grade of A- or higher. Highly motivated students who have already been accepted to the honors track may be invited to complete an honors thesis in lieu of taking the graduate course. The honors thesis option must be carried out under the direction of a department faculty member, in the area of specialization. Students will identify the professor with whom he or she intends to work, obtain approval of the topic, and submit application materials by March 15th of the junior year to the Director of Undergraduate Studies. Students are also encouraged to take at least one course that addresses cultural or literary theoretical questions and readings; this course may be a 40000-level course offered in the Department of Romance Languages, or a similar course in a related field (English, gender studies, FTT, philosophy, sociology, etc.). Romance languages and literatures majors are admitted to the honors track by invitation, although qualified students may petition for admission in the second semester of their junior year. For full consideration, students should contact the advisor for the romance languages and literatures major no later than March 15 of their junior year. Applications for eligible seniors will be accepted through October 1st.

Placement in Language Courses

For French and Spanish, there is an online placement exam for students who have not already demonstrated language proficiency through national standardized testing, such as the AP or Achievement tests. Students with previous experience are required to take one of these tests before enrolling in their first course in those languages. For Italian or Portuguese placement, please contact the department. The

normal prerequisite for a 30xxx-level course is at least one 20202 or above level course. The normal prerequisite for a 40xxx-level course is at least one 30xxx-level course or permission of the instructor.

Policy Regarding Romance Language Placement Examination

The placement examination is designed to place each student at an appropriate level within a language sequence. Obtain placement examination information from the Department of Romance Languages and Literatures.

MAJOR IN INTERNATIONAL ECONOMICS & ROMANCE LANGUAGES

The undergraduate major in International Economics is a collaborative effort between the Department of Economics and the Department of Romance Languages and Literatures. In pursuing this major, students take a minimum of eight economics courses and at least six intermediate and advanced courses in French, Italian or Spanish. Students are also required to enroll in a one-credit course "Exploring International Economics" designed to foster the integration of the study of culture with the study of economics. Students must also complete a senior research project or equivalent designed to integrate their economic and language and culture study. The senior research project is intended to provide an experience that integrates the analytical aspects of economics with the linguistic and cultural aspects of a romance language.

Students must satisfy a mathematics requirement of Calculus I and II and successfully complete ECON 10010/20010; ECON 10020/20020; ECON 30010; ECON 30020; ECON 30330; ECON 30331; and either ECON 40700 and ECON 40800, or ECON 40710 and ECON 40720 or other international economics courses as approved by the Director of Undergraduate Studies. In addition, students must complete at least one fourth semester or above language and culture course (ROXX 20202 or above); "Exploring International Economics" (briefly described above); one introduction to literature and culture course (ROXX 30310); two 30000 level courses including literature survey courses (ROXX 30710, 30720, and/or ROSP 30810, ROSP 30820) or equivalent, and/or culture courses ROFR 306XX; at least two courses at the 40000 level (one may be taught in English); and the Senior Research Project (ECON 48100).

Through the major, the collaborating departments seek to blend two programs of study to ensure that students will achieve advanced linguistic and cultural competency in a foreign language as well as excellent preparation in Economics. The balance of economics with languages and culture courses should attract motivated students and inspire them to undertake a challenging course of study that will prepare them for post-graduate studies and or professional career opportunities in the international arena. International Economics Romance Languages majors

will learn how aesthetic and cultural categories and value judgments are shaped by economic trends and political conditions and how political conditions and economic trends are influenced by aesthetic and cultural trends.

COURSE DESCRIPTIONS

All of the courses associated with these academic programs can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting one or more of the following subjects:

- *Romance Languages & Literature*
- *French*
- *Italian*
- *Portuguese*
- *Spanish*

Course descriptions can be found by clicking on the subject code and course number in the search results.

SOCIOLOGY

Sociology

Chair:

TBD

Eugene Conley Professor of Sociology:

Jorge Bustamante

Julian Samora Chair in Latino Studies:

Gilberto Cárdenas

William R. Kenan Jr. Endowed Chair:

Christian Smith

Nancy Reeves Dreux Endowed Chair:

Rory McVeigh

Professors:

Mark Berends; Fabio B. Dasilva (emeritus);

Eugene W. Halton; Omar Lizardo; Sarah

Mustillo; Lynette P. Spillman; J. Samuel

Valenzuela; Andrew J. Weigert (emeritus);

Michael R. Welch (emeritus)

Associate Professors:

Kraig Beyerlein; William J. Carbonaro; Kevin J.

Christiano; David Gibson; David S. Hachen Jr.;

Tamara Kay; David M. Klein (emeritus); Richard

A. Lamanna (emeritus); Terence McDonnell;

Ann Mische; Atalia Omer; David Sikkink; Jason

Spring; Erika Summers-Effler; Richard A.

Williams

Concurrent Assistant Professor:

Mark L. Guntz

Assistant Professors:

Amy Langenkamp; Elizabeth Aura McClintock;

Erin Metz McDonnell; Abigail Ocobock

Adjunct Instructor:

Russell S. Faeges

Adjunct Assistant Professor:

Mim Thomas

Director of Undergraduate Studies:

Mim Thomas

Associate Professional Specialist:

Ann R. Power (emerita)

Program of Studies. Sociology at Notre Dame combines rigorous academic training with a focus on social justice and human rights, emphasizing the use of evidence to ask and answer complex questions. The sociology curriculum provides students with a strong background in empirical research, statistical analysis and sociological theory enhancing students' understanding of how the environments in which people are embedded influence their perceptions, actions and life chances.

Through its emphasis on critical thinking and sound data collection and analysis, sociology prepares students to excel in a variety of disciplines. Notre Dame's sociology majors go on to have careers in business, law, medicine, health care administration, politics, religious ministries, research institutions, non-profits, social work, teaching and academia.

MAJOR

The sociology major offers our students both structure and flexibility. In addition to providing students with a strong foundation in the core of the discipline, sociology at Notre Dame also encourages our students to explore and study in depth several areas of specialization, including race and ethnicity, immigration, gender, education, religion, family, crime, law, culture, social networks, and inequality.

The requirements of the major are as follows:

(a) Students must take a minimum of 31 credit hours (usually 10 courses and the proseminar which is one credit) offered by the department. Students are urged to start their major as early as possible but may declare a major or change majors at any time as long as they are able to fulfill the requirements.

(b) Central to the requirements for the major are the following four courses:

SOC 3090. Foundations of Sociological Theory

SOC 3092. Methods of Sociological Research,

or

SOC 30952. International Research Design

SOC 30903. Statistics for Sociological Research

SOC 33090. Proseminar (1 credit)

The above required courses should be taken as soon as possible, especially before taking any 4xxxx-level courses.

(c) Each major must take a minimum of three 4xxxx-level lecture, seminar or research courses. Internships (SOC 45000) and Directed Readings in Sociology (SOC 46000) do **not** fulfill this requirement.

(d) Each major must also acquire at least 12 credits of sociology elective courses, usually consisting of four 3-credit courses. These courses may be at any level, 10xxx–4xxxx.

MINOR

Additionally, the Sociology Department offers a minor, requiring 15 credit hours. Students minoring in sociology not only gain unique insight into the complexity of social life but also develop practical skills which enhance their major field of study. The sociological imagination teaches students how to understand context and is therefore relevant for success in the classroom and beyond.

The requirements of the minor are as follows:

(a) One course in sociological theory, usually SOC 30900, Foundations of Sociological Thought (3 credits)

(b) SOC 30902, Methods of Sociological Research or SOC 30952, International Research Design (3 credits)

(c) Two sociology electives at any level, only one of which may be at the 10000 level (6 credits)

(d) At least one sociology elective at the 40000 level (3 credits)

Our Students. Because of its broad applicability, strong emphasis on both qualitative as well as quantitative aspects of social life and commitment to Notre Dame's continuing mission to promote human solidarity and concern for the common good, Sociology at Notre Dame attracts students with a variety of interests, strengths and goals. Many of our students have double majors in areas such as Business, Pre-Health, Engineering, Political Science, Mathematics, Psychology and Liberal Studies among many others. Our majors also pursue numerous minors including Poverty Studies, Peace Studies, Business Economics and Education, Schooling and Society.

The department has an active Epsilon Chapter of Alpha Kappa Delta, the international sociology honor society. Students interested in the qualifications for nomination are encouraged to contact the director of undergraduate studies (Room 823 Flanner Hall) at any time.

Sociology Undergraduate Honors Track. The Department of Sociology offers academically gifted and highly motivated students the opportunity to graduate with departmental honors. In order to participate in the honors track, students must be at least a first semester junior with a minimum major GPA of 3.5.

The requirements for pursuing the sociology honors track are as follows:

- Students must maintain a 3.5 major GPA.
- Students are required to take a 3-credit standard graded graduate level sociology course. While any graduate sociology class is open to students on the honors track, students are required to get permission from the class instructor, prior to requesting departmental approval from the DUS.
- Including the required graduate class, students on the honors track are required to earn at least 34 credits in sociology.
- Students are required to complete a senior thesis.

Writing in Sociology. The College of Arts and Letters is proud of the level of writing its undergraduates achieve. One way in which the college supports students' writing development is by requiring each department to offer at least one writing-intensive course. SOC 30900, Foundations of Sociological Theory, is the Sociology Department's writing-intensive course. There, students reflect on the quality of their own and others' writing and learn to articulate a sociological perspective in writing. Instructors in this course may spend more time doing textual analyses, going over students' writing, holding in-class writing workshops, and giving opportunities to do re-writes than in other courses. The department's 43xxx-level courses also demand high-level writing within a sociological perspective. In addition, students may opt to develop their research and writing skills by undertaking a senior thesis.

SOCIOLOGY

Course Listings by Area of Research Focus. The following is a list of courses offered by the Sociology Department, organized by research focus. Students are encouraged (but not required) to choose at least one area of focus in the major in order to deepen their knowledge of that area. Students are also encouraged to pursue research opportunities within their area of interest.

GENERAL INTRODUCTIONS TO SOCIOLOGY

- 10002/20002. Understanding Societies
- 10033/20033. Introduction to Social Problems
- 10722/20722. Introduction to Social Psychology
- 10723/20723. Social Psychology for Pre-Health Students
- 23011. Selflessness and Selfishness

REQUIRED COURSES FOR SOCIOLOGY MAJORS

- 30900. Foundations of Sociological Theory
- 30902. Methods of Sociological Research
- 30903. Statistics for Sociological Research
- 33090. Sociology Proseminar

INDIVIDUAL WORK WITH FACULTY/SUPERVISOR

- 41800. Senior Thesis Workshop
- 45000. Sociology Internship
- 46000. Directed Readings in Sociology
- 48000. Directed Research in Sociology
- 48009. Senior Thesis Capstone Project

CLASS, RACE, ETHNICITY

- 20838. Social Inequality
- 20870. Inner City America: Decoding "The Wire"
- 30581. Racism and Activism: From Civil Rights to Tea Parties
- 30806. Race and Ethnicity: Constructing Identity and Difference
- 30838. Poverty, Inequality, and Social Stratification
- 40838. Race Relations and Ethnic Conflict
- 43281. Racial and Ethnic Educational Inequality
- 43839. Unequal America

CRIMINOLOGY, DEVIANCE, AND SOCIAL CONTROL

- 20732. Introduction to Criminology
- 33750. Sociology of Violence
- 43704. Law, Society and Criminal Justice in the U.S.
- 43730. Crime and Deviance in Ideological Perspective
- 43732. Controversies and Crises in Modern Criminology

CULTURE/MEDIA

- 20100. Introduction to Cultural Sociology
- 23111. Living in a Material World
- 23195. Media, Technology, and the Good Life
- 30109. Sociology of Culture
- 33191. Consumer Culture and the Cultures of Consumption
- 33199. Social Networks
- 40001. Time and Society
- 43101. Telling About Society: Media, Representation, and the Sociology of Knowledge

- 43110. Sociology of Media, Technology, and Society
- 43113. Cultural Sociology
- 43162. Latino Art in American Society
- 43170. Materialism & Meaning in Modern Life
- 43165. Art in Everyday Life
- 43171. Materializations of America
- 43197. Culture, Morality and Society

DEMOGRAPHY/MEDICAL

- 10723/20723. Social Psychology for Pre-Health Students
- 20410. Health, Medicine, and Society
- 43402. Population Dynamics
- 43471. Social Aspects of Mental Health

ECONOMICS, POLITICAL, DEVELOPMENT

- 20501. Globalization and Social Movements
- 20502. Dynamic Organizations
- 20533. Responding to World Crisis
- 20541. Sociology of War and Terror
- 20550. Development and Human Well-being
- 30505. Aid and Violence
- 30514. Social Movements
- 30518. Sociology of Money
- 33501. Political Protest in a Globalizing World
- 40505. Globalization and Its Discontents: Ethical Perspectives on Economy, Conflict, and Human Values
- 40604. When Tolerance is Not Enough
- 40606. Religion and Democracy in Comparative Perspective: Islam, Judaism, Christianity
- 40607. Religion, Civil Disobedience and Non-violent Resistance
- 40838. Racial and Ethnic Conflict in the U.S.
- 43510. Governance and Africa
- 43513. Sociology of Development
- 43524. Employment in a Changing Economy
- 43527. Social Network Analysis
- 43553. Building Democratic Institutions
- 43558. Comparing European Societies
- 43563. Nationalism and Globalization
- 43578. Chile in Comparative Perspective
- 43579. Social Organization of Secrecy and Deception
- 43590. Sociology of Economic Life

EDUCATION

- 20228. Social Inequality and American Education
- 20260. Religion and Schooling in American Society
- 30235. Sociology of Education
- 37290. Special Studies in Education Policy
- 43228. Controversies in Education
- 43240. Research on School Effects
- 43281. Racial/Ethnic Educational Inequality
- 43290. Education Policy in a Reform & Data-Driven World

FAMILY & GENDER

- 20342. Marriage and Family
- 20810. Gender Roles and Violence
- 20818. The Sociology of Sexuality
- 30846. Today's Gender Roles
- 43377. Family, Gender and Employment
- 43380. Gender and Sexualities in Family

LATINO STUDIES

- 20479. Introduction to Latinos in American Society
- 23470. Making Latinos: Race, Identity, and Immigration in the U.S.

- 30048. Latinos and the City
- 33458. Mexico-U.S. Border Immersion Seminar
- 43016. Visual Sociology: Exploring Society Photographically
- 43162. Latino Art in American Society
- 43404. International Migration: Mexico and the United States
- 43479. International Migration and Human Rights

RELIGION

- 20610. Sociology of Religion
- 20651. Religion and Politics in the Middle East
- 20683. Religion, Gender, and Family
- 30408. Religion in International & Global Relations
- 30600. Peace vs. Justice: What is Just Peace?
- 30602. Jerusalem: Peace or Apocalypse?
- 30605. Religion, Nationalism and Peace
- 30671. Catholicism in Contemporary America
- 30672. Religion and Social Life
- 30675. Religion, Modernity, Secularization, Religious Persistence
- 43600. Society and Spirit: Religion in Classical Social Thought
- 43652. God, Country and Community: Religion and Public Life in America
- 43662. Religion and American Society
- 43691. Religion and Social Activism

SOCIAL PSYCHOLOGY

- 10722. Introduction to Social Psychology
- 10723/20723. Social Psychology for Pre-Health Students
- 20722. Introduction to Social Psychology
- 33001. Society, Self, and Catholic Social Tradition
- 43713. Socialization and the Life Course
- 43719. Self, Society, and the Environment
- 43774. Society and Identity

THEORY/METHODOLOGY

- 23901. Power & Identities
- 23951. Foundations of International Research Design
- 30952. International Research Design
- 35900. Sociology Research Apprenticeship
- 43901. Power and Identity in Modern Society
- 43910. Contemporary Social Theory
- 43959. Sociology of the Life Course
- 43991. Sociology Research Practicum

SUMMER ONLY

- 30019. Sociology of Sport

MINOR IN DATA SCIENCE

Housed in the Department of Sociology, the Data Science Minor is a cross-college venture between the College of Arts and Letters and the College of Engineering. The Data Science minor will involve courses that focus on the acquisition, management, analysis, and use of complex data as well as communication about data with an understanding of the broader implications for society.

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Upon completion of the minor, students should be able to:

- Understand data in its different forms.
- Collect data.
- Obtain data through scraping (using a program to download and process data from webpages) or mining (extracting and analyzing usable data from a large dataset).
- Parse and transform data into structures designed for analysis.
- Draw meaning from data.
- Visualize data to improve understanding.
- Statistically analyze data to summarize, draw inferences, and make predictions.
- Discover and characterize patterns in large data sets.
- Collect, analyze, and present data in an ethically responsible manner and understand privacy issues.
- Communicate effectively about data, methods, and conclusions.

Data Science is a fifteen credit interdisciplinary minor, offering classes from departments across the university, including Sociology, Computer Science Engineering, Psychology, Economics, English, Philosophy and Design.

The Requirements for the minor are as follows:

- Course 1—Introduction to Data Science
- Course 2—Elements of Computing 1
- Course 3—Statistics
- Courses 4 and 5—Electives, including:
 - Machine Learning
 - Textual Analysis
 - Graphical Data Analysis
 - Data Visualization
 - Robot Ethics
 - Social Network Analysis

More to come as the minor expands!

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Sociology*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Graduate Courses. Senior honors track majors may take any graduate course with the permission of the instructor and the Director of Undergraduate Studies.

Theology

Chair:

Timothy Matovina

Catherine F. Huisking Professor of Theology:

Rev. Brian E. Daley, S.J.

John A. O'Brien Professor of Theology:

Gerald Knoppers

Patrick O'Brien Professor of Theology:

Robin Jensen

Catherine F. Huisking Professor of Theology:

Cyril J. O'Regan

Hesburgh Professor of Catholic Theology:

Gary A. Anderson

John A. O'Brien Professor of Theology:

Khaled Anatolios

John A. O'Brien Professor of Theology:

Joseph Blenkinsopp (emeritus)

John A. O'Brien Professor of Theology:

Lawrence S. Cunningham (emeritus)

John A. O'Brien Professor of Theology:

Jean Porter

John A. O'Brien Professor of Theology:

Eugene Ulrich (emeritus)

John A. O'Brien Professor of Theology:

James C. VanderKam (emeritus)

John Cardinal O'Hara Professor of Theology:

Gustavo Gutierrez, O.P. (emeritus)

Keough-Hesburgh Professor of Music History and Liturgy:

Margot Fassler

Theodore M. Hesburgh, C.S.C., Professor of Philosophy and Theology:

Rev. David B. Burrell, C.S.C. (emeritus)

Walter Professor of Theology:

David E. Aune (emeritus)

Walter Professor of Theology:

Gerald P. McKenny

William K. Warren Professor of Catholic Theology:

Rev. John P. Meier (emeritus)

William K. Warren Professor of Catholic Theology:

Rev. Thomas F. O'Meara, O.P. (emeritus)

Professors:

Khaled Anatolios; Ann Astell; John C. Cavadini;

Celia Deane-Drummond; David Fagerberg;

John Fitzgerald; Mary Catherine Hilkert, O.P.;

Rev. Maxwell E. Johnson; Emmanuel Katongole;

Robert A. Krieg (emeritus); Rev. Edward A.

Malloy, C.S.C. (emeritus); Timothy Matovina;

Francesca A. Murphy; Rev. Hugh R. Page;

Gabriel Said Reynolds; Joseph Wawrykow;

Randall Zachman (emeritus)

Research Professor:

Robert Gimello (emeritus)

Associate Professors:

J. Matthew Ashley; Yuri Avvakumov; John

R. Betz; Peter Casarella; David A. Clairmont;

Mary Rose D'Angelo (emerita); Rev. Michael S.

Driscoll (emeritus); Nathan Eubank; Rev. Daniel

Groody, C.S.C.; Rev. Paul V. Kollman, C.S.C.;

Blake Leyerle; David Lincicum; Bradley J.

Malkovsky; Michael (Tzvi) Novick; Rev. Paulinus

Odozor, C.S.Sp.; Maura Ryan; Todd Whitmore; Abraham (Avi) Winitzer

Assistant Professors:

Neil Arner; Steven Battin; Kimberly Belcher; Nina Glibetic; Jennie Grillo; Rev. Kevin Grove, C.S.C.; David Lantigua; Kenneth Oakes; Gabriel Radle; Mun'im Sirry; Alexis Torrance

Professional Specialists:

Janice M. Poorman

Associate Professional Specialists:

Catherine Cavadini; Rev. Michael E. Connors, C.S.C.; Stacey Noem; Margaret Pfeil; Todd Walatka

Assistant Professional Specialist:

Anthony Pagliarini

THE THEOLOGY PROGRAM UNIVERSITY OF NOTRE DAME

At the University of Notre Dame, the study of theology is carried out in the spirit of the classic formulation of theology as “Faith seeking understanding.” The Theology Department dedicates itself to critical reflection on the historic faith of Catholic Christianity in service to our students, to the larger church, to the world of the academy, and to the general public.

Why major in theology?

When the former British prime minister Tony Blair was asked what effect his embrace of Christian faith at the University of Oxford had on him, he commented simply, “I began to make sense of the world.” A major in Theology at Notre Dame will challenge you to do just that.

Our majors encounter head-on the great questions of life: Where is the God of justice? What is truth? Who do you say I am? Why did God become a human? What must I do to inherit eternal life?

Yet majors in theology are challenged to do still more. They are challenged to think of their life journey not only in terms of how they might best be served by careers, but also how they might best serve others. Whether they go on to careers in law, medicine, business, journalism, education, ministry, government, or any other field, theology majors do so with an experience of intellectual and spiritual illumination that is absolutely unique.

Our majors also benefit from working closely with faculty in one of the premiere Catholic Departments of Theology in the world. Theology majors at Notre Dame have majored in a field for which Notre Dame is renowned and will study with the best of the best. In addition, our majors may have the opportunity to visit the Holy Land at the Tantur Ecumenical Institute of Theology in Jerusalem, where the department regularly hosts courses and pilgrimages during fall and spring break.

When Father Edward Sorin, C.S.C., envisioned the school that would be built next to two remote lakes in Indiana, he commented, “This college will be one of the most powerful means of doing good in

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the country.” This faith in the great potential of the school that would be called Notre Dame emerged from his belief in a Catholic education. Theology majors at Notre Dame, having experienced the fullness of a Catholic education, are indeed powerful forces for good in this country, and in the world.

What are the requirements for the theology major?

Beyond the six theology credits required of every Notre Dame student, primary majors take 28 hours; supplementary majors take 19 hours. Each of these majors combines formally required courses and electives. The two University requirements (6 credits) are prerequisites for upper-level courses. All courses in the theology major, primary or supplementary, must be 3-credit courses and graded (with the exception of the proseminar).

SUMMARY OF THE PRIMARY MAJOR:

First University requirement (Foundations of Theology): THEO 10001 (first-year) or 10002 (sophomore, junior, senior) or 13183 (University seminar) or 13002 (honors).

Second University requirement (a “development of theology” course): a THEO course listed between 20101 and 29999.

THEO 40201 and 40202—Christian Traditions I and II

THEO 40101 and 40108—Old Testament and New Testament

Electives (15 hours at the upper level; up to 6 may be courses in a classical language)

THEO 43001—Proseminar (1 credit)

Including the University requirements, the primary major thus consists of 34 credit hours.

SUMMARY OF THE SUPPLEMENTARY MAJOR:

First University requirement (Foundations of Theology): THEO 10001 (first-year) or 10002 (sophomore, junior, senior) or 13183 (University seminar) or 13002 (honors).

Second University requirement (a “development of theology” course): a THEO course listed between 20101 and 29999.

THEO 40201 and 40202—Christian Traditions I and II

THEO 40101 or 40108—Old Testament or New Testament

Electives (9 hours at the upper level; up to 6 may be courses in a classical language)

THEO 43001—Proseminar (1 credit)

Including the University requirements, the supplementary major thus consists of 25 credit hours.

WHAT OTHER PROGRAMS ARE OFFERED?

The Theology Honors Thesis

The Theology Department offers a special program for particularly gifted undergraduate majors who seek a deeper, more sustained experience in the major through the completion of a thesis project. Each spring semester, the junior class of theology majors will be invited to apply; those selected will be assigned a thesis director from among the faculty of the department. A minimum grade point average of 3.66 within the major is normally expected. Seniors in the Honors Program will enroll in a one-credit Honors Colloquium as well as a two-credit directed reading course in the fall semester, and a three-credit Honors Thesis Writing course in the spring semester, culminating in the submission of a 40–55-page thesis. The Honors Program will normally consist of 37 hours, as compared to 34 hours in the regular primary major. To receive the honors designation on their transcript, students must earn an A– or higher grade on their thesis. A full description of the Theology Honors Program is available on the departmental website (see below for address).

The Minor in Theology

The minor is recognized by the University on the student’s transcript. To fulfill requirements for a minor, a student must take 12 credit hours beyond the required 6 hours (for a total of 18 hours). The additional 12 hours must be composed of 3-credit graded courses, which can be taken at the 20xxx or 40xxx level. The minor in theology is accepted by many parochial schools as adequate preparation for secondary school teaching.

Contact information

You may reach the director of undergraduate studies in theology, through the departmental office:

(574) 631-7811

aastell@nd.edu

theology.nd.edu/majors-and-minors

Department of Theology

130 Malloy Hall

University of Notre Dame

Notre Dame, IN 46556-5601

WRITING-INTENSIVE REQUIREMENT

THEO 40101 Old Testament and 40108 New Testament have been designated writing-intensive courses by the Department of Theology and fulfill the College of Arts and Letters’ writing-intensive requirement. Students will be expected to work closely with the professor throughout the semester on a significant written project, although specific writing assignments will be designed by the faculty member teaching the course.

PHILOSOPHY AND THEOLOGY JOINT MAJOR

Director:

Director of Undergraduate Studies, Theology

Faculty:

Additional faculty for the joint major are drawn from the Departments of Philosophy and Theology.

Program of Studies. The joint major is intended for undergraduates who are intrigued by philosophical and theological ideas and who have an equal commitment to both disciplines. It seeks to equip such students to handle theology and philosophy adeptly. The major is structured, providing undergraduates with a suitable introduction to the study of both disciplines, but also flexible, granting students considerable scope for the pursuit of their own interests.

The joint major offers the opportunity for an informed investigation of religious and philosophical ideas and should appeal especially to those who intend to pursue graduate work in philosophy or theology.

The joint major incorporates the University requirements in the two departments and most of the formal requirements of the first majors in theology and philosophy. Students in the joint major will take the two-semester sequence in Christian Traditions and an upper-level course in Scripture. The joint major, however, does not require the one-credit proseminar in theology.

Other formal requirements are peculiar to the joint major. Students will study a classical language for two semesters. (For practical as well as pedagogical reasons, this will normally be Greek or Latin.) Majors will also be expected to take on one occasion the joint seminar (offered each spring). Each seminar, led by a theologian and a philosopher, will examine an issue in which the differing approaches of philosophy and theology may prove fruitful. The topic and instructors will change from year to year. Finally, each major will submit a senior thesis prepared under the direction of two advisors, drawn from each department. At the option of the directors, this thesis may be presented and discussed in an informal colloquium consisting of the other students in the joint major.

The remaining courses in the joint major will be at the discretion of the student. Normally taken at the 40xxx level, there should be an equal distribution in the electives between theology and philosophy. However, students may devote up to six hours within the joint major to additional language work. These hours may add to the classical language previously studied, or used to begin another language of significance for philosophical and theological work.

The distinctive features of the joint major should make the program particularly attractive to students preparing for advanced study.

SUPPLEMENTARY MAJORS, MINORS, AND SPECIAL PROGRAMS

Requirements in Philosophy:

PHIL 10101 or 20201, and 20xxx-level course (University-required courses; a higher-level course may be substituted for the latter).

PHIL 30301 and 30302. History of Philosophy I and II.

PHIL 30313. Formal Logic.

Requirements in Theology:

THEO 10001 or 10002 and 20xxx-level course (University-required courses).

THEO 40201 and 40202. Christian Traditions I and II.

THEO 40101 or 40108. Upper-division scripture course.

Plus:

Classical language (normally Greek or Latin)—two semesters.

Joint seminar.

Senior thesis.

18 credit hours of electives (up to six of these may be additional hours in language study).

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting Theology:

Course descriptions can be found by clicking on the subject code and course number in the search results.

Supplementary Majors, Minors, and Special Programs

A supplementary major is one that cannot stand alone in qualifying a student for an undergraduate degree but must be taken in conjunction with a primary major. Several departments offer both majors and supplementary majors. They have been described above. Included below are interdisciplinary nondepartmental supplementary majors and minors.

THE GLYNN FAMILY HONORS PROGRAM*Directors:*

Paul Weithman; Christopher Kolda

The Glynn Family Honors Program brings together a small number of outstanding students in the College of Arts and Letters, the College of Science, and School of Architecture. Students are accepted into the Program at the time of admission to Notre Dame. Although selection criteria include the promise of outstanding academic performance as demonstrated by standardized test scores and high school performance, the program is looking for more than mere academic ability. It hopes to identify students with deep intellectual curiosity and interdisciplinary interests.

The Glynn Family Honors Program offers honors sections to fulfill most of the University and college requirements in the students' first and sophomore years. Courses include the yearlong Honors Seminar (satisfying the writing and literature requirements), Honors Calculus, Honors Philosophy, Honors Theology, Honors Biology, and Honors Physics. Since these courses are restricted to honors students, they are smaller than non-honors sections and are usually taught in a seminar format. The instructors for honors sections are chosen from the most outstanding faculty in each college. After the first year, students' academic work will be centered in their major field of study, but each semester the program offers the opportunity to take elective courses in a variety of subjects. Additionally, three one-credit colloquia are required: a Moral Problems Colloquium during sophomore year, and two colloquia focused on senior thesis research during senior year. During the spring of senior year, all students in the Glynn program are required to submit a senior research thesis that reflects at least two semesters' work under the guidance of a faculty advisor. In Science, the research for this project usually begins sophomore year, and in Arts and Letters during the spring of junior year. While undertaking thesis research and writing, students work individually under the direction of a faculty advisor. Because of the generous endowment of the program by John and Barbara Glynn and family, students may apply for available funding for qualified project proposals, including summer research.

In addition to the more narrowly academic features of the honors program, students will be offered various opportunities for broadening personal, cultural, and spiritual growth. Workshops, liturgical events, social gatherings, informal discussions, and cultural excursions are available.

Further information on the structure and content of the Glynn Family Honors Program or on the criteria for admission may be obtained by contacting Prof. Paul Weithman or Prof. Christopher Kolda, 309 O'Shaughnessy Hall, Notre Dame, IN 46556, 574-631-5398; or by visiting our website <https://glynnhonors.nd.edu/>.

ARTS AND LETTERS PRE-HEALTH STUDIES*Director:*

Vicki Toumayan
Assistant Dean
College of Arts and Letters

Students in the Arts and Letters Pre-Health Program are required to complete an arts and letters primary major in addition to the pre-health profession supplementary major. The APH2 program provides students who intend to pursue a career in medicine or other health profession with an opportunity to complete a major in the College of Arts and Letters while building a firm foundation in the basics of science. Most students elect the APH2 program because they wish to go on to medical or dental school; there are, however, students who intend to pursue other health-related careers or simply prefer the integration of science classes into the arts and letters curriculum. Medical schools encourage prospective applicants to seek a broad, liberal arts education, which enables them to develop skills that will be useful in their career and throughout life. The APH2 program provides students with all of the necessary prerequisites to prepare for the Medical or Dental College Admissions Test and can easily accommodate the completion of prerequisite courses for other health professions such as physical therapy, physician assistant, nurse practitioner occupational therapy, pharmacy, veterinary medicine, optometry, and podiatry.

The APH2 major consists of 10 core courses: MATH 10350 & 10360, BIOS 10171 & 10172 and labs, CHEM 10171 & 10172 with labs, CHEM 20273 & 20274 and labs, and PHYS 20210 & 20220 with labs, plus three upper-level science electives (nine credits). Those preparing for programs other than medical school may, with permission from the director, substitute two upper-level science courses for two of the core courses. For premed students Biochemistry (CHEM 40420) is required for the MCAT and the completion of one upper-level biology course (especially Cell Biology [BIOS 30341] or Physiology [BIOS 30344]) prior to the exam is strongly recommended. Students interested in one of the other health professions should choose APH2 electives in light of their prospective graduate program's requirements. CHEM 20204 and PHYS

SUPPLEMENTARY MAJORS, MINORS, AND SPECIAL PROGRAMS

20140 do not count toward the three upper-level science electives nor do research, special studies, or directed readings. Please note that a student may use no more than eight credits' worth of AP (Calculus only) toward the APH2 major. Transfer students may transfer a maximum of 24 science credits for APH2; otherwise, credit for science classes taken outside of Notre Dame does not count toward the APH2 major unless specifically approved by the APH2 director.

Students who wish to go to medical/dental school directly after graduation should aim to take the Medical/Dental College Admissions Tests in the spring of the junior year

All curricular advising in reference to the APH2 major is conducted by the APH2 advisor in 104 O'Shaughnessy. The sequencing of courses taken throughout the sophomore, junior and senior years is worked out by the student in consultation with the APH2 director and the student's departmental advisor so that the best schedule for each individual is arranged. One possible sequence is the following.

SAMPLE STUDY PLAN**First Year***First Semester*

WR 13100. Writing and Rhetoric/ Writing Intensive	3
MATH 10350. Calculus A ⁴	4
CHEM 10171 and lab. Chemical Principles	4
Foreign Language	4
First Philosophy/First Theology ¹	3
Moreau First Year Experience	1
	19

Second Semester

Arts and Letters Major	3
MATH 10360. Calculus B ⁴	4
CHEM 10172 and lab. Organic Structure & Reactivity	4
Foreign Language	4
Arts & Letters Major	3
Moreau First Year Experience	1
	19

Sophomore Year*First Semester*

College Seminar	3
BIOS 10171 and lab and module. Biology I	4
CHEM 20273 and lab. Organic Reactions and Applications	4
Foreign Language	3
Arts and Letters Major	3
	17

Second Semester

Arts and Letters Major	3
BIOS 10172 and lab. Biology II	4
CHEM 20274 and lab. Chem across the Periodic Table	4
First Theology/First Philosophy ¹	3
Foreign Language	3
	17

Junior Year*First Semester*

PHYS 20210 and lab. Physics I	4
Science Elective	3
Arts and Letters Major	3
Elective	3
Social Science ^{1,2}	3
	16

Second Semester

PHYS 20220 and lab. Physics II	4
Science Elective	3
Arts and Letters Major	3
Arts and Letters Major	3
Literature ¹	3
	16

Senior Year*First Semester*

Science Elective	3
Arts and Letters Major	3
Arts and Letters Major	3
Second Theology/Second Philosophy ³ (Medical Ethics)/CAD	3
History ¹	3
	15

Second Semester

Arts and Letters Major	3
Elective	3
Second Philosophy/Second Theology ³	3
Fine Art ¹	3
Elective	3
	15

Notes:

1. One of these requirements should be a University Seminar.
2. The MCAT includes material in psychology, sociology, and anthropology. Premed students should choose from among those disciplines in fulfilling the social science requirement(s). Introductory Psychology (PSY10000/20000) is highly recommended.
3. The MCAT includes questions on ethics. Premed students should consider fulfilling the second philosophy or theology requirement with a course on ethics.
4. If a student has AP credit for both Calc A & B, Statistics for Life Sciences (ACMS 20340) may be taken to fulfill both an APH2 science elective and the University Quantitative Reasoning requirement.

IDZIK COMPUTING AND DIGITAL TECHNOLOGIES (CDT) MINOR*Director*

Prof. Charles R. Crowell
Department of Psychology
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Faculty

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Program Overview

The Computing and Digital Technologies (CDT) minor is a blended program cutting across the Colleges of Arts & Letters and Engineering. Key departments in Arts & Letters have partnered with Computer Science & Engineering to offer a unique interdisciplinary minor. Program students will take CDT courses in both colleges to enhance their technical skills and increase their understanding of the ways in which technology can contribute to both personal and professional life. CDT will enrich the liberal arts educations of program students, broaden their perspectives, and give them skills and experience that prospective employers will value tremendously.

Program requirements

The Computing and Digital Technologies (CDT) minor requires five, 3-credit courses including:

SUPPLEMENTARY MAJORS, MINORS, AND SPECIAL PROGRAMS

- A two-semester core course sequence in programming,
- A one-credit “Technology as a Profession” seminar, and
- Three additional elective courses from one or more of the sub-specialties listed below.

Required Core Courses

All program students are required to complete the two semester (fall–spring) core course sequence in the Python programming language. These courses will be offered every year by a faculty member in the Department of Computer Science and Engineering. The core sequence does not assume any prior background in programming and is intended to be an introductory experience for non-engineering students. Ideally, CDT students will complete the core sequences first before taking specialization courses, but that is not generally required..

Elective Specialty Courses

The CDT elective courses are organized into six categories reflecting the diversity of disciplines within the College of Arts and Letters along with areas of technology expertise that are attractive to potential employers. Program students are encouraged to view these categories as sub-specialty tracks within the minor and to gain depth by taking all of their elective courses in a single track. While specialization is not required, students must take at least two (2) courses in a track to earn a specialization in that area.

Courses With and Without Computational or Digital Focus

Most CDT courses have a significant computational or digital focus that involves student learning/use of technology. However, some may not, instead providing background information that is highly relevant to the particular specialty in question. In those courses without a computational/digital focus, CDT students are encouraged to take advantage of any project or paper requirements in the class to reflect on how computational methods or technology can be brought to bear on the subject matter of the course. CDT students are limited to only one course without computational/digital focus in any specialization track. If a student earns a specialization in a track with only two courses, both must have a computational/digital focus. Classes with and without computational/digital focus in each track are shown where applicable on the Courses pages.

CDT Specialty Tracks

- *User Interface and Experience.* This track allows students to focus on how technology systems should be designed to enhance and maximize the user experience.
- *Cyber Safety and Security.* This track allows students to focus on the vulnerabilities, threats, protections, investigations and legalities associated with technology systems.
- *Digital Humanities.* This track allows students to focus on the ways in which technology can assist in the analysis and understanding of literature and textual information.

- *Digital Arts.* This track allows students to focus on how technology can assist in the creation and display of artistic expression.
- *Cognitive Science.* This track allows students to focus on the important role technology plays in the growing field of cognitive science.
- *Technology Development and Management.* This track allows students to focus on the ways in which technology solutions can be developed, implemented, managed, and maintained in organizations.

Requirement Completion Options

To complete CDT, a student must take six (6) courses total including:

- Two (2) core programming courses taken in sequence; and
- The “Technology as a Profession” seminar; and
- Three (3) elective specialty courses taken in one of the following five configurations:
 1. Three (3) courses with computational/digital focus in one track (earns track specialization); or
 2. Two (2) courses with computational/digital focus in one track and one (1) without computational/digital focus in same track (earns track specialization); or
 3. Two (2) courses with computational/digital focus in one track and one (1) with or without computational/digital focus in another track (earns track specialization); or
 4. One (1) course with computational/digital focus in each of three different tracks (does not earn track specialization); or
 5. One (1) course with computational/digital focus in each of two different tracks and one (1) without computational/digital focus in any track (does not earn track specialization).

NOTE: Fewer than three (3) specialty courses or fewer than two (2) courses with computational/digital focus will NOT fulfill CDT requirements.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Computing and Digital Technologies (CDT)*. Course descriptions can be found by clicking on the subject code and course number in the search results. CDT courses and their descriptions also may be found on the CDT website, at the following URL: <http://cdt.nd.edu>.

DUAL-DEGREE PROGRAM WITH THE COLLEGE OF ENGINEERING*Advisors:*

College of Engineering—Michael Ryan,
Assistant Dean for Academic Affairs
College of Arts and Letters—the advising deans
in the Office for Undergraduate Studies

Program of Studies. The dual-degree, five-year program between the College of Arts and Letters and the College of Engineering enables the student to acquire degrees from both colleges—the bachelor of arts from the College of Arts and Letters and the bachelor of science degree in a chosen program from the College of Engineering.

This combination program, instituted in 1952, offers students the advantages of both a liberal and a technical education. The student completing one of these combination programs has a background in the humanities and social sciences as well as a degree from one of the programs offered by the College of Engineering. Because it is a demanding program, only students who have both the aptitude and motivation necessary for the five-year program should apply. Advisors for the program are available for consultation about the advisability of entering the program and about meeting the particular needs of each student already pursuing this program. Qualified students are eligible to receive modest scholarship support from the John J. Reilly Endowed Scholarship Program during their fifth year of study.

The decision to enter the program ordinarily should be made prior to beginning the sophomore year, although students can also enter the program at a later stage. There are three sets of requirements that must be met for the program: University requirements, College of Arts and Letters requirements, and College of Engineering requirements, as the following table indicates.

University Requirements	Credit Hours
Philosophy	6
Theology	6
Writing and Rhetoric	3
University Seminar+	(3)
History or Social Science (LA5)	3
Arts and Literature or	
Advanced Language and Culture (LA4)	3
Moreau First Year Experience	2
	<hr/> 26
Arts and Letters Requirements	
College Seminar	3
Literature	3
History	3
Foreign Language* (1–4 courses)	3–14
Fine Arts	
Social Science	
Major (minimum)	27
	<hr/> 42/45

SUPPLEMENTARY MAJORS, MINORS, AND SPECIAL PROGRAMS

Engineering Requirements

MATH 20550, 20580	7
PHYS 10310, 10320	8
EG 10111, 10112	6
	—
	21

Engineering Program

Engineering degree program (required courses and program or technical electives)	66/72
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Total 168/177

Schematic Program of Studies*First Semester*

WR 13100. Writing and Rhetoric	3
History/Social Science*	3
MATH 10550. Calculus I	4
CHEM 10171. General Chemistry: Fundamental Principles	4
EG 10111. Introduction to Engineering Systems I	3
Moreau First Year Experience	1
	—
	18

Second Semester

University Seminar+	3
PHYS 10310. General Physics I	4
MATH 10550. Calculus II	4
CHEM 10122. General Chemistry: Biological Processes, or other technical course	3
EG 10112. Introduction to Engineering Systems II	3
Moreau First Year Experience	1
	—
	18

Third Semester

Theology/Philosophy	3
Modern Language	3
PHYS 10320. General Physics II	4
MATH 20550. Calculus III	3.5
Engineering Program†	3
	—
	16.5

Fourth Semester

Theology/Philosophy	3
College Seminar	3
Modern Language	3
MATH 20580. Introduction to Linear Algebra and Differential Equations	3.5
Engineering Program†	3
Engineering Program	3
	—
	18.5

Fifth Semester

Philosophy/Theology	3
History/Social Science*	3
Engineering Program	3
Arts and Letters Major‡	3
Engineering Program	3
Engineering Program	3
	—
	18

Sixth Semester

Philosophy/Theology	3
Arts and Letters Major	3
Arts and Letters Major	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
	—
	18

Seventh Semester

Literature*	3
History/Social Science	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
	—
	18

Eighth Semester

Fine Arts*	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
Engineering Program	3
Engineering Program	3
	—
	18

Ninth Semester

Engineering Program	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
Arts and Letters Major	3
	—
	18

Tenth Semester

Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
Engineering Program	3
	—
	15

+The University Seminar may be selected from an appropriate history, social science, fine arts, or literature course, or the first course in theology or philosophy.

*Students who place out of lower level language courses must take at least one language course at the appropriate level.

†Courses specified by the student's major engineering department. Minimum total for the five-year program to fulfill degree requirements in both colleges is 168 to 177 credit hours.

‡Courses necessary to fulfill the requirements for a major in the student's major arts and letters department.

EDUCATION**Elementary Education**

The Notre Dame student taking elementary education at Saint Mary's College must also complete a Notre Dame major along with the University and appropriate college requirements. Those interested in the elementary education program are encouraged to take the prerequisite course, EDU 201, at Saint Mary's in the second semester of their first year of studies. With appropriate planning, and possibly summer-school course work, both the Notre Dame major and elementary teaching certification can be completed in four years.

Secondary Education

(including middle school)

The following Notre Dame majors have been approved for secondary education licensing through the Education Department at Saint Mary's College:

In the College of Science: biology, chemistry, mathematics.

In the College of Arts and Letters: English, languages (French, Spanish, Latin), art, music, social studies (history and political science). Students interested in a secondary license in social studies must also complete additional course work in political science or history (depending on the major) and in one other area: either economics, sociology, or psychology.

In the College of Business: business education.

Notre Dame undergraduates interested in one of the professional teacher education programs should apply to the department the first semester of the sophomore year, but in some cases may start as late as the first semester of the junior year.

Students in the College of Arts and Letters, contact education advisor Stuart Greene for more information and help with planning. Students in the College of Science, contact Dr. Kathleen Cannon at 574-631-5812.

Interdisciplinary Minors within the College

During the junior and senior years, students may elect to complete one or more interdepartmental minors in addition to the departmental major sequence. Composed of 15 hours of class work chosen from at least two departments, these minors encourage students to think from an interdisciplinary perspective about a given issue or topic. Requirements for completion are determined by the faculty director in consultation with the relevant college committee. Current offerings include Catholic Social Tradition; Education, Schooling, and Society; Gender Studies; Hesburgh Program in Public Service; Journalism, Ethics, and Democracy; Latino Studies; Medieval Studies; Peace Studies; Philosophy, Religion and Literature; Philosophy, Politics, and Economics; and Science, Technology, and Values. These were formerly called concentrations and are described in detail below.

CATHOLIC SOCIAL TRADITION

Co-Directors:

Bill Purcell
(wpurcell@nd.edu/574-631-9473)
Todd David Whitmore
(twhitmor@nd.edu/574-631-6407)

Program Assistant:

Paula Muhlerr
(muhlerr.1@nd.edu/574-631-9402)

The Minor in Catholic Social Tradition is an interdisciplinary minor that serves as a resource for Notre Dame undergraduates to learn Catholicism's social tradition.

Catholicism offers a long-standing and profound tradition of thought and teaching that addresses, from a normative standpoint, the full range of social spheres. Such concepts include those of solidarity, the common good, the just wage, human rights, the free economy, subsidiarity, and the option for the poor.

Sources for the tradition go back as far as the Bible and develop even in the early church fathers. Pope Leo XIII inaugurates Catholicism's effort to bring its social tradition to bear on industrial society in his 1891 encyclical, *Rerum Novarum* (The Condition of Labor). Since then, popes have drawn upon *Rerum Novarum* and the social tradition to broaden and develop Leo's set of concerns in encyclicals often titled—as with Pius XII's *Quadragesimo Anno*, Paul VI's *Octogesima Adveniens*, and John Paul II's 1991 *Centesimus Annus*—in accordance with their relationship to the earlier document. In doing so, the popes and the Second Vatican Council have addressed issues ranging across all spheres of social life from the family to the state to the church. The U.S. bishops have made sophisticated application of these teachings to the specific circumstances of the United States.

Unfortunately, many Catholics are unaware of this tradition. Pope John Paul II writes, "It must be asked how many Christians really know and put into practice the principles of the church's social doctrine." The U.S. bishops concur. While "Catholic social teaching is a central and essential element of our faith," it is still the case that "our social heritage is unknown by many Catholics." At the same time, graduates of Notre Dame move on to assume leadership positions, often quite advanced ones, in a broad spectrum of social spheres, including in politics, law, business, education, the media, and the military. The Catholic Social Tradition minor serves as a resource for Notre Dame undergraduates to learn the tradition so that it can inform life both before and after graduation.

The Minor in Catholic Social Tradition involves 15 credit hours of course work, including a core course (3 credits), two electives (each three credits), three one-credit colloquia/social concerns seminars, and a senior capstone course.

Contact: Bill Purcell at wpurcell@nd.edu, or Todd David Whitmore at twhitmor@nd.edu.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Catholic Social Tradition*. Course descriptions can be found by clicking on the subject code and course number in the search results.

CONSTITUTIONAL STUDIES

Director:

Vincent Phillip Muñoz
(vmunoz@nd.edu/574-631-0489)

Program Assistant:

Jennifer Smith
(jsmith70@nd.edu/574-631-5351)

Program Website:

constudies.nd.edu

Nothing has done more for justice in the modern world than the development of the rule of law under constitutional principles. But for constitutional governments to secure the common good, thoughtful and educated citizens must possess certain virtues: they must understand and be able to implement, defend, and, if need be, reform constitutional institutions. The Constitutional Studies minor seeks to nurture such citizens, thereby contributing to the University's mission to pursue truth and to nurture a concern for the common good, that will bear fruit as learning becomes service to justice.

Building on courses across the College of Arts and Letters and the Law School, the Constitutional Studies minor is designed to encourage students to confront fundamental questions concerning justice, the rule of law, and human flourishing. From a variety of historical, cultural, disciplinary, and

philosophical perspectives, constitutional studies courses ask questions such as:

- What is the proper relationship between government and civil society, between law and moral principles?
- What are the philosophical foundations of human rights and constitutional democracy?
- What principles of justice can or should lie at the foundation of a constitutional republic?
- What are the proper relationships between church and state and religion and politics, and how do these relationships reflect the more basic relationship between faith and reason?
- What are the moral, social, and political conditions necessary to sustain America's experiment in constitutional government?
- What is the nature of international law and how are international norms created and maintained?

Constitutional Studies minors receive invitations to participate in extracurricular events associated with the Potenziani Program in Constitutional Studies, the Tocqueville Program for Inquiry into Religion and Public Life and the Law School's Program in Constitutional Structure.

Constitutional Studies Minor Requirements:

The Constitutional Studies minor requires 15 credit hours of class work. Students must complete core topics in constitutional studies, such as the history and philosophy of constitutional government and human rights and contemporary constitutional issues in American and international law.

- One of the program's gateway courses: *Constitutionalism, Law and Politics I: Constitutional Government & Public Affairs*, or *CLP II: American Constitutionalism* (3 credit hours)
- Three elective courses (total of 9 credit hours)
- Capstone experience (3 credit hours)

The elective courses are grouped into the following clusters:

- *Constitutionalism: History and Philosophy*
- *The American Founding and American Constitutional History*
- *Constitutional Government and Public Policy*
- *Comparative Constitutionalism and International Law*

These categories focus on the great political and constitutional debates in American and world history and on the underlying principles of constitutional government—natural and civil rights, social contract theory, the market economy, voluntary associations, separation of powers, popular sovereignty, and the rule of law. Elective courses that count for the Constitutional Studies minor for current and past semesters are listed on the minor's website (constudies.nd.edu/courses).

INTERDISCIPLINARY MINORS WITHIN THE COLLEGE

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at constudies.nd.edu/courses OR at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Constitutional Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

EDUCATION, SCHOOLING, AND SOCIETY

Director:

Nicole McNeil

Associate Director, DUS:

Ann Primus Berends

The primary goal of this interdisciplinary minor is to help students acquire diverse perspectives on important questions in education. Education is a complex and challenging aspect of human experience. It is both an end in itself and a means to many personal, professional, and spiritual goals. Thus, understanding its history and traditions, analyzing its processes, critiquing its goals, and studying its outcomes are of great importance to all of us.

The minor in Education, Schooling, and Society (ESS) uses the tools and resources of a liberal arts perspective to help students reflect on, research, and influence the role of education in society. In addition, the program provides a rich body of resources for students who may want to pursue careers in education after graduation, including teaching, research, working for non-profits, or policy making.

Typically, students apply for admission to the minor late in their freshman year or during their sophomore year. All students are required to meet with the associate director before enrolling.

The ESS minor involves 15 credit hours: the introductory course (ESS 33600, which must be completed by the spring semester of junior year), three electives, and a senior capstone research project.

The capstone project provides students with an opportunity to build upon and extend the work they have completed in fulfilling the requirements for the minor. Students may undertake this in one of three ways: (1) Senior Research Seminar (ESS 43640) in fall semester of senior year; (2) Thesis in ESS (ESS 48100), an independent study completed over the course of senior year (requires approval and 2 credits of research lab); or (3) thesis in the student's major department that incorporates the study of an educational issue into the research question (requires approval and a second reader from the IEI). Students who choose the third option must take a fourth ESS elective to complete the minor.

The ESS program will accept courses marked as “Univ. Req.” via the online Class Search *if they are listed/cross-listed with ESS*. The program will not accept CSEM courses for credit but will consider

education-related USEM courses on a case-by-case basis. ESS will accept no more than one international course for credit toward the minor.

ESS faculty work closely with students on undergraduate discernment, research, and postgraduate planning (e.g., employment, graduate or professional school, service opportunities).

For more information or to sign up for the minor, contact Ann Primus Berends at aprimus@nd.edu.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at ess.nd.edu or at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Education, School and Society*. Course descriptions can be found by clicking on the subject code and course number in the search results.

HESBURGH PROGRAM IN PUBLIC SERVICE

Assistant Director:

Claudia Francis

The Hesburgh Program in Public Service serves students interested in public policy and public service. By preparing students for engaged citizenship, the Program honors the dedicated leadership and public service of the late Rev. Theodore Hesburgh, C.S.C.

The health of American society is closely related to good public policy and ethical leadership. Through an interdisciplinary curriculum in public policy, the Hesburgh Program provides a foundation for students who plan to pursue careers in the public-sector, non-profits, or private business and seek to be knowledgeable and effective citizens.

The minor consists of 15 credit hours: Introduction to Public Policy, three electives, and a capstone during the senior year. All students take Introduction to Public Policy, preferably early in the program, and select one elective to fulfill the research tools requirement. Hesburgh minors choose two additional electives from courses in three categories: values, institutions and processes, and policy topics (only one course per category). The capstone course focuses on practical skills and policy writing. Alternatively, students can elect to do an independent, semester-long capstone project. Introduction to American Politics and Introduction to Microeconomics are co-requisites to the Hesburgh Program course of study. These requirements will be waived for students that receive University credit for AP American Government and/or Microeconomics.

The Hesburgh Program encourages students to pursue summer internships and offers generous support through the Gary Lyman Internship Stipend Awards. Students with internships in public policy and public service may apply for funding twice during their time at the University.

Interested students should meet with the Assistant Director. Students from all colleges and majors are welcome to declare the minor.

For more information contact Claudia Francis at canewalt@nd.edu or visit the program's website hesburghprogram.nd.edu

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at hesburghprogram.nd.edu/courses or at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Hesburgh Program in Public Service*. Course descriptions can be found by clicking on the subject code and course number in the search results.

JOHN W. GALLIVAN PROGRAM IN JOURNALISM, ETHICS, AND DEMOCRACY

Director:

Richard G. Jones

The John W. Gallivan Program in Journalism, Ethics, and Democracy offers several courses for students interested in careers in print, broadcast, online, and multimedia journalism. Begun in 1997 with a grant from the John S. and James L. Knight Foundation and now endowed by the family of John W. Gallivan, this minor combines professional training in journalistic skills with examination of philosophical concerns related to the practice of journalism. For example, what ethical issues arise in preparing a particular story? Or what role does—and should—journalism play in a self-governing society?

The journalism minor requires completion of 15 hours in addition to a student's major requirements and a news-related internship during either the summer or the academic year. Fundamentals of Journalism is the first, or gateway, class for the program. Other courses that count for the minor include The Digital Newsroom; The Craft of Journalism; Advanced Reporting; Sports Media Newsroom; Applied Multimedia for Journalists; Persuasion, Commentary, and Criticism; Broadcast Journalism; and Ethics in Journalism.

The director of the program is Richard G. Jones. An advisory committee of Notre Dame graduates in journalism helps guide the program. Members include Robert Costa, national political reporter, *The Washington Post*; Michael D. (Mickey) Gallivan, former television and wire service journalist and program benefactor; Maddie Hanna, reporter, *The Philadelphia Inquirer*; Meg Martin, associate editor, Public Insight Network at American Public Media; and Anne Thompson, chief environmental affairs correspondent, NBC News.

INTERDISCIPLINARY MINORS WITHIN THE COLLEGE

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Journalism, Ethics & Democracy*. Course descriptions can be found by clicking on the subject code and course number in the search results.

LATINO STUDIES

Co-Director:

Luis Ricardo Fraga

Director of Undergraduate Studies:

Karen Richman

Program of Studies

Latino Studies is an interdisciplinary field of academic research and scholarship engaged in understanding the past, present, and future of the youngest and fastest-growing population in the United States. Latinos encompass immigrants from every country in Latin America and the Caribbean as well as those whose ancestors were long ago incorporated during U.S. westward expansion. The supplemental major and minor in Latino Studies engage students with the latest research and analysis on the diverse Latino population in fields such as American studies, anthropology, history, literature, political science, sociology, and theology. Each semester, the Institute for Latino Studies offers approximately fourteen undergraduate courses that range from classroom lectures and seminars to community-based, service-learning courses in the local Latino community of South Bend. ILS also offers annual summer service-learning courses in Chicago, Los Angeles, and Washington, D.C. Latino Studies is relevant to practically every academic discipline and to careers in architecture, business, church leadership, community organizing, the arts, engineering, law, medicine, teaching, and much more. Latino Studies enhances students' leadership and effectiveness in whatever pathway your life takes you beyond Notre Dame.

Supplementary Major

The supplementary major in Latino Studies consists of twenty-four (24) credits: a gateway course (3 credits), capstone/practicum course (3 credits), and eighteen (18) credit hours or the equivalent of six additional Latino Studies courses.

Requirements:

1. Gateway Course (3 credits)
ILS 20701, Introduction to Latinos in American Society. This course examines the Latino experience in the United States, including the historical, cultural, social, economic, political, and religious foundations of the diverse U.S. Latino population.
2. Capstone/Practicum Course (3 credits)
In this 40000-level course, students meet in a seminar-style class and complete a substantial research project (approximately 15–20 pages) based

on bibliographic and/or experiential research in Latino Studies.

3. Elective Courses (18 credits)

Students take six more Latino Studies courses as electives chosen in consultation with the ILS Director of Undergraduate Studies.

4. Senior Thesis Option (3 credits)

A senior thesis in Latino Studies is encouraged, but not required, for students enrolled in the supplementary major. In addition, Glynn Honors Program students enrolled in the Latino Studies program as minors or supplemental majors may also write a senior thesis in Latino Studies. Thesis students take the thesis-writing course in Latino Studies (ILS 48900) under the direction of their thesis faculty supervisor. A minimum grade point average and faculty recommendation are required for acceptance. Students interested in writing a senior thesis should apply to the ILS Director of Undergraduate Studies by the spring of their junior year.

5. Directed Reading Course Option (1–3 credits)

A directed readings course (ILS 46711) allows a student to explore in depth a theme or subject in Latino Studies under the guidance of a faculty member. Directed readings cover material that is not offered as a regular classroom course. Enrollment requires the approval of the Director of Undergraduate Studies.

Minor

The minor in Latino Studies consists of fifteen (15) credit hours: a gateway course (3 credits), capstone/practicum course (3 credits), and nine (9) credit hours of elective course work.

Requirements:

1. Gateway Course (3 credits)
ILS 20701, Introduction to Latinos in American Society. This course examines the Latino experience in the United States, including the historical, cultural, social, economic, political, and religious foundations of the diverse U.S. Latino population.

2. Capstone/Practicum Course (3 credits)

In this 40000-level course, students meet in a seminar-style class and complete a substantial research project (approximately 15–20 pages) based on bibliographic and/or experiential research in Latino Studies.

3. Elective Courses: (9 credits)

Students take three additional Latino Studies courses as electives chosen in consultation with the ILS Director of Undergraduate Studies.

4. Senior Thesis Option (3 credits)

A senior thesis in Latino Studies is encouraged, but not required, for students enrolled in the minor. In addition, Glynn Honors Program students enrolled in the Latino Studies program as minors or supplemental majors may also write a senior thesis in Latino Studies. Thesis students take the thesis-writing course in Latino Studies (ILS 48900) under the direction of their thesis faculty supervisor. A minimum grade point average and

faculty recommendation are required for acceptance. Students interested in writing a senior thesis should apply to the ILS Director of Undergraduate Studies by the spring of their junior year.

5. Directed Reading Course Option (1–3 credits)

A directed readings course (ILS 46711) allows a student to explore in depth a theme or subject in Latino Studies under the guidance of a faculty member. Directed readings cover material that is not offered as a regular classroom course. Enrollment requires the approval of the Director of Undergraduate Studies.

Summer Service Learning Courses

The Cross-Cultural Leadership Program (CCLP) engages students in real-world applications of their academic studies through summer service learning in Chicago, Los Angeles, and Washington, D.C. Students in this three-credit, eight-week summer course will be immersed in community-based and national organizations. They will also engage in critical study related to their service learning in a class led by an ILS professor. To promote full immersion in this service-learning experience, students will not be placed in their home communities.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Latino Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

LINGUISTICS

Director of Undergraduate Studies:

Maggie Vosters

Linguistics, the scientific study of human language, is an investigation into a complex domain of human knowledge. Students of linguistics master a variety of conceptual and empirical techniques that enrich all of their coursework as well as their careers after graduation.

Because of the field's inherent interdisciplinary nature, students of linguistics have connections with a wide variety of fields, including neuroscience, linguistics, literature, anthropology, psychology, philosophy, computer science, English, and other area studies. Some may choose to focus on academic postgraduate studies; others may bring their understanding of human language to careers in information technology, education, translation or interpretation, publishing, dictionary development, legal, medical, or public health, consulting, advertising, government, and various aspects of the arts.

The undergraduate Minor in Linguistics requires completion of five courses and completion of a language pre-requirement as follows:

INTERDISCIPLINARY MINORS WITHIN THE COLLEGE

Pre-requirement: evidence of second language learning experience equivalent to 4 semesters of a second language through classes and/or placement tests

Requirements (5 Courses / 15 Credit Hours)

Gateway Course: CSLC 20301. Introduction to Linguistics (3 hours)

Core Course (3 hours):

- ANTH 20204. Fundamentals of Linguistic Anthropology
- ANTH 45842. Doing Things with Words
- PHL 43902. Philosophy of Language
- PSY 43455/63455. Psycholinguistics
- PSY 43456/63456. Pragmatics of Language Usage

Electives (6 hours): (Core courses not taken to fulfill the core course requirement can be taken as an elective)

- ANTH 30400. Language and Culture
- ANTH 35370. New Media
- ANTH 40141. Language and Power
- CSE 40657/60657. Natural Language Processing
- CSLC 20302. Sociolinguistics of Second Language Acquisition
- CSLC 20304. Topics in Linguistics
- CSLC 30101. Introduction to Second Language Acquisition
- ENGL 40203. Introduction to Old Norse
- ENGL 40211. History of the English Language
- ENGL 40211. Introduction to Old English
- ENGL 40212. Introduction to Old English
- PHIL 30313. Formal Logic
- PHIL 43916. Natural Language Semantics
- PSY 43251/63251. Language Development

Capstone:

CSLC 48000. Independent Research Practicum (3 hours). Students are required to complete an independent, article-length research paper under the direction of an approved faculty member and overseen by the Director or Assistant Director of the CSLC. During the semester in which students are completing this project, they enroll in a 3-credit hour research practicum. The research practicum guides students through the writing process and requires regular updates and presentations on their individual projects. This final paper is graded and signed off on by the approved faculty member.

The Minor in Linguistics is housed in the Center for the Study of Languages and Cultures (CSLC). Profiles of the faculty, course descriptions, and additional information about the minor can be found on the CSLC's website at cslc.nd.edu.

LITURGICAL MUSIC MINISTRY

This 15-credit minor consists of two 3-credit courses in theology and two 3-credit courses in music, plus 3 credits of music lessons or approved ensembles, to be selected in consultation with the student's music advisor. Contact the director of undergraduate studies in the Department of Theology.

MEDIEVAL STUDIES

The Minor in Medieval Studies allows students who are committed to other programs of study to pursue interests in the culture of the Middle Ages and to cross the limits of individual disciplines as a means of understanding the changing social, economic, legal, intellectual, and artistic systems of medieval society.

Students may declare their intention to undertake a minor in Medieval Studies to the director of undergraduate studies at any time before the end of their third year. The undergraduate director will then act as their minor advisor and help them select a set of courses that form a coherent program of study, often in conjunction with their major if possible. Students are required to take five courses, including the introductory course, The World of the Middle Ages, and three or four electives in Medieval Studies drawn from at least two of the 12 affiliated departments: (Anthropology; Art, Art History, and Design; Classics; English; German and Russian Languages and Literatures; History; Irish Language and Literature; Music; Philosophy; Political Science; Romance Languages and Literatures; and Theology). The Medieval Studies Advanced Seminar (3 credits) is recommended as one of the five courses, in lieu of a medieval elective, on a space-available basis. Courses counted toward a student's major may not be used for the minor.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Medieval Institute*. Course descriptions can be found by clicking on the subject code and course number in the search results.

MUSICAL THEATRE

This interdisciplinary minor is meant to engage the student who has multiple interests in Musical Theatre. Some students will structure their program around singing and acting, but others around song-writing, or work as conductor/impresario, or stage directing, or scholarship, etc. Admission to introductory classes will not be based on performance ability.

5 courses (15 credit hours):

- 3 credits - Musical Theatre History
- 3 credits of course work in FTT courses
- 3 credits of course work in MUSIC
- 3 credits from either FTT or MUSIC, with the Musical Theatre Minor Designation
- 3 credits for a CAPSTONE PROJECT

Current Department of Film, Television, and Theatre courses for the Musical Theatre minor:

Musical Theatre History (required)
Musical Theatre Movement/Dance
Performance Techniques

Production and Performance

The Movie Musical
Disney in Film and Culture
Musical Theatre Lab

Current Department of Music courses for the Musical Theatre minor:

American Popular Song
Voice Lessons for Non-Majors
Theory for Non-Majors
Intro. To Harmony and Voice Leading
Musicianship I
Musicianship II
Musicianship III
Conducting I
Opera in Production
Opera Workshop
Vocal Pedagogy
Voice Science

PHILOSOPHY, POLITICS, AND ECONOMICS

The minor in philosophy, politics, and economics (PPE) is designed for students with serious interests at the intersection of political theory, political philosophy, and economic theory. Its aim is to help students acquire some fluency in each of the disciplines, and to provide a forum where all three disciplines can be brought to bear on problems which are common or complementary. PPE emphasizes the development of the analytic skills exercised in close reading, cogent writing and clear oral expression. Students are strongly encouraged to engage in undergraduate research. A high percentage of PPE graduates pursue advanced degrees.

The PPE minor is 15 credits, including the 3-credit Justice Seminar, which is the core course of the minor and is required of all concentrators. The minor is open by application only; any student who wishes to take the Justice Seminar must complete the application for the minor. Most of the students who are granted admission to the seminar are PPE-intents. First-years, sophomores and juniors from across the University are welcome to submit applications, regardless of their majors.

The PPE curriculum consists of 15 credit hours usually distributed over four semesters, as follows:

- The Justice Seminar (cross-listed in Philosophy, Political Science, and Economics), an intensive 3-credit-hour seminar that is the gateway to the minor, taken in the fall semester of sophomore or junior year. (3 credit-hours)
- Three 1-credit PPE Colloquia, each devoted either to the critical reading and discussion of one or two major works or to a group project on some contemporary issue(s). The colloquia are normally taken in the three semesters following the Justice Seminar. Special arrangements can sometimes be made for students who wish to participate in a colloquium while studying abroad. (3 credit-hours *in toto*)

INTERDISCIPLINARY MINORS WITHIN THE COLLEGE

- Three approved 3-credit courses from the two fields outside the student's first major, with at least one course in both non-major fields. (9 credit hours *in toto*)

Total credit-hours: 15.

PPE students are also encouraged (but not required) to write senior theses in their majors that reflect the interdisciplinary focus of the program.

The Justice Seminar is always offered in the fall semester. An informational meeting about the PPE minor is usually held early in the March of each year, with applications for the minor normally due early in April of the year in which the Seminar will be taken.

Contact: Director Paul Weithman, Department of Philosophy, pweithma@nd.edu.

PHILOSOPHY, RELIGION, AND LITERATURE

Director:

Susannah Monta and Christopher Shields

The Philosophy, Religion, and Literature minor brings together and amalgamates two formerly existing minors, Philosophy and Literature and Religion and Literature. The new minor is designed for students who want to pursue an interdisciplinary course of studies that focuses on the many intersections among philosophy, religion, and literature. The minor seeks to build bridges between disciplines and modes of thought which have traditionally been in dialogue with one another and which historically have been at the heart of teaching at Notre Dame. The aim is to create a context in which philosophical, religious, and literary approaches to thought and its expression may be studied systematically and in conjunction with each other. This integrative approach to liberal education's foundational subjects resonates deeply with the intellectual values and mission of Notre Dame.

Curricular Requirements. The Philosophy, Religion, and Literature minor will require students to complete 15 credit hours of approved course work. These 15 credit hours will normally comprise at least one three-credit Gateway seminar, three three-credit electives, and a three-credit capstone project.

Gateway seminar. Students are required to take a three-credit Gateway seminar, either in philosophy and literature or in religion and literature. The minor is thus organized around two parallel but intersecting tracks. The purpose of the Gateway seminars, whatever their specific topics may be, is to provide a rigorous introduction to the study of philosophy and literature or religion and literature.

Electives. In addition to the Gateway seminar, students are required to take three other courses that have been approved for the minor. The minor's director will help students identify courses relevant to the minor and to their own individual interests and needs.

Integrating the tracks. Students working primarily in one track are required to take one course in the other. Thus, a student focusing on religion and literature is required to take one course in philosophy and literature. That course may be either the Gateway seminar or another course. If students choose to fulfill this requirement by taking Gateway seminars in both tracks, both seminars will count toward the 15 credit hours needed for the minor.

The capstone project. For the capstone project, each student, working directly with a professor associated with the minor, will write a research essay of approximately 20 pages on a topic that embraces philosophy and literature or religion and literature, or both. Students are encouraged to consult with a professor who is working in a different subject area from the one on which the advisor has expertise. Thus, if a student's advisor is in Theology, that student will be encouraged to consult with a literature professor who has some interest in the student's topic. We recognize that some seniors in the College of Arts and Letters are writing senior theses for their majors. In many cases it is unrealistic to expect such students to write an additional capstone essay. Students in the Philosophy, Religion, and Literature minor who are already writing a senior thesis are allowed to complete the minor by taking a fifth elective course instead of the capstone project, provided that the senior thesis topic in some way resonates with the overall themes of the minor.

Events and Activities. The Notre Dame community already hosts a number of lectures, forums, and one-day seminars relevant to the minor. In addition, the minor will sponsor events and activities such as trips to the opera and theater. Students in the minor are required to attend at least three such events.

PHILOSOPHY, SCIENCE, AND MATHEMATICS

This interdisciplinary minor offers students the opportunity to explore the "big questions" raised by science and mathematics. The minor is particularly intended for students who already have significant scientific and/or mathematical training and wish to pursue related philosophical questions which may not be explored by the courses within their major as well as for students outside the sciences, who would like to combine some serious scientific work with intensive discussions of the big questions raised by contemporary science and mathematics.

Students pursuing the minor in Philosophy, Science, and Mathematics take a Core Seminar offered every fall semester which serves as a gateway course to continued studies. In addition, students will take courses in the philosophy of science, the philosophy of mathematics, and logic. Regularly offered courses in these areas include the following:

Philosophy of Science

- PHIL 43704: Science and Social Values
- PHIL 43722: Ethics and Policy in Technology Management

- PHIL 43708: Bio-Medical Ethics, Scientific Evidence & Public Health Risk
- PHIL 30389: Philosophical Issues in Physics
- PHIL 43718: Scientific Images of Humanity
- PHIL 43720: Historical & Conceptual Foundations of Spacetime Theory
- PHIL 43308: Environmental Justice
- PHIL 43711: The Life and Works of Darwin
- PHIL 43721: The Science-Gender Connection
- PHIL 43715: Philosophy of Science and Public Policy

Logic and Philosophy of Mathematics

- PHIL 43907: Intermediate Logic
- PHIL 43918: History and Philosophy of Logic
- PHIL 43906: Philosophy of Mathematics
- PHIL 43913: Modal Logic
- PHIL 43917: Intuitionism
- PHIL 43912: Between Math and Philosophy
- PHIL 43908: Topics in Philosophical Logic: Set Theory

Details about the minor can be found on the Department of Philosophy website at <https://philosophy.nd.edu/majors-minors/philosophy-science-and-mathematics/>.

POVERTY STUDIES

(povertystudies.nd.edu)

Director:

Jennifer Warlick

Co-Director:

Connie Snyder Mick

Affiliated Faculty:

Visit povertystudies.nd.edu/about/the-faculty/

The Poverty Studies Interdisciplinary Minor (PSIM) contributes to Notre Dame's mission by requiring its students to examine poverty, social injustice, and oppression from the perspectives of the social sciences, the humanities, sciences, and business.

PSIM explicitly recognizes the interconnected nature of the causes of poverty and the problems of low-income families and individuals, and provides a framework that assists students in making the links between the contributions of multiple and varied disciplines. It also helps students contextualize their personal interactions with low-income populations and the institutions that serve them, and make the connections between classroom lessons and real-world experiences.

PSIM is an appropriate supplement to every major at the University because it is designed to help students understand how their future civic activity and professional work—in almost any area—will invariably impinge on disadvantaged persons and communities.

Requirements. An interdisciplinary minor in Poverty Studies consists of 15 or 16 credit hours, including a required gateway course, experiential learning (service learning, community-based research, or immersion); elective coursework selected from a list of courses approved by the director on the

INTERDISCIPLINARY MINORS WITHIN THE COLLEGE

advice of the affiliated faculty; and senior capstone seminar or special studies/senior thesis.

Gateway course (3 credits). The gateway course introduces students to academic research about the nature, causes, and consequences of poverty. Throughout, the readings and lectures reveal the collaboration across the various disciplines, the array of interlocking problems that lead to poverty, and guides the formulation of policies to prevent and alleviate poverty. Equal emphasis is given to poor citizens of the United States and developing nations.

Experiential learning (3 or 4 credits). The experiential learning requirement is designed to get students into the field where the concepts discussed in classrooms come to life and disciplinary boundaries are challenged. Experiential learning enhances a student's understanding of poverty and prepares students for the final capstone experience, whether it is the seminar or an independent research project. The experiential learning requirement may be satisfied by satisfactorily completing one of the following options:

- three designated 1-credit Center for Social Concerns seminars combined with PS 35001; or
- three credits of internship(s) with community agencies and organizations serving the poor; or
- one approved 3-credit community-based learning research course.

Three 1-credit seminars offered by the Center for Social Concerns. Participating in CSC seminars is a well-established tradition among Notre Dame students. PSIM students may satisfy the experiential learning requirements by bundling three Center for Social Concerns 1-credit experiential learning seminars with PS 35001. When choosing this option, students must take the Urban Plunge Seminar (THEO 33963/CSC 33963), the Appalachia Seminar (THEO 33950/CSC 33950), or another approved seminar.

Three credits of internship(s). Each semester, many Notre Dame students engage in internships with community agencies and organizations working to improve the well-being of low-income individuals and families. Three total credits of internship experience with the same or different agencies satisfy this requirement.

One 3-credit community-based research course/project. This requirement may be fulfilled during the academic year satisfactorily by completing a regularly scheduled course with a community-based research component, by participating in a summer service-learning project sponsored by the Center for Social Concerns, or by completing a Shepherd Program summer internship enhanced by the addition of an academic component similar to CSC's summer service-learning courses.

Electives (6 credits). Two courses from the list of approved Poverty Studies minor electives. See <http://povertystudies.nd.edu>.

Capstone Experiences (3 credits). As the final step in the PSIM, students may choose either to enroll in the capstone seminar or to undertake a 3-credit special studies project directed by one of the affiliated faculty.

Capstone Seminar (3 credits). The capstone seminar is topic-oriented drawing on literature from multiple disciplines. The students will be from different majors and will share the perspectives of their major disciplines as well as their varied experiences in the field, thus ensuring the interdisciplinary nature of the inquiry. Experts with diverse perspectives and professional experiences will join the seminar as special guests.

Special studies capstone option (3 credits). Students may also opt for research or other intellectual experience by enrolling in special studies with one of the minor's affiliated faculty. In this case, the students will produce a project (manuscript, work of art, composition, poster board display of research results, etc.) and will present this project to the members of PSIM at a special colloquium held in the spring semester of each academic year.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject of *Poverty Studies*, or by highlighting all of the course subjects simultaneously and selecting the "PSIM-Poverty Studies Elect." course attribute. Course descriptions can be found by clicking on the subject code and course number in the search results.

SCIENCE, TECHNOLOGY, AND VALUES

Program Director:

Anna Geltzer, Assistant Director for Education
Reilly Center for Science, Technology & Values

Science and technology play a powerful role in structuring our world, in everything from our physical environment to our culture. A multifaceted understanding of this role is key both for those who aspire to shape our world and for those who want to be successful in it.

The Science, Technology, and Values minor offers students the opportunity to acquire an interdisciplinary understanding of science and technology in modern societies, providing them with analytical and conceptual tools they need to confront the complex questions that arise where science and society intersect.

STV prepares students to pursue a variety of academic and career goals. Students focused on the natural sciences and engineering get to explore the social, political and ethical implications of their chosen fields, while students majoring in business, the humanities and social sciences have an opportunity to study the processes, products and impacts of science and technology.

In addition to our wide selection of interdisciplinary courses, the minor offers opportunities for undergraduate research.

Contact information: The Reilly Center,
453 Geddes Hall, 574-631-5015,
ageltzer@nd.edu.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Science, Technology and Values*. Course descriptions can be found by clicking on the subject code and course number in the search results.

TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES

Director of Undergraduate Studies:

Maggie Vosters

The Minor in TESOL (Teaching English to Speakers of Other Languages) is an interdisciplinary minor designed to instruct students in the essential aspects of linguistics and language education while providing practical experience in classroom management and lesson planning. Courses in TESOL focus on understanding the components of language and the interrelationship between language and cultural attitudes, values, and practices. Students learn how to teach English by studying second language acquisition theories and teaching methodologies as well as through authentic classroom experiences.

A Minor in TESOL is excellent preparation for professions in teaching ESL/EFL (English as a Second/Foreign Language)—both within the United States and in other countries—as well as careers with government agencies and non-profit organizations in an international setting. In addition, it has particular value for students who want to pursue graduate work in education, applied linguistics, or theoretical linguistics as well as prospective Peace Corps volunteers, Teach for America applicants, and Fulbright English Teaching Assistants.

Language Requirement. To teach and understand the second language acquisition process, students need experience learning a second language. As such, the TESOL Minor requires its students to have completed 4 semesters of a second language through coursework and/or testing.

Coursework. TESOL courses are structured to give students both theoretical and practical grounding in TESOL. Students study linguistic and pedagogical theories as well as the practical how-tos of teaching.

Capstone Practicum. The TESOL Practicum gives students a chance to apply the knowledge that they have gained. Students log 30 hours of teaching and 15 of observation in an actual classroom setting, are observed and evaluated by TESOL professionals, and complete a teaching e-portfolio.

Required Courses (18 credit hours)

CSLC 20301 Introduction to Linguistics
CSLC 20302 Sociolinguistics of Second Language Acquisition (or CSLC 20304 Topics in Linguistics or CSLC 20306 Language, Literacy/ies, and Pedagogy in 21st Century Schooling and Society)
CSLC 20303 Pedagogical English Grammar
CSLC 30101 Introduction to Second Language Acquisition
CSLC 30102 Methods in Second Language Teaching
CSLC 40000 TESOL Practicum

The TESOL Minor is housed in the Center for the Study of Languages and Cultures (CSLC). Profiles of the faculty, course descriptions, and additional information about the TESOL Minor can be found on the CSLC's website at slc.nd.edu.

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Mendoza College of Business

The Mendoza College of Business, an accredited member of the AACSB—Association to Advance Collegiate Schools of Business—was established in 1921.

Notre Dame's business school is noted for challenging its students to "Ask More of Business™," by placing individual integrity at the heart of every decision, by tackling tough problems and building effective organizations, and by harnessing the power of business to serve the greater good of the global community.

The undergraduate student body of the college is made up of sophomores, juniors, and seniors. Students who are accepted into the Mendoza College of Business through the admissions process (page 22) and successfully complete the requirements of the First Year of Studies are admitted to the college at the beginning of sophomore year only.

Programs of Study

At the Mendoza College of Business, students should expect challenging academic coursework, an excellent faculty, and many opportunities to interact with corporate executives and industry experts who can immerse them in the realities of today's business world.

A holistic approach to business education springs from the deepest root of Notre Dame and radiates throughout the curriculum. Education involves more than developing just specialized skills; it involves teaching every student to recognize a role of service to the human community.

The business education program at Notre Dame seeks to expand learning beyond traditional silos and to integrate knowledge across business disciplines, in order to promote critical thought. Students develop the broader perspective they will need to lead in a complex, global economy.

The business world has always required people with initiative, a willingness to take risks and the stamina to thrive in a competitive world. To meet demands for new and better goods and services, leaders must manage operations which are extensive and multifaceted. The business leader whose job it is to put the work of many specialized people together into a smooth-working whole has traditionally developed business skills by rather accidental means: by knowing instinctively, by learning from experience, or by building upon some specialized body of knowledge.

The purpose of the business program is to focus attention directly on the skills and knowledge required by a leader today. The work is especially appropriate at Notre Dame. The responsibility of each business to its employees, customers, suppliers,

owners, and the common good is being recognized and studied with growing intensity.

This responsibility raises ethical issues to which Notre Dame and its graduates should respond in a sound and practical way. The continuing effort to improve the practical application of ethical principles to competent performance in leadership roles is a prime concern of the Mendoza College of Business.

In light of the responsibility of the Mendoza College of Business for guiding students toward a liberal education in the Christian tradition and toward future responsibilities as business administrators, the following mission statement has been formulated:

The mission of the Mendoza College of Business is to build a premier Catholic business school that fosters academic excellence, professional effectiveness and personal accountability in a context that strives to be faithful to the ideals of community, human development and individual integrity.

Learning Objectives. The educational objective of the undergraduate program in the Mendoza College of Business is to assist and guide students in preparation for lifelong learning, for effective citizenship and for professional careers as competent and ethical participants in business, government, and other complex organizations. This is accomplished by educating students in the professional area of business while remaining true to the scholarly, liberalizing, and Catholic mission of the college and the University.

The Mendoza College of Business has established the following program learning objectives in support of this mission and objective:

- Be effective problem solvers.
 - Students will gather and analyze relevant evidence to articulate solutions to business problems.
 - Students will analyze business problems in a global context.
- Become effective communicators.
 - Students will produce professional quality business documents.
 - Students will deliver professional quality presentations.
 - Students will work collaboratively to accomplish business objectives.
- Knowledgeable in the field of business.
 - Students will demonstrate foundational knowledge relevant to business.
 - Students will have content knowledge requisite of their academic major.

- Ability to integrate ethics into decision making.
 - Students will evaluate the ethical dimensions of business decisions.

The Program. The educational activities of a university and a college are broader than the mere teaching of courses. Nevertheless, one of the main expressions of an educational plan is its program of instruction. Several features of the program itself and certain fundamental concepts on which it is based deserve special comment.

The college recognizes four distinguishable but inter-related types of education to which future business leaders should be exposed: (1) study in the fields traditionally called liberal arts; (2) a basic understanding of the operation of a business enterprise; (3) an understanding of the economic and legal climate or atmosphere in which business functions and of which business is a part; (4) a professional concentration in a major for the student's in-depth educational pursuit, which will also provide some preparation for future employment.

The curriculum of the three-year business program combined with that of the First Year of Studies is approximately one-half business courses and one-half instruction in traditional liberal studies usually provided by the College of Arts and Letters and the College of Science.

Upon entering the Mendoza College of Business at the beginning of the sophomore year, the student registers for a program which introduces the basic tools of business and the functions of accounting, information systems, financial management, management, business statistics, marketing, business law, and ethics.

In the junior and senior years the student continues his or her studies using the analytical tools developed in the sophomore year. The student enters into a consideration of the operation of the business firm and the economic and legal climate of business. The examination of the economic climate in which business must operate is concerned with the fundamentals of money and banking, the role of the federal government in terms of its fiscal and monetary policies, and the concepts of national income accounting that afford a basis for measuring and forecasting economic change. A student gives emphasis to his or her major and may either add to minimum major requirements or elect other course areas for study.

CURRICULUM FOR THE DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION

Curriculum for the Degree of Bachelor of Business Administration

The college stands ready to accept students who are admitted to Mendoza and have successfully completed the course requirements of the First Year of Studies (FYS) at Notre Dame as outlined in the University Requirements and FYS sections of this *Bulletin*. In addition to the general FYS requirements, Mendoza College of Business student intents should also complete the following specific courses during the FYS:

- Calculus
- Statistics for Business
- Principles of Microeconomics

During the sophomore year, a College of Business student is expected to complete the following *minimum* business courses:

Principles of Accountancy I and II
Corporate Financial Management
Principles of Marketing
Principles of Management
Business Law
Statistical Inference in Business
IT Management Applications
Intro to Business Ethics

The sequence of completion of courses will vary according to the availability of courses.

The BBA degree requires a total of 128 credits. Of these credit hours, a student has up to 12 free elective credits and must take at least 18 credits in non-business elective courses. Consequently, a student has considerable flexibility in selecting courses that meet his or her particular academic and career plans. Students in the Mendoza College of Business will declare a major in the spring semester of their sophomore year, in one of the following majors: accountancy, business analytics, finance, information technology management, management consulting, or marketing. The Mendoza College of Business is committed to admit as many students as possible into their choice of business major. However, if it becomes necessary to limit enrollment in any majors, Mendoza will use minimum college and degree requirements and cumulative GPA to determine assignment to “limited enrollment” majors. Additional information on selection criteria can be found on the Mendoza website.

The Mendoza College of Business also offers an interdisciplinary minor in Innovation and Entrepreneurship. Students desiring to select the minor must be enrolled in the Mendoza College of Business. Second majors, minors, and concentrations in subject areas outside the College of Business are also available. Students must be able to complete additional majors, minors and concentrations within their four years of study at Notre Dame. Students

should refer to specific departments for opportunities and requirements.

To be eligible for the BBA degree, students must complete a minimum of 64 credits at Notre Dame.

A graduate from the college must have at least a 2.0 cumulative GPA and have accumulated a minimum number of credit hours in the following areas:

The following is a breakdown of course and credit requirements to satisfy the 128 BBA degree credits. Refer to the University Requirements section of this Bulletin for an understanding of how courses satisfy the Core Curriculum “Ways of Knowing.”

Moreau First Year Experience	2
Writing and Rhetoric [^]	3
University Seminar	3
Quantitative Reasoning*	3–6
Science and Technology*	3–6
Arts & Literature or Adv Language & Culture*	3
History or Social Science*	3
Integration (or alternate per Univ Req)*	3
Theology*	6
Philosophy (or CAD)*	6
Principles of Microeconomics**	3
Statistics for Business**	3
Calculus**	3
Accountancy I & II	6
Business Law	3
Corporate Financial Management	3
Statistical Inference in Business	3
IT Management Applications	3
Principles of Management	3
Principles of Marketing	3
Introduction to Business Ethics	1.5
Macroeconomic Analysis	3
Managerial Economics	3
Foresight in Business and Society	3
Strategic Management	1.5
Intro to Process Analytics	1.5
Major Courses***	19.5–21
Non-business electives****	≥18
Free Electives****	≤12

[^]*Other Writing-Intensive Course if AP for Writing & Rhetoric*

**May also satisfy University Seminar*

***May satisfy Univ. Req. if not AP*

****A minimum GPA of 2.000 is required in the major*

*****Can be variable depending on applied AP credit*

General administration of the undergraduate program is accomplished in the Office of Undergraduate Studies, Room 101 Mendoza College of Business. Advisors are available in this office to counsel students and answer questions concerning university and college requirements/policies. Faculty mentoring for juniors and seniors is available from their respective major departments; however, Room 101 advisors will continue to provide general advice on college and university issues. The department offices of the college, (e.g. Accountancy; Finance; Information Technology; Analytics; and Operations; Management and Organization; and Marketing)

are located in Room 102 of the Mendoza College of Business. In addition to the University pre-law advisor, Mendoza College offers pre-law advising to current undergraduate business students.

Normal semester course load for sophomores is 15–17 hours; for juniors and seniors, 15–19 hours. The minimum semester course load for all students is 12 hours. Normally, a cumulative and recent term grade point average of 3.4 or higher is required to obtain permission to carry an overload. Interested students should contact the Office of Undergraduate Studies for specific information.

Students may elect to fill free elective or non-business elective requirements to include 1-, 1.5-, or 2-credit-hour courses, AP credit, or Credit by Exam. The college accepts a maximum of 32 credits through AP, including no more than six credits through AP and/or credit by exam in any one language, toward degree-seeking credits. AP credit cannot be applied toward University core curriculum requirements in the degree.

A maximum of three credit hours of workshops, service, activity or experiential learning from the following types of voluntary courses can be applied as free elective credit toward the 128 degree credits:

Band (Marching, concert and Jazz)
Orchestra
Chorale
Glee Club
Liturgical Choir
Folk Choir
Music Lessons and Ensembles
Ballet and Dance
Debate
Theater Experience/Film Society
Social Concerns Seminar
FYS Introductory (FYS 10XXX)
Peer Advising
Internships

Exceptions may be made if required for a second major. If students complete more than three credit hours of these courses, they will still appear on a student's transcript, but the extra credits will not count toward the degree requirements.

Pass-Fail. With permission from their academic advisor and approval of the assistant dean, juniors and seniors may elect one course per semester under the pass-fail option. Only free elective and non-business elective courses may be taken pass-fail. No business courses, required courses, or courses in a student's second major or minor (other than the first course taken in a minor track) may be taken pass-fail even though taken as a free elective. The selection of a course as pass-fail must be made during the first six days of the semester and is irrevocable. Note: to be eligible for Dean's List status, a student must have a minimum of 12 graded credits for the semester.

Directed readings or special studies are not part of a standard curriculum for students in the Mendoza College of Business and cannot duplicate or

STUDY ABROAD

substitute for an existing course. Directed readings or special studies are rare exceptions to established coursework, designed to support an area of research or study that is of mutual interest to a faculty member and a student. These courses contain advanced objectives beyond those covered in regularly scheduled courses—not introductory material or material taken from the popular literature that should more properly be considered “self-improvement” than academic in nature. A directed reading/special studies course will not satisfy a University, College, or major requirement. Directed readings or special studies outside of a student’s major in business may count as free elective or non-business elective credit only. A student may register for no more than three credit hours of directed readings or special studies in any given semester. No more than a maximum of nine directed reading or special studies credit hours may be applied toward the 128-credit-hour BBA degree requirements.

Study Abroad

Students from any of the majors in the Mendoza College of Business may participate in study abroad programs.

For more than a decade, Notre Dame has made it possible for students to earn credits toward graduation in study abroad programs. Travel, direct personal experience of another language and culture, and study in another tradition all broaden and deepen the liberal education of the whole person, to which the University has always been committed.

Qualified undergraduates can spend all or part of their sophomore or junior year in such places as Angers and Paris, France; Berlin and Heidelberg, Germany; Dublin, Ireland; St. Andrews, Scotland; London, England; Fremantle, Australia; Bologna and Rome, Italy; Puebla, Mexico; Nagoya and Tokyo, Japan; Seoul, South Korea; Santiago, Chile; Salvador da Bahia and São Paulo, Brazil; Beijing, Hong Kong and Shanghai, China; Toledo, Spain; Cairo, Jerusalem, Israel; Egypt; Athens, Greece; and Amman, Jordan. New program locations are periodically added.

For further information and advice on international study, students of the Mendoza College of Business may contact the Office of Undergraduate Studies, Room 101 Mendoza College of Business, and/or the director of the Study Abroad Programs, 105 Main Building.

Collegiate Sequence in International Business

The Collegiate Sequence in International Business consists of courses which offer Mendoza College undergraduates a broad exposure to the global nature of the world of business. Completion of the program is acknowledged with an International Business Certificate at graduation. While not a major or minor, this program enriches the student’s academic preparedness to take advantage of the multitude of opportunities and challenges awaiting them. The International Business Certificate substantiates a student’s acquisition of knowledge and perspective in the varying aspects of our ever-evolving global economy. The multi-disciplinary aspect of the course selections enhances the student’s ability to communicate and engage in the international arena with a greater appreciation of diverse commerce, cultural and social contexts.

While a semester or summer of international study is encouraged and may be helpful in completing the certificate requirements, the certificate may be earned by taking courses on the main campus.

A total of five courses and fifteen credits are required from among a variety of offerings from the Mendoza College of Business, the College of Arts and Letters and other national and international institutions: one course (3 credits) must be in a foreign language at the intermediate level with the LANG attribute; two courses (6 credits) must be selected from among the international business course offerings with the IBC Business (IBCB) attribute; and the remaining two courses (6 credits) must be selected from among contemporary international liberal arts courses with the IBC Liberal Arts (IBCL) attribute or from courses with the IBCB attribute. Neither AP courses nor courses graded Pass/Fail or Satisfactory/Unsatisfactory will count towards the International Business Certificate.

Students must indicate their intention to complete the program via the Mendoza College of Business website no later than the end of their junior year. Once a student’s intent to pursue the Collegiate Sequence in International Business has been indicated, the Graduation Progress System will include an International Business Certificate section so as to assist in tracking progress toward completion of the requirements.

Courses for the International Business Certificate may not be taken on a pass/fail basis. Courses may “double count” toward other University or major requirements.

For more information, contact the Mendoza College of Business Office of Undergraduate Studies.

Student Awards and Prizes

College Level Awards

The Dean’s Award. This award is given to the graduate whose leadership has contributed most significantly to the progress of the college.

Eugene D. Fanning Award. Given to a senior man and woman who demonstrate exceptional achievement in business communication; excellence in writing, speaking, listening, and interpersonal communication; and who demonstrate leadership potential, initiative, integrity, and respect for the dignity and rights of others.

The Hamilton Awards. Founded by Robert L. Hamilton ’34, Racine, Wis., these awards are given to the outstanding senior in each of the five departments of the college.

The Charles G. Morrow Award for Business Excellence. This award was established by the five children of the late Charles G. Morrow, Class of 1938, in honor of his contributions to Notre Dame and the business community. Given to a graduating senior in the Mendoza College of Business, this award recognizes business excellence through documented service, leadership, and personal integrity.

Accountancy Awards

Accountancy Chairman Award. An annual award provided to an accountancy senior who demonstrates outstanding service to the Department of Accountancy.

The Accountancy Faculty Award. This award recognizes an outstanding senior in the Department of Accountancy in the Mendoza College of Business. It is given to an outstanding senior with one of the highest cumulative grade point averages.

The William Barth Award. This award is designed to assist students who have accepted a full-time volunteer experience after they leave Notre Dame or who plan to work for a not-for-profit organization.

Peter Brady Award. Established to honor past faculty member Peter Brady, this award is given in recognition of outstanding academic performance.

Accountancy Excellence Awards. Given annually to up to 25 sophomores who declare accountancy as their major and have demonstrated outstanding economic achievement. The awards are funded by annual gifts from Deloitte, Ernst & Young, KPMG, and PricewaterhouseCoopers.

Elmer Layden Awards. Given annually to graduating accountancy seniors in recognition of academic achievement. The awards are funded by the Elmer Layden Jr. Endowed Fund.

Brother Cyprian Awards. Given annually to graduating accountancy seniors in recognition of academic achievement. The awards are granted in honor of Holy Cross Brother Cyprian O’Hare

BUSINESS ORIENTED STUDENT ORGANIZATIONS AND ACTIVITIES

("Brother Zip"), who helped to launch Notre Dame's accountancy education program in 1895 and later served as department chair.

James Dincolo Awards. Given annually to graduating seniors in each major in recognition of academic achievement. The awards honor former accountancy professor James Dincolo and are funded by an endowment in his name.

Finance Awards

Paul F. Conway Award. Given to a senior in the Department of Finance who embodies those characteristics that define our tradition of excellence: a person of keen intellect who enriches the ideals of Notre Dame.

The Herman Crown Award. Given to a senior in the Department of Finance with the highest overall grade point average.

Raymond P. Kent Award. Given to seniors with outstanding performance in finance courses.

LeClair Eells Award. Given to seniors in the Department of Finance who have demonstrated outstanding leadership.

Department of Finance Outstanding Service Award. Given to a senior in the Department of Finance for rendering outstanding service to the department.

Information Technology, Analytics, and Operations Awards

The IT Management Award. Given to the outstanding ITM senior in the Department of Information Technology, Analytics and Operations.

The Justin Harris Brumbaugh Memorial Award. Given annually to the graduating ITM major who has excelled academically and has been selected by the graduating seniors as best representing the unique and enduring spirit of Notre Dame.

Management and Organization Awards

The Management & Organization Department Student Service Award. This award honors students who embody the spirit of Notre Dame through the provision of extraordinary and selfless service to Management Consulting students and the Mendoza community.

The Robert Vecchio Leadership Award. Established in 2010, this award honors the memory of Bob Vecchio, former Chair of the Management & Organization Department. This award is given at the discretion of the faculty to a Consulting student who embraces the spirit of Notre Dame and has excelled in developing leadership skills.

Marketing Awards

David A. Appel Award. The award is given to a marketing student engaged in significant community service at Notre Dame and in the greater Michiana area.

Wesley C. Bender Award for Outstanding Performance in Marketing. An annual award given to the senior marketing major with the highest grade

point average in marketing courses. The award is named for the first chairman of the Department of Marketing, Wesley C. Bender.

Yusaku Furuhashi Award. In honor of an esteemed colleague who was a pioneer in the area of international marketing. The award will be given on a calendar year basis to a student who, in the estimation of the faculty, writes the best essay capturing the marketing insights gained by the semester abroad experience. The winner each year may be either a junior or senior, depending upon the dates spent overseas.

Paul D. Gilbert Award for Leadership. An annual award given to a marketing senior for overall leadership in extracurricular departmental activities. The recipient is selected by the faculty of the Department of Marketing.

John R. Malone Award. An annual award given to the junior marketing major with the highest overall grade point average.

The Robert M. Satterfield Award. An annual award given to a senior marketing student for brining enthusiasm, integrity and spirit of teamwork to the classroom.

Business Oriented Student Organizations and Activities

Students' academic organizations are supported and encouraged by the administration and the faculty. These associations are actively managed by student officers. Members of the faculty serve in advisory capacities.

Honorary Societies.

Beta Gamma Sigma. The mission of the International Honor Society Beta Gamma Sigma is to encourage and honor academic achievement in the study of business, to cultivate and celebrate leadership and professional excellence, to advance the values of the Society, and to serve its lifelong members. Undergraduate membership in this organization is restricted to the upper 10 percent or less of the senior class and the upper 5 percent or less of the junior class for all full-time students. Faculty membership is limited to those with tenure in the Mendoza College of Business at Notre Dame.

Beta Alpha Psi. Accountancy majors who have demonstrated outstanding scholastic ability and the personal characteristics requisite to professional status are eligible for membership in Beta Alpha Psi, the national professional and honorary accounting society. The purposes of this society are to encourage and foster the ideal of service as the basis of the accounting profession; to promote the study of accountancy and its highest ethical standards; to act as a medium between professional persons, instructors, students and others who are interested in the development of the study or profession of

accountancy; to develop high moral, scholastic, and professional attainments in its members; and to encourage cordial interaction among its members and the profession generally.

American Advertising Federation Chapter. The purpose of the ACND is to provide and promote a better understanding of the functions of advertising and of its values, to stimulate and encourage advertising professionalism through advertising education, career exploration in advertising, to follow and understand the trends of the advertising industry, to develop the individual abilities of its members, and to ultimately possess a better understanding of the advertising industry as a whole.

Asia Pacific Business Club. The purpose of APBC is to provide the Notre Dame community with a platform to share knowledge about business in Asia Pacific, explore career opportunities in Asia Pacific and other regions, and support long-term relationships among its members, ND alumni, and Asian business leaders.

Association of Latino Professionals in Finance and Accounting (ALPFA). ALPFA is the premier business organization for expanding opportunities for Latino leadership in the global market. At Notre Dame this organization is designed to provide networking, career building, and leadership opportunities to diverse students who intend to major in accountancy, finance or information technology management. ALPFA also provides scholarships, internships and other career advancing opportunities to diverse students.

Business Action in Social Entrepreneurship (BaseND). The purpose of BaseND is to build a firm business foundation for our members and partners through solving real business problems for local and global non- and for-profits; to create positive social change for the community; and to provide career resources and mentorship to members.

Corporate Finance Club of Notre Dame. The primary purpose of this organization is to advocate the corporate finance industry and assist members in networking, personal branding, and the interviewing process to obtain internships and full-time employment. The club shall seek to supplement the classroom education of members and broaden their awareness of the financial world's theories, principles, and practices.

Entrepreneurship Society of Notre Dame. The purpose of the Entrepreneurship Society of Notre Dame is to foster the entrepreneurial spirit and ability of Notre Dame undergraduate students through coordinating programs which emphasize entrepreneurship. The mission of the club is to coordinate guest speakers throughout the year, to devise new and creative ways to raise money while providing real experience in starting new ventures, and to provide resources for any student interested in starting a new venture but lacking the resources necessary.

ACCOUNTANCY

Information Technology Management Club, Notre Dame (ITMND). The purpose of ITMND is to pool the resources of all persons interested in the field of Information Technology Management (ITM) to more fully develop the academic, career, and social potential of all individuals in this dynamic field of study.

Investment Club of Notre Dame du Lac. The club was established to serve as an opportunity for all undergraduate students who are interested in the field of investments to develop and/or increase their knowledge of this special area of finance through activities designed as rewarding educational experiences.

Marketing Club. The purpose of the University of Notre Dame Marketing Club is to provide a medium for the interaction of all those interested in marketing. The club strives to go one step beyond the classroom in terms of learning what marketing really constitutes by organizing speakers, field trips, and social interaction between students and faculty. It is a resource for connecting the students throughout their education in and out of the classroom.

MoneyThinkND. MoneyThinkND seeks to promote financial literacy by placing college mentors in South Bend high schools to teach personal finance lessons. The goal is to help build the financial health of Americans by equipping youth and young adults to believe in themselves, navigate the financial decisions of adulthood, and achieve financial independence.

National Association of Black Accountants (NABA). The Student Chapter of NABA of Notre Dame shall unite through membership accounting students who have similar interests and ideals, are committed to academic and future professional excellence, have a sense of professional and civic responsibility, and are concerned with enhancing opportunities for minorities in the accounting profession.

Wall Street Club. Through a network of current students and alumni, we provide resources and mentoring for ND students who wish to learn about careers on Wall Street. The club works closely with the Investment Office, Career Center, alumni, and senior mentors to help students network, learn about opportunities, and prepare for a successful career on Wall Street.

Smart Women Securities at Notre Dame. Smart Women Securities at Notre Dame seeks to provide undergraduate women with the tools they need to become financially independent and knowledgeable about their investments.

By working on an investment project, our goal is to foster an environment in which members develop personal aspirations along with collaborative skills and a business foundation that inspires confidence to participate in the financial world.

Students Consulting for Nonprofit Organizations Notre Dame. The mission of SCNOND is to develop the South Bend community through pro-bono consulting engagements with local nonprofit organizations through the unique experiences and gain academic knowledge of our student members. The secondary mission of SCNOND is to develop our student members for future career endeavors through consulting projects with nonprofit organizations.

Student International Business Council (SIBC). The SIBC seeks to fulfill its vision of "Peace through Commerce" by interacting with global companies and organizations, while educating its members and the Notre Dame community on the different aspects of international business. The council encourages students from all majors and interests to become active members of the organization to work on semester projects with the hope of bringing a variety of perspectives to issues regarding international business and economics.

Undergraduate Women in Business (UWIB). The Undergraduate Women in Business Club is committed to the development of women's roles as students of business and as leaders in business-related fields. The club is designed to build a stronger sense of community among undergraduate women to aspire to business-related professions through events, including an annual professional development conference, highlighting the many opportunities available to them.

Unleashed. We believe that educating individuals early in life about the importance of impact investing will encourage continuous involvement and contribution to all related fields. Unleashed is an organization for people from all disciplines, and intends to collaborate with other universities and colleges to learn from each other's experiences. Our members are challenged to think in new ways and explore alternative financial solutions to existing social issues.

Accountancy

Deloitte Foundation Professor of Accountancy, and Department Chair:

H. Fred Mittelstaedt

KPMG Professor of Accountancy:

Thomas F. Schaefer

Notre Dame Alumni Professor of Accountancy:

Peter D. Easton

Professors:

Brad A. Badertscher; Kenneth W. Milani; William D. Nichols (emeritus); Ramachandran Ramanan; James L. Wittenbach

Associate Professors:

Jeffrey J. Burks; Stephannie Larocque; Chao-Shin Liu; Jeffrey S. Miller; James A. Seida; Thomas L. Stober; Sandra C. Vera-Muñoz; Asís Martínez-Jerez

Assistant Professors:

Erik L. Beardsley; John B. Donovan; Andrew J. Imdieke; Zach Kowaleski; Jessica Watkins

Professional Specialists:

Edward F. Hums; Brian R. Levey; Tonia H. Murphy; James A. O'Brien

Associate Professional Specialists:

Colleen M. Creighton; Laura L. Hollis; Michael J. Meyer; Janet L. O'Tousa; Samuel Ranzilla; William J. Schmuhl (emeritus); Keith Urtel

Program Objectives. The AACSB separately-accredited Department of Accountancy provides outstanding accounting educational experiences for its students by (a) complementing and supporting the tradition of liberal arts/general education at Notre Dame, (b) adhering to the objectives of the undergraduate program of the Mendoza College of Business, and (c) developing and continuously improving an innovative accounting curriculum for successful careers as accounting professionals. The curriculum focuses on critical thinking/analysis, research, professionalism, teamwork, and communication.

The department provides students with the skills and knowledge necessary to succeed in accounting-related careers. The department also supports the activities of the Notre Dame Career Center by (a) maintaining an outstanding record of placing high percentages of graduates with national accounting firms and other large organizations such as Citigroup, Goldman Sachs, Disney and GE; and (b) supporting student desires to pursue other postgraduate options, including graduate education and volunteer work.

Program of Studies. The accounting sequence begins with Accountancy I and II (ACCT 20100 and 20200). These courses, normally taken in the sophomore year and required of all business students, are designed to provide a broad introduction to accounting concepts, the profession of accountancy and the role of accounting in society.

FINANCE

Students choosing the accountancy major must complete the following Department of Accountancy requirements.

ACCT 30110. Accounting Measurement and Disclosure I

ACCT 30120. Accounting Measurement and Disclosure II

ACCT 30210. Strategic Cost Management

ACCT 30280. Data Analytics in Accounting

ACCT 40510. Audit and Assurance Services

ACCT 40610. Federal Taxation

MGTO 30320. Business Communications

The 150-Hour Rule for CPA Certification.

Typically, 150 hours of college credit with an accounting concentration are necessary to be licensed as a CPA. The rules vary across states. Many students meet the 150-hour requirements through AP credit and overloads during their four-year undergraduate degree. Notre Dame also offers a one-year Master of Science in Accountancy program to help our students meet the 150-hour requirement as well as other state-specific course requirements.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Accountancy*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Finance

William and Cassie Daly Professor of Finance, and Department Chair:

Richard Mendenhall

Professors:

John Affleck-Graves, Executive Vice President and University of Notre Dame Chair in Finance; Robert Battalio; Jeffrey Bergstrand; Shane Corwin; Martijn Cremers, Interim Dean and Bernard J. Hank Professor; Zhi Da; Roger Huang, Kenneth R. Meyer Chair in Global Investment Management; Barry Keating; Timothy Loughran, C.R. Smith Professor of Finance; Bill McDonald, Thomas A. and James J. Bruder Professor of Administrative Leadership; Paul Schultz, John W. and Maude Clarke Professor of Finance; Richard Sheehan

Teaching Professors:

Carl Ackermann, Nolan Professorship for Excellence in Undergraduate Instruction; Walter Clements; Margaret Forster

Associate Professors:

Pengjie Gao, Viola D. Hank Associate Professor of Finance; Benjamin Golez; Sophie Shive; D. Katherine Spiess, Associate Dean for Graduate Programs

Associate Teaching Professors:

Gianna Bern; Kristen Collett-Schmitt; David Hutchison; Howard Lanser; Jim Leadly, Assistant Department Chair; John Stiver

Assistant Professors:

Huaizhi Chen; Peter Kelly; Taehyun Kim; Andreas Neuhierl; Qiping Xu; Jun Yang

Assistant Teaching Professor:

Jason Reed

Program Objectives. The department offers courses with the dual objective of (1) equipping students with the solid base of knowledge and skills necessary for entry into the financial world and (2) providing a broad foundation so that students can pursue further study at the graduate level.

Program of Study. All students enrolled in the Mendoza College of Business are required to take an introductory finance course during their sophomore year; this course provides an overview of issues encountered by a firm's financial manager. Finance majors must complete FIN 20150 Corporate Financial Management with a grade of C or higher. This course cannot be repeated for a higher grade. All business students are also required to complete two courses in business economics: FIN 30210 Managerial Economics and FIN 30220 Macroeconomic Analysis. The aim of these courses is to provide students with an understanding of the economic environment within which business enterprises operate.

In addition to the courses required of all candidates for the degree of bachelor of business administration, finance majors are required to take seven courses offered by the department. The three required

courses are FIN 30100 Financial Statement Analysis (or ACCT 30100 Corporate Financial Reporting), FIN 30400 Advanced Corporate Finance, and FIN 30600 Investment Theory. Students interested in pursuing a career in corporate finance or CPA certification are encouraged to take the two-course sequence ACCT 30110 & 30120 in place of FIN 30100 or ACCT 30100. Finance majors choose any four 40000-level finance electives from the specialized courses offered by the department.

The finance elective courses are designed to equip students with the knowledge to progress in whatever area of business they choose upon graduation. The subject matter in these courses—investments, corporate finance, financial markets, financial institutions, and real estate—can be tailored to meet the student's individual interests. Graduates of the department are currently pursuing successful careers in many areas of business, including investment banking, consulting, commercial banking, and corporate financial management, among others.

Sophomores intending to major in finance and who are interested in investments should consider applying for the Investment Management Leaders Program offered through the Notre Dame Institute for Global Investing. Students selected for this program will have access to the Institute's mentoring program, institute-sponsored experiential learning and networking opportunities, and assistance with externship, internship, and career placement within the field of investment management.

Students who intend to take the examinations leading to the Chartered Financial Analyst (CFA) designation should structure their programs with that objective in mind. An additional business law class (ACCT 40710) should be included in their program, along with appropriate courses in accounting and investments.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found at the department's website <http://mendoza.nd.edu/research-and-faculty/academic-departments/finance/academics/> as well as the registrar's class search tools available through [insideND](#).

Information Technology, Analytics, and Operations

John W. Berry Sr. Department Chair and Professor:

Robert F. Easley

Edward Frederick Sorin Society Professor of ITAO:

Ken Kelley

Fred V. Duda Professor of Business:

Sarv Devaraj

Professors:

Corey Angst; David B. Hartvigsen; Daewon Sun

Associate Professors:

Nicholas Berente; Nasir Ghiaseddin; Hong Guo;

Jerry C. Wei; Xuying Zhao

Assistant Professors:

Lin Hao; Sriram Somanchi; Katie Wowak;

Ovunc Yilmaz; Zifeng Zhao

Associate Teaching Professor:

Tim Carone; Michael Chapple; Robert

Lewandowski; Scott Nestler; Jennifer Waddell

Assistant Teaching Professors:

Seth Berry; Bruce Harris; Frederick Nwanganga

Programs of Study. The IT, Analytics, and Operations Department offers two majors, one in Information Technology Management (ITM), and one in Business Analytics (BAN).

INFORMATION TECHNOLOGY MANAGEMENT MAJOR

The ITM program is designed to prepare students to become leaders in the use of information technology for the benefit of organizations and society. This program of study focuses on educating students about the development and use of information systems as decision-making and problem-solving tools. The program also is intended to develop an understanding of the managerial issues encountered in the introduction or operation of IT solutions in organizations, particularly, how these tools can be used to gain a competitive edge and to re-engineer an organization.

ITM Major Required Courses

ITAO 30150. Data Storytelling	1.5 hrs.
ITAO 30610. Application Development	3.0 hrs.
ITAO 30620. Strategic IT	1.5 hrs.
ITAO 30630. Systems Analysis and Design	3.0 hrs.
ITAO 30640. Networking and Security	3.0 hrs.
ITAO 40150. Quantitative Decision Modeling	1.5 hrs.
ITAO 40660. IT Project Management	1.5 hrs.
MGTO 30300. Business Problem Solving	3.0 hrs.

Complete 3 additional credits from the following:

Elective Courses

ITAO 30210. Data Analysis with Python	3.0 hrs.
ITAO 30220. Predictive Analytics	3.0 hrs.
ITAO 40710. Advanced Database Management	1.5 hrs.
ITAO 40720. Enterprise Architecture	1.5 hrs.

BUSINESS ANALYTICS MAJOR

The Business Analytics major will prepare students to conceive of the right kinds of questions that can be addressed using the massive datasets accumulating in firms and other repositories. Students will learn how to formulate the best research plan to answer those questions, and to use cutting-edge tools and techniques to execute those plans. The curriculum includes coursework on: data management, data mining, predictive analytics, machine learning, visualization, unstructured data, text mining, and other analytic techniques. Students with these skills will be in high demand in all disciplines, including HR, marketing, finance, accounting, IT, and consulting, as well as across a wide variety of firms.

BAN Major Required Courses

ITAO 30150. Data Storytelling	1.5 hrs.
ITAO 30210. Data Analysis with Python	3.0 hrs.
ITAO 30220. Predictive Analytics	3.0 hrs.
ITAO 30230. Data Management	1.5 hrs.
ITAO 30240. Data Exploration & Visualization	1.5 hrs.
ITAO 40150. Quantitative Decision Modeling	1.5 hrs.

ITAO 40250. Unstructured Data Analytics	1.5 hrs.
ITAO 40420. Machine Learning	1.5 hrs.
MGTO 30300. Business Problem Solving	3.0 hrs.

Complete 3 additional credits from the following:

Elective Courses

ITAO 40210. SAP Predictive Analytics	1.5 hrs.
ITAO 40430. Social Media Analytics	1.5 hrs.
ITAO 40510. Ethics of Data Analytics	1.5 hrs.
ITAO 40520. Sports Analytics	1.5 hrs.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found at mendoza.nd.edu/ITAO. Click on Academics in the left menu to explore course descriptions for both majors.

Management and Organization

Rev. Basil Moreau, C.S.C. Associate Professor of Business and Department Chair:

Craig Crossland

Associate Teaching Professor, and Assistant Department Chair:

Wendy Angst

Ray and Milann Siegfried Professor of Entrepreneurship:

Dean A. Shepherd

David E. Gallo Professor of Business Ethics:

Ann E. Tenbrunsel

Professor:

J. Michael Crant

Associate Professors:

Viva O. Bartkus; Matthew C. Bloom; Michael

Mannor; Oliver Williams; Adam Wowak

Assistant Professors:

Timothy Hubbard; Charlice Hurst; Brittany

Solomon; Danielle Tussing

Teaching Professors:

James S. O'Rourke IV; Bryan Ritchie

Associate Teaching Professor, and the Rex and Alice

Martin Executive Director of the Notre Dame Deloitte Center for Ethical Leadership:

Christopher Adkins

Associate Teaching Professor, and the Arthur F. and

Mary J. O'Neil Director of the Fanning Center for Business Communication:

Amanda McKendree

Associate Teaching Professors:

Sandra Collins; Chad Harms; Joseph Holt;

Jessica McMannus Warnell; John Michel; Samuel

Miller; Gerard Pannekoek; Eric Zimmer

Assistant Teaching Professors:

Timothy Balko; Jennifer Cronin; Christopher

Stevens

Research Assistant Professor:

Manuela Casti Yeagley

Programs of Study

The Department of Management & Organization offers both an undergraduate major in Management Consulting, and a minor in Innovation and Entrepreneurship.

MANAGEMENT CONSULTING MAJOR

The consulting program prepares students to manage people and processes within both large and small organizations or to advise organizations on those management issues. A particular emphasis is placed on managing within organizations facing the challenges of rapid change and increased competition. The major is designed to provide sufficient flexibility for students to prepare for several career paths by preparing students to think systematically about the processes through which organizations achieve excellence.

Consulting Major Required Courses

MGTO 30620. Management Communications	1.5 hrs.
ITAO 30620. Strategic IT	1.5 hrs.

NON-DEPARTMENTAL COURSES

MGTO 30300. Business Problem Solving	3.0 hrs.
ITAO 40660. Project Management	1.5 hrs.
ITAO 40150. Quantitative Decision Modeling	1.5 hrs.

In addition to the courses listed above, all consulting majors must take any four of the following five courses:

MGTO 30200. Management Competencies	3.0 hrs.
MGTO 30310. Innovation & Design Thinking	3.0 hrs.
MGTO 30100. Strategic Human Res. Mgt.	3.0 hrs.
MGTO 30320. International Management	3.0 hrs.
MGTO 40720. Values-Based Leadership	3.0 hrs.

INNOVATION AND ENTREPRENEURSHIP MINOR

The Mendoza College of Business offers an interdisciplinary minor in Innovation and Entrepreneurship to students enrolled in the College. Through unique, immersive learning experiences, the minor helps students build the entrepreneurial confidence needed to identify emerging opportunities and lead the launch of new ventures. The minor provides students with a high-impact capstone experience in one of the following tracks: New Venture Startup, Entrepreneurial Finance, or Social Entrepreneurship. Students who combine a minor in Innovation and Entrepreneurship with one of the traditional business majors can find employment via starting a new venture or in corporate areas of research and development, new product development, strategic planning and venture capital investing.

Entrepreneurship Minor Courses

(Note: None of these courses can be counted as elective requirements in any major)

Required Courses (6 credits)

MGTO 30500. Intro. to Entrepreneurship	3.0 hrs.
MGTO 30310. Innovation & Design Thinking	3.0 hrs.

Elective Courses (select 6 credits)

MGTO 30510. Social Entrepreneurship	3.0 hrs.
MGTO 30520. Funding New Ventures	1.5 hrs.
MGTO 30540. Imagination, Creativity & Commerce	3.0 hrs.
MGTO 40510. Legal Issues in Entrepreneurship	1.5 hrs.
MGTO 40520. Entrepreneurial Sales & Sales Management	1.5 hrs.

Capstone Course

MGTO 40550. New Venture Creation	3.0 hrs.
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COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found at the department's website: mendoza.nd.edu/research-and-faculty/academic-departments/management-organization/ as well as on the Registrar's class search tools available through [insideND](#).

Marketing

John Cardinal O'Hara C.S.C. Professor of Business and Department Chair:

Shankar Ganesan

Raymond W. and Kenneth G. Herrick Professor of Marketing:

John F. Sherry Jr.

Aloysius and Eleanor Nathe Professor of Marketing Strategy:

William L. Wilkie

John T. Ryan Jr. Chair in Business Ethics and Professor of International Ethics:

Georges Enderle

Professor:

Joel E. Urbany

Associate Professors:

John F. Gaski; Timothy J. Gilbride; Elizabeth S. Moore

Assistant Professors:

Emily N. Garbinski; Frank A. Germann; Vamsi K. Kanuri; Mitchell C. Olsen; James E.B. Wilkie

Professional Specialists:

Joseph Cherian; Robert Essig

Program of Studies. Students completing a degree in marketing at Notre Dame should: (1) understand the decision-making processes of buyers and sellers in a market; (2) comprehend the role and impact of marketing in society; (3) apply behavioral models and quantitative tools to the analysis of marketing issues; (4) develop informed marketing strategies; (5) work effectively in a team environment; and (6) respond to the ethical and social responsibilities of marketing practitioners.

All students in the Mendoza College of Business take Principles of Marketing (MARK 20100) in their sophomore year. Students who choose marketing as a major must take Consumer and Organizational Buyer Behavior (MARK 30100), Marketing Research (MARK 30120), and five additional marketing electives.

Students majoring in marketing may elect to pursue one of three specialized tracks: (1) Marketing Decision Analytics to focus on marketing models and data analytics; (2) Brandscaping to focus on brand strategy, marketing communications, creativity and culture; and (3) Market Development to focus on consulting, customer solutions, and sales management. Each track consists of three elective courses. Students may pursue any of the three tracks to develop depth and select electives from other tracks or general electives to develop breadth in the marketing domain. Students are not required to pursue any of these tracks and are free to choose electives consistent with their academic interests. More information is available on the Marketing Department website.

The marketing major prepares students for a wide range of opportunities in leading public and private business organizations. Marketing majors are also increasingly recruited by non-profit organizations

such as educational or art institutions, charitable organizations, and hospitals. The Marketing Decision Analytics track prepares students for careers in marketing and data analysis, marketing research and retail analysis. The Brandscaping track helps students for careers in brand management, advertising, media planning, digital marketing, and social media marketing. The Marketing Development track readies students for careers in retail account management, market development, and Business-to-Business (B2B) and Business-to-Consumer (B2C) sales. Each of these tracks also prepares students for a career in top consulting firms.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Marketing*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Non-Departmental Courses

Assistant Dean for Undergraduate Studies:

Dale M. Nees, Mendoza College of Business

Many courses in the college are designed to cross departmental lines and provide basic tools during the sophomore and junior years or to foster the integration of various disciplines during the junior and senior years. These courses are open to all business students with appropriate prerequisites.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting one or more of the following subjects:

- *Business Administration - Business Law*
- *Business Administration - AL*
- *Business Administration - EG*
- *Business Administration - SC*
- *Business Administration - UG*

Course descriptions can be found by clicking on the subject code and course number in the search results.

OFFICERS OF ADMINISTRATION

Officers of Administration

In the Mendoza College of Business

K.J. MARTIJN CREMERS

Interim Dean of the Mendoza College of Business

D. KATHERINE SPIESS, Ph.D.

Associate Dean of the Mendoza College of Business

KENNETH KELLEY III, Ph.D.

Associate Dean of the Mendoza College of Business

DALE M. NEES, M.S.

Assistant Dean of the Mendoza College of Business

H. FRED MITTELSTAEDT, Ph.D.

Chair of the Department of Accountancy

RICHARD R. MENDENHALL, Ph.D.

Chair of the Department of Finance

ROBERT E. EASLEY, Ph.D.

*Chair of the Department of Information Technology,
Analytics, and Operations*

CRAIG CROSSLAND, Ph.D.

*Chair of the Department of Management and
Organization*

SHANKAR GANESAN, Ph.D.

Chair of the Department of Marketing

ADVISORY COUNCIL

Advisory Council

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WILLIAM P. ANGRICK <i>Washington, D.C.</i>	KATHLEEN C. GUBANICH <i>Valley Forge, Pennsylvania</i>	PAUL C. REILLY <i>St. Petersburg, Florida</i>
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JEROME J. CROWLEY JR. <i>Los Altos, California</i>	JAMES M. JAEGER <i>Laguna Beach, California</i>	KEITH S. SHERIN <i>Weston, Connecticut</i>
PERRY N. DELLELCE <i>Toronto, Ontario</i>	GARY R. KANEB <i>Lynnfield, Massachusetts</i>	BAILEY J. SIEGFRIED <i>Tulsa, Oklahoma</i>
MATTHEW S. DeSALVO <i>New York, New York</i>	TIMOTHY J. KENESEY <i>Cassopolis, Michigan</i>	JAMES D. SINEGAL <i>Kirkland, Washington</i>
MAURICE J. DeWALD <i>Newport Beach, California</i>	SEAN T. KLIMCZAK <i>New York, New York</i>	CYNTHIA HANK STARK <i>Westmont, Illinois</i>
THOMAS P. DOLPHIN <i>Minneapolis, Minnesota</i>	JOHN A. KOLTES <i>Edina, Minnesota</i>	RICHARD G. STARMANN SR. <i>Westchester, Illinois</i>
ROBERT E. DOWDELL <i>Laguna Beach, California</i>	ASHLEY MARTIN <i>Elkhart, Indiana</i>	ROBERT A. SULLIVAN <i>Chicago, Illinois</i>
JOSE RAFAEL FERNANDEZ <i>San Juan, Puerto Rico</i>	JOHN G. MARTIN <i>Chicago, Illinois</i>	ROSEY M. VALENCIA <i>Chicago, Illinois</i>
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BRIAN P. GALLAGHER <i>Chicago, Illinois</i>	VERA L. MUZZILLO <i>Independence, Ohio</i>	
GARY R. GARRABRANT <i>New York, New York</i>	ROBERT A. NARMONT <i>Springfield, Illinois</i>	
ROBERTO GARZA DELGADO <i>Garza Garcia, Mexico</i>	NEIL S. NAUGHTON <i>Dublin, Ireland</i>	
JOHN C. GERSPACH <i>New York, New York</i>	WILLIAM A. NOLAN <i>Canton, Ohio</i>	
JOSEPH E. GIOVANINI <i>Highlands Ranch, Colorado</i>	PATRICK E. O'SHAUGHNESSY <i>Wichita, Kansas</i>	
CHRISTINA L. GLORIOSO <i>New York, New York</i>	FRANK A. POTENZIANI <i>Rancho Santa Fe, California</i>	
TIMOTHY M. GRAY <i>Minneapolis, Minnesota</i>	PAUL E. PURCELL (Chair) <i>Milwaukee, Wisconsin</i>	

College of Engineering

The College of Engineering was established as a distinct unit of the University in 1897, although a program in civil engineering was offered in 1873. The college comprises five departments: aerospace and mechanical engineering, chemical and biomolecular engineering, civil and environmental engineering and earth sciences, computer science and engineering, and electrical engineering.

Since its inception, the College of Engineering has regarded the primary purpose of all higher education as the development of the intellect, discriminatory power, and judgment in all students to enable them to arrive at sound decisions in their personal lives and in the professional lives they will pursue after graduation. The programs of studies offered in the various departments of the college are, therefore, constructed to give the student a good knowledge of the basic sciences and of engineering principles, and to prepare the student for the manifold duties of an educated professional and for the cultural life of an educated person. Classroom instruction is amplified by laboratory work and design experiences that give the student insight into the application of principles to practical problems. Detailed information about the College of Engineering and its many programs can be found at engineering.nd.edu.

Engineering at Notre Dame combines technical inquiry with a creative bent (novel methods of using and producing materials, components, devices, and systems) to develop innovations that can improve the health, well-being, and quality of life for all persons. Consistent with the University's Catholic mission and heritage, the College of Engineering's mission is founded on the principle that the creation and transfer of knowledge should reflect a profound and complete respect for the dignity of all persons and for the greater common good of humanity. To appropriate the words of the University's founder, Rev. Edward A. Sorin, C.S.C., the college must be, first and foremost, a force for good in the world.

To that end, the college will continue to engage in transformational research in its core competencies—energy, biomedical/bioengineering, environmental science/engineering, and national/personal security—as they address the important needs of humanity, while inspiring students of all levels to scholarship and service. It will also continue to develop its expertise in electronic materials and devices, wireless and information systems, natural hazard mitigation, flow physics and control, geochemistry and geosciences, hydrology, and computational science and engineering, translating research outcomes into commercial ventures as possible, so that the efforts of Notre Dame engineering researchers produce the greatest good for society.

Accreditation and Academic Association. The College of Engineering is a member of the American Society for Engineering Education. All engineering bachelor degree programs are accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. The computer science bachelor degree program is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org>.

Registration of Engineers. Registration of engineers is required for many fields of practice. Recent graduates need not acquire registration immediately upon graduation, but they benefit by applying early for the required state examination. Graduating from accredited programs such as those offered by Notre Dame facilitates registration as a professional engineer.

Programs and Degrees

The College of Engineering offers curricula leading to the undergraduate degrees listed below:

B.S. in aerospace engineering
B.S. in chemical engineering
B.S. in civil engineering
B.S. in computer engineering
B.S. in computer science
B.S. in electrical engineering
B.S. in environmental earth sciences
B.S. in environmental engineering
B.S. in mechanical engineering

To complete all degree requirements, the student must take and pass all of the courses specified in the *Bulletin* for the given degree and must earn the total minimum number of course credit hours specified for the degree.

To obtain two undergraduate degrees from the College of Engineering, a student must successfully carry out an approved program of courses totaling no less than 157 credit hours, depending on the programs. These must include all of the courses specified in the *Bulletin* for each degree.

The college offers advanced degrees in the following areas:

M.S. in aerospace engineering
M.S. in bioengineering
M.S. in chemical engineering
M.S. in civil engineering
M.S. in computer science and engineering
M.S. in electrical engineering
M.S. in environmental engineering
M.S. in geological sciences
M.S. in mechanical engineering
Ph.D. in aerospace and mechanical engineering
Ph.D. in bioengineering

Ph.D. in chemical engineering
Ph.D. in civil engineering and geological sciences
Ph.D. in computer science and engineering
Ph.D. in electrical engineering

The Department of Aerospace and Mechanical Engineering also offers a non-thesis master of engineering (M.E.) in mechanical engineering.

The details of the programs and the engineering courses offered at the graduate level are in the Graduate School *Bulletin of Information*.

Engineering Common Core. All engineering curricula consist of each of the following:

University Core Curriculum. Students enrolled in the College of Engineering must satisfy all University Core Curriculum requirements as detailed below:

Six courses in the liberal arts

1. Quantitative Reasoning
2. Science and Technology
3. An additional course in Quantitative Reasoning or Science and Technology
4. Arts and Literature or Advanced Languages and Cultures
5. History or Social Science
6. Integration, or a course from an area not yet chosen in 4 or 5

Four courses exploring explicitly Catholic dimensions of the liberal arts

1. A foundational Theology course
2. A developmental Theology course
3. A Philosophy course
4. An additional Philosophy course or a Catholicism and the Disciplines course

Two courses in writing

1. A University Seminar
2. A Writing and Rhetoric course, or another writing-intensive course.

The University Core courses and requirements are fully detailed and explained in the First Year of Studies section on page 38 of this *Bulletin*. A Notre Dame course taken to satisfy a Common Core requirement can also be used to satisfy a Basic Science or Basic Engineering core requirement.

Basic Science Core: 27 credit hours. MATH 10550 Calculus I; MATH 10560 Calculus II; MATH 20550 Calculus III, MATH 20580 Introduction to Linear Algebra and Differential Equations; CHEM 10171 General Chemistry: Fundamental Principles; PHYS 10310 General Physics I; PHYS 10320 General Physics II.

Basic Engineering Core: 6 credit hours. EG 10111, 10112 Introduction to Engineering Systems I and II

PROGRAMS AND DEGREES

First Year of Studies. A first-year student enters the Notre Dame First Year of Studies for one academic year of basic collegiate studies before entering a department within the college. In the spring of the first year of studies, a first-year student intending to major in engineering will select a degree program.

A first-year student intending to pursue any of the College of Engineering degree programs should complete the following courses by the end of the first year:

<i>First Semester</i>	
WR 13100. Writing and Rhetoric	3
MATH 10550. Calculus I	4
CHEM 10171. General Chemistry: Fundamental Principles*	4
EG 10111. Introduction to Engineering Systems I	3
University Curriculum Course†	3
Moreau First Year Experience	1
	18
<i>Second Semester</i>	
University Seminar+	3
MATH 10560. Calculus II	4
CHEM 10122. General Chemistry: Biological Processes or other technical course*	3
PHYS 10310. General Physics I	4
EG 10112. Introduction to Engineering Systems II	3
Moreau First Year Experience	1
	18

+ *The University Seminar may be selected from an appropriate history, social science, fine arts, advanced languages and cultures, literature, first theology, or first philosophy course. Any course coded as satisfying the University Seminar requirement will normally satisfy the university's writing requirement as well.*

* *The College requires CHEM 10171 or CHEM 10181 for all students. Aerospace, environmental and mechanical engineering all require a second chemistry class, either CHEM 10122, CHEM 10172 or CHEM 10182. Chemical engineering students must take either CHEM 10122, CHEM 40420 or another approved advanced chemistry course. CHEM 10122 will satisfy a technical elective requirement in all other degree programs, and is strongly recommended for students pursuing the bioengineering minor or any bio-focused concentration within a degree program.*

† *See University Core Curriculum above.*

General Requirements. The University of Notre Dame reserves the right to change at any time regulations included in its *Bulletins* with respect to admission to the University, continuance therein and graduation therefrom. Every effort is made to give advance information of such changes.

The number of credit hours carried by the undergraduate student in the College of Engineering may not exceed 19 hours without permission, granted at the discretion of the assistant dean for academic affairs. The minimum semester course load for all

students is 12 credit hours. Normally a cumulative and recent-term grade point average of 3.2 or higher is required to obtain permission to carry an overload. Interested students should contact the Assistant Dean for Academic Affairs for specific information.

Engineering Scholars Program (ESP). The College of Engineering has developed a program for those students whose achievements have identified them as among the best of entering first-year students. This program provides special opportunities for classroom interaction, cultural enrichment, and social leadership. Admission to the program is by invitation. ESP students take a special yearlong seminar in the first year that satisfies two University core requirements.

Grand Challenge Scholars Program. The Grand Challenge Scholars Program allows engineering students to engage in transformational passionate learning and research activities that address the important needs of humanity, to inspire students to the highest levels of scholarship and service, and to enrich our students with Notre Dame's ideals and virtues. Student participation is voluntary, with an application process and open to anyone in good academic standing. Most students will begin in their sophomore year to complete the five program components in about two years. The five program competencies include: (1) Project or Research Experience, (2) Interdisciplinary Curriculum, (3) Business/Entrepreneurship, (4) Multicultural/Global Dimension, and (5) Social Consciousness/Community Engagement. Students will define their own path to meet these program components, but the College of Engineering aims to support student aspirations wherever possible so there is intentionally flexibility in the requirements. More information can be found at <https://engineering.nd.edu/gcsp>.

International Study Opportunities. The University strongly supports study abroad and has encouraged the programs in the College of Engineering to participate. At present, there are semester- or year-long opportunities during the academic year for juniors in Dublin, Ireland; London, England; Perth, Australia; Puebla, Mexico; Cairo, Egypt; and Santiago, Chile. The programs in Mexico and Chile require the student to be fluent in Spanish. In each location, students must take at least two technical courses to remain on track for graduation. Programs vary by semester, and not all locations are appropriate for every major in the college. Students should contact a department adviser to work out any details.

The college currently offers two summer programs for engineering undergraduates who have completed at least the first-year engineering curriculum, in London, England, and Alcoy, Spain.

Admission to all programs is competitive and requires demonstration of satisfactory academic performance.

ROTC Programs. ROTC students who complete their programs may use a maximum of six credits of upper-level air, military, or naval science courses as

substitutes for specified degree requirements determined by each department. Three of these credits may substitute for either a history or social science requirement; three may substitute for a technical elective (for Aerospace degrees it will satisfy the professional development course requirement).

The Moreau First Year Experience

First-year students are required to complete a two semester course sequence for the Moreau First Year Experience.

Engineering Business Practice. The college recognizes the importance of providing its graduates with opportunities to learn how engineers function in the world of business and offers a multi-course sequence (EG 40421/40422) that provides education in this area. Students in all majors of the college may take at least the first course to satisfy technical elective requirements. The courses increase the effectiveness of engineering graduates by developing an understanding of the dynamics of business operations. They include issues related to ethics, leadership, and business practices such as marketing, management, finance, and human resources, and they examine the professional and leadership characteristics of modern industrial leaders. In the second course, students develop a business plan and execute it using a computer simulation program.

Combination Five-Year Programs with the College of Arts and Letters. The college recognizes the benefits of a broad background in cultural, social, and technical subjects and, in 1952, in cooperation with the College of Arts and Letters of the University, instituted a five-year program that combines the liberal arts program with the requirements of the various engineering programs. Students who complete this combination program will earn two degrees: the degree of bachelor of arts and the degree of bachelor of science in the engineering major pursued. Dual-degree students are eligible to join the Reilly Program in Engineering and Arts and Letters described at <http://reilly.nd.edu/reilly-dual-degree-in-arts-and-letters-and-engineering/>.

Students pursuing this program must have strong scholastic ability and be acceptable to both the dean of the College of Arts and Letters and the dean of the College of Engineering. Application to the program is normally done by the end of the second year, but choice of a particular field in Arts and Letters may be deferred until the end of the third year.

The general sequence of courses in the five-year engineering-liberal arts program is found under "Dual Degree Programs" later in this section of the *Bulletin*.

Combination Five-Year Dual-Degree with the College of Science. The college also recognizes that a background in the natural sciences or mathematics, which are also foundational to a strong liberal arts experience, can provide engineering students with a broader context for solving societal problems and meeting humanity's needs. Thus, in 2013,

PROGRAMS AND DEGREES

the colleges of engineering and science approved a plan of study that would allow students to earn a bachelor's degree in each college in five years.

The general requirements for this program are found under "Dual Degree Programs" later in this section of the *Bulletin*.

Combination Five-Year Program with the Mendoza College of Business. To address the needs of engineering students who wish to integrate management and engineering, the College of Engineering and the Mendoza College of Business have established a program in which a student may earn the bachelor of science degree from the College of Engineering and the master of business administration from the Mendoza College of Business (there is no program where a student can earn dual undergraduate degrees from the College of EG and Mendoza College of Business).

The program is structured so that a student who has completed the first three years of the bachelor's degree program, if accepted through a competitive admissions process, completes the master of business administration and the bachelor of science in engineering by the end of the fifth year. This program may require summer or intersession work.

Students who wish to pursue this program should have a superior scholastic record in their undergraduate program and must apply to and be accepted by the MBA program during their third year in the College of Engineering.

The general sequence of courses in the five-year engineering-MBA program may be found under "Dual Degree Programs" later in this section of the *Bulletin*.

Combination Five-Year Program with Saint Mary's College. Students at Saint Mary's College may elect to earn a B.S. in biology, chemistry, or mathematics from Saint Mary's while simultaneously earning a B.S. in a related engineering program at Notre Dame. This program requires five years of study, with only the fifth year at Notre Dame to satisfy residency requirements. Students interested in this program must consult the appropriate advisor(s) at Saint Mary's College before enrolling in required courses at Notre Dame.

Through a special arrangement, students at Saint Mary's College, Notre Dame, Ind., may take a combination program of science classes at Saint Mary's and engineering classes at Notre Dame beginning in their sophomore year at Saint Mary's. The student will earn her bachelor of science degree from Saint Mary's at the end of the fourth year, and complete her bachelor of science in engineering degree in her fifth year at Notre Dame.

Combination Five-Year Programs with Other Schools. The highly desirable objective to infuse more liberal arts and sciences work into the education of engineering students has also been met also through 3-2 engineering programs with select liberal arts institutions.

The University of Notre Dame has entered into agreements with Assumption College, Worcester, Mass.; Bethel College, Mishawaka, Ind.; Carroll College, Helena, Mont.; Elon University, Elon, N.C.; Franciscan University, Steubenville, Ohio; Goshen College, Goshen, Ind.; Kings College, Wilkes-Barre, Penn.; Loyola University Chicago, Chicago, Ill.; Saint Anselm College, Manchester, N.H.; Stonehill College, Easton, Mass.; University of St. Thomas, St. Paul, Minn.; University of St. Thomas, Houston, Tex.; Xavier University of Louisiana, New Orleans, La., and the Atlanta University Center, comprising Morehouse College, Spelman College and Clark Atlanta University in Atlanta, Ga., whereby the liberal arts and sciences part of a combination five-year program is given by these respective colleges and the engineering part by Notre Dame. In these dual-degree programs, the student spends three years at a college of first choice and two years at Notre Dame. After completion of the five-year program, the student receives a bachelor of arts or bachelor of science degree from the first college and a bachelor of science in engineering degree from Notre Dame.

The sequence of courses for any of these programs will vary depending on the program of study at the other institution. No attempt has been made to set up a rigid pattern, and each participating institution has some freedom concerning the choice and arrangement of courses, provided that the coverage in the areas of mathematics, physics, chemistry, computing, introductory engineering, theology, philosophy, history, social science, and literature or fine arts is appropriate. It is expected, however, that students will complete the equivalent of the first two years of the desired College of Engineering program before applying for transfer.

To be eligible for an undergraduate degree, the student must complete a minimum of 62 credit hours at the University with a minimum of 75% of the degree credit hours (not less than 90 credit hours) earned after high school graduation through college and university courses, and be enrolled in the last semester on the main university campus. Please consult the Undergraduate Academic Code for further details.

Details of these programs may be obtained by writing to the institutions concerned or to the College of Engineering.

Graduate Programs in Engineering.* The Graduate School of the University of Notre Dame comprises four divisions: humanities, social science, science, and engineering. The division of engineering was organized in 1946 with power to grant advanced degrees in the departments of aerospace and mechanical engineering, chemical and biomolecular engineering, civil and environmental engineering and earth sciences, computer science and engineering, and electrical engineering. The general conduct of graduate work is under the jurisdiction of the Graduate Council of the University, the members

of which serve as specified in the Academic Articles. Director of the program in the engineering division is the dean of the College of Engineering.

** Reference should be made to the Graduate School Bulletin of Information for details of these programs and to the Web at <http://graduateschool.nd.edu/departments-and-programs/degree-programs-by-division/>.*

MINORS

The College of Engineering offers six minors, open to all University students who have taken the appropriate pre-requisite courses for upper-level engineering and science courses. For students in the College of Engineering, only one course required for the minor may double-count towards degree requirements and the minor. Students in other colleges should consult their own program department for similar restrictions.

Bioengineering

This minor, offered by the Department of Aerospace and Mechanical Engineering and the Department of Chemical and Biomolecular Engineering, comprises a six-course sequence that teaches students how to use the tools of engineering analysis with the fundamentals of the engineering and life sciences, to enliven the understanding of living organisms, medical treatments and biochemical pathways and to provide quantitative predictions and insight towards the design of medical and biological devices and processes. The six-course minor consists of three foundational courses in bioengineering, cell biology and more advanced courses in the biology field, along with three courses specializing in areas such as biomaterials, biomechanics, biotransport/microdevices, tissue engineering and biomaterials, molecular and cellular bioengineering, bioinformatics, biomedical imaging and treatment, and environmental bioactivity and remediation. Students intending to pursue this minor should take CHEM 10122 prior to starting the minor. Details are provided at ame.nd.edu/undergrad-programs/minors-and-concentrations.

Computational Engineering

This minor, offered by the Department of Aerospace and Mechanical Engineering, recognizes the importance of computational tools in all disciplines of engineering and gives students exposure to the fundamentals of programming and numerical methods, experience and skills in computer usage, and knowledge of applications from a range of different areas. The minor requires fifteen credit-hours (nominally five courses) selected from among a list available at ame.nd.edu/undergrad-programs/minors-and-concentrations.

Energy Engineering

This minor, offered by the Department of Aerospace and Mechanical Engineering, recognizes that Energy is an important subject of current interest that involves many engineering and non-engineering

DEPARTMENTAL AWARDS

disciplines, and enables students to develop a stronger background in and to prepare better for professional jobs or higher studies in the area. This minor differs from the Energy Studies minor as described below in that it focuses on the technical aspects of energy and requires courses concentrated in engineering and science. The minor requires five courses from among a list available at ame.nd.edu/undergrad-programs/minors-and-concentrations.

Energy Studies

This minor, offered by the Center for Sustainable Energy at Notre Dame (cSEND) through the Department of Chemical and Biomolecular Engineering, differs from the minor in Energy Engineering described above in that it requires less technical content and more broadly examines the issue of energy from a variety of perspectives. Through this minor, students will learn to: quantify energy resources and use and recognize the fundamental laws of thermodynamics that govern energy conversion; develop a functional knowledge of the historical and economic frameworks that guide decision-making in the energy industry today; develop oral and written communication skills necessary to convey the critical information about energy to the non-expert; understand the environmental consequences such as pollution and climate change of today's energy technologies; understand the linkages between ethics and energy utilization; critically assess the strengths and weaknesses and the prospective impact of alternative energy technologies; and understand the influence of geopolitics, economics and public policy on our nation's and the world's energy future. The minor requires:

ENER 20101

ENER 20102

Capstone project or CSC 33985

and three courses (nine credit-hours) concentrated either in a technical or non-technical area of energy studies, approved in advance by the director of the Energy Studies Minor, selected from a list maintained by cSEND.

Engineering Corporate Practice

This minor, offered by the college in cooperation with the Mendoza College of Business, is restricted to students in their final year as undergraduates in the college, and participation may be restricted due to capacity limitations in Mendoza. To qualify for consideration for the minor, a student must complete the first two courses of the Engineering Business sequence, EG 40421/44421 and EG 40422, by the end of junior year. The minor comprises those two courses, a course in economics, and accountancy and corporate finance courses offered through Mendoza. Complete details for the minor are available at <https://engineering.nd.edu/academics/undergraduatedegreeprograms>.

Environmental Earth Sciences

This minor, offered by the Department of Civil and Environmental Engineering and Earth Sciences, provides background for students interested in

learning about the physical sciences, emphasizing the processes that occur near or at the surface of the Earth, and the impact of human activity on such processes. The minor requires 16 credit hours distributed across four courses and a field experience:

All students pursuing the minor must take:

		credit hours
CE 20110	Planet Earth	4
CE 20520	Env. Mineralogy	4
CE 45200	Field Trip	1
EVES	Elective	4
EVES	Elective	3

Concentrations

Several College departments also offer concentrations, restricted to students within particular majors. Concentrations comprise a set of at least three 3-credit-hour courses focusing on a specific discipline, designed to give students greater depth of knowledge in that area. Concentrations may be completed within degree requirements, by selecting departmental and technical electives from pre-approved lists of courses. Please see each department's web site for more information. The list of currently approved concentrations includes:

Department of Aerospace & Mechanical Engineering

Aerospace Engineering
Bioengineering
Computational Engineering
Control and Mechanical Systems
Design and Manufacturing
Energy
Materials
Solid Mechanics
Thermal and Fluid Sciences

Department of Chemical and Biomolecular Engineering

Biomolecular Engineering
Energy
Materials

Department of Civil and Environmental Engineering & Earth Sciences

Hydraulics (Civil Engineers only)
Structures (Civil Engineers only)

Department of Computer Science & Engineering

Bioinformatics and Computational Biology
Cloud Computing
Cybersecurity
Media Computing
Mobile Computing

Department of Electrical Engineering

Biosystems
Communications
Energy
Multimedia
Semiconductors and Nanotechnology

College Awards and Prizes

COLLEGE OF ENGINEERING AWARDS

The Rev. Thomas A. Steiner Prize. From a fund established in 1948 by former students of Rev. Thomas A. Steiner, C.S.C., former dean of the College of Engineering, a cash award is made to seniors in the college who have been selected for their all-around excellence as students.

The Reilly Scholar Designation. The designation of Reilly Scholar is given annually to those fifth-year seniors enrolled in the dual Engineering/Arts and Letters program who have excelled academically and otherwise during their first four years as students.

The Americo Darin Prize. From a fund set up by the Darin family in their father's name, a cash award is made to several engineering juniors who have demonstrated exceptional and steady improvement over their first four semesters at Notre Dame.

Departmental Awards

AEROSPACE AND MECHANICAL ENGINEERING

Patrick J. Deviny Award. Presented each year to a junior aerospace student who has displayed the most diligence and persistence in the pursuit of undergraduate studies in aerospace engineering.

Vincent P. Goddard Design Award. Presented each year to a senior in aerospace engineering for outstanding performance in the aerospace design course.

Sigma Gamma Tau Honor Award. Presented each year to a member of the Notre Dame chapter in recognition of outstanding academic performance and demonstrated professional potential.

Pi Tau Sigma Honor Award. Presented each year to a member of the Notre Dame chapter in recognition of outstanding academic performance and demonstrated professional potential.

The Aero Propulsion Award. Presented each year to a senior in aerospace engineering for outstanding performance in the Gas Turbine and Propulsion class.

The Zahm Prize for Aeronautical Engineering was founded in 1946 by Dr. Albert J. Zahm, distinguished pioneer in aeronautics and at one time professor of physics at the University of Notre Dame. The award is made to the senior aerospace engineering student who, in the estimation of the faculty of the program, has achieved the most distinguished record in professional subjects.

The Zahm Prize for Mechanical Engineering. Beginning with 2007–08 year, awarded to a senior mechanical major who, in estimations of the faculty,

STUDENT ORGANIZATIONS AND ACTIVITIES

has achieved the most distinguished record in professional subject.

Jerome L. Novotny Design Award. Presented each year to a junior in mechanical engineering for the best design in the junior heat transfer course.

The Rockwell Automation Power Systems Design Award. Presented each year to seniors in mechanical engineering for the best design in the senior mechanical engineering design course.

Best Undergraduate Research Paper. Presented each semester to the undergraduate who has written the best research paper based on research done during undergraduate research class for the semester.

CHEMICAL AND BIOMOLECULAR ENGINEERING

American Institute of Chemists Award. Presented to an outstanding senior in the Department of Chemical and Biomolecular Engineering.

Chemical Engineering Alumni Award. Presented to one or more seniors who have an outstanding combination of scholarship and extracurricular activities.

Chemical Engineering Faculty Award. Presented to the senior with the highest scholastic average after seven semesters of study.

Chemical Engineering William D. Manly Research Award. Presented to one or more undergraduate students who have performed outstanding undergraduate research.

James P. Kohn Scholarship in Chemical Engineering. A fund dedicated to helping meet the financial need of top performing seniors.

John C. Treacy Award. Presented to the student with the highest score in thermodynamics.

CIVIL AND ENVIRONMENTAL ENGINEERING AND EARTH SCIENCES

The American Society of Civil Engineers Activity Award. The Indiana section each year presents an award to the two senior students most active in the student chapter of ASCE.

Leroy D. Graves Academic Improvement Award. Presented to a senior civil engineering student for significant development in academic performance.

The Sydney Kelsey Outstanding Scholar Award. Presented to a senior civil engineering student for excellence and creativity in academics.

The Kenneth R. Lauer Award. Presented to a senior civil engineering student for leadership, integrity, and service to fellow students and community as determined by that student's classmates.

James A. McCarthy Scholarship in Civil Engineering. Presented to a junior civil engineering student for outstanding academic and professional excellence.

The Walter L. Shilts Award for Undergraduate Achievement. Presented to a senior civil engineering student who has best fulfilled his or her potential as a student through hard work and dedication to obtaining the best possible education.

The Rev. Alexander Kirsch, C.S.C., Award. To the senior receiving a degree in geological sciences who has evidenced high qualities of personal character, scholarship, and leadership.

Dr. Raymond C. Gutschick Award. To the graduating senior who has demonstrated the most promise in geological research as evidenced by a successful research project.

COMPUTER SCIENCE AND ENGINEERING

Outstanding Computer Engineering Award. To the graduating senior in computer engineering who has evidenced high qualities of personal character, scholarship, and leadership.

Outstanding Computer Science Award. To the graduating senior in computer science who has evidenced high qualities of personal character, scholarship, and leadership.

ELECTRICAL ENGINEERING

The James L. Massey Award. For achievement in electrical engineering, recalling communication theory, undergraduate teaching, and the Binary Examination.

The Basil R. Myers Award. For achievement in electrical engineering, recalling circuit theory, the English language, and St. George Day at Notre Dame.

The Arthur J. Quigley Award. For achievement in electrical engineering, recalling electronics, service to our neighbor, and the little man in the circuit.

The Laurence F. Stauder Award. For achievement in electrical engineering, recalling electrical power, the IEEE Student Branch, and the Notre Dame alumni.

The IEC William L. Everitt Award. For achievement in electrical engineering, computer engineering, or computer science, with an interest in the area of communications.

Student Organizations and Activities

HONOR SOCIETIES

TAU BETA PI

In 1960, the Indiana Gamma Chapter of Tau Beta Pi was installed at Notre Dame to foster a spirit of liberal culture in the engineering college and to recognize those who have conferred honor upon Notre Dame by distinguished scholarship and exemplary character as undergraduates in engineering or by their attainment as alumni in the field of engineering. Seniors in the top fifth of their class and juniors in the top eighth of their class are eligible

for election under rigid standards of scholarship, character, leadership, and service.

ETA KAPPA NU

In 1962, the Delta Sigma Chapter of Eta Kappa Nu, the national honor society for electrical engineers, was installed at Notre Dame. Juniors, seniors, and alumni are elected to membership on the basis of scholastic attainment, leadership, and quality of character.

PI TAU SIGMA

In 1963, the Sigma Beta Chapter of Pi Tau Sigma, the national honor society for mechanical engineers, was installed at Notre Dame. Juniors, seniors, and alumni are elected to membership on the basis of scholastic attainment, leadership, quality of character, and a demonstration of probable future success in engineering.

CHI EPSILON

In 1966, the Notre Dame Chapter of Chi Epsilon, the national honor society for civil engineers, was installed at Notre Dame. Chi Epsilon recognizes those civil engineering students, faculty, and alumni who have displayed superior qualities in scholarship, character, practicality, and sociability during their professional careers.

SIGMA GAMMA TAU

In 1981, the Notre Dame Chapter of Sigma Gamma Tau, the national honor society for aerospace engineering was installed. This organization recognizes and honors those individuals in the field of aeronautics and astronautics who have distinguished themselves through scholarship, integrity, service, and outstanding achievement. Senior students who rank in the top third of their aerospace engineering class are eligible for admission.

UPSILON PI EPSILON

In 2004, the Notre Dame chapter of Upsilon Pi Epsilon, which recognizes the academic excellence of students in the computing and information disciplines, was installed at Notre Dame. Outstanding juniors, seniors, and graduate students from the Department of Computer Science and Engineering are honored each year with induction.

PROFESSIONAL SOCIETIES

Several departments of the college actively support student chapters of their respective professional societies; these are:

American Institute of Aeronautics and Astronautics (AIAA)
 American Institute of Chemical Engineers (AIChE)
 American Society of Civil Engineers (ASCE)
 American Society of Mechanical Engineers (ASME)
 Association of Computer Machinery (ACM)
 Institute of Electrical and Electronic Engineers (IEEE)
 National Society of Black Engineers (NSBE)
 Society of Hispanic Professional Engineers (SPHE)
 Society of Women Engineers (SWE)

The Engineering Leadership Council (ELC), a student organization with representation from the college's professional and honor societies, coordinates the activities of all engineering organizations and encourages the pursuit of a professional attitude in the student body of the College of Engineering. The ELC sponsors activities of general interest to the engineering student body.

Aerospace and Mechanical Engineering

Chair:

Kenneth Christensen

Associate Chair:

James P. Schmiedeler

H. Clifford and Evelyn A. Brosey Professor of Mechanical Engineering:

Frank P. Incropera (emeritus)

Roth-Gibson Professor of Engineering:

Eric J. Jumper

Viola D. Hank Professors of Mechanical Engineering:

Kenneth Christensen; Nicholas Zabaras

Clark Professor:

Thomas C. Corke

Dorini Family Associate Professor:

Tengfei Luo

Rooney Family Associate Professor:

David B. Go

Dunn Family Teaching Professor:

Michael J. Seelinger

Professors:

Hafiz M. Atassi (emeritus); Stephen M. Batill (emeritus); Raymond M. Brach (emeritus); Kenneth Christensen; Patrick F. Dunn (emeritus); J. William Goodwine Jr.; Scott C. Morris; Thomas J. Mueller (emeritus); Robert C. Nelson (emeritus); Glen L. Niebur; Timothy C. Ovaert; Samuel Paolucci (emeritus); Joseph M. Powers; Francis H. Raven (emeritus); Ryan K. Roeder; James P. Schmiedeler; Mihir Sen (emeritus); Steven B. Skaar (emeritus); Steven R. Schmid; Albin A. Szewczyk (emeritus); Flint O. Thomas; Meng Wang; Kwang-tzu Yang (emeritus)

Associate Professors:

Stanislav Gordeyer; John W. Lucey (emeritus); Edward Kinzel; Tengfei Luo; Svetlana Neretina; Karel Matous; Ryan G. McClarren; Hirotaka Sakae; Michael M. Stanisic

Assistant Professors:

Woutijn Baars; Donny Hanjaya-Putra; Maria Holland; James E. Houghton (emeritus); Seong Kyun Im; Thomas Juliano; Zhangli Peng; Mark Plecnik; Jian Xun Wang; Patrick Wensing; Sangpil Yoon; Matthew J. Zahr; Yanliang Zhang; Pinar Zorlutuna

Professional Specialists:

Michael J. Seelinger

Associate Professional Specialists:

John Ott; Richard B. Strebinger

Assistant Professional Specialists:

Paul F. Rumbach; Jing Wang

Program of Studies. The Department of Aerospace and Mechanical Engineering offers programs of study that lead to degrees of bachelor of science and master of science in aerospace engineering and mechanical engineering, respectively; master of engineering for mechanical engineers; and doctor of philosophy.

Program in Aerospace Engineering. This program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. The aerospace program is designed to prepare those students interested in the design and operation of aircraft and space vehicles for entrance into a professional career. The curriculum, based on a solid foundation in mathematics, physics, chemistry and the engineering sciences, places emphasis on such basic aerospace disciplines as aerodynamics and fluid mechanics, orbital mechanics, and solid and structural mechanics, as well as such integrating disciplines as design, experimental methods and systems analysis. Technical specializations in the junior and senior year enable students to emphasize specific technical areas, including design and manufacturing, thermal and fluid sciences, bioengineering, solid mechanics, materials, control and mechanical systems and computational engineering.

The aerospace engineering program uses laboratories in Fitzpatrick Hall of Engineering and in the Hessert Laboratory for Aerospace Research. The Hessert laboratories contain superior facilities for instruction and research.

Students are encouraged to participate in the activities of the student chapter of the American Institute of Aeronautics and Astronautics and to enter the national student paper competition conducted by the parent institute. Outstanding achievement in the aerospace program is recognized by membership in Sigma Gamma Tau, the national aerospace honor society.

Further details about the standard aerospace program, the London Program and electives can be found on the Web at ame.nd.edu.

Aerospace Engineering Program Educational Objectives and Student Outcomes.

The Engineering Accreditation Commission of ABET encourages the explicit statement of the Program Educational Objectives and Learning Outcomes for all engineering programs. Publication of the objectives and desired outcomes, as well as efforts to determine if these are being achieved, are part of the process of continuous improvement in engineering education.

Program Educational Objectives. The Department of Aerospace and Mechanical Engineering has established the following Program Educational Objectives that are consistent with the mission of the University and College of Engineering. These objectives have been developed in collaboration with faculty, students, and industry representatives. Program Educational Objectives are "broad statements that

describe the career and professional accomplishments that the program is preparing the graduates to achieve." These are usually recognized as accomplishments in the first few years after graduation.

The aerospace engineering program at Notre Dame appreciates the diverse set of individual goals to which our students aspire, so it has expressed the Program Educational Objectives in two forms. Graduates of the program should:

- Secure a position consistent with their personal aspirations and qualifications
- Assume a technical or managerial leadership role with their organization
- Participate as a volunteer with at least one professional or social service organization

In addition, depending on the career path selected, graduates would be prepared to achieve one or more of the following:

- Be recognized as the key technical specialist within their organization for a particular professional specialty
- Receive a graduate or professional degree
- Start their own company
- Be granted a patent

Student Learning Outcomes. To achieve these Program Educational Objectives, the curriculum is designed to provide the following Student Learning Outcomes that describe what students are expected to know or be able to do by the time of graduation.

First Principles and Problem Solving: Graduates understand fundamental scientific first principles of engineering and can apply them to the solution of problems or systems by way of analytical and numerical treatment.

Engineering Skills and Professional Practice:

Graduates understand the essential role of experimentation in engineering, and they are able to compare and gain insight from a combination of analytical, numerical, and experimental results. They are able to use modern engineering software tools, including CAD, and are capable of programming digital computers

Design: Graduates have a pragmatic understanding of design and the engineering design process and are able to contribute in various ways to the design of a product, system, or process.

Communication: Graduates are able to communicate well, both orally and in writing, and function effectively in multidisciplinary groups, both in leadership and support roles.

Professional Responsibility: Graduates are familiar with the responsibilities of professional practice, the roles that aerospace engineers play in society, the kinds of issues they deal with, and their influence in society.

AEROSPACE AND MECHANICAL ENGINEERING

First Year of Studies

First-year students intending to major in aerospace engineering when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

The following schedule is applicable to the EG Class of 2020.

Sophomore Year*First Semester*

MATH 20550. Calculus III	3.5
PHYS 10320. General Physics II	4
AME 20221. Mechanics I	3
AME 20211. Introduction to Aeronautics	3
AME 20214. Introduction to Engineering Computing	1
AME 20216/21216. AME Laboratory 1/1L	2
	16.5

Second Semester

MATH 20580. Introduction to Linear Algebra and Differential Equations	3.5
AME 20222. Mechanics II	3
AME 20241. Solid Mechanics	3
AME 20231. Thermodynamics	3
AME 21267. Design Tools I	2
Core University requirement+	3
	17.5

Junior Year*First Semester*

AME 30314. Differential Equations, Vibrations and Controls I	3
AME 30341. Aerospace Structures	3
AME 30331. Fluid Mechanics	3
AME 20217/21217. AME Laboratory II/III	2
AME 21268. Design Tools II	2
Core University requirement+	3
	16

Second Semester

AME 30315. Differential Equations, Vibrations and Controls II	3
AME 30333. Theoretical and Experimental Aerodynamics	4
AME 30332. Compressible Aerodynamics	3
AME 30334. Heat Transfer, or	
AME 30381. Orbital and Space Dynamics	3
Core University requirement+	3
	16

Senior Year*First Semester*

AME 40461. Flight Mechanics and Introduction to Design	3
AME 40451. Aerospace Dynamics	3
AME 40431. Gas Turbines and Propulsion	3
Technical Specialization*	3
Core University requirement+	3
	15

Second Semester

AME 30381. Orbital and Space Dynamics	
or AME 30334. Heat Transfer	3
AME 40462. Aerospace Design	4
Technical Specialization/Prof. Development	3
Technical Specialization	3
Core University requirement+	3
	16

Total for the four years: 133 semester hours.

**A list of approved technical specialization and professional development courses is available on the department website.*

+ See "Arts and Letters Core" on the first page of the College of Engineering section.

The most current information for the degree program course requirements is available on the department website, ame.nd.edu.

The Program in Mechanical Engineering. This program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. The department offers a well-rounded program at the bachelor's level. The curriculum is built on a sound foundation in mathematics, physics, chemistry and the engineering sciences. In the undergraduate curriculum the student may obtain, by suitable selection of elective courses, a program suited to enable him or her to specialize in a given sequence or to prepare as a generalist. Elective course sequences are available in aerospace, design and manufacturing, thermal and fluid sciences, bioengineering, solid mechanics, materials, control and mechanical systems, and computational engineering.

To prepare for today's changing technological world, the program requires use of a computer in many of its courses.

Finally, for professional growth during formative years as engineers in training, students are encouraged to participate in the activities of the student chapter of the American Society of Mechanical Engineers. Outstanding achievement in the mechanical engineering program is recognized by membership in Pi Tau Sigma, the national mechanical engineering honor society.

Further details about the mechanical engineering program, the London Program and electives can be found on the Web at ame.nd.edu. The program below pertains only to the Classes of 2015 and beyond. Prior class requirements are noted below.

Mechanical Engineering Educational Objectives and Student Learning Outcomes. The Engineering Accreditation Commission of ABET encourages the explicit statement of the Program Educational Objectives and Student Learning Outcomes for all engineering programs. Publication of the objectives and desired outcomes, as well as efforts to determine if these are being achieved, are part of the process of continuous improvement in engineering education.

Program Educational Objectives. The Department of Aerospace and Mechanical Engineering has established the following Program Educational Objectives that are consistent with the mission of the University and College of Engineering. These objectives have been developed in collaboration with faculty, students, and industry representatives. Program Educational Objectives are "broad statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve." These are usually recognized as accomplishments in the first few years after graduation.

The mechanical engineering program at Notre Dame appreciates the diverse set of individual goals to which our students aspire, so it has expressed the educational objectives in two forms. Graduates of the program should:

- Secure a position consistent with their personal aspirations and qualifications
- Assume a technical or managerial leadership role with their organization
- Participate as a volunteer with at least one professional or social service organization

In addition, depending on the career path selected, graduates would be prepared to achieve one or more of the following:

- Be recognized as the key technical specialist within their organization for a particular professional specialty
- Receive a graduate or professional degree
- Start their own company
- Be granted a patent

Student Learning Outcomes. To achieve these Program Educational Objectives, the curriculum is designed to provide the following Student Learning Outcomes that describe what students are expected to know or be able to do by the time of graduation.

First Principles and Problem Solving: Graduates understand fundamental scientific first principles of engineering and can apply them to the solution of problems or systems by way of analytical and numerical treatment.

Engineering Skills and Professional Practice:

Graduates understand the essential role of experimentation in engineering, and they are able to compare and gain insight from a combination of analytical, numerical, and experimental results. They are able to use modern engineering software tools, including CAD, and are capable of programming digital computers, including microprocessors.

Design: Graduates have a pragmatic understanding of design and the engineering design process and are able to contribute in various ways to the design of a product, system, or process.

Communication: Graduates are able to communicate well, both orally and in writing, and function effectively in multidisciplinary groups, both in leadership and support roles.

CHEMICAL AND BIOMOLECULAR ENGINEERING

Professional Responsibility: Graduates are familiar with the responsibilities of professional practice, the roles that mechanical engineers play in society, the kinds of issues they deal with, and their influence in society.

First Year of Studies

First-year students intending to major in mechanical engineering when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

The following schedule is applicable to the EG Class of 2019.

Sophomore Year*First Semester*

MATH 20550. Calculus III	3.5
PHYS 10320. General Physics II	4
AME 20221. Mechanics I	3
CBE 30361. Science of Engineering Materials**	3
AME 20214. Introduction to Engineering Computing	1
AME 20216/21216. AME Laboratory I/IL	2

16.5

Second Semester

MATH 20580. Introduction to Linear Algebra and Differential Equations	3.5
AME 20222. Mechanics II	3
AME 20241. Solid Mechanics	3
AME 21267. Design Tools I	2
AME 20231. Thermodynamics	3
Core Curriculum course+	3

17.5

Junior Year*First Semester*

AME 30314. Differential Equations, Vibrations and Controls I	3
AME 20217/21217. AME Laboratory II/IL	2
AME 30331. Fluid Mechanics	3
AME 30363. Design of Machine Elements	3
AME 40423. Mechanisms and Machines	3
Core Curriculum course+	3

17

Second Semester

AME 21268. Design Tools II	2
AME 30315. Differential Equations, Vibrations and Controls II	3
AME 30334. Heat Transfer	3
EE 20222. Introduction to Electrical Engineering and Embedded Systems	4
Core Curriculum course+	3

15

Senior Year*First Semester*

AME 30362. Design Methodology	3
AME Technical Elective**	3
AME Technical Elective	3
Technical Elective*	3
Core Curriculum course+	3

15

Second Semester

AME 40463. Senior Design Project	4
AME Elective	3
AME Elective	3
Technical Elective*	3
Core Curriculum course+	3

16

*A list of approved AME and technical specialization courses is available on the department website.

+ See "University Core Curriculum" on the first page of the College of Engineering section.

**Students entering mechanical engineering prior to fall 2012 take AME 20212 in the sophomore year instead of CBE 30361, and CBE 30361 in the senior year instead of an additional AME technical elective.

The most current information for the degree program course requirements is available on the department website: (ame.nd.edu).

Total for the four years: 131 semester hours.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Aerospace and Mechanical Engineering*. Course descriptions can be found by clicking on the subject code and course number in the search results.

A number of introductory graduate-level courses, described in the *Graduate School Bulletin of Information* and on the department website, are open to advanced undergraduates, with the permission of the department chair, to satisfy upper-level electives.

Chemical and Biomolecular Engineering*Chair and Dorini Family Professor of Energy Studies:*

Edward J. Maginn

Arthur J. Schmitt Professor of Chemical & Biomolecular Engineering:

Paul W. Bohn

Bayer Corporation Professor of Engineering:

Hsueh-Chia Chang

Anthony Early Professor of Energy and the Environment:

Thomas F. Degnan

Matthew H. McCloskey Dean of the College of Engineering:

Peter K. Kilpatrick

H.C. and E.A. Brosey Professor of Engineering:

William F. Schneider

Professors:

Merlin L. Bruening; Jeffrey C. Kantor; David T. Leighton Jr.; Mark J. McCready; Paul J. McGinn

Associate Professors:

Basar Z. Bilgic; Ruilan Guo; Jason C. Hicks; Davide A. Hill; William A. Phillip; Jeremiah J. Zartman

Assistant Professors:

Alexander W. Dowling; Casey P. O'Brien; Jennifer L. Schaefer; Matthew J. Webber; Jonathan K. Whitmer

Professional Specialists:

Victoria Goodrich; Tanyel Kiziltepe; Troy J. Vogel (assistant chair)

Program of Studies. The Department of Chemical and Biomolecular Engineering offers programs of study leading to the degrees of bachelor of science in chemical engineering, master of science in chemical engineering, and doctor of philosophy. The program leading to the bachelor of science degree is accredited by the Engineering Accreditation Commission of ABET, Inc.

The traditional role for chemical engineers of providing the principal technical guidance for the chemical and petroleum industries has been greatly augmented in recent years. Chemical engineers now direct the advancement and utilization of technology for the food processing and consumer products industries and are playing increasing roles in the manufacture of the highest density computer chips and in the invention of advanced drug delivery systems. In addition to creating remediation strategies, chemical engineers contribute to the prevention of deleterious impact of society on the environment by the development of new green process technologies that eliminate the use of dangerous solvents. They are the leaders in the field of sustainability which is the implementation of energy sources and raw material supplies that can sustain humankind indefinitely. In all of these areas, complex processes involving chemical changes of matter occur and, as such, sound training in chemistry, physics, mathematics, and

CHEMICAL AND BIOMOLECULAR ENGINEERING

allied applied sciences are prerequisites to resolving the challenges posed by these complex systems.

The undergraduate program at Notre Dame is notable for its combination of a strong fundamental focus in chemical engineering courses with a broad humanities and science education provided in courses other than chemical engineering. The science and humanities courses prepare students both for the study of chemical engineering and to understand the complex scientific, social, and moral issues of the world today. Our intention in emphasizing fundamentals is to develop students' intellect and equip them with enduring knowledge in chemical engineering and related fields. Thus, our undergraduate chemical engineering curriculum provides students with not only a preparation for a career as a chemical engineer, but for a lifetime of learning and a lifelong career in areas that may include law, medicine, or business.

University of Notre Dame Undergraduate

Program Goals: Students who have graduated in Chemical Engineering at Notre Dame have successfully pursued a wide range of career paths. The faculty believe that this has resulted from the interests of students who enter our program and is facilitated by our emphasis on fundamental aspects of chemical engineering. Consistent with the mission of the University, the Department of Chemical and Biomolecular Engineering program seeks to develop students who:

1. Pursue knowledge and commensurate understanding and critically evaluate the consequences of these.
2. Communicate clearly and effectively.
3. Demonstrate proficiency in the art and science of chemical engineering with a strong understanding of the fundamental principles of pure and engineering sciences on which chemical engineering practice is based.
4. Appreciate their social and moral responsibilities both within their careers in engineering and through service in their communities.
5. Understand how chemical engineering connects with other major disciplines to produce the goods and services needed by society.

Within the chemical engineering degree program, students can complete concentrations in materials, energy, and biomolecular engineering. A suggested course sequence for students interested in going to medical school is also available.

More than one-third of the chemical engineering undergraduates participate in research activities with faculty and graduate students at some time in their careers in areas such as advanced materials, ionic liquids, separations, biomaterials, microfluidic devices, catalysis, fuel cells, and drug delivery techniques.

Further details about the chemical engineering program may be found at cbe.nd.edu.

First Year of Studies

First-year students intending to major in chemical engineering when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

The following course schedule is applicable to students first matriculating fall 2018.

Sophomore Year

First Semester

MATH 20550. Calculus III	3.5
CHEM 10172. Organic Chemistry	3
CHEM 11172. Organic Chemistry Lab I	1
PHYS 10320. General Physics II	4
CBE 20255. Introduction to Chemical Engineering Analysis	3
Arts and Letters Course+	3
	<hr/>
	17.5

Second Semester

MATH 20580. Introduction to Linear Algebra and Differential Equations	3.5
CHEM 20273. Organic Chemistry II	3
CBE 20260. Chemical Engineering Thermodynamics I	3
CBE 20258. Numerical and Statistical Analysis	3
CBE 20290. Career Choices for Engineers**	1
Core Curriculum course+	3
	<hr/>
	16.5

Junior Year

First Semester

MATH 30650. Differential Equations	3
CHEM 30333. Analytical Chemistry	3
CHEM 31333. Analytical Chemistry Lab	1
CBE 30361. Science of Engineering Materials	3
CBE 30355. Transport Phenomena I or	
CBE 30357. Biotransport	3
CBE 30367. Chemical Engineering Thermodynamics II	3
	<hr/>
	16

Second Semester

CHEM 30324. Physical Chemistry	3
CBE 30356. Transport Phenomena II	3
CBE 31358. Chemical Engineering Laboratory I	3
CBE 30338. Chemical Process Control	3
Core Curriculum course+	3
	<hr/>
	15

Senior Year

First Semester

CBE 41459. Chemical Engineering Laboratory II or	
CBE 41910. Biomolecular Engineering Lab	3
CBE 40443. Separation Processes	3
CBE 40445. Chemical Reaction Engineering	3
Chemical Engineering Elective*	3
Core Curriculum course+	3
	<hr/>
	15

Second Semester

CBE 40448. Chemical Process Design	3
Chemical Engineering Elective*	3
Technical Elective*	3
Technical Elective*	3
Core Curriculum course+	3
	<hr/>
	15

* All electives are selected from a list available in the department office or found on the department website. A maximum of 3 credits of CBE 48902, Advanced Undergraduate Research, may count toward the 6 credits of required technical electives.

** CBE 20290 is recommended in this semester but not required.

+ See "University Core Curriculum" on the first page of the College of Engineering section.

Total for the four years: 130 semester hours.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Chemical & Biomolecular Engineering*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Certain graduate courses are open to advanced undergraduates with permission from the department chair or director of undergraduate studies, and the course instructor.

Civil and Environmental Engineering and Earth Sciences

Henry J. Massman Chair:

Joannes J. Westerink

Associate Chair:

Yahya C. Kurama

Henry J. Massman Professor of Civil Engineering:

Peter C. Burns

Robert M. Moran Professor of Civil Engineering:

Ahsan Kareem

Wayne and Diane Murdy Professor of Engineering and Geosciences:

Harindra J. Fernando

Joseph and Nona Ahearn Professor in Computational Science and Engineering:

Joannes J. Westerink

Professors:

Diogo Bolster; Jeremy B. Fein; Robert L. Irvine (emeritus); Patricia A. Maurice (emerita); Clive R. Neal; James I. Taylor (emeritus); Yahya C. Kurama; Stephen E. Silliman (emeritus)

Associate Professors:

Kyle Bibby; Andrew Kennedy; Lloyd H. Ketchum Jr. (emeritus); Kapil Khandelwal; Tracy L. Kijewski-Correa; David J. Kirkner (emeritus); Jerry J. Marley (emeritus); Robert Nerenberg; Rev. James A. Rigert, C.S.C. (emeritus); Joshua Shrout; Antonio Simonetti; Alexandros Taflanidis; Ashley Thrall

Assistant Professors:

Melissa Berke; Paola Crippa; Kyle Doudrick; Alan Hamlet; Amy Hixon; George Mavroidis; Marc Muller; David Richter; Na Wei

Associate Teaching Professors:

Elizabeth A. Kerr; Brian Smith

Assistant Professional Specialists:

Stefanie Simonetti; Kevin Walsh

Program of Studies. The Department of Civil and Environmental Engineering and Earth Sciences offers programs of study leading to the degrees of bachelor of science in civil engineering, bachelor of science in environmental engineering, bachelor of science in environmental earth sciences, master of science in civil engineering, master of science in geological sciences (for graduate students entering the program in or prior to the fall of 2012), master of science in environmental engineering, master of science in environmental earth sciences (for graduate students entering the program in or after the fall of 2013), and doctor of philosophy.

Program Goals. The Department of Civil and Environmental Engineering and Earth Sciences (CEEES) focuses on knowledge related to civil infrastructure, natural and manmade hazards, environment, energy, water, and planet systems. We emphasize a strong foundation in science and engineering with a focus in the areas of structural engineering, environmental engineering, environmental fluid dynamics, and geochemistry.

Our professions develop the fundamental and applied technologies that impact people's health, well-being, and ability to thrive through our work on infrastructure (buildings, bridges, tunnels, waterways, ports, roads, dams, offshore energy platforms, wind farms), clean water supply (water resources, water distribution and water treatment), sewage and waste disposal (wastewater treatment), protection from natural hazards (earthquakes, tornadoes, tsunamis, riverine floods, winds, waves, hurricanes), energy systems (offshore oil extraction, wind farms, hydro-electric, nuclear fuel reprocessing), safe and sustainable environments (pollutants in the atmosphere, groundwater, surface water, reactive transport of pollutants within these systems, biological and geochemical processes, the interplay of natural processes such as mineral-water-rock-bacteria interactions, and anthropogenic issues such as transport of toxic heavy metals and safe disposal of nuclear waste), and the larger geophysical and geochemical earth system. CEEES strives to provide a stimulating and unique interdisciplinary environment for learning and research by blending traditional disciplines of science and engineering. CEEES offers outstanding educational programs for those aspiring to contribute as leaders in the fields of Civil Engineering, Environmental Engineering, and Environmental Earth Sciences. CEEES educational objective is to provide students with the knowledge, skills, vision and ethical basis to contribute as leaders in design, construction and protection of our civil infrastructure, and understanding, management and remediation of the environment.

CEEES has very innovative undergraduate programs that synergize classroom teaching with research, field trips, lecture series and hands on experiences that expose students to the realities and professionals in their field. These programs are designed to be inspirational and lead to inquiry as well as lead to life-long connections in the field. All of our students experience in-depth fieldtrips and the majority of our students participate in research programs, thematic professional competitions, and professional lecture series. In addition, our students have a strong tradition of service in programs such as NDSEED, a student organization that proposes, designs, finances and builds bridges for poor communities in Central America, and Engineers Without Borders. The department has a long tradition of placing its graduates from both undergraduate and graduate programs into sectors that truly serve society from their most basic needs of clean water and shelter to the advanced energy and transportation systems that sustain a thriving economy and a high standard of living. Our alumni have a history of success and exemplary leadership in academia, consulting, national laboratories, construction, and industry.

PROGRAM IN CIVIL ENGINEERING.

This program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. The department presents a well-rounded program for the bachelor's degree with the first two years devoted primarily to the basic principles of science and engineering. The third and fourth years are devoted to courses in the basic areas of civil engineering—structural analysis and design, hydraulics and hydrology, water supply and wastewater disposal, materials of construction, geotechnical engineering, and transportation engineering. A student may emphasize a particular area of interest by selecting either the structures or hydraulics concentrations. Civil engineering electives in the senior year may be regular courses, individualized directed study or research courses. The civil engineering program will culminate with major design experience in the senior year. Student teams will work closely with industry professionals and faculty who act as consultants on a real-world design projects to facilitate the student's understanding of the design process. Additionally, the curriculum for all programs in the CEEES department requires students to take the Challenges and Innovation Seminar series which brings in top engineering professionals from industry, consulting, academia, and government to discuss major problems of interest and their solutions.

The program provides a firm foundation in the many basic disciplines comprising the broad field of civil engineering. This is especially desirable, for often in the course of professional development the civil engineer is asked to coordinate the planning, design, and construction of highly complex systems and must use many or all of these disciplines.

The department has excellent facilities for research available to both graduate and undergraduate students. These facilities include a structural dynamics/structural control laboratory; a materials testing and structural research laboratory; a groundwater hydrology field laboratory; and a number of analytical laboratories for water, wastewater and hazardous waste treatment.

The professional aspects of civil engineering are emphasized and promoted by the activities of a student chapter of the American Society of Civil Engineers, in which all students of the department are eligible and encouraged to participate. In addition, a junior class field trip examines major infrastructure projects and environmental systems including tall buildings, bridges, stadiums, transportation systems, navigations systems, flood protection works, clean water supply, and wastewater systems.

Further details about the civil engineering may be found on the Web at cees.nd.edu.

CIVIL AND ENVIRONMENTAL ENGINEERING AND EARTH SCIENCES

First Year of Studies

First-year students intending to major in civil engineering when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

Sophomore Year*First Semester*

MATH 20550. Calculus III	3.5
PHYS 10320. General Physics II	4
CE 20150. Statics	3
CE 20111. Planet Earth	3
CE 20600. Intro to CAD	2
CE 20230. Engineering Programming	1
	<hr/>
	16.5

Second Semester

MATH 20580. Introduction to Linear Algebra and Differential Equations	3.5
ACMS 30440. Probability and Statistics	3
AME 20241. Solid Mechanics	3
CE 30160. CE Materials	4
Core Curriculum course+	3
	<hr/>
	16.5

Junior Year*First Semester*

MATH 30650. Differential Equations	3
CE 30125. Computational Methods	3
CE 30200. Intro to Struct. Engrg	3
CE 30300. Intro to Env. Engrg	3
CE 30460. Fluid Mechanics	3
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	15

Second Semester

CE 40270. Reinf. Concrete Design	4
CE 40450. Hydraulics	3.5
CE 30150. Dynamics & Modeling	3
Core Curriculum course+	3
Core Curriculum course+	3
	<hr/>
	16.5

Senior Year*First Semester*

CE 40620. Transportation or	
CE 40465. Environmental Fluid Mechanics	3
Core Concentration Elective**	4
CE 40701. Principles of Practice	1
CE 30510. Intro to Geotech Engineering	3.5
Core Curriculum course+	3
	<hr/>
	14.5

Second Semester

CE 40702. Senior Design	3
Core Concentration Elective**	3
CE Elective**	3
CE Elective**	3
Core Curriculum course+	3
	<hr/>
	15
Total degree required credits	130

+See "University Core Curriculum" on the first page of the College of Engineering section.

***Note: All electives are as defined in the academic guide for the Department of Civil and Environmental Engineering and Earth Sciences on the department's website.*

Certain graduate courses are open to advanced undergraduates with permission of the department chair.

ENVIRONMENTAL ENGINEERING

Program in Environmental Engineering. The Environmental Engineering program at Notre Dame will be seeking accreditation by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. This program was founded by the Department of Civil and Environmental Engineering and Earth Sciences to provide students with a quantitative preparation for professional careers or continued higher education regarding the assessment and remediation of human impact on our environment. It is a unique program that prepares students to look at all aspects of water and environmental problems from a range of perspectives including the Earth system, water movement (hydrology, fluid flow), environmental chemistry, geochemistry, and reactive transport. The Environmental Engineering degree program will prepare students to understand the necessary foundational chemistry, fluid flow and mixing mechanics, all within the context of the Earth system.

The environmental engineering program combines classroom, laboratory and field studies. Students are encouraged to participate in a semester study abroad, such as the Australia program (during the fall semester, junior year), which provides additional opportunity for field-based studies. All students are encouraged to conduct independent research under faculty supervision during their junior and senior years. The environmental engineering program will culminate with major design experience in the senior year. Student teams will work closely with industry professionals and faculty who act as consultants on a real-world design projects to facilitate the student's understanding of the design process. Additionally, the curriculum for all programs in the CEEES department requires students to take the Challenges and Innovation Seminar series which brings in top engineering professionals from industry, consulting, academia, and government to discuss major problems of interest and their solutions.

The professional aspects of civil and environmental engineering are emphasized and promoted by the activities of a student chapter of the American Society of Civil Engineers, in which all students of the department are eligible and encouraged to participate. In addition, a junior class field trip examines major infrastructure projects and environmental systems including tall buildings, bridges, stadiums, transportation systems, navigations systems, flood protection works, clean water supply, and wastewater systems.

Environmental Engineering students will be ready to work as environmental engineers remediating the environment on local and global scales with opportunities available in engineering consulting firms, government agencies, national laboratories, and industries requiring monitoring and advancement of remediation technologies. Additionally, the environmental engineering degree will prepare students for graduate study in Environmental Engineering programs.

Further details about the environmental engineering program may be found on the Web at cees.nd.edu.

First Year of Studies

First-year students intending to major in civil engineering when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

Sophomore Year*First Semester*

CE 20110. Planet Earth w/lab	4
PHYS 10320. Physics II	4
CE 30300. Intro to Env. Eng.	3
CE 31300. Intro to Env. Eng. Lab	1
MATH 20550: Calculus III	3.5
CE 20150. Statics	3
	<hr/>
	18.5

Second Semester

CE 20300. Global Change, Water & Energy	3
CE 20320. Env. Aquatic Chem	3
MATH 20580. Linear Alg. Diff. Equations	3.5
ACMS 30440. Prob. & Stats.	3
Core Curriculum course+	3
CE 20230: Engineering Programming	1
	<hr/>
	16.5

Junior Year*First Semester*

CE 30455. Env. Hydrology	3
CE 30125. Comp. Methods	3
CE 20520. Env. Mineralogy	4
CE 30460. Fluid Mechanics	3
Core Curriculum course+	3
	<hr/>
	16

Second Semester

CE 30320. Water Chemistry & Treatment	3
CE 40450. Hydraulics	3
CE 40350. Env. Microbiology	3
Core Curriculum course+	3
CE 40341. Biological Process Design	3
Unit Processes Design	1
	<hr/>
	16

Senior Year*First Semester*

CE 40300. Geochemistry	3
CE 40460. Groundwater Hydrology	3
CE 40701. Principles of Practice	1
Core Curriculum course+	3
EG Elective	3
	<hr/>

CIVIL AND ENVIRONMENTAL ENGINEERING AND EARTH SCIENCES

Second Semester

CE 40420. Reactive Transport	3
CE 40702. Senior Design	3
EG Elective**	3
Technical Elective	3
Core Curriculum course+	3

15

Total credit hours required for degree 131

+See "University Core Curriculum" on the first page of the College of Engineering section.

**All electives are defined in the Academic Guide for the Department of Civil and Environmental Engineering & Earth Sciences, available on the department web site.

ENVIRONMENTAL EARTH SCIENCES**Program in Environmental Earth Sciences.**

The Environmental Earth Sciences program at Notre Dame was founded by the Department of Civil and Environmental Engineering and Earth Sciences to provide students with a quantitative preparation for professional careers or continued higher education in the disciplines of the earth and environmental science. This degree program blends the disciplines of fluid dynamics and hydrology, environmental chemistry and geochemistry framed within the larger context of Earth systems and focuses more on the geology side of the environment and planetary systems. The program provides a foundation in the physical sciences, with emphasis on processes that occur near or at the surface of Earth, and the impact of human activity on such processes. Students explore the geochemical, mineralogical and hydrological properties of Earth's crust, and develop an understanding of the interplay of natural processes such as mineral-water-rock-bacteria interactions, with anthropogenic issues such as transport of toxic heavy metals and safe disposal of nuclear waste.

The environmental earth sciences program combines classroom, laboratory and field studies. Students are encouraged to participate in a semester study abroad, such as the Australia program (during the fall semester, junior year), which provides additional opportunity for field-based studies. All students are encouraged to conduct independent research under faculty supervision during their senior year. Additionally, the curriculum for all programs in the CEEES department requires students to take the Challenges and Innovation Seminar series which brings in top engineering professionals from industry, consulting, academia, and government to discuss major problems of interest and their solutions.

An undergraduate major in Environmental Earth Sciences prepares a student for graduate study (M.S., Ph.D.) in many aspects of earth science and environmental science and engineering, as well as for admission to a variety of professional schools. Graduates with a B.S. degree may enter careers in diverse areas such as the National Park Service, industry, environmental consulting, and government

research laboratories. An Environmental Earth Science degree is also ideal background for those planning to teach in secondary schools at all levels.

Below you will see an example of the curriculum that can be followed by an incoming student who wishes to major in environmental earth sciences. However, the flexibility of our undergraduate program allows students to switch to environmental earth sciences if they have followed either an engineering or science track during their first year.

Further details about the environmental earth sciences program may be found on the Web at cees.nd.edu.

First Year of Studies

First-year students intending to major in environmental earth sciences when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

The following course schedule is applicable to the EG class of 2019.

Sophomore Year*First Semester*

CE 20110. Planet Earth w/ lab	4
PHYS 10320. Physics II	4
CE 30300. Intro to Env. Eng w/lab	4
MATH 20550. Calculus III	3.5

15.5

Second Semester

CE 20300. Global Change, Water & Energy	3
CE 20320. Env. Aquatic Chem	3
MATH 20580. Linear Alg. Diff. Equations	3.5
ACMS 30440. Prob. & Stats.	3
Core Curriculum Course+	3
CE 20230. Engineering Programming	1
CE 23601. Chlg. & Innov. of CE Eng.	0

16.5

Junior Year*First Semester*

CE 30455. Env. Hydrology	3
CE 30125. Comp. Methods	3
CE 20520. Env. Mineralogy	4
CE 45300. Fall Field Trip	1
CE 30500. Surficial Processes	3
Core Curriculum Course+	3

17

Second Semester

CE 30540. Petr. of Earth Matls	4
CE 30560. Dynamic Earth	3
CE 45200. Field Trip	1
Technical Elective	3
Core Curriculum Course+	3

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Senior Year*First Semester*

CE 40300. Geochemistry	3
CE 40460. Groundwater Hydrology	4
Technical Elective	3
Core Curriculum Course+	3

13

Second Semester

CE Elective*	3
CE Elective*	3
CE Elective*	3
CE 40350. Environmental Microbiology	3
Core Curriculum Course+	3

15

Total credits required for degree 127

+See "University Core Curriculum" on the first page of the College of Engineering section.

**All electives are defined in the Academic Guide for the Department of Civil and Environmental Engineering & Earth Sciences, available on the department web site.

Certain graduate courses are open to advanced undergraduates with permission of the department chair.

MINOR IN ENVIRONMENTAL EARTH SCIENCES

A minor in environmental earth sciences requires the completion of 16 credit hours in geological sciences as follows.

CE 20110. Planet Earth	4
CE 20520. Environmental Mineralogy	4
CE 45200 or CE 45300. Field Trip	1
EVES Elective	4
EVES Elective	3

16

For more details visit <https://cees.nd.edu/undergraduate/current-students/minors-offered>.

RESILIENCY & SUSTAINABILITY OF ENGINEERING SYSTEMS

The Resiliency and Sustainability of Engineering Systems minor is open to students from all disciplines in the College of Engineering and students from the University who can satisfy the pre-requisites for the required courses. The minor includes two required courses, three elective courses, and a capstone experience. The two required courses are:

CE 10700. Sustainable Development in a Changing World	3
CE 20710. Resiliency of Engineering Systems	3
Elective	3
Elective	3
Elective	3
Capstone	1

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COMPUTER SCIENCE AND ENGINEERING

The three elective courses will be selected from an approved list in collaboration with the director of the minor. Options to fulfill this requirement span multiple departments and include approved courses from departments such as Political Science, Psychology, Philosophy, Laws, Economics, and Sociology. For details please visit <http://cees.nd.edu/undergraduate/resiliency-and-sustainability-of-engineering-systems>.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Civil Engineering*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Computer Science and Engineering

Duda Family Professor of Engineering and Department Chair of Computer Science and Engineering:

Patrick J. Flynn

Frank Freimann Collegiate Professor of Computer Science and Engineering:

Nitesh Chawla

Ted H. McCourtney Professor of Computer Science and Engineering:

Peter M. Kogge

Schubmehl/Prein Professor:

Kevin W. Bowyer

Professors:

Steven C. Bass (emeritus); Rick Billo; Jane Cleland-Huang; Danny Z. Chen; Eugene W. Henry (emeritus); X. Sharon Hu; Aaron Striegel; Douglas Thain; John J. Uhran Jr. (emeritus)

Associate Professors:

David Chiang; Collin McMillan; Ronald Metoyer; Tijana Milenkovic; Michael Niemier; Christian Poellabauer; Yiyu Shi; Chaoli Wang

Assistant Professors:

Meng Jiang; Siddhash Joshi; Taeho Jung; Walter Scheirer; Dong Wang; Timothy Weninger

Research Professor and Director of Graduate Studies:

Gregory R. Maday

Professional Specialist:

Jay B. Brockman

Associate Professional Specialist and Director of Undergraduate Studies:

Ramzi K. Bualuan

Associate Professional Specialist:

Peter Bui

Assistant Professional Specialists:

Shreya Kumar; Corey Pennycuff

Program of Studies. The Department of Computer Science and Engineering offers programs of study that lead to the degrees of bachelor of science in computer science and bachelor of science in computer engineering. The program in computer engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. The program in computer science is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org>. The department also offers programs that lead to a master of science in computer science and engineering, and a Ph.D.

Educational Goals. The goals of the programs in computer science and computer engineering are (1) to prepare all students for careers in the public or private sector; (2) to prepare outstanding students for graduate study; (3) to develop lifelong learning skills in all students; (4) to provide comprehensive education in computer science, including theoretical foundations, software and hardware systems, and applications; and (5) to ensure significant design experience including working in teams.

Program Outcomes. At the time of completion of the undergraduate program, all graduates should possess (1) the ability to specify, design, test, and document software; (2) an understanding of current computer software and hardware technology; (3) an understanding of science, engineering, and mathematics; (4) a comprehensive general education; (5) the ability to continue learning in response to professional needs as well as personal desire for self-improvement; and (6) an understanding of personal and professional responsibility to society.

Programs. Programs in the Department of Computer Science and Engineering follow the four-year curricula listed below. These include required and elective courses in the basic, pure, and applied sciences, as well as the humanities, electrical engineering, computer science, and computer engineering. Emphasis is on developing a mastery of the key principles underlying the organization, operation, and application of modern computers to real problems, with a solid grounding in math and science to permit a quantitative analysis of such solutions. In addition, central to both programs is the development of the ability to function, both independently and in multidisciplinary teams, and to be prepared for continued change in future computing technology and what effects it will have on all aspects of society. Opportunities for specialization in several professional computer disciplines are available. Students are individually assisted and advised in their choices of elective courses.

The Department of Computer Science and Engineering offers concentrations in five areas: Bioinformatics and Computational Biology, Media Computing, Mobile Computing, Cloud Computing, and Cyber Security. Each concentration is designed to offer a structured set of elective courses around an organized theme. Upon a student's successful completion of a CS/CPEG program with a chosen concentration, the concentration will appear on the student's transcript.

Further information about computer science and computer engineering programs may be found on the Web at cse.nd.edu.

PROGRAM IN COMPUTER ENGINEERING

The Program in Computer Engineering focuses on understanding the basic nature of the electronic devices that go into the creation of modern computers and on the detailed architecture and organization of such systems, both within the central processing unit and in how larger systems are assembled. Modern design tools and techniques are introduced very early in the program and used throughout to design, analyze, and prototype real digital computing systems. All computer engineering students are required to enroll in at least one of a prescribed set of design courses before graduation.

COMPUTER SCIENCE AND ENGINEERING

PROGRAM IN COMPUTER SCIENCE

The Program in Computer Science focuses on the application of computers to real problems, especially in the design, development, and use of software. The program is designed to foster an understanding of the key properties of algorithms (the mathematical statements of how problems are to be solved), and how to recognize and design good algorithms to solve real problems in efficient fashions. The program also includes developing the ability to engineer large, efficient, portable, and scalable pieces of software that implement good algorithms in ways that are useful to the end users, and to do so in ways that use modern software development tools and techniques.

First Year of Studies

First-year students intending to major in computer engineering or in computer science when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

The following class schedule is applicable to the EG class of 2020.

COMPUTER ENGINEERING PROGRAM**Sophomore Year***First Semester*

PHYS 10320. General Physics II	4
CSE 20110. Discrete Mathematics	3
CSE 20311. Fundamentals of Computing	4
MATH 20550. Calculus III	3.5
Core Curriculum course +	3
	<hr/>
	17.5

Second Semester

CSE 20221. Logic Design	4
CSE 20289. Systems Programming	3
CSE 20312. Data Structures	4
MATH 20580. Introduction to Linear Algebra and Differential Equations	3.5
Core Curriculum course +	3
	<hr/>
	17.5

Junior Year*First Semester*

EE 20224. Electrical Circuit Analysis	2
EE 20225. Intro to Electrical Engineering	2
CSE 30321. Computer Architecture	4
Free Elective	3
Core Curriculum course +	3
CSE Elective	3
	<hr/>
	17

Second Semester

EE 20234. Electric Circuits	3
EE 20242. Electronics	4
CSE 30341. Operating System Principles	3
ACMS 30440. Probability and Statistics	3
Core Curriculum course +	3
	<hr/>
	16

Senior Year*First Semester*

EE 30344. Signals and Systems	3
CSE Electives*	9
Free Elective	3
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	15

Second Semester

CSE 40175. Ethics and Professional Issues	3
CSE 40522. CPEG Capstone	4
CSE Elective*	3
Core Curriculum course +	3
	<hr/>
	13

Total Program Credits: 132

COMPUTER SCIENCE PROGRAM**Sophomore Year***First Semester*

PHYS 10320. General Physics II	4
CSE 20110. Discrete Mathematics	3
CSE 20311. Fundamentals of Computing	4
MATH 20550. Calculus III	3.5
Core Curriculum course +	3
	<hr/>
	17.5

Second Semester

CSE 20221. Logic Design	4
CSE 20289. Systems Programming	3
CSE 20312. Data Structures	4
MATH 20580. Introduction to Linear Algebra and Differential Equations	3.5
Core Curriculum course +	3
	<hr/>
	17.5

Junior Year*First Semester*

CSE 30321. Computer Architecture	4
CSE Elective*	3
Technical Elective	3
Core Curriculum course +	3
CSE Elective	3
	<hr/>
	16

Second Semester

CSE 30151. Theory of Computing	3
CSE 30332. Programming Paradigms	3
CSE 30341. Operating System Principles	3
ACMS 30440. Probability and Statistics	3
Core Curriculum course +	3
	<hr/>
	15

Senior Year*First Semester*

CSE 40113. Algorithms	3
CSE Electives*	6
Technical Elective	3
Free Elective	3
	<hr/>
	15

Second Semester

CSE 40175. Ethics and Professional Issues	3
CSE Electives*	6
Core Curriculum course +	3
	<hr/>
	12

Total Program Credits: 129

+ See "Core Curriculum" on the first page of the College of Engineering section.

* These courses must be selected from a list approved by the department. For computer engineering, at least one must be a designated design course.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Computer Science and Engineering*. Course descriptions can be found by clicking on the subject code and course number in the search results.

ELECTRICAL ENGINEERING

Electrical Engineering

Chair:

Thomas E. Fuja

H.C. and E.A. Brosey Professor of Electrical

Engineering:

Panagiotis J. Antsaklis

Leonard Bettex Chair of Electrical Engineering:

Daniel J. Costello Jr. (emeritus)

Frank M. Freimann Professors of Electrical Engineering:

Gary H. Bernstein; Martin Haenggi; Bertrand Hochwald; Craig Lent; Ruey-wen Liu (emeritus); James L. Merz (emeritus); Anthony N. Michel (emeritus); Wolfgang Porod; Alan C. Seabaugh

Keough-Hesburgh Chair in Electrical Engineering and Biological Sciences:

Gregory Timp

Freimann Chair of Engineering:

Suman Datta

Professors:

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Associate Professors:

Douglas C. Hall; Anthony Hoffman; Scott Howard; Hai Lin; Lei Liu; Ken D. Sauer

Assistant Professors:

Jonathan Chisum; Thomas O'Sullivan

Research Professors:

Alexander Mintairov; Alexei Orlov; Thomas Pratt

Research Associate Professor:

Sergei Rouvimov

Teaching Professor:

R. Michael Schafer

Concurrent Faculty:

Kevin Bowyer; Patrick Flynn; Sharon Hu; Yiyu Shi; Nicholas Zabaras

Statement of Goals and Objectives. The goals of the Department of Electrical Engineering's academic programs are to provide quality education and to foster leading-edge research as means of training highly qualified engineers and leaders of tomorrow, in keeping with the mission of the University of Notre Dame. The educational objectives through which this goal is met are:

- Graduates will successfully participate in the electrical engineering profession.
- Graduates will enroll in and complete high quality MS, PhD, JD, MBA and MD programs.
- Graduates will exploit the breadth in their education to secure a diverse set of initial positions and will demonstrate professional agility in adapting to varied career paths and changing professional landscapes.

Program of Studies. The Department of Electrical Engineering offers programs of study that lead to the

degrees of bachelor of science and master of science in electrical engineering and doctor of philosophy. The program leading to the bachelor of science degree is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

Program in Electrical Engineering. The four-year curriculum, listed below, includes required and elective courses in the pure and applied sciences, the humanities, and electrical engineering. Emphasis is on the mastery of fundamental principles, with added depth and provision for specialization in the major professional areas of communications, control systems, electronic circuit design and analysis, microelectronics and integrated circuit fabrication, photonics, and signal image processing. Students are individually assisted and advised in their choices of elective courses. Departmental facilities include laboratories for electronics, circuits, electrophysics, control systems, communications, integrated circuit fabrication, photonics, microwave circuit/device characterization, and digital signal/image processing.

Further details about the electrical engineering program may be found on the Web at ee.nd.edu.

The following course schedule is applicable to the EG class of 2019.

First Year of Studies

First-year students intending to major in electrical engineering when they become sophomores will find first-year course requirements on the first page of the College of Engineering section.

Sophomore Year

First Semester

MATH 20550. Calculus III	3.5
PHYS 10320. General Physics II	4
CSE 20133. Introduction to Computing for EE Majors	3
EE 20224. Introduction to Electric Circuit Analysis	2
EE 20225. Introduction to Electrical Engineering	2
Core Curriculum course+	3
	17.5

Second Semester

MATH 20580: Introduction to Linear Algebra and Differential Equations	3.5
EE 20242. Electronics	4
EE 20234. Electric Circuits	3
CSE 20221. Logic Design	4
Free Elective	3
	17.5

Junior Year

First Semester

MATH 30650. Differential Equations	3
EE 30344. Signals and Systems	3
EE 30347. Fundamentals of Semiconductors	3
EE 30348. Electromagnetic Fields	3
Core Curriculum course+	3
	15

Second Semester

EE 30363. Random Phenomena in EE	3
Electrical Engineering Electives*	6
Technical Elective	3
Core Curriculum course+	3
	15

Senior Year

First Semester

EE 41430. Senior Design I	3
Electrical Engineering Electives*	6
Free Elective	3
Core Curriculum course+	3
	15

Second Semester

EE 41440. Senior Design II	3
Electrical Engineering Electives*	6
Technical Elective†	3
Core Curriculum course+	3
	15

Total for four years: 131 semester hours.

* At least one electrical engineering elective must be chosen from EE 30342, 40446, 40455, 40458, and 40468.

+ See "University Core Curriculum" on the first page of the College of Engineering section.

† The engineering science and technical elective course lists may be found on the Electrical Engineering website.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Electrical Engineering*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Certain graduate courses are open to advanced undergraduates with permission of the department chair.

Interdepartmental Engineering

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Engineering (Non-Departmental)*. Course descriptions can be found by clicking on the subject code and course number in the search results.

DUAL DEGREE PROGRAMS

Dual Degree Programs

**DUAL DEGREE PROGRAM WITH
THE COLLEGE OF ARTS AND LETTERS***Coordinators:*

College of Engineering
Michael Ryan
Assistant Dean
College of Arts and Letters
Advising dean for each cohort

Program of Studies. The five-year dual degree program between the College of Arts and Letters and the College of Engineering enables the student to acquire degrees from both colleges—the bachelor of arts from the College of Arts and Letters and the bachelor of science degree in a chosen program of the College of Engineering.

This combination program, instituted in 1952, offers students the advantages of both a liberal and a technical education. The student completing one of these combination programs has a background in the humanities and social sciences as well as a degree from one of the programs offered by the College of Engineering. Advisors for the program are available for consultation about the advisability of entering the program and about meeting the particular needs of each student pursuing this program. Qualified students are eligible to receive modest scholarship support from the John J. Reilly Endowed Scholarship program during their third, fourth, and fifth years of study.

The decision to enter the program ideally should be made prior to beginning the sophomore year, although students can also enter the program at a later stage. Three sets of requirements must be met by students in the program: University requirements, Arts and Letters requirements and Engineering requirements, as the following table indicates.

University Requirements

Philosophy	6
Theology	6
Writing and Rhetoric	3
University Seminar+	(3)
History or Social Science (LA5)	3
Arts and Literature or	
Advanced Language and Culture (LA4)	3
Moreau First Year Experience	2
	26

Arts and Letters Requirements

College Seminar	3
Literature	3
History	3
Foreign Language* (1–4 courses)	3–14
Fine Arts	
Social Science	
Major (minimum)	27
	42/45

Engineering Requirements

CHEM 10171	4
MATH 10550, 10560, 20550, 20580	15
PHYS 10310, 10320	8
EG 10111, 10112	6
	33

Major

approximately 60 credits (see specific major for details)

Engineering Program

Engineering degree program (required courses and program or technical electives) 69–75
Total : 170–179

Schematic Program of Studies

The exact sequence of courses will vary based on the specific majors selected.

First Semester

WR 13100. Writing and Rhetoric	3
Intro to Theology/Philosophy	3
CHEM 10171. General Chemistry:	
Fundamental Principles	4
EG 10111. Introduction to Engineering	
Systems I	3
MATH 10550. Calculus I	4
Moreau First Year Experience	1
	18

Second Semester

University Seminar	
(Theo/Philo recommended)+	3
CHEM 10122. General Chemistry:	
Biological Processes	3
EG 10112. Introduction to Engineering	
Systems II	3
MATH 10560. Calculus II	4
PHYS 10310. General Physics I	4
Moreau First Year Experience	1
	18

Third Semester

Modern Language	3
PHYS 10320. General Physics II	4
MATH 20550. Calculus III	3.5
Engineering Program†	3
Engineering Program	3
	16.5

Fourth Semester

Theology/Philosophy	3
College Seminar	3
Modern Language	3
MATH 20580. Linear Algebra	
and Differential Equations	3.5
Engineering Program	3
Engineering Program	3
	18.5

Fifth Semester

History/Social Science	3
History/Social Science	3
Engineering Program	3
Arts and Letters Major††	3
Engineering Program	3
Engineering Program	3
	18

Sixth Semester

Philosophy/Theology	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
Arts and Letters Major	3
	18

Seventh Semester

Literature	3
History/Social Science	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
	18

Eighth Semester

Fine Arts	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
	18

Ninth Semester

Engineering Program	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
Arts and Letters Major	3
	18

Tenth Semester

Engineering Program	3
Engineering Program	3
Engineering Program	3
Engineering Program	3
Arts and Letters Major	3
Arts and Letters Major	3
	18

+ The University Seminar may be selected from an appropriate history, social science, fine arts or literature course, or the first course in the theology or philosophy.

* Students who place out of lower level language courses must take at least one language course at the appropriate level.

† Courses specified by the student's major engineering department.

†† Courses necessary to fulfill the requirements for a major in the student's major arts and letters department.

DUAL DEGREE PROGRAMS

DUAL DEGREE PROGRAM WITH THE COLLEGE OF SCIENCE*Coordinators:*

Michael Ryan
Assistant Dean
College of Engineering
Malgorzata Dobrowolska-Furdyna
Associate Dean
College of Science

Program of Studies. The five-year dual degree program between the College of Science and the College of Engineering enables the student to acquire degrees from both colleges—the bachelor of science from the College of Science and the bachelor of science degree in a chosen program of the College of Engineering.

This combination program, instituted in 2013, offers students the advantages of the liberal arts aspects of natural science and mathematics education coupled with a strong technical education. Because a student may enter the program from either college, both colleges have agreed to a certain degree of flexibility in allowing students to meet degree requirements. The following guidelines apply to all students intending to pursue this dual degree program, regardless of the student's initial college:

(1) Students must complete the degree requirements of both colleges, including University requirements (satisfied only once for both degrees), college requirements (with liberal appropriate substitutions for similar courses), and major requirements (with limited appropriate substitutions for similar content). Students may double-count more than one course between both degrees as appropriate to eliminate unnecessary duplication in course content.

(2) Students must earn 30 usable (degree-appropriate) credits past engineering degree requirements. Usable credits are defined as credits—including AP, IB, credit-by-examination and course credits—that are of high enough level that they could be applied to degree requirements. For example, additional AP credits in economics could be used to satisfy a free elective credit in a degree program, but AP credit for statistics (ACMS 10145) cannot be used in either degree program because the class level is lower than the statistics requirements for any degree program in science or engineering.

(3) Students must complete sequences of courses in mathematics, chemistry and physics, as described in the course sequences below and the corresponding table on the following page. This requirement ensures that all necessary material is covered through a sequence of classes, and that students do not duplicate content by taking classes from more than one approved sequence.

(4) The exact set of courses a student must complete to earn both degrees will be determined by agreement between the appropriate associate/assistant deans of each college and will, naturally, depend on the pair of majors selected. Ordinarily, a student will

	ACMS/Statistics	Mathematics	Physics	Chemistry	Other Science
AERO ME	Math 3* Chem 1 or 3 Phys 1	Math 1 or 2* Chem 1 or 3 Phys 1	Math 1a, 2*, 3* or 4 Chem 1 or 3 Phys 3	Math 1a, 2* or 3* Chem 4 Phys 1	Math 1a, 2* or 3* Chem 1 or 3 Phys 1
CE	Math 3 Chem 1 or 3 Phys 1	Math 1 or 2 Chem 1 or 3 Phys 1	Math 1, 2, 3 or 4 Chem 1 or 3 Phys 3	Math 1, 2 or 3 Chem 4 Phys 1	Math 1, 2 or 3 Chem 1 or 3 Phys 1
CHEG	Math 3 Chem 2 or 4 Phys 1	Math 1 or 2 Chem 2 or 4 Phys 1	Math 1, 2, 3 or 4 Chem 2 or 4 Phys 3	Math 1, 2 or 3 Chem 4 Phys 1	Math 1, 2 or 3 Chem 2 or 4 Phys 1
CPEG CS EVEG EVES	Math 3 Chem 1 or 3 Phys 1	Math 1 or 2 Chem 1 or 3 Phys 1	Math 1a, 2, 3 or 4 Chem 1 or 3 Phys 3	Math 1a, 2 or 3 Chem 4 Phys 1	Math 1a, 2 or 3 Chem 1 or 3 Phys 1
EE	Math 3 Chem 1 or 3 Phys 2	Math 1 or 2 Chem 1 or 3 Phys 2	Math 1, 2, 3 or 4 Chem 1 or 3 Phys 3	Math 1, 2 or 3 Chem 4 Phys 2	Math 1, 2 or 3 Chem 1 or 3 Phys 2

* *AERO and ME students need not take AME 30314 because it duplicates content of MATH/ACMS 20750. However, they must take the 0-credit Vibrations and Controls make-up sequences through AME.*

present a plan of study that incorporates the above rules for approval.

Approved Math Sequences:

1. MATH 10550, 10560, 20550, 20580, 30650
CE, CHEG, EE
- 1a. MATH 10550, 10560, 20550, 20580
AERO, CPEG, CS, EVEG, EVES, ME
2. MATH 10550, 10560, 20550, 20610, 20750
3. MATH 10550, 10560, ACMS 20550, 20750, 20620
4. MATH 10550, 10560, 20550, PHYS 20451, 20452

Approved Chemistry Sequences:

1. CHEM 10171/11171, 10122
All EG (except CHEG)
2. CHEM 10171/11171, 10122, 10172/11172, 20273
CHEG
3. CHEM 10171/11171, 10172/11172
4. CHEM 10181/11181, 10182/11182, 20283/22283, 20284/22284

Approved Physics Sequences:

1. PHYS 10310, 10320
All EG (except EE)
2. PHYS 10310, 10320, 20330
EE
3. PHYS 10411, 10424, 20435, 20464

DUAL DEGREE PROGRAM WITH THE MENDOZA COLLEGE OF BUSINESS*Coordinators:*

Kristin McAndrew
Director of Admissions
Master of Business Administration Program
Michael Ryan
Assistant Dean
College of Engineering

Program of Studies. The five-year dual degree program between the Mendoza College of Business and the College of Engineering enables the student to earn the bachelor of science in a chosen field of the College of Engineering and the master of business administration.

This program, instituted in 1991, offers students the opportunity to better integrate study in engineering and in management. The student completing this program has a background in the management sciences, as well as the first professional degree in one of the fields of engineering. Because it is a demanding program, only those students of superior scholastic ability, who have both the aptitude and motivation necessary for the combined graduate and undergraduate program, should apply. Advisors for the program are available for consultation about the advisability of applying for the program and about meeting the particular needs of each student pursuing this program.

This program is open only to those currently enrolled Notre Dame students who have completed three years of a degree program in the College of Engineering. Students interested in the MBA/engineering program should apply to the MBA program during their junior year. To facilitate the application process, students should take the

OFFICERS OF ADMINISTRATION

Graduate Management Admission Test (GMAT) by December of their junior year.

An applicant who is not admitted to the dual degree engineering/MBA program continues in the undergraduate engineering program and completes his or her undergraduate engineering program in the usual four-year time frame.

As a general rule, it is expected that a student accepted to this program will take two courses required for the undergraduate engineering degree during the summer session following the junior year. The following schedule of classes is an example of how a program might be accomplished.

Students in the five-year engineering/MBA program are also required to:

(1) Complete a minimum of 48 MBA credit hours and maintain a GPA of at least 3.0 to successfully complete the program.

(2) Take only MBA courses in their fourth year and be able to complete 16 MBA credits plus all outstanding engineering degree requirements in the fifth year.

(3) Maintain full-time student status (minimum course load of 12 credit hours per semester).

First Year, Sophomore Year, Junior Year:

As outlined for individual engineering degree programs in this *Bulletin*. 98–104 credit hours.

Summer Session Following Junior Year:

Arts and Letters course+	3
Arts and Letters course+	3
Math Review Workshop*	0
Accounting Review Workshop*	0

The MBA curriculum divides each semester into two modules.

Senior Year

36 credits, all MBA courses

First Semester, Module 1:

ACCT 60100. Financial Accounting	2
MBET 60340. Conceptual Foundation of Business Ethics	2
MGT 60100. Statistics	2
MGT 60300. Organizational Behavior	2

First Semester, Interterm Week:

Professional Development Seminar	1
Communications Seminar++	1

First Semester, Module 2:

ACCT 60200. Cost Accounting	2
FIN 60400. Finance I	2
FIN 60210. Microeconomic Analysis	2
MARK 60100. Marketing Management	2

Second Semester, Module 3:

FIN 70600. Finance II	2
FIN 60220. Macroeconomic Analysis	2
MGT 60900. Strategic Decision Making	2
Free Elective	2

Second Semester, Interterm Week:

Values in Decision Making	1
Required Course (TBD)	1

Second Semester, Module 4:

MGT 60400. Leadership and Teams	2
MGT 60700. Operations Management	2
Free Elective	2

Fifth Year

12 credits, MBA courses and remainder engineering courses

First Semester, Module 1:

MGT 60200. Problem Solving	2
Management Communication Elective I (Floating Optional Elective*)	2)

**Students have the option to take one additional two-credit-hour elective now or in any remaining module.*

First Semester, Module 2:

Ethics Elective	2
Management Communication Elective (Floating Optional Elective)	2)

Second Semester, Module 3:

Free Elective	2
Free Elective	2
(Floating Optional Elective)	2)

Second Semester, Interterm Week:

(OPTIONAL: Two one-credit-hour electives OR Corporate Case Studies OR Offshore Program: China or Brussels)	2)
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Second Semester, Module 4:

Free Elective	2
Free Elective	2
(Floating Optional Elective)	2)

+See "Arts and Letters Core" on the first page of the College of Engineering section.

++Special one/two-week courses. All other MBA courses are seven weeks in length.

**Occurs during August Orientation*

Total for both degrees: 128–134 undergraduate, 48 MBA

One MBA course will be accepted as an elective or technical elective by each College of Engineering program. No more than two MBA courses may be accepted toward an undergraduate degree from the College of Engineering. Students are advised to check specific program requirements.

Officers of Administration

YIH-FANG HUANG, Ph.D.

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Chair of the Department of Electrical Engineering

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Keough School of Global Affairs

The Donald R. Keough School of Global Affairs is the first new school at the University of Notre Dame in nearly a century. In keeping with Notre Dame's mission to place scholarship in service to the common good, the Keough School advances integral human development through research, policy and practice; transformative educational programs; and partnerships for global engagement.

Founded in 2014, the Keough School builds on the strengths of existing institutes focused on international research, scholarship, and education at Notre Dame. The Keough School educates and trains global affairs professionals, preparing students for effective and ethical professional leadership in governments, nongovernmental organizations, and the private sector. The Master of Global Affairs welcomed its first class of students in August 2017. The Keough School will be inaugurating new undergraduate programming in 2019.

The institutes and centers within the Keough School offer Notre Dame students a wide range of globe-spanning academic opportunities and programs of study in addition to the extensive study abroad and other options available through Notre Dame International.

Details about the Donald R. Keough School of Global Affairs can be found online at <http://keough.nd.edu/>.

Global Affairs

Associate Director for Undergraduate Programs:
Denise A. Ayo

SUPPLEMENTARY MAJOR IN GLOBAL AFFAIRS

The new supplementary major in Global Affairs, framed within the School's mission to advance integral human development, offers an interdisciplinary and integrated study of contemporary global issues. It provides students with foundational knowledge of the major political, economic, and social institutions of our world and gives them the analytical tools and skills they need to become active, engaged, and knowledgeable global citizens. Students in the supplementary major complete 5 core courses (15 credit hours) and 5 concentration courses (15 credit hours) in a selected area of study. In addition, they are required to develop cross-cultural competency through proficiency in a second language and participation in an immersive cross-cultural experience.

For more information, please contact Denise A. Ayo at dayo@nd.edu.

Asian Studies

Director:
Michel Hockx
Director of Undergraduate Studies:
Patrick Deegan

LIU INSTITUTE FOR ASIA AND ASIAN STUDIES

The program in Asian Studies introduces students to the complexity of the continent of Asia. Students select courses in a wide variety of fields, such as anthropology, East Asian languages and cultures, economics, film, television, and theatre, history, political science, and psychology. The Liu Institute for Asia and Asian Studies also provides enriching activities such as lectures, films, gatherings, and grant opportunities to students interested in Asia. Students with the supplementary major or the minor in Asian Studies will be very desirable employees of international business or accounting firms, nongovernmental organizations, and service organizations. They will be well prepared for graduate school in a discipline, or for a professional school such as law or business. The supplementary major and the minor in Asian Studies provide recognition of students' training in this significant aspect of the world.

THE SUPPLEMENTARY MAJOR IN ASIAN STUDIES

The supplementary major in Asian Studies emphasizes the study of Asia as an integral part of the world today. Students study both historical and contemporary aspects of culture, society, politics, literature, language, religion, etc. Required classes stress interdisciplinarity through our intra-university offerings.

Through the interdisciplinary nature of the major, classes draw from a broad range of topics, enabling the student to come away with a holistic and comprehensive study of Asia, including both humanistic and social scientific approaches to study.

Requirements for the Supplementary Major:

Asia-related courses from each of the following disciplines: (Total of 24 credit hours)

- One history: one class in ancient, early, or modern history (3 credit hours)
- One literature/culture (East Asian Languages and Cultures, English) (3 credit hours)
- One social science (anthropology, economics, political science, psychology, or sociology) (3 credit hours)
- One humanities (theology or philosophy) OR an additional literature/culture (3 credit hours)

- Three general electives (can include up to 6 credit hours of language) (9 credit hours)
- One upper-level course taken during the senior year that culminates in a capstone essay (3 credit hours)

THE MINOR IN ASIAN STUDIES

Students who are contemplating graduate study in a particular area of the world or a career in international business or government—as well as those who are generally interested in the region—are well served by the minor in Asian Studies. It provides a well-rounded introduction to the world's most populous region. The minor in Asian Studies is a very appropriate accompaniment to majors in anthropology, East Asian languages and cultures, history, political science, economics, or other arts and letters departments. It is also suitable for students in the Mendoza College of Business, the College of Science, and other Colleges and Schools at our University.

Students should meet with the director of undergraduate studies (DUS) as early as possible in their academic career in order to plan their courses. They should also meet with the DUS each semester to select approved courses.

Requirements for the Minor:

Asia-related courses fulfilling each of the following: (Total of 15 credit hours)

- Four courses from at least three different disciplines (history, literature/culture, humanities, social sciences; may include up to one language course) (12 credit hours)
- One upper-level course taken during the senior year that culminates in a capstone essay (3 credit hours)

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Asian Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

European Studies

Director:

A. James McAdams

THE NANOVIC INSTITUTE FOR EUROPEAN STUDIES

Founded in 1992, the Nanovic Institute builds upon Notre Dame's broad base of faculty expertise in the histories, languages, and cultures of Europe. With a comprehensive suite of grant programs, a full range of lectures and campus events, and the participation of faculty fellows from a wide range of academic departments, the Institute creates a well-integrated, multidisciplinary, and international home for students and faculty to explore the evolving ideas, cultures, beliefs, and institutions that shape Europe today.

The Minor

Administered by the Nanovic Institute, the Minor in European Studies (MES) allows students to explore topics of interest and relevance in the field of European Studies. The MES is an appropriate accompaniment to majors related to international affairs, economics, art, architecture, and many others. Students should meet with the Institute's Student Coordinator to learn more and plan their course of study.

The program has three component requirements:

- completion of three upper-division courses from two different departments in approved areas of European Studies (9 credits)
- one semester of European language study beyond the College of Arts and Letters requirement (note: this applies to students in all colleges) (3 credits)
- a capstone thesis essay on a topic within European Studies, to be completed during the senior year (3 credits)

Other Undergraduate Support

The Nanovic Institute also administers a wide range of undergraduate grant programs. European Studies minors and other undergraduates wishing to travel to Europe to conduct research, carry out internships or service projects, or to complete other academic initiatives are encouraged to apply for support.

For more information, interested students should consult the institute's website at nanovic.nd.edu.

International Development Studies

Director:

Steve Reifenberg

Associate Director:

Holly Rivers

The goal of the **Kellogg Institute for International Studies'** minor in International Development Studies (IDS) is to provide undergraduate students with both the opportunity to learn about and contribute to international development. IDS will provide context and an academic foundation for students to analyze the dynamics of development across the globe as well as help students develop skills for effective engagement in a complex world.

Development studies is interdisciplinary in nature, so students are required to take courses in a variety of disciplines. This equips students with a broad lens through which to view and investigate development challenges. Students from all colleges and departments are encouraged to enroll.

The IDS minor prepares students for a variety of post-graduate options related to international development, including graduate work in development studies, volunteer work or employment in the field, ranging from international and advocacy organizations, businesses, consulting firms, and policy and research groups. Regardless of what career path IDS students follow, the breadth and diversity of academic and fieldwork training help prepare them to apply their learning from the classroom to the world around them.

The IDS minor was founded by the Kellogg Institute's Ford Program in Human Development Studies and Solidarity, and today the minor is managed by the Kellogg Institute, working closely with the Ford Program. To supplement their course work, students can take advantage of the many opportunities made available by the Kellogg Institute and the Ford Program: a calendar of events, grants and internship opportunities, an annual student-led human development research conference, and other resources.

Requirements:

A central component and requirement of the IDS minor is a field-based research project in the so-called "developing" world, allowing students to contribute to the Ford Program's mission of seeking solutions to real world challenges by examining the causes and consequences of extreme poverty. This research project will normally be conducted the summer after a student's junior year.

Additionally, the minor in International Development Studies consists of 15 credit hours:

Gateway Course (3 credit hours): Introduction to International Development Studies

- This course is usually offered in the fall and spring semesters and will normally be taken during sophomore year.

Research Methods Course (3 credit hours)

- Students are expected to take a research methods course through the designated IDS courses or through a methods course in a student's major. (Courses that meet this requirement must be approved by the IDS office.)

Two Electives (6 credit hours):

- Qualifying elective courses are listed each semester in the Schedule of Classes under IDS.
- When possible, students are encouraged to take an elective outside a student's major college.
- One of these electives must be outside a student's major.
- With approval, one course may be taken abroad.

Capstone Seminar (3 credit hours):

- This course will be taken the fall semester of senior year.
- Each student will write a senior essay based on his or her field research.
- Bringing together their unique experiences and disciplinary perspectives, students will discuss and critique each other's work.

For more complete information about the minor in International Development Studies, please consult our website at kellogg.nd.edu/students/ids. Questions about the minor can be directed to Holly Rivers at hrivers@nd.edu

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *International Development Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Irish Studies

Director:

Patrick Griffin

Director of Undergraduate Studies

Mary O'Callaghan

KEOUGH-NAUGHTON INSTITUTE FOR IRISH STUDIES

The Keough-Naughton Institute for Irish Studies provides students with a unique opportunity to explore Ireland's extraordinary tradition in literature (in both the English and Irish languages) and distinctive historical development, including its influence on the history of the United States. The Irish Studies faculty includes leaders in several fields, including English, history, film, television, and theatre, anthropology, American studies, marketing, politics, psychology, medieval studies, classics and Irish language and literature. The Irish Studies Program also organizes a calendar of intellectual and cultural activities in which undergraduates are encouraged to participate; visitors to campus have included Seamus Heaney and John Hume, both Nobel Prize winners, and other leading Irish writers and public figures, including Mary McAleese, two-term president of Ireland.

Minor

The core of the program is a minor in Irish Studies. The minor helps students develop their understanding of Irish society, culture, and politics through both course work and firsthand experience of Ireland. To qualify for the minor, students must demonstrate proficiency in Irish language (by taking IRST 10101, 10102, and 20103) and complete four three-credit Irish Studies courses; students may choose to undertake independent study with a faculty fellow in lieu of one of the four courses. The topic must be agreed upon before the independent study begins. Courses may be taken on Notre Dame's campus, at Dublin's O'Connell House, and through the Kylemore Abbey Global Center; courses from other study abroad programs may be substituted with permission. All qualifying classes are listed in the Schedule of Classes under IRST.

Dublin Program

The home of the Dublin program is the Keough Naughton Notre Dame Centre in O'Connell House in the historic heart of Ireland's capital. Each semester, roughly 35 Notre Dame students enroll for courses in the Centre and at Trinity College Dublin, University College Dublin, and the National College of Art and Design. The program includes several field trips and a variety of social and cultural activities. Students taking the minor in Irish Studies have a distinct advantage when applying for this highly competitive program.

Irish Internships

The Keough-Naughton Institute for Irish Studies annually awards Keough Irish Internships, which place undergraduates in internship positions in

Dublin relating to Irish politics and commerce, culture, and society. In the past, students have been placed in the Irish parliament, government departments, the Irish Film Centre, and various social service organizations. Most internships last for a period of seven weeks.

For further information, students should consult Prof. Patrick Griffin, director; telephone 631-3555.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Irish Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Peace Studies

Director of Undergraduate Studies:

Ernesto Verdeja

Assistant Director:

Anna Van Overberghe

Peace Studies at the University of Notre Dame is centered at the **Kroc Institute for International Peace Studies**. Profiles of the Peace Studies faculty and information about activities in Peace Studies can be found on the Kroc Institute's website at kroc.nd.edu.

Program of Studies. Peace Studies is defined as an interdisciplinary field of study that draws on diverse academic disciplines to understand the causes of violent conflict; develop nonviolent ways to prevent and resolve war, genocide, terrorism and gross violations of human rights; and build peaceful and just societies.

As a liberal arts curriculum, Peace Studies links scholarship to practice and empowers students to become effective citizens with global perspective. It develops critical thinking skills, strengthens research and writing ability, teaches specific tactics in areas such as conflict resolution and social change, and challenges students to develop their knowledge into new ways of thinking and acting in the world. Peace Studies provides students with the capacity to imagine and build the global community as it ought to be (rather than simply how it is) and with the skills to work toward that vision.

The Undergraduate Program in Peace Studies offers two curriculum options: the Supplementary Major in Peace Studies (24 credits) and the Interdisciplinary Minor in Peace Studies (15 credits). Both require students to complete an introduction course, a mid-level course on peacebuilding and a capstone research and writing seminar. The remaining coursework consists of electives selected from the Peace Studies course catalog. Electives are designated as either core electives or support electives.

The Supplementary Major. The Supplementary Major in Peace Studies requires successful completion of eight (8) courses: the three required courses and five courses selected from a list of approved peace studies electives. At least two of the five electives must be core electives. The curriculum for the supplementary major is:

Required Courses

IIPS 20101 Introduction to Peace Studies	3 cr
IIPS 33101 Perspectives on Peacebuilding	3 cr
IIPS 43101 Peace Studies Senior Seminar	3 cr

Peace Studies Electives

2 core IIPS courses	6 cr
3 additional IIPS courses (core or support)	9 cr

The Interdisciplinary Minor. The Interdisciplinary Minor in Peace Studies requires successful completion of five (5) courses: the three required courses and two courses selected from a list of approved

peace studies electives. The curriculum for the minor is:

Required Courses

IIPS 20101 Introduction to Peace Studies	3 cr
IIPS 33101 Perspectives on Peacebuilding	3 cr
IIPS 43101 Peace Studies Senior Seminar	3 cr

Peace Studies Electives

2 additional IIPS courses (core or support)	6 cr
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The required courses may not be taken concurrently. Introduction to Peace Studies is a pre-requisite for Perspectives on Peacebuilding, and both of those foundational courses are pre-requisites for Peace Studies Senior Seminar. The senior seminar course may only be taken during the senior year.

Elective courses may be completed at any point, and they may be taken concurrently with required courses. However, students are advised to take Introduction to Peace Studies first, before completing other work in the curriculum. Courses taken abroad count only as Peace Studies electives and may not substitute for any of the required courses.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Institute for International Peace Studies*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Officers of the Administration

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Marilyn Keough Dean

TED BEATTY

Associate Dean for Academic Affairs

HAL CULBERTSON

Associate Dean for Operations

SARA SIEVERS

Associate Dean for Policy & Practice

JENNIFER MASON McAWARD

Director, Center for Civil and Human Rights

RAY OFFENHEISER

Director, Notre Dame Initiative for Global Development

PAOLO CAROZZA

Director, Kellogg Institute for International Studies

PATRICK GRIFFIN

Director, Keough-Naughton Institute for Irish Studies

ASHER KAUFMAN

Regan Director, Kroc Institute for International Peace Studies

MICHEL HOCKX

Director, Liu Institute for Asia & Asian Studies

WILLIAM DONAHUE

Director, Nanovic Institute for European Studies

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College of Science

The University of Notre Dame awarded its first bachelor of science degree in 1865. Before that time, courses had been taught in mathematics (from 1842), in biology (from 1844), and in chemistry (from 1850). In 1867, a program in general science was formulated. Subsequently, specialized programs were added, leading to the degree of bachelor of science in botany and in zoology (both now covered by one degree in biological sciences), in environmental sciences, in biochemistry, in chemistry, in physics, in mathematics, and in preprofessional studies.

Departments of the College of Science

The Department of Applied and Computational Mathematics and Statistics is housed in Crowley Hall, in the academic center of campus. The facilities include office space for faculty members, graduate students and postdoctoral associates, as well as space for these department members to collaborate with undergraduate students in research and educational activities. The department has access to the computing resources of the Center for Research Computing and computing facilities dedicated to department research groups.

The Department of Biological Sciences, located in the Galvin Life Science Center, has well-equipped laboratories for undergraduate and graduate research. The facilities include controlled-environment rooms; an optics facility containing confocal microscopes, scanning and transmission electron microscopes; molecular analysis facilities for DNA sequencing, microarrays, cell sorting; and extensive data storage and retrieval equipment.

The Hank Center for Environmental Science provides more than 20,000 square feet of state-of-the-art research space for aquatic, terrestrial, and environmental studies that includes greenhouses, wet laboratories, and a field sample processing room.

The Freimann Life Science Center provides additional laboratories, vertebrate animal care, and associated specialized modern research facilities to serve the expanding needs of life science research at Notre Dame.

The Jordan Hall of Science contains 16 state-of-the-art biology laboratories for teaching undergraduate and graduate life science laboratory courses. In addition, the collections of museum specimens, including the Greene-Nieuwland Herbarium and the Museum of Biodiversity, are available for research and teaching, housed in superb facilities in Jordan Hall.

The Department of Chemistry and Biochemistry, located in Nieuwland Science Hall and Stepan Hall of Chemistry and Biochemistry, has laboratories devoted to research in several areas of chemistry: physical, inorganic, organic, and biochemistry. The laboratories are equipped with all necessary facilities for undergraduate students, graduate students, postdoctoral investigators, and faculty. Undergraduate researchers have access to seven high-field NMR spectrometers and three state-of-the-art single crystal X-ray diffractometers, plus many other pieces of equipment such as infrared, ultraviolet, Raman, mass spectrometer; photoelectron spectroscopy; potentiostats; analytical and preparative HPLC and GC equipment; special apparatus for studying mechanisms and rates of reactions; and cell culture facilities. For theoretical work, two large parallel cluster supercomputers are available. The facilities of the Radiation Research Laboratory are used by some faculty of the chemistry department for research in physical chemistry.

The new Jordan Hall of Science houses all of the undergraduate teaching laboratories for chemistry and biochemistry. Included are spacious facilities for introductory and organic chemistry; analytical, physical, and inorganic chemistry; and biochemistry. The building also contains a new NMR spectrometer. Also within Jordan Hall are two large lecture rooms specially designed for teaching introductory science courses, along with a 150-seat multimedia visualization center.

The Department of Mathematics is housed in Hayes-Healy Center/Hurley Hall, conveniently located in central campus. The facilities for undergraduate and graduate instruction and research in mathematics include a first-rate research library; a faculty room; offices for the faculty, postdoctoral investigators, and other visitors, graduate students, and staff; several research seminar and conference rooms; and several large classrooms with state-of-the-art media capability.

The Department of Physics, located in Nieuwland Science Hall, has teaching facilities and laboratories for both undergraduate and graduate research. There are facilities for experimental work in astrophysics, biophysics, condensed-matter physics, elementary particle physics, and nuclear physics. There are three atomic spectroscopy laboratories, and some additional use is made of facilities at Argonne National Laboratory. Elementary particle experiments are done at the Stanford and Fermi national laboratories, and at CERN in Geneva, Switzerland. Detector development for the major accelerators is also being done in the department. The Nuclear Science Laboratory has two accelerators dedicated to nuclear astrophysics. This facility is home to the second largest low-energy nuclear physics program in the

country. A variety of solid state facilities are available for the study of metals, high T_c superconductors, and semiconductors. Off-site facilities at Argonne, the National High Magnetic Field Laboratory, and the National Institutes of Standards and Technology are also heavily used. Notre Dame is a partner in the Large Binocular Telescope project. This will be one of the most capable facilities in the world for cutting-edge cosmology and astrophysics research. Research is conducted in many major areas of theoretical physics, including all of the above areas as well as statistical mechanics, field theory, general relativity, and astrophysics. The department has a substantial machine shop and research library and a variety of staff technicians. Many faculty members and research groups have computing facilities, and all have access to the Office of Information Technologies' very large computers.

Jordan Hall of Science houses all of the undergraduate teaching laboratories for physics, including spacious facilities for introductory mechanics, electricity and magnetism, and modern physics. Within Jordan Hall are also a laser and optics lab and an advanced laboratory for physics majors. The building also hosts a rooftop observatory equipped with a dozen small telescopes for introductory astronomy courses, along with a separate dome housing a large, research-quality telescope for physics and astronomy students. Jordan Hall is also home to a 150-seat digital visualization theatre that serves as a planetarium for a variety of astronomy and astrophysics courses.

The Department of Preprofessional Studies is located in the Center for Health Sciences Advising in the Jordan Hall of Science. This center centralizes the advising process for all University students interested in the health professions. All courses for students enrolled in the preprofessional program and collegiate sequence programs are provided by the other departments of the College of Science and the other colleges of the University.

Undergraduate Education

The aim of the program of undergraduate education in the College of Science is to produce intellectually able graduates who are grounded in the broad fundamental principles of the basic sciences, versed in the advanced concepts of their chosen scientific discipline and educated in the humanistic and social studies. Each graduate should be a good scientist in his or her own field; a fully developed person, aware of his or her responsibilities to society and prepared to participate fruitfully in the affairs of society.

Education in science at Notre Dame is a coordinated program involving the basic sciences, the chosen advanced science, and the humanistic and social

CURRICULA AND DEGREES

studies, including theology and philosophy. In this education, the student should acquire a thorough, integrated, and broad understanding of the fundamental knowledge in his or her field, a competence in orderly analytical thinking, and the capacity to communicate ideas to others, orally and in writing. This system of education is so arranged to develop in each student the desire and habit of continuing to learn after graduation, advancing over the years to higher levels of professional and personal stature and keeping abreast of the changing knowledge and problems of his or her profession.

Emphasis is placed on fundamental principles so that the students can develop abilities to apply these principles to the solution of new problems never before encountered by society, to the discovery of new things and to the invention of devices not learned about in books. Notre Dame stresses basic concepts useful in later learning rather than masses of particular facts and data that can better be found in books at the time of need.

Curricula and Degrees

The College of Science offers curricula leading to the degree of bachelor of science in each of six undergraduate departments:

Applied and Computational Mathematics and Statistics
Biological Sciences
Chemistry and Biochemistry
Mathematics
Physics
Preprofessional Studies

The following are degree programs offered by these departments:

Applied and Computational Mathematics and Statistics
Biochemistry
Biological Sciences
Chemistry
Chemistry combined with Business
Chemistry combined with Computing
Environmental Sciences
Mathematics
Mathematics (combined with other programs)
Neuroscience and Behavior
Physics
Physics-in-medicine
Preprofessional Studies
Science-Business
Science-Computing
Science-Education
Statistics

These degree programs are described in detail in later sections of this *Bulletin*.

See also the bachelor of science degree programs offered by the College of Engineering:

Computer Science
Environmental Geosciences

Each College of Science student must enroll in the department of his or her major beginning with the sophomore year; however, a student may change primary majors in the College of Science at any point up until the last drop day of the 7th semester in consultation with their advisor and dean. Concentrations, second and supplementary majors, and minors may be changed at any time.

The College of Science maintains a website at science.nd.edu. Further information related to programs offered by the college may be found at that location.

Listed below are the allowed options for students interested in double science majors, double majors between colleges, second majors in the College of Science, and supplementary majors and minors in the College of Arts and Letters.

Students pursuing one of these combination programs must have superior scholastic ability and be formally accepted by the dean of both colleges involved. Approval will not be granted if there is substantial overlap between the two programs.

Note: Courses taken toward the completion of an additional major, supplementary major or minor may not also be counted toward the student's other major, supplemental major, supplemental major or minor.

Double Science Majors. In certain instances, students will have the option of pursuing majors in two departments of the College of Science. Details on the double science major option and lists of combinations that are normally approved are found under "Special Programs," later in this section of the *Bulletin*.

Dual Degree. Notre Dame students pursuing majors in two of the undergraduate colleges may qualify for a five-year dual-degree program.

The requirements for a dual degree generally are as follows: The student completes all of the university requirements, all of the requirements for both colleges, all of the requirements for both majors, and the total number of degree credits specified for a dual degree in the two colleges. While the total number of hours required does depend on the two major programs, the minimum required total number of degree credits is set to be 30 degree credits beyond the college total for the college with the greatest required number of degree credits.

Double Majors in Two Colleges. Qualified Notre Dame students pursuing majors in one of the other undergraduate colleges or schools may add another major in the College of Science. Additionally, qualified Notre Dame students pursuing a major in the College of Science may also add another major in one of the other undergraduate colleges or schools.

The requirements for a double major between colleges generally are as follows: The student completes all the University requirements, the requirements of his or her college or school, and the requirements of both majors. In general, a single course may not satisfy requirements for both majors.

Supplementary Majors and Minors. Qualified Notre Dame students pursuing majors in the College of Science may add a supplementary major or minor. Options include programs offered through the College of Arts and Letters and the Environmental Geosciences minor offered through the College of Engineering.

Science students may not add the Arts and Letters Preprofessional Studies supplementary major.

Supplementary Majors, Minors, and Concentrations in the College of Science. In the College of Science, the term "second major" is used for a supplementary major. Three departments offer a second major program specifically for students in the other colleges: mathematics as a second major, physics as a second major, and environmental sciences as a second major. The Applied and Computational Mathematics and Statistics department offers supplementary majors for students with a primary major in other departments in the College of Science, as well as other colleges. For details, see the departmental sections of this *Bulletin*.

Three departments in the College of Science offer concentration programs: Applied and Computational Mathematics and Statistics, Mathematics and Physics. For details, see the departmental sections of this *Bulletin*.

Combination Five-Year Program with the Mendoza College of Business. The College of Science and the Mendoza College of Business have established a competitive cooperative program in which a student may simultaneously earn a bachelor of science and a master of business administration degree. The program is structured so that the student who has completed the three years of a science bachelor's degree program, if accepted, completes the master of business administration and the bachelor of science in a major in the College of Science in a summer session and two subsequent academic years.

Students who wish to pursue this program should have a superior scholastic record in their major program and must make application to, and be accepted by, the MBA program.

The general sequence of courses in the five-year Science-MBA program may be found under "Dual Degree Program with the Mendoza College of Business," later in this section of the *Bulletin*.

University and College Requirements

A minimum of 124 credit hours is required for graduation from the College of Science. A minimum of 60 credit hours must be in science; however, each department may specify more than 60 credit hours for any of its programs. A minimum cumulative and major GPA of 2.0 is required for graduation.

All College of Science majors must fulfill University requirements. The specifics of University Requirements are listed in this *Bulletin* on pages 15–18.

Six courses in the liberal arts:

1. Quantitative Reasoning
2. Science and Technology
3. An additional course in Quantitative Reasoning or Science and Technology
4. Arts and Literature or Advanced Languages and Cultures
5. History or Social Science
6. Integration, or a course from an area not yet chosen in 4 or 5.

Four courses exploring explicitly Catholic dimensions of the liberal arts:

1. A foundational Theology course
2. A developmental Theology course
3. A Philosophy course
4. An additional Philosophy course or a Catholicism and the Disciplines course.

Two courses in writing:

1. A University Seminar
2. A Writing and Rhetoric course, or another writing-intensive course.

The two-semester Moreau First Year Experience.

** One of these requirements must be designated as a University Seminar course typically numbered as 13180–13189.*

In addition, all College of Science majors must take courses in:

- Chemistry (10171 and (10172 or 10122) or 10181, 10182)
- Mathematics (10350, 10360 or 10550, 10560 or 10850, 10860)
- Physics (10310, 10320 or 10411, 10424, 20435 or 20210, 20220).

The appropriate sequence for a student depends on the student's major.

The College of Science requires language proficiency through intermediate level in one of the following languages: Arabic, Chinese, French, German, Greek, Irish, Italian, Japanese, Korean, Latin, Portuguese, Russian, and Spanish. "Intermediate proficiency" is defined differently in each of the languages, depending on the complexity of the language and the intensity of the course. Students may complete the language requirement by either completing a course taught at intermediate level or by demonstrating

proficiency through placement examination. The college office maintains a list of language courses at intermediate level. (See the college website, science.nd.edu under Academic Information Frequently Asked Questions.)

Students with no previous background in a language should start with a beginning-level course. They take typically either nine credits over a three-semester period, eleven credits over a three semester sequence, or two semesters of an intensive language sequence (10 credits total). Students with Advanced Placement or SAT II credit may receive up to eight credit hours of language toward their degree. If for some reason more than eight credits appear on the transcript, only eight credits will count toward the required 124 credits. Students who arrive with some background in the language they elect, but without AP or SAT II credit, will be placed by departmental examination but will receive no credit hours.

The College of Science will count a maximum of one credit hour from the following types of activity courses:

Band (Marching and Concert)
Orchestra
Chorale
Glee Club
Liturgical Choir
Folk Choir
Music Lessons and Ensembles
Dance
Debate
Science in the Classroom

Additionally, a maximum of six credit hours of upper-level (30000- or 40000-level) ROTC courses can be counted toward the 124-credit-hour requirement. These courses will be counted as free electives.

The College of Science works with the Center for Social Concerns (see page 27 of the *Bulletin*) to develop relevant, community-based opportunities. Science majors may count as general electives up to 3 credits for approved Summer Service Learning Program courses (e.g., THEO 33936) or Social Concerns Seminars (e.g., CSC 33951).

Not all science courses will count toward degree credit or science elective credit for science majors. The survey science courses offered as options for non-science majors for their University science requirement will not count as a science elective or toward the minimum science credit hour requirement. Because of overlap in content with required courses for science majors, many of these courses will also not count toward the degree credit requirement (see "Science Degree Credit," later in this section of the *Bulletin*).

Some major programs have a science elective requirement. For a course to be a science elective, it must meet the following rules: (1) It is offered through one of the departments of the College of Science or through the college itself. (2) It is major's level; that is, other science majors are required to take

this course to meet a major requirement or it has a prerequisite course that is offered for science majors, or the *Bulletin* description for the course states that it is a science elective in the College of Science. Finally, the departments may place additional restrictions on allowed science electives, e.g., for biological sciences major one science elective must be a non-biology course.

All College of Science courses offered by a major program must be taken at the University of Notre Dame. If a student wants to take a course outside Notre Dame for credit toward the Notre Dame degree, prior approval of the dean's office must be obtained. This does not apply to the courses taken by a transfer student prior to attending Notre Dame.

Advising. All Notre Dame science majors have been assigned an advisor in the department of their major. All advisors are members of the faculty of the College of Science. In some departments, the director of undergraduate studies for the department advises all students. In others, the director of undergraduate studies or the department office may be contacted to find out the name of the student's advisor. A complete list of names of advisors is kept on the science website.

Notre Dame students who have questions concerning the choice of a major or considering a change of major are urged to make appointments with the advisors of the departments involved. Students needing help choosing from similar majors may request an advising appointment with the associate or assistant dean of undergraduate studies of the College of Science, 215 Jordan Hall. Any Notre Dame student who is considering a health profession can receive advising in the Center for Health Sciences Advising in 219 Jordan Hall.

Student Organizations and Activities

In addition to participation in University-wide student activities, the undergraduate students of the College of Science may participate in activities directly related to science, including the undergraduate departmental science organizations: the Biology Club, the Notre Dame Chapter of Student Affiliates of the American Chemical Society, the Mathematics Club, the Society of Physics Students, the Premed Club (preprofessional), the Prevet Club, the Science-Business Club, and the Notre Dame Chapter of Alpha Epsilon Delta (premedical honorary fraternity).

Student Council. The Student Council of the College of Science is composed of representatives of the majors of the College of Science. The student council serves as the official body representing the undergraduate students before the administration of the College of Science.

STUDENT AWARDS AND PRIZES

Student Awards and Prizes

The Dean's Award. Presented to a graduating senior in the College of Science in recognition of exemplary academic achievements, leadership, and service to society.

The Dean's Research Award. Presented to a graduating senior in the College of Science in recognition of exceptional research that advances scientific knowledge in their field through publications and presentations.

Outstanding Senior Biological Scientist(s). To the senior(s) who has/have demonstrated the most promise in the biological sciences as evidenced by both academic performance and research participation.

Outstanding Biology Student Leader Award. Seniors nominated for this award must be exemplary student leaders in the Department of Biological Sciences. The student will have made outstanding contributions, through their leadership and service, to advance the interests of other students in the department.

Paul F. Ware, M.D., Excellence in Undergraduate Research Award. The top student nominated for the Outstanding Biological Scientist award will be chosen for the Paul F. Ware award, the highest honor given to a graduating senior in the department. Leadership and/or service in the department, college, or university are also key qualifications for this award.

Outstanding Environmental Scientist Award. Seniors nominated for this award must be exemplary students in the Environmental Science major with at least 3 semesters (or 2 semesters and 1 summer) spent in a Notre Dame faculty laboratory that emphasizes any aspect of environmental science. The student must have made a significant intellectual contribution to their lab, typically evidenced by a co-authored publication and/or national or regional conference presentation.

Mr. and Mrs. Frank McDonald Undergraduate Research Award. Seniors nominated for this award must be exemplary undergraduate researchers with at least 3 semesters (or 2 semesters and 1 summer) spent in a Notre Dame faculty laboratory. The student must have made a significant intellectual contribution to their lab, typically evidenced by a co-authored publication and/or national or regional conference presentation.

Mr. and Mrs. Frank McDonald Senior Leader Fellowship. The senior nominated for this award must have devoted substantial time and energy to create sustainable programs or other changes that fundamentally improve the student experience in the Department of Biological Sciences. This academic year fellowship is given periodically to a deserving undergraduate biology major.

Robert Braco, M.D., Honors Research Award. Seniors nominated for this award must be outstanding students in the Biology Honors program with at least 3 semesters (or 2 semesters and 1 summer) of undergraduate research in a Notre Dame faculty laboratory. The student must have made a significant intellectual contribution to their lab, resulting in a co-authored publication and/or a national or regional conference presentation. A successful candidate would also have been exemplary in all honors activities including the honors seminars, the graduate course, and the honors thesis.

Royal Society of Chemistry Certificate of Excellence. For outstanding achievements in chemistry or biochemistry.

Norbert L. Wiech Ph.D. Award. Given to a chemistry or biochemistry major in the junior year for outstanding achievement in academics and research.

Outstanding Biochemist Award. For leadership, academic achievements, research and scholarship in biochemistry.

Outstanding Chemist Award. For academic and research achievements in chemistry as an undergraduate.

William R. Wischerath Outstanding Chemistry Major Award. For academic achievements of a graduating senior chemistry major.

Chemistry-Education Award. For academic achievements in preparation for teaching of chemistry in a secondary education system.

ACS Division of Organic Chemistry Outstanding Senior Organic Chemistry Student. For senior students who have displayed a significant aptitude for organic chemistry in coursework and research accomplishments. Awardees receive a certificate of recognition from the ACS Division of Organic Chemistry.

Chemistry & Biochemistry Leadership Award. For a senior that has devoted substantial time and energy to create sustainable programs or other changes that fundamentally improve the student experience in the Department of Chemistry & Biochemistry.

The General Electric Prizes for Honors Majors in Mathematics. Awarded to senior honors majors in the Department of Mathematics who, in the opinion of the members of the faculty, excelled in mathematics during their undergraduate career.

The General Electric Prizes for Majors in Mathematics. A similar award to senior majors.

The George Kolettis Award in Mathematics. An award established by friends of the late Prof. George Kolettis, for a graduating senior who excelled in mathematics and contributed notably to the esprit de corps of the mathematics student body.

The Aumann Prize for First Year Students in Mathematics. A prize given by Ms. Monika Caradonna in honor of her father, Prof. Georg

Aumann, awarded on the basis of a competition among First Year honors mathematics students.

The Norman and Beatrice Haaser Mathematics Scholarships. These scholarships, made possible by the generosity of Professor and Mrs. Haaser, are awarded to worthy, needy students majoring in mathematics.

R. Catesby Taliaferro Competition for Sophomore Mathematics Honors Students. Friends and students of the late Professor Taliaferro established this prize, which is awarded to a sophomore mathematics major on the basis of an essay submitted by the student.

J & C Sophomore Award in Mathematics. Exemplary performance in mathematics classes by a non-honors math major sophomore female or minority (African-American, Asian, Hispanic, Native American) student.

Neuroscience and Behavior Senior Awards for Academic Excellence

Outstanding Undergraduate Research Award. Seniors nominated for this award must be exemplary undergraduate researchers with at least 3 semesters (or 2 semesters and 1 summer) spent in a Notre Dame faculty laboratory. The student must have made a significant intellectual contribution to their lab, typically evidenced by a co-authored publication and/or national or regional conference presentation.

Outstanding Undergraduate Teaching Award. Seniors nominated for this award must have consistently demonstrated excellence in teaching, either through undergraduate teaching assistantships, community education, mentorship, or other direct teaching experience. The student will have demonstrated commitment to teaching excellence through multiple semesters (minimum of 2) of superior teaching performance, as demonstrated by the quality of teaching reviews, faculty or community mentor recommendation.

Outstanding Undergraduate Leadership and Service Award. Seniors nominated for this award must be exemplary student leaders in the Neuroscience and Behavior major and/or the University at large. The student will have made outstanding contributions, through their leadership and service, to advance the interests of other students in the major and/or make significant impact on the larger Notre Dame or South Bend communities.

Universal Scholar Award. Seniors nominated for this award demonstrate remarkable capability across multiple domains (research, teaching, leadership, service), while simultaneously demonstrating the character traits and behaviors that align with the teachings of Catholic Social Tradition: The Common Good, Life and Dignity of Human Persons, Correlation of Rights and Responsibilities, Preferential Option for the Poor, Care for Creation, and Solidarity.

Outstanding Senior Physics Major. This award is given to the outstanding senior physics major, who, in the judgment of the departmental faculty, shows the

SPECIAL OPPORTUNITIES

most promise for a distinguished career in physics. Course grades, the opinion of those who have taught the candidates, and any research performance are considered in making the award.

Paul Chagnon Award. An award to be given to a senior physics major for demonstrated character and leadership and for service to the University, the physics department, and to his or her fellow physics majors.

Physics Outstanding Undergraduate Research Award. A monetary award given for excellence in research to an undergraduate physics major.

DiNardo Award. To the outstanding junior preprofessional student.

Emil T. Hofman Scholarships. To six outstanding students pursuing premedical studies.

J.C. Lungren, M.D., Scholarships. Awarded to three outstanding science preprofessional students.

The Lawrence H. Baldinger Award. To seniors in the preprofessional program who excelled in scholarship, leadership, and character.

The Patrick J. Niland, M.D., Award. A monetary award given to a preprofessional studies senior to purchase books for the first year of medical school.

The Samuel Chmell, M.D., Award. To an outstanding senior in preprofessional studies who exemplifies high academic achievement and uncompromising integrity within the program.

The Rev. Joseph L. Walter, C.S.C., Award. To a senior with a keen social awareness who shows great promise as a concerned physician.

Special Opportunities

Glynn Family Honors Program. In the fall of 1983, the University inaugurated an honors program for a small number of outstanding students in the College of Arts and Letters and the College of Science. A limited number of students with academic intents for each college are identified at the time of admission. Although selection criteria include the promise of outstanding academic performance as demonstrated by standardized test scores and high school performance, the program is looking for more than mere academic ability. It hopes to identify students with a deep intellectual curiosity.

The program offers honors sections to fulfill most of the University and college requirements in the students' freshman and sophomore years. At present, there is the yearlong Honors Seminar (satisfying the writing and literature requirements). Honors Calculus, Honors Philosophy, Honors Theology, Honors Biology, Honors Physics, and an array of Honors Social Science courses. Since these courses are restricted to honors students, they are smaller than non-honors sections and are usually taught in a seminar format. The teachers for honors sections are chosen from the most outstanding teachers

in each college. After the first year, each student's academic work will be mainly centered in his or her major field (or fields) of study, but two or more honors electives are also taken during these years. In the fall of the senior year, there is an "Honors Thesis/Research Seminar," which is followed by the "Senior Seminar" in the spring. The fall seminar is intended to be a spur to the students' capstone project, whereas the spring seminar brings the honors students from diverse majors back together for some concluding topical discussions. All honors students will also be expected to complete a special six-hour senior research honors project in their major field of study. In science, this is the culmination of a research project begun earlier, and in arts and letters, it is a two-semester project culminating in a thesis. Those writing senior theses work individually under the direction of a faculty advisor of their choosing in their major field. Funds are available for research projects during summers either at Notre Dame or other universities.

In addition to the more narrowly academic features of the honors program, students will be offered various opportunities for broadening personal, cultural, and spiritual growth. Regular colloquia, informal discussions, and cultural excursions are available.

Further information on the structure and content of the Honors Program may be obtained by contacting Prof. Chris Kolda or Prof. Paul Weithman, 323 O'Shaughnessy Hall, Notre Dame, IN 46556, 574-631-5398.

The Environmental Research Center (UNDERC), a University facility, is composed of approximately 7,500 acres located primarily in the Upper Peninsula of Michigan. Research is conducted at UNDERC by undergraduate as well as graduate students on a variety of environmental problems, including the manipulation of ecosystems. Internships are available to support student participation in BIOS 35502, 35503, and 35504 at UNDERC each summer semester.

Study Abroad. Students from any of the majors in the College of Science may participate in one of the University of Notre Dame's study abroad programs. Science students who go abroad generally do so in one of the two semesters of their junior year. Students applying to medical or dental school during the summer following their junior year (to enter after their senior year) should not study abroad in the spring semester of their junior year. Science students interested in study abroad should discuss their plans with their advisor and with the associate dean, Sr. Kathleen Cannon, 248 Nieuwland Science Hall. Further information can be obtained through Study Abroad, 105 Main Building.

Applied and Computational Mathematics and Statistics

Chair:

Bei Hu

Associate Chair:

Jonathan Hauenstein

Director of Graduate Studies:

Fang Liu

Director of Undergraduate Studies:

Alan Huebner

Vincent J. Duncan and Annamarie Micus Duncan

Professor of Mathematics:

Andrew Sommesse

Full Professors:

Steven Buechler; Bei Hu; Yongtao Zhang

Associate Professors:

Jonathan Hauenstein; Jun Li; Fang Liu; Zhiliang Xu

Assistant Professors:

Martina Bukac; Stefano Castruccio; Alexandra Jilkine; Ick Hoon Jin; Lizhen Lin; Alan Lindsay; Dong Quan Ngoc Nguyen; Robert Rosenbaum; Daniele Schiavazzi; Hyungsuk Tak

Full Special Professional Faculty:

Roya Ghiaseddin; Roger Woodard

Associate Special Professional Faculty:

Alan Huebner; Huy Huynh; Molly Walsh

Assistant Special Professional Faculty:

Michael Pruitt; Victoria Weber

Program of Studies. The partnership of applied mathematics, computational mathematics and statistics brings the tools of modeling, simulation and data analysis to bear on real-world problems, producing solutions with the power to predict and explain complex phenomena. These methods, often applied computationally, are being used in a wide variety of areas in business, engineering, the natural sciences, and the social sciences.

The Department of Applied and Computational Mathematics and Statistics (ACMS) offers programs of study leading to the bachelor of science degree in applied and computational mathematics and statistics and to the bachelor of science in statistics. Computational skills, which are often required to solve real-world problems, will be developed continuously throughout the curriculum. For many students, significant work in an area of application will complement their core studies. Graduates of the program will be well prepared for the following post-graduate opportunities.

- Further training in professional masters or doctoral programs in applied mathematics or statistics;
- Graduate study, at the masters or doctoral level, in bioinformatics or computational biology;
- Employment in technical fields requiring skills in statistics and computation;

APPLIED AND COMPUTATIONAL MATHEMATICS AND STATISTICS

- Employment and further study in actuarial science and quantitative methods in business and economics.

In addition to the core bachelor of science in ACMS major, ACMS offers a concentration in biological sciences, which will prepare students for further study or employment in computational biology, bioinformatics, ecological modeling, or epidemiology.

ACMS also offers supplementary majors in applied and computational mathematics and statistics and in statistics. Students in numerous areas of study can benefit from advanced study in applied and computational mathematics and statistics. This is true for students in business and the social sciences as well as those in the natural sciences and engineering. These supplementary majors are well suited for these students.

BACHELOR OF SCIENCE WITH A MAJOR IN APPLIED AND COMPUTATIONAL MATHEMATICS AND STATISTICS

The requirements for the degree include courses that develop a strong foundation in the methods of applied mathematics and data analysis, while allowing students to also take courses in a wide variety of application areas. The specific requirements for the bachelor of science in applied and computational mathematics and statistics, beyond the university and college requirements are as follows.

Chemistry (CHEM 10171, 10122 or CHEM 10171, 10172) ¹	
Physics (PHYS 10310, 10320) ¹	
Calculus I, II (MATH 10550, 10560) ¹	
Introduction to Applied Mathematics Methods, I, II (ACMS 20550, 20750)	
Scientific Computing (ACMS 20210)	
Applied Linear Algebra (ACMS 20620)	
Introduction to Probability (ACMS 30530)	
Statistical Methods and Data Analysis I (ACMS 30600)	
Mathematical/Comp Modeling (ACMS 40730) or Mathematical/Comp Modeling in Neurosci (ACMS 40740) or Stochastic Modeling (ACMS 40760) ⁸	
Numerical Analysis (ACMS 40390)	
ACMS electives (6 credits in ACMS courses numbered 30000 and above) ²	
MATH or ACMS elective (3 credits in MATH or ACMS courses numbered 30000 or above) ^{2, 3, 4}	
Science elective (3 credits)	
These requirements total 43 credits in ACMS and MATH and 61 credits in Science.	

Concentration in biological sciences. The required courses for this concentration are as follows.

Introduction to Chemical Principles (CHEM 10171) ¹	
Organic Chemistry (CHEM 10172, 20273, 21273) ¹	
Physics (PHYS 10310, 10320) ¹	

Biological Sciences I, II (BIOS 10171, 10172)	
Calculus I, II (MATH 10550, 10560) ¹	
Introduction to Applied Mathematics Methods, I, II (ACMS 20550, 20750)	
Scientific Computing (ACMS 20210)	
Applied Linear Algebra (ACMS 20620)	
Introduction to Probability (ACMS 30530)	
Mathematical Statistics (ACMS 30540) or Statistical Methods and Data Analysis I (ACMS 30600)	
Mathematical/Comp Modeling (ACMS 40730) or Mathematical/Comp Modeling in Neurosci (ACMS 40740) or Stochastic Modeling (ACMS 40760) ⁸	
Numerical Analysis (ACMS 40390)	
ACMS electives (6 credits in ACMS courses numbered 30000 and above) ^{2, 5}	
Genetics (BIOS 20303)	
Cellular Biology (BIOS 30341) or Ecology (30312)	
Biology Elective (3 credits in BIOS which has BIOS 10172 as a prerequisite)	
Elective in Biology, Chemistry or Physics (3 credits)	
These requirements total 40 credits in ACMS and MATH and 79 credits in Science.	

ACMS Sample Curriculum:

First Year

<i>First Semester</i>	
MATH 10550. Calculus I	4
CHEM 10171. Chemical Principles	4
PHYS 10310. General Physics I	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	19

Second Semester

MATH 10560. Calculus II	4
CHEM 10172 or 10122	4
PHYS 10320. General Physics II	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	19

Sophomore Year

<i>First Semester</i>	
ACMS 20550. Applied Math Methods I	3.5
ACMS 20620. Applied Linear Algebra	3
Language	3
University Requirement	3
Elective	3
	15.5

Second Semester

ACMS 20750. Applied Math Methods II	3.5
ACMS 20210. Scientific Computing	3.5
ACMS 30530. Introduction to Probability	3
Language	3
University Requirement	3
	16

Junior Year

First Semester

ACMS 30600. Stat. Methods & Data Analysis I	3.5
ACMS 40390. Numerical Analysis	3
Language	3
University Requirement	3
Elective	3
	15.5

Second Semester

ACMS 30540. Mathematical Statistics	3
ACMS/MATH Elective	3
University Requirement	3
Science Elective	3
Elective	3
	15

Senior Year

First Semester

Mathematical/Comp Modeling (ACMS 40730) or Mathematical/Comp Modeling in Neurosci (ACMS 40740) or Stochastic Modeling (ACMS 40760) ⁸	3
ACMS Elective	3
Elective	9
	15

Second Semester

ACMS Elective	3
Electives	9
	12

ACMS/BIOS Sample Curriculum:

First Year

First Semester

MATH 10550. Calculus I	4
CHEM 10171. Chemical Principles	4
BIOS 10171. Biology I: Big Questions	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	19

Second Semester

MATH 10560. Calculus II	4
CHEM 10172	4
BIOS 10172. Biology II	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	19

Sophomore Year

First Semester

ACMS 20550. Applied Math Methods I	3.5
ACMS 20620. Applied Linear Algebra	3
CHEM 20273/21273	4
Language	3
University Requirement	3
	16.5

APPLIED AND COMPUTATIONAL MATHEMATICS AND STATISTICS

Second Semester

ACMS 20750. Applied Math Methods II	3.5
ACMS 20210. Scientific Computing	3.5
ACMS 30530. Introduction to Probability	3
Language	3
University Requirement	3
	<hr/>
	16

Junior Year*First Semester*

ACMS 30600. Stat. Methods & Data Analysis I	3.5
PHYS 10310. General Physics I	4
BIOS 30341 or 30312	3
Language	3
University Requirement	3
	<hr/>
	16.5

Second Semester

BIOS 20303. Genetics	3
PHYS 10320. General Physics II	4
Biology/Chemistry/Physics Elective	3
University Requirement	3
Elective	3
	<hr/>
	16

Senior Year*First Semester*

ACMS 40390. Numerical Analysis	3
Mathematical/Comp Modeling (ACMS 40730)	
or Mathematical/Comp Modeling in Neurosci	
(ACMS 40740)	
or Stochastic Modeling (ACMS 40760) ⁸	3
Biology Elective	3
ACMS Elective	3
Elective	3
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	15

Second Semester

ACMS Elective	3
ACMS Elective	3
Electives	6
	<hr/>
	12

Notes:

1. Equivalent or higher sequences in science may be substituted, e.g., MATH 10850, 10860 for MATH 10550, 10560.
2. Some ACMS courses, ACMS 30440 in particular, are not acceptable as electives for the major. The list of acceptable courses for ACMS majors can be obtained from the student's advisor.
3. Introduction to Mathematical Reasoning (MATH 20630) is also an acceptable ACMS/MATH elective.
4. Students with an interest in attending graduate school in mathematics or applied mathematics are encouraged to take Algebra (MATH 30710) and Functional Analysis (ACMS 50550).
5. An appropriate class in bioinformatics, biophysics, or a related topic, may be substituted for 3 credits in

ACMS coursework with the permission of the Director of Undergraduate Studies.

6. A student should take three core requirement courses during the first year, including one course that is designated a University Seminar. It is recommended that one course in history or social sciences be taken in the first year and one philosophy and one theology be taken by the end of sophomore year.
7. ACMS 30600 is a required course. ACMS 30550 is an ACMS elective.
8. One of the courses satisfies the modeling course requirement. If more than one course is taken, the other can be counted as an ACMS elective.

BACHELOR OF SCIENCE WITH A MAJOR IN STATISTICS

The requirements for the degree include courses that develop a strong foundation in the methods of applied mathematics and data analysis, while allowing students to also take courses in a wide variety of application areas. The specific requirements for the bachelor of science in statistics, beyond the university and college requirements are as follows.

Chemistry (CHEM 10171, 10122 or CHEM 10171, 10172) ¹	
Physics (PHYS 10310, 10320) ¹	
Calculus I, II (MATH 10550, 10560) ¹	
Introduction to Applied Mathematics Methods, I, II (ACMS 20550, 20750)	
Scientific Computing (ACMS 20210 or approved alternative computing course in science)	
Applied Linear Algebra (ACMS 20620)	
Introduction to Probability (ACMS 30530)	
Statistical Methods and Data Analysis I (ACMS 30600)	
Mathematical Statistics (ACMS 30550)	
ACMS statistics electives (9 credits in ACMS statistics courses chosen from a list of approved courses) ²	
MATH or ACMS elective (3 credits in MATH or ACMS courses numbered 30000 or above) ³	
Science elective (3 credits)	
These requirements total 43 credits in ACMS and MATH and 61 credits in Science.	

Statistics Sample Curriculum:**First Year***First Semester*

MATH 10550. Calculus I	4
CHEM 10171. Chemical Principles	4
PHYS 10310. General Physics I	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
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	19

Second Semester

MATH 10560. Calculus II	4
CHEM 10172 or 10122	4
PHYS 10320. General Physics II	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Sophomore Year*First Semester*

ACMS 20550. Applied Math Methods I	3.5
ACMS 20620. Applied Linear Algebra	3
Language	3
University Requirement	3
Elective	3
	<hr/>
	15.5

Second Semester

ACMS 20750. Applied Math Methods II	3.5
ACMS 20210. Scientific Computing	3.5
ACMS 30530 Intro Probability	3
Language	3
University Requirement	3
Elective	3
	<hr/>
	19

Junior Year*First Semester*

ACMS 30600. Stat. Mthds Data Anal.	3.5
ACMS/MATH Elective	3
Language	3
University Requirement	3
Elective	3
	<hr/>
	15.5

Second Semester

ACMS 30550. Mathematical Statistics	3
ACMS Statistics Elective	3
University Requirement	3
Science Elective	3
Elective	3
	<hr/>
	15

Senior Year*First Semester*

ACMS Statistics Elective	3
Science Elective	3
Elective	9
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	15

Second Semester

ACMS Statistics Elective	3
Electives	9
	<hr/>
	12

Notes:

1. Equivalent or higher sequences in science may be substituted, e.g., MATH 10850, 10860 for MATH 10550, 10560.
2. The acceptable elective courses are:
 - a. ACMS 40842 Time Series Analysis
 - b. ACMS 40852 Statistical Methods in the Biological and Health Sciences

BIOLOGICAL SCIENCES

- ACMS 40855
 c. ACMS 40860 *Statistical Methods in Molecular Biology*
 d. ACMS 40870 *Statistical Methods in Social Sciences*
 e. ACMS 40880 *Statistical Methods in Pattern Recognition and Prediction*
 ACMS 40878
 f. ACMS 40890 *Statistical Methods in Financial Risk Management*
 g. ACMS 40950 *Topics in Statistics*
 h. Any graduate ACMS course in statistics or probability
3. *Introduction to Mathematical Reasoning (MATH 20630) is also an acceptable elective.*
4. *A student should take three core requirement courses during the first year, including one course that is designated a University Seminar. It is recommended that one course in history or social sciences be taken in the first year and one philosophy and one theology be taken by the end of sophomore year.*

SUPPLEMENTARY MAJOR IN STATISTICS

The supplementary major in statistics requires 37 credits in ACMS and Mathematics. The specific requirements are as follows.

Calculus I, II (MATH 10550, 10560)
 Introduction to Applied Mathematics Methods, I, II (ACMS 20550, 20750)
 Scientific Computing (ACMS 20210 or approved alternative computing course in science)
 Applied Linear Algebra (ACMS 20620)
 Introduction to Probability (ACMS 30530)
 Mathematical Statistics (ACMS 30550)
 Statistical Methods and Data Analysis (ACMS 30600)
 ACMS Statistics electives (6 credits)

Difference from the full major: The full Statistics major requires 43 credits in ACMS and MATH courses. This supplementary major requires one fewer statistics elective and one fewer ACMS elective.

Double counting issues. A student is permitted to double count Calculus I and II for a first major and this supplementary major. A student whose first major requires Calculus III and Ordinary Differential Equations is exempt from ACMS 20550 and 20750, but must complete an additional 6 credits of electives in ACMS. The same principle applies to any other courses required by a first major and this program.

SUPPLEMENTARY MAJOR IN APPLIED AND COMPUTATIONAL MATHEMATICS AND STATISTICS

The supplementary major in applied and computational mathematics and statistics requires 37 credits in ACMS and Mathematics. The specific requirements are as follows.

Calculus I, II (MATH 10550, 10560)

- Introduction to Applied Mathematical Methods I, II (ACMS 20550, 20750)
 Scientific Computing (ACMS 20210)
 Applied Linear Algebra (ACMS 20620)
 Introduction to Probability (ACMS 30530)
 Statistical Methods and Data Analysis I (ACMS 30600)
 Mathematical/Comp Modeling (ACMS 40730) or Mathematical/Comp Modeling in Neurosci (ACMS 40740) or Stochastic Modeling (ACMS 40760) ¹
 Numerical Analysis (ACMS 40390)
 ACMS electives (3 credits in ACMS courses numbered 30000 and above, except those overlapping in content with one of the above)
1. *One of the courses satisfies the modeling course requirement. If more than one course is taken, the other can be counted as an ACMS elective.*

HONORS IN ACMS

Junior majors in ACMS may apply for the departmental honors program to receive the designation "Honors in Applied and Computational Mathematics and Statistics".

Here are the requirements:

- A minimum of Cum GPA of 3.5.
- Complete a minimum of two semesters in undergraduate research ACMS 48498 during the junior or senior year, potentially including a summer semester.
- Complete an undergraduate thesis, ACMS 48500.
- Presentation of the thesis in a seminar or a conference, on campus or outside campus.

Before the end of the junior year, students interested in the Honors option must apply to the director for undergraduate studies, who will make suggestions to students for an appropriate advisor. The subject matter should be in an area of expertise of at least one member of the department. The student will work with the advisor to complete a thesis, which must be signed off by the advisor and then submitted to the Director of Undergraduate Studies by April 15 of the senior year. If approved, the student will receive credit for ACMS 48500, Undergraduate Thesis.

The undergraduate thesis must go beyond what is found in an undergraduate course, and present a novel approach to a subject.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Applied & Computational Mathematics and Statistics*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Biological Sciences*Chair:*

Crislyn D'Souza-Schorey

Associate Chair:

Nora Besansky

Assistant Chair:

Michelle Whaley

Director of Undergraduate Studies:

David Veselik

Professors:

Gary Belovsky; Nora Besansky; Sunny Boyd; Frank Collins; Crislyn D'Souza-Schorey; John Duman; Jeffrey Feder; Michael Ferdig; Malcolm Fraser; Kasturi Haldar; David Hyde; Gary Lambert; Edwin Michael; Joseph O'Tousa; Michael Pfrender; Matthew Ravosa; Jeanne Romero-Severson; Jeffrey Schorey; Robert Schulz; David Severson; Jennifer Tank

Associate Professors:

Elizabeth Archie; Patricia Champion; Giles Duffield; Hope Hollocher; Stuart Jones; Shaun Lee; Lei Li; Mary Ann McDowell; Jason McLachlan; David Medvigy; Zachary Schafer; Cody Smith; Kevin Vaughan; Rebecca Wingert; Siyuan Zhang

Assistant Professors:

Xin Lu; Athanasia Panopoulos; Alex Perkias; Adrian Rocha

Emeritus Professors:

Paul Grimstad; Ronald Hellenenthal; Charles Kulpa; David Lodge; Kenyon Tweedell

Special Professional Faculty:

Lacey Ahern; Heidi Beidinger-Burnett; Dominic Chaloner; Anjuli Datta; Marie Donahue; Kenneth Filchak; Barbara Hellenenthal; Kristin Lewis; Xuemin Lu; Nancy Michael; Rachel Novick; T. Mark Olsen; Jennifer Robichaud; Amy Stark; David Veselik; Michelle Whaley

Concurrent Faculty:

Melissa Berke; Michael Cramer; Scott Emrich; David Flagel; Holly Goodson; Alan Hamlet; Kristin Shrader-Frechette; Joshua Shrout; Sharon Stack; Kay Stewart

Adjunct Faculty:

Michael Blakesley; David Boone; Richard Dahl; David Halperin; David Leege; Jennifer Proserpi; Kenneth Olson; Molly Scheel; Patrick Sheets

Program of Studies. The Department of Biological Sciences offers programs of study leading to the degrees of bachelor of science with a major in biological sciences or bachelor of science with a major in environmental sciences, master of science in biological sciences and doctor of philosophy. Also offered is a second major in environmental sciences for students in the College of Arts and Letters or in the College of Business Administration.

Program in Biological Sciences. The Department of Biological Sciences at Notre Dame is committed to understanding the fundamental mechanisms by which living systems operate. The Department is highly interdisciplinary and in excellent position to

BIOLOGICAL SCIENCES

fulfill the promise of the new integrative approach to biology. Basic research is at the center of our endeavors and fuels and inspires our teaching and training. We seek solutions to human health and environmental crises facing our society—such as finding treatments, cures and preventions for human diseases, maintaining biodiversity on land and in our natural water sources, ensuring an adequate supply of food and fresh water, and reversing the effects of pollution and climate change.

Research in the department spans the wide realm of the life sciences, across scales of complexity—from cells and organs to whole organisms and ecosystems—and across foci as varied as infectious disease, cancer, organ regeneration, climate change and biodiversity. *United through the ultimate goals of fostering human and environmental health*, we believe that real-world solutions require integrative biological inquiry and multidisciplinary collaboration. Our department serves as a hub connecting different academic units across campus and different universities worldwide, through life science-related investigation and problem solving.

Students choosing an undergraduate major in biological sciences will be prepared for graduate study (M.S., Ph.D., MD/Ph.D.) leading to a research career, or for admission to medical, veterinary, and other professional schools. Graduates with a bachelor's degree may enter careers in industry, government, or health-related research laboratories. Those who wish to teach at the elementary or secondary level should be sure to include required education courses such as those offered through Saint Mary's College.

Policy Statement on the Use of Organisms in Biological Sciences Teaching Laboratories. Some laboratory courses offered by the Department of Biological Sciences may involve the use of living or preserved organisms. Instructors use these animal specimens in cases where this is deemed necessary for teaching important biological concepts and principles. *Students who have concerns about the use of organisms in classes must, prior to registering, submit a request for alternate materials to the course instructor.* It is up to the discretion of the instructor(s) as to whether and how non-organism alternatives may be substituted for biological materials in classes. *Students permitted to use alternate materials are responsible for the same knowledge and application as their classmates and may be required to complete examinations that involve the inspection or handling of biological specimens.*

Biology Courses. The biology courses included in this Bulletin are those reasonably expected to be offered several times to every semester during the next four years. However, changes may occur as faculty add new courses or drop those with little demand. Courses without laboratories are indicated as lecture only.

The requirements in biological sciences include courses from a basic six core sequence, laboratory courses and sufficient numbers of BIOS electives to complete the 41- credit-hour requirement.

All majors are strongly encouraged to complete the sequence Biological Sciences I and II (BIOS 10171–10172) in their first year to ensure the completion of all requirements in four years. Students may begin the core in sophomore year; however, they will be at a considerable disadvantage in scheduling requirements in the two remaining years; they also will have one year less to explore their interests in biology.

BACHELOR OF SCIENCE WITH A MAJOR IN BIOLOGICAL SCIENCES

The biological sciences majors take the following basic sequence of courses in the College of Science:

General Chemistry (CHEM 10171 and 20274)
Organic Chemistry (CHEM 10172 and 20273)
Physics (PHYS 20210–20220)
Calculus (MATH 10350–10360 or 10550–10560)

There are seven components to the biology core requirement, consisting of courses in the following areas:

Core I: Introductory Biology Sequence

Biology I: Big Questions (BIOS 10171)
Biological Investigations Laboratory (BIOS 11173)*
Biology II: Molecules to Ecosystems (BIOS 10172)
Research Experience in Biology Laboratory (BIOS 11174)*

*These labs are designated lab #1 and lab #2 in the six required for the major.

Core II: Genetics

Classical and Molecular Genetics (BIOS 20250 and 21250; lab #3)²

Core III: Cellular Biology

Molecular Cell Biology (BIOS 20241)²

Optional labs available are BIOS 27241, a research orientated 2-credit laboratory², or BIOS 31341, a basic 1-credit cell biology laboratory. Students may not take both cell labs.

Core IV: Physiology

Students choose from either:

- Vertebrate (Human) Physiology (BIOS 30344)³ or
- Integrative Comparative Physiology (BIOS 30421) (not available all years)

Optional lab available is BIOS 41344

Core V: Evolutionary Biology

Students choose from either:

- Evolution (BIOS 30305) or
- The History of Life (BIOS 30310)

Core VI: Ecology

Students choose from either:

- General Ecology (BIOS 30312; optional lab BIOS 31312 is offered fall semesters only)
- Aquatic Ecology (BIOS 30420 and required lab BIOS 31420—not available all years)
- Stream Ecology (BIOS 40527 and required lab BIOS 41527—not available all years)

Core VII: Laboratory Courses

Students complete six laboratory courses. Three semesters of undergraduate research can fulfill one of six laboratory courses.

Note that select overseas courses that have been approved for science credit may satisfy the Core II through VI requirement if approved by the Director of Undergraduate Studies in Biological Sciences before taking the class.

TRACKS

The Department of Biological Sciences offers eight tracks within the Biological Sciences major. Tracks provide structure to electives to assist students' development in their fields of interest, and provide experience in a field within biology for students seeking admission to graduate school, medical school, or other programs/jobs.

Each track requires at least 14 credits, two of which can be used for Undergraduate Research. These credits are in addition to the core requirements of the Biological Sciences major listed above. Note that courses listed in more than one track will not count twice.

Tracks include:

- Biomedical Sciences
- Cell and Developmental Biology
- Computational Biology
- Ecology and Environment
- Evolution and Genomics
- Infectious Disease and Global Health
- Integrative Biology
- Medical Neurobiology

For full descriptions of each track, see biology.nd.edu/undergraduate/programs-of-study/

BIOS ELECTIVES

The minimum required credits in the core including labs is 27. An additional 14 credits of electives in biological sciences are chosen to complete the required total of 41 credits.^{4,7} All biological sciences majors are encouraged to include non-science among their “free electives.”

Notes:

1. Students are required to take a total of six laboratories; three of the six labs will be part of the Core (Core I(a,b), II, and the remaining three of the

BIOLOGICAL SCIENCES

six laboratories are chosen among the core III through Core VI and/or BIOS electives, including 50000- and 60000-level courses. Thus, there are three required “named” BIOS labs and three additional elective BIOS labs. As an option, students who conduct a minimum of three semesters of undergraduate research (BIOS 48498) in the same laboratory or research group at Notre Dame and earn a minimum of 3 credits (i.e., 3 x 1.0 credit), may substitute those research semesters for one of the six required labs.

2. Majors in biological sciences, as well as those considering a professional school (medicine, veterinary science, others), will take Molecular Cell Biology (BIOS 20241) and Classical and Molecular Genetics (BIOS 20250). These should be taken in the sophomore year but no later than the junior year. The two-credit cell research lab (BIOS 27241) is especially ideal for those interested in obtaining summer research internships, doing undergraduate research at Notre Dame or elsewhere, and is especially critical to any graduate research career. Only one of the two available cell biology labs may count toward the required six, however.

3. Physiology should be completed by the end of the junior year for students planning to take the MCAT exam or the seventh semester for students planning to take the GRE biology subjects exam.

4. Most graduate (60000-level) courses (through 60579) are open to eligible juniors and seniors.

5. Students may choose additional courses in the Core areas III through VI or among courses not assigned to the core (e.g., BIOS 40411, Biostatistics, or BIOS 48498, Undergraduate Research), or 60000-level courses as BIOS electives, to meet the required total of 41 credit hours in biological science courses.

6. Select non-BIOS major-level College of Science courses (i.e., those taken to meet science-major requirements and not among those designated as “Recommended University electives”) that are not being used to fulfill other specific graduation requirements can be chosen with the consent of the director of undergraduate studies for the Department of Biological Sciences and counted toward the BIOS elective credits. While majors are allowed to take one 3-credit, non-BIOS lecture course and have that count toward the 41 required credits, students may also include one non-BIOS lab if it is required for that non-BIOS lecture and have that laboratory satisfy one of the six required laboratories. For example, Physical Geology (SC 20110, ENVG 10110/20110) has a required laboratory, and majors who choose BIOS electives based on their environmental or ecological interests may elect to take Physical Geology for a total of 4 credits toward the 41 required credits. Majors who might have transferred into BIOS from BCHM and had taken the required biochemistry (CHEM 30341) lecture and laboratory course will be allowed to count both the lecture and laboratory toward the 41 credits. The same would be true of other relevant science courses (e.g., analytical chemistry, physical chemistry) as approved by the director of their major and the associate dean of the College of Science.

SUMMARY OF REQUIREMENTS FOR GRADUATION FOR ANY BIOLOGICAL SCIENCES MAJOR		
		Year Usual Credits Taken
Biological Sciences*	41	all
Chemistry (10171–10172 or 10181–10182)	8	First year
	8	Sophomore
Physics (20210–20220 with labs)	8	Junior
Mathematics (10350–10360 or 10550–10560)	8	First year
Total Science:	73	
Liberal Arts 4–6	9	First year
Philosophy**	6	
Theology**	6	
WR 13100	3	First year
Language	Intermediate Level Competency (3)	
Free Electives	24+	Sophomore/Senior
Moreau First Year Experience	2	First year
124 credits		
* It is essential for prospective biology majors to begin their general biology courses in the first year to schedule all required core curriculum courses within a four-year period.		
** One of these courses must be a University Seminar.		
+ Minimum number of free electives based on the assumption that intermediate-level competency in language was achieved by taking a minimum of one three-credit course.		
Majors often have time to incorporate 20 or more free elective credits (i.e., a second major or minor) into their four-year course selection.		

7. Undergraduate Research (BIOS 48498) and Directed Readings (BIOS 46497) count toward the 41-credit biological sciences requirement; however, only a maximum of two credits per semester per course and a combined total of six credits from these two courses may be counted in fulfilling the 41-credit requirement. A maximum of two credits of BIOS 37495 (Teaching Practicum) may be included in any combination of these six credits. A maximum of only nine credits in these courses may be used toward graduation; however, additional credits do remain on a student's permanent transcript record.

Sample Curriculum: The sample curriculum for the four-year program listed below is only one of a number of ways a student can complete all the requirements for a biology major. Students should discuss their specific interests with their departmental advisor and plan their semesters accordingly. Alternative sample curricula can be developed with the assistance of the biology advisor.

Note that this sample curriculum assumes that no language CE credits are included.

First Year		
<i>Fall Semester</i>		
BIOS 10171/BIOS 11173 (Lab #1)	4	
MATH 10350 or 10550	4	
CHEM 10171 (or 10181) ¹	4	
University Requirements	3	
WR 13100	3	
Moreau First Year Experience	1	
	19	
<i>Spring Semester</i>		
BIOS 10172/BIOS 11174 (Lab #2)	4	
MATH 10360 or 10560	4	
CHEM 10172 (or 10182) ¹	4	
University Requirements	3	
Theology or Philosophy ²	3	
Moreau First Year Experience	1	
	19	
Sophomore Year		
<i>Fall Semester</i>		
BIOS 20250 (Core II: Genetics)	4	
BIOS 21250 (required LAB #3)	1	
CHEM 20273	4	
Theology/Philosophy	3	
Language	4	

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Spring Semester

BIOS 20241 (Core III: Cell Biology)	3
Elective Lab 4 (e.g., 27241 Cell Biology)	2
CHEM 20274	4
Theology/Philosophy	3
Language	4

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Junior Year*Fall Semester* (V overseas BIOS class[es] are an option)

BIOS Core V (Evolutionary Biology)	3
Physics 20210, 21210	4
Free Elective	3
Theology/Philosophy	3
Language	3
Elective BIOS Lab #4	1

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Spring Semester

BIOS 40411 (Biostatistics)	4
BIOS Core IV (Physiology)	3
Physics 20220, 21220	4
University Requirement	3

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Senior Year*Fall Semester*

BIOS Core VI (Ecology)	3
BIOS or Science Elective ⁴	3
Free Elective	3
Free Elective	3
Elective BIOS Lab #5	1

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Spring Semester

BIOS Elective	3
BIOS Elective	3
Free Elective	3
Free Elective	3
Elective BIOS Lab #6	- / 1

12 / 13

TOTAL: 124 minimum

1 Students who begin with the CHEM 10181–10182 sequence and select BIOS as their major would complete the four-semester sequence with CHEM 20273–20274.

2 One of these courses must be a University seminar.

3 For premedical students, it is strongly recommended that the student take a 20000-level English literature course. This ensures that the student will be able to meet the standard medical-school admission requirement of two English courses. Medical ethics and biochemistry are also generally required or highly recommended.

4 While not required, many students choose to take a supporting 3-credit non-BIOS science course that counts toward the required 41 credits in their major.

Students majoring in biological sciences please

note: the biology survey courses (10101–10119) satisfy the science requirement for **non-science majors** at Notre Dame. They do not satisfy the science requirements for science majors at Notre Dame

or elsewhere. Students may not take courses with overlapping or similar lecture material such as BIOS 10101 and 10110 or BIOS 10107, 10118, and 10119, for example. A table listing these overlapping courses is on the final pages of the College of Science section of this *Bulletin*.

Also, Biostatistics (BIOS 40411/42411) is highly recommended for all students planning on a health related professional program or a graduate program, especially in ecology, environmental biology, or other field of life science. A non-BIOS/Science elective can be any 30000–50000-level course other than those required, and approved by the director of undergraduate studies for the Department of Biological Sciences. Biochemistry (e.g., CHEM 40420) is especially recommended.

In addition to the undergraduate curriculum, the Department of Biological Sciences offers programs of graduate study leading to the degrees of master of science and doctor of philosophy, as described in the *Graduate School Bulletin of Information*.

SELECT GRADUATE-LEVEL COURSES

Many 60000-level courses in biological sciences are open to qualified undergraduates, subject to the approval of the course instructors and the director of undergraduate studies. Graduate-level courses generally include a majority of upper-class students and are recommended to undergraduate majors.

The above 60000-level courses are described in the *Graduate School Bulletin of Information*.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting one or more of the following subjects:

- *Biological Sciences*
- *Global Health - Eck Institute*
- *Sustainability*

Course descriptions can be found by clicking on the subject code and course number in the search results.

BIOLOGICAL SCIENCES HONORS PROGRAM

The goal of the biology honors program is to give our most talented students an exceptional background in biological research. Participation in this program will increase their level of commitment and productivity while preparing them for successful postgraduate research work.

The program will accept junior biological sciences and environmental science majors in good academic standing who have already completed one semester of undergraduate research at Notre Dame. Selection by the Undergraduate Research Committee will be based on a research statement, transcript, a minimum GPA of 3.25 in College of Science courses, and a recommendation letter from their research advisor.

To graduate with honors, students will have to complete:

1. At least three semesters (for at least 4 credits total) and one summer of independent research at Notre Dame. Students are expected to apply for REU, COS-SURF or other summer funding as appropriate.
2. A thesis of at least 25 pages (a manuscript can substitute only if the student has made substantial writing contributions to the work).
3. A 3-credit graduate-level course in the area of research.
4. A presentation at a national or regional meeting.
5. One disciplinary research seminar each year (1 credit seminar, see below).

Thesis Requirements:

Students will write a draft of their thesis in the senior research seminar under the guidance of the advisor and the seminar coordinator. The final draft of the thesis will be written with the advisor, and will be submitted by April 1. Each thesis will be reviewed by one member of the Undergraduate Research Committee. If the thesis is not approved, a second committee member will read the thesis and confer. The students will be notified by April 15 if a rewrite is needed. The rewrite will be due May 1. Guidelines for the thesis and thesis reviewers will be provided.

Research Seminar (Graded S/U)

The purpose of these seminars is to create a small learning community where students and practicing scientists can connect. The seminar learning goals are to support and develop each student's independence, scientific communication skills, critical review skills, and understanding of their research in the context of the larger field. The seminar will have the added benefit of helping students prepare for graduate applications and fellowships.

Seminar Coordinator:

Michelle Whaley

Junior year topics (offered each spring):

1. Critical reading of research articles
2. Project/experimental design, creativity in research.
3. Research presentations (posters and talks)
4. Proposal writing
5. Career exploration that includes guest speakers.

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Senior year topics (offered each fall):

1. Thesis writing
2. The publication process
3. Graduate fellowship and graduate school personal statements
4. Attend biology seminars and discuss research methods and results with faculty
5. Research presentations.

UNDERC FIELD BIOLOGY PROGRAMS

Seven-credit programs for undergraduates that emphasize field biology are offered at the University's Environmental Research Centers (Michigan and Montana). The programs entail course work, group research projects, and an independent research project. Application to the programs occurs in the fall of the sophomore and junior years and enrollment is limited by housing at each location. If selected, students enroll in BIOS 35501 during the spring semester and BIOS 35502 during the summer. To participate in the Montana (BIOS 35503) or other programs (BIOS 35504, 35505), one must first participate in the Michigan program.

ENVIRONMENTAL SCIENCES*Director of Undergraduate Studies:*

Dominic Chaloner

Program in Environmental Sciences. All life, including humans, directly depends on the functioning of Earth's ecosystems. Further, it has become apparent that human activities have altered Earth's environments. Factors such as pollution, invasive species introductions, anti-biotic resistance, and global climate change can all be traced to human activity. Increasing the knowledge and awareness of the link between humans and the environment is one of the most important endeavors of the twenty-first century.

The environmental sciences major stresses interdisciplinary knowledge and logic. The curriculum is designed to expose students to a scientific understanding of our environment from biological, chemical, and physical perspectives. Particular emphasis is placed on understanding how humans interact chemically and biologically with the environment. Material and energy resource limitations, chemical and thermal pollution, and effects of environmental pollution on public health are major considerations within the environmental sciences curriculum. Emphasis is also placed on understanding interactions between human societies and the environment from social, ethical, economic, anthropological, and governmental points of view. Students are also encouraged to strengthen their mathematical and computational skills and to participate voluntarily in environmentally oriented research projects or summer internships.

Concentrations in Earth Science. With this collaboration students will explore how geologic processes affect humans and how human activity is changing earth systems, studying a range of topics

including earthquakes, volcanic activity, global climate change, subsurface transport of toxic heavy metals, carbon sequestration, and safe disposal of nuclear waste. The Earth Science concentration program combines classroom, laboratory and field studies, and all students are encouraged to conduct independent research under faculty supervision. The flexibility of the undergraduate program allows students to switch to this concentration if they have followed either an engineering or science track during their first or even their second years.

An undergraduate major in Environmental Science with a concentration in Earth Science prepares a student for graduate study (M.S., Ph.D.) in many aspects of geological and environmental science, as well as for admission to a variety of professions. Graduates with a B.S. degree may enter careers in diverse areas such as state geological offices, the National Park Service, oil and mining industries, environmental consulting, and government national research laboratories or policy offices.

The First Major. College of Science students who major in Environmental Sciences will earn the degree of bachelor of science. Students following the Environmental Sciences first major program complete a total of 69 credits of science.

The Second Major for Arts and Letters and Business: Most students in the College of Arts and Letters or in the Mendoza College of Business may participate in the Environmental Sciences Program as a second major. Second majors are required to complete a minimum of 37 credits of science. Students considering this program should investigate options brought to a first major by adding course work in environmental sciences. For example, students majoring in government and in environmental sciences could consider postgraduate study or careers in *public policy*. Students majoring in economics and in environmental sciences would have a good background for the developing field of *environmental economics*. A second major in Environmental Sciences also complements majors in the other sociological fields of anthropology, psychology, or sociology. Similarly, business students will likely find environmental sciences to be useful background when working with local or federal governments on issues of *environmental compliance* or when considering the impact of business decisions on the environment (*environmental assessment*). All students are urged to discuss their long-range career plans with advisors in both majors.

Relationship with Other Programs: The Environmental Sciences Major Program has a special collaborative relationship with the Science, Technology, and Values (STV) Concentration program housed in the Reilly Center in O'Shaughnessy Hall. Select courses required of environmental sciences first majors are also cross-listed as STV courses. Thus, students in the STV program from across the university are expected to benefit in the curricular endeavors of the Environmental Sciences Program. Environmental sciences first majors often

enroll in the STV program. (Environmental science students with flexibility in their program often have room to complete an STV concentration by taking STV courses beyond those required by the first major or university requirements.) However, arts and letters students with second majors in environmental science will be encouraged to participate in further interdisciplinary course work through the STV concentration. Second majors are especially encouraged to take the capstone course, SC 40491, Current Topics in Environmental Science, *provided it* completes that second program.

BACHELOR OF SCIENCE WITH A MAJOR IN ENVIRONMENTAL SCIENCES

All environmental sciences first majors take the following courses in science:

Introductory Biology (BIOS 10171–10172 and 11173–11174)

Chemistry (CHEM 10171 and 10172)

Calculus (MATH 10350–10360)^{1, 2, 3}

Planet Earth (SC 20110/21110)

Physics (PHYS 20210–20220)

Biostatistics (BIOS 40411)⁴

General Ecology (BIOS 30312 and 31312)

Chemistry Elective⁵

Current Topics in Environmental Science (SC 40491)

Students also will choose science electives chosen from an approved list,⁶ completing a required minimum total of 69 credits in science.

Also required for the major are the following non-science courses:

One philosophy or theology University requirement must be in the area of ethics. An ethics course with emphasis on environmental biology or life science issues, i.e., Environmental Ethics or Science, Technology, and Society, or other approved arts and letters courses.

Students must take Introduction to Microeconomics (ECON 10010 or 20010) as a social science University requirement.^{7, 8}

Students are also urged to choose their electives from a recommended list of arts and letters courses.⁹

Requirements for the program are summarized in the table in this section.

Notes:

1. *Equivalent or higher-level sequences in mathematics may be substituted, e.g., MATH 10850–10860 for MATH 10350–10360.*

2. *Students interested in the area of ecological modeling are strongly urged to take MATH 10550–10560 for their mathematics requirement. Other mathematics courses should be taken as science electives.*

3. *Students who have completed only six hours of mathematics in their first year may transfer into the*

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program, but they will be required to complete a mathematics sequence equivalent to MATH 10350–10360 or MATH 10550–10560. Students having taken MATH 10250, 10110 (or 10260 or 10270) may do this by taking MATH 10360, while those who have taken only one semester of lower-level calculus should take both MATH 10350, 10360. (See also the discussion on science degree credit found later in this section of the Bulletin.)

4. Students transferring into the ES or ES2 major, or transfer students who have previously taken a statistics course equivalent to ACMS 20340, MAY BE allowed to have this course count for BIOS 40411 (Biostatistics) with the permission of the ES Director. Students will be allowed to substitute ACMS 20340, or an equivalent statistics course (e.g., PSY 30100) as ES or ES2 majors in exceptional cases with the permission of the director of their major and the associate dean of the College of Science.

5. The 4-credit chemistry elective requirement is satisfied by either one additional course in organic chemistry (CHEM 20273) or Inorganic Chemistry (CHEM 20243) or by Analytical Chemistry (CHEM 30333, 31333) or by an alternative 4-credit CHEM course as approved by the director of their major and by the associate dean of the College of Science. Students are also allowed to take the 3-credit CHEM 10122 lecture or CHEM 20204 with the understanding that if/when a laboratory is established for that course, they will be required to take that lab prior to graduation.

6. The following are examples of many approved science electives for this program:

Botany (BIOS 30304) or at St. Mary's
Evolution (BIOS 30305)
The History of Life (BIOS 30310)
Genetics (BIOS 20250 or 20303)
Principles of Microbiology (BIOS 30401)
Animal Behavior (BIOS 30407)
Aquatic Ecology (BIOS 30420)
Stream Ecology (BIOS 40527)
Numerous other BIOS courses as designated by the ES director, including 60000-level graduate courses are accepted.
Environmental Chemistry (CHEM 20204)
Further chemistry electives (from Note 6 above)
Second course in general chemistry (CHEM 20274)
Principles of Biochemistry (CHEM 40420)
Computer Programming and Problem Solving (MATH 20210)
Calculus III (MATH 20550)
Introduction to Linear Algebra and Differential Equations (MATH 20580)
Differential Equations (MATH 30650)
Topics in Computing
Historical Geology (SC 20120)
Sedimentation and Stratigraphy (SC 30530)
Environmental Microbiology (SC 40350)

Environmental Mineralogy (SC 20520)

Geochemistry (SC 40300)

Geomorphology (SC 30500)

Select CE courses may be allowed with the approval of the associate dean, College of Science.

Other SC courses as approved by the ES director may be included as they become available. Select courses offered in Study Abroad (UC-Dublin, UWA-Perth) also may be counted toward the ES science electives as well as select CE courses not cross-listed with SC, with permission of the ES director.

Students interested in attending graduate school in environmental sciences should consider taking science electives beyond requirements of this major. For example, for admission into some graduate programs, a year of organic chemistry would be a requirement. Deviations from the approved list of science electives must be approved by the advisor for the major.

7. The economics requirement for this major is fulfilled by taking Introduction to Economics (Microeconomics) either in the first year (ECON 10010) or in the second through fourth years (ECON 20010). Note, the course ECON 13181 (Social Science University Seminar) will not fulfill the economics requirement for this major.

8. For this major, the University social science requirement will be fulfilled by the required microeconomics course.

9. Numerous STV courses are recommended as electives, including Environment and Environmentalism in History (STV 30175); Self, Society and the Environment (STV 40319) and others as approved by the ES director. The STV courses may be taken either under the STV label or from the primary departmental cross-list.

10. As is the case for science first majors, six credits of the science course work in this program may also be counted toward the student's university science requirement.

11. While Biostatistics (BIOS 40411) is the preferred course, other 3- or 4-credit statistics courses required for completion of a first major (i.e., economics, psychology) may be substituted for BIOS 40411 with the permission of the ES2 director. MATH 101430 is not an acceptable substitute for BIOS 40411 or other statistics course, however. Although mathematics course work is not specifically required of this program, several required courses (BIOS 40411 or some of the first courses in physics) do have a prerequisite of one year of calculus (MATH 10350–10360 or equivalent). For all students in the College of Arts and Letters or the Mendoza College of Business, the mathematics sequence MATH 10350–10360 is acceptable for completion of the university mathematics requirement; thus, this sequence is recommended for students considering Environmental Sciences as a second major. Students lacking this mathematics background may have to take further course work in mathematics to meet the prerequisites in mathematics of courses in this program.

12. Chosen from approved biology or geology electives listed in note 7 above or one first course in physics

(PHYS 10111 or 10310 or 10411 or 30210) or an approved survey course: Concepts of Energy and the Environment (PHYS 10052) or Energy and Society (PHYS 20051) and others as designated.

Sample Curriculum (B.S. Degree Majors):

First Year

First Semester*

Biology I and lab	4
Calculus A	4
General Chemistry I and lab	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Second Semester

Biology II and lab	4
Calculus B	4
Organic Chemistry I and lab	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Sophomore Year

First Semester

Planet Earth and lab	4
General Ecology and lab	4
Language I	4
Microeconomics	3
	<hr/>
	15

Second Semester

Chemistry Elective and lab ⁵	4
Biostatistics	4
Language II	4
General Elective ¹⁰	3
	<hr/>
	15

Junior Year

First Semester

Physics for Life Sciences I and lab	4
University Requirement	3
Language III (intermediate level)	3
Science Elective #1	3
Science Elective #2	3
	<hr/>
	16

Second Semester

Physics for Life Sciences II and lab	4
Science Elective #3	3
University Requirement	3
General Elective ¹⁰	3
	<hr/>
	13

Senior Year

First Semester

Current Topics (SC 40491)	3
Science Elective #4	3
Science Elective #5	3
University Requirement	3
General Elective ¹⁰	3
	<hr/>

BIOLOGICAL SCIENCES

Second Semester	
Science Elective #6	3
General Elective ¹⁰	3
General Elective ¹⁰	3
General Elective ¹⁰	3
General Elective ¹⁰	1

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****Ideally, students who decide to major in environmental sciences before beginning their first year should take BIOS 10171–10172. This will allow for an additional year of relevant science and other electives to be included in their total curriculum. See notes accompanying BIOS 10171–10172.***

***** One of these must be a University Seminar (13180–18189).***

Honors. ES majors can participate in the Biological Sciences honors program. See page 146 for more information.

ENVIRONMENTAL SCIENCES MAJOR WITH A CONCENTRATION IN EARTH SCIENCES

The following outlines the course requirements (totaling 34 credits) for Earth Sciences concentration:

CE 20520. Environmental Mineralogy	
CE 20320. Environmental Aquatic Chemistry	
CE 20300. Global Change, Water & Energy	
CE 30530. Sedimentation and Stratigraphy	
CE 30300. Geomorphology for Engineers and Earth Scientists	
CE 34540. Petrology of Earth Materials	
CE 30560. Dynamic Earth	
CE 40300. Geochemistry	
CE 40350. Environmental Microbiology	
CE 40381. Environmental Isotope Geochemistry	
CE 45200. Spring Field Trip	
CE 45340. Field Trip	

First Year (see core environmental sciences major)

Sophomore Year

<i>First Semester</i>	
Planet Earth and lab	4
General Ecology and lab (BIOS 31312)	4
Language I	3
Topics in Environmental Science	3
University Requirement	3
	17

Second Semester

Global Change, Water & Energy	3
Biostatistics and tutorial	4
Chemistry Elective ⁵	4
Language II	3
University Requirement	3
	17

Junior Year

<i>First Semester</i>	
Environmental Mineralogy	4
Sedimentation and Stratigraphy	3
Physics for Life Sciences I and lab	4
Fall Field Trip	1
Language III	3
	15

Second Semester

Petrology of Earth Materials	4
Environmental Microbiology	3
University Requirement	3
Physics for Life Sciences II and lab	4
Spring Field Trip	1
	15

Senior Year

<i>First Semester</i>	
Environmental Isotope Geochemistry	3
Geochemistry	3
General Elective	3
Geomorphology for Engineers and Earth Scientists	3
University Requirement	3
	15

Second Semester

Dynamic Earth	3
Environmental Aquatic Chemistry	3
General Elective	3
University Requirement	3
University Requirement	3
	15

ENVIRONMENTAL SCIENCES AS A SECOND MAJOR

Most students in the College of Arts and Letters or in the Mendoza College of Business may participate in the Environmental Sciences Program as second majors. Students who are considering the environmental sciences second major must have a first major in one of the departments of the College of Arts and Letters or the Mendoza College of Business. Because of the sizable overlap in requirements, students in the College of Arts and Letters who have a second major in preprofessional studies will not be allowed to add this second major program.

The requirements for second majors consist of the following science courses:¹⁰

General Biology (BIOS 10161+11161 and BIOS 10162+11162) or (BIOS 20201+21201 and BIOS 20202+21202)	
General Ecology (BIOS 30312, 31312)	
Chemistry (CHEM 10171, 10172) or (CHEM 10171, 10122)	
Environmental Chemistry (CHEM 20204) or approved alternative	
Geology (SC 20110 with lab)	
Biostatistics (BIOS 40411) ¹¹	

Biology or Geology elective (3 or 4 credits)¹²

The total required course work requires a minimum total of 32 credits in science beyond the University math requirement.

Note, the same policy applies for Environmental Sciences first and second majors: All College of Science courses specified by the major program must be taken at the University of Notre Dame. (An exception is made for any science courses taken for this major through an approved Notre Dame study abroad program.)

Sample Curriculum (Second Majors):

Students should remember that all science major programs require course work that builds upon prerequisites and thus require careful planning. A sample curriculum for second majors is given below. Note: Only the courses for the second major are listed.

First Year*

<i>First Semester</i>	
CHEM 10171 Chemical Principles and Lab	4

Second Semester

CHEM 10122 or CHEM 10172	3/4
--------------------------	-----

Sophomore Year

<i>First Semester</i>	
General Biology I (10171)	3
General Biology Lab (11173)	1

Second Semester

General Biology II (10172)	3
General Biology Lab (11174)	1

Junior Year

<i>First Semester</i>	
SC 20110 Planet Earth	4

Second Semester

Statistics or Biostatistics	3/4
CHEM or SC/CE requirement**	3

Senior Year

<i>First Semester</i>	
BIOS 30312, 31312. General Ecology	4
BIOS or CE or PHYS or SC Elective***	3

Second Semester

Course selection(s) to complete second major, as needed

MATH 10350–10360 or equivalent are **not included in the minimum total of 37 credits in this sequence; satisfies the University math requirement.*

***Students may take CHEM 20204 (Environmental Chemistry) or SC 20100 (Environmental Geosciences) or SC 30111 (Environmental Geology) or other approved CHEM, CE, or SC electives.*

****Students whose final requirement is a three-credit class in BIOS, CE, or SC may take SC 40491 to complete the major with the permission of the director of the ES major.*

BIOLOGICAL SCIENCES

SUMMARY OF REQUIREMENTS FOR
GRADUATION FOR ENVIRONMENTAL
SCIENCES MAJOR

	<i>Credits</i>
Biological Sciences	16
Chemistry	12
Geology	4
Mathematics	8
Physics	8
SC 40491	3
Science Electives	18
Total Science	69
Language	Intermediate-Level Competency (3)
University Requirement	3
Philosophy*	6
Theology*	6
University Requirement	3
University Requirement	3
University Requirement	3
Moreau First Year Experience	2
Free Electives	28**
	124

* One of these courses must be a University Seminar 13180–13189

** Assumes intermediate-level competency in language was achieved by taking a minimum of one three-credit course

MINOR IN SUSTAINABILITY

Director of the Minor in Sustainability:

Rachel Novick

Advisory Committee:

Samantha Salden (Chair)

Jon Coleman

Alan Hamlet

Jason McLachlan

Jessica McManus Warnell

Samuel Miller

Anthony Serianni

John Sitter

Jennifer Tank

The Minor in Sustainability is a course of study for undergraduates from broadly diverse academic disciplines. It examines the footprint of humanity on Earth's systems and ways to reduce that footprint to achieve social well-being and environmental protection. Faculty from multiple Colleges teach the principles and practices of sustainability from varied perspectives to provide a unique and dynamic curriculum. The curriculum is designed to augment disciplinary coursework in an area of major study so that students learn to integrate diverse ways of thinking and appreciate interdisciplinary problem-solving.

Students in the minor receive training in the principles and practices of sustainability through formal courses and independent study. Graduates of the minor will be equipped with knowledge and skills about sustainability, an ability to communicate about sustainability, and an imperative to implement sustainable practices. Graduates will be prepared to make substantive contributions to the development of more sustainable practices, practices that benefit their personal and professional lives, the lives of others, and the lives of future generations. Students will also be well positioned for in-depth study on sustainability at the post-baccalaureate level. Finally, the study of Catholic traditions and social and environmental ethics will help students understand the role that religious commitment can play in achieving sustainability.

Students can apply for admission to the minor in their first year, sophomore year, or junior year by contacting the director of the minor. They are required to take a gateway course "Sustainability: Principles and Practices", an interdisciplinary course taught by faculty from multiple departments across the University. This course should be taken at the beginning of study in the minor, but students do not need to declare the minor to enroll.

Students then select from a list of approved courses totaling at least 3 classes of at least 9 credits. These courses fall into four categories (Design, Impacts, Social Institutions, and Individual Behavior and Values) and are tagged as such using the course attributes which are searchable via the University's online Class Search. Students must take two courses outside of their College, except for Arts and Letters students who may take one liberal arts course and

one social science course. They also must take courses from three out of the four elective categories. Students who wish to take two electives in the same category may petition for an exception, provided that the two classes are providing substantially different disciplinary approaches to sustainability. One-credit seminars such as those offered by the Center for Social Concerns can be accumulated to give the equivalent of one 3-credit course. Students planning to study abroad are encouraged to petition for approval of relevant courses at their international institution before they leave campus.

Students must meet with the director of the minor in sustainability to discuss their capstone projects during the spring semester of their penultimate year, but they are encouraged to set up an initial meeting sooner. They are required to submit a brief description of their project proposal at the end of their penultimate year and identify a faculty member who has agreed to serve as their advisor. Students will receive feedback on their proposals from the Sustainability Minor Advisory Board and may be required to resubmit their proposals with modifications to gain approval. Students wishing to start their project earlier (for example, the summer before their junior year) should submit their project proposal before they begin their research. During the fall of their final year, students will enroll in a capstone seminar (SUS 43000) and one credit of independent study (SUS 48001). As part of the requirements for SUS 48001, they will complete a research paper thoroughly exploring existing scholarship on their project topic. During the spring of their final year, students will enroll in a second credit of independent study (SUS 48002) and complete their capstone project.

Additional details about the Minor in Sustainability can be found online at <http://sustainabilitystudies.nd.edu>.

CHEMISTRY AND BIOCHEMISTRY

Chemistry and Biochemistry

Chair:

Brian M. Baker

George and Winifred Clark Professor of Chemistry:

Christian Melander

Grace-Rupley Professor of Chemistry

Norman Dovichi

Emil T. Hofman Professor of Chemistry

Bradley D. Smith

Charles Huisking Professor of Chemistry:

Brian Blagg

Kleiderer/Pezold Professor of Biochemistry

Francis J. Castellino

Kleiderer-Pezold Professor of Biochemistry:

Sharon Stack

Navari Family Professor of Life Sciences:

Shahriar Mobashery

Rev. John A. Zahn Professor:

Brian M. Baker

Rev. John Cardinal O'Hara Professor

Patricia L. Clark

Arthur J. Schmitt Professor of Chemical and Biomolecular Engineering:

Paul Bohn

Rev. John A. Zahn Professor of Science:

Prashant V. Kamat

Professors:

Seth Brown; Ian Carmichael; Steven A. Corcelli; Mary Galvin; J. Daniel Gezelter; Holly V. Goodson; Gregory V. Hartland; Paul Helquist; Paul W. Huber; Masaru Kenneth Kuno; A. Graham Lappin; Marya Lieberman; Anthony Serianni; Slavi Sevov; Richard E. Taylor; Olaf G. Wiest

Associate Professors:

Brandon L. Ashfeld; Jon P. Camden; Haifeng Gao; Vlad M. Iluc; S. Alexander Kandel; Jeffrey W. Peng

Assistant Professors

Jessica Brown; Laurie E. Littlepage; John Parkhill; Arnaldo Serrano; Emily Tsui

Teaching Faculty:

DeeAnne Goodenough-Lashua; Douglas Miller; Bahram Mousser; Jim Parise; Sarah West; Steven Wietstock; Kelley M.H. Young

Emeriti:

Subhash C. Basu; Xavier Creary; Thomas P. Fehlner; Richard W. Fessenden; Dan Meisel; Thomas L. Nowak; W. Robert Scheidt; Anthony M. Trozzolo

Program of Studies. Chemistry is the science of substances that comprise the world about us and is concerned with their structure, their properties and the reactions that change them into other substances. Chemists and biochemists practice their profession in many ways—in educational institutions, government laboratories, private research institutions and foundations and in many commercial areas, including the chemical, drug, health, biotechnology, pharmaceutical and food industries.

The Department of Chemistry and Biochemistry has a strong undergraduate program together with a strong graduate education and research program. The graduate program greatly benefits undergraduate education by attracting highly qualified faculty and results in the availability of excellent research facilities and modern instrumentation necessary to train the scientists of tomorrow. This department is able to provide an excellent program of undergraduate research to complement regular course work. Student participation in research is highly encouraged as a key part of the education of chemistry and biochemistry majors.

The programs in chemistry and biochemistry described in the following pages prepare students for graduate studies and professional work in the chemical and biochemical sciences, as well as in interdisciplinary areas that rely heavily on chemistry. Bachelor of science degrees are offered with a major in chemistry or a major in biochemistry. At the graduate level, the Department of Chemistry and Biochemistry offers programs leading to the degrees of master of science and doctor of philosophy, as described in the *Graduate School Bulletin of Information*.

BACHELOR OF SCIENCE WITH A MAJOR IN CHEMISTRY

The chemistry curriculum at Notre Dame includes two programs: the Chemistry Career Program, designed for students interested in a professional career in chemistry, and the Chemistry Combination Program, designed for those students who are interested in combining chemistry with business or with computing.

All chemistry majors take the following basic sequence of courses:

General Chemistry (CHEM 10181, 11181 recommended; or optionally, CHEM 10171, 11171)

Organic Chemistry (CHEM 10182, 11182, 20283, 21283)¹

Inorganic Chemistry (CHEM 20284, 21284, 40443, 41443)

Physical Chemistry (CHEM 30321, 30322, 31322)

Analytical Chemistry (CHEM 30333, 31333)

Physical Methods of Chemistry (CHEM 40434 or CHEM 40436)

Principles of Biochemistry (CHEM 40420)

Chemistry Seminars (CHEM 23201, CHEM 23202, CHEM 23203), three semesters

Physics (PHYS 10310, 10320)¹

Mathematics (MATH 10550, 10560, and CHEM 20262)

In addition to this basic sequence, the following courses are required for each program.

Chemistry Career Program

Science Electives (six credit hours)²

Combination Program

Program Electives (15 credit hours)

Science Electives (three credit hours)²

The program electives for the Chemistry Combination Program are from either the area of business or from the area of computing and are the same as those in the corresponding Collegiate Sequence programs:

Chemistry with Business

Accounting I (BASC 20100)

Accounting II (ACCT 20200 or FIN 30210 or FIN 30220 or FIN 30600 or MGT 40750)

Corporate Financial Management (BASC 20150)

Principles of Management (BASC 20200)

Principles of Marketing (BASC 20250)

Introduction to Economics (ECON 10010) or

Principles of Microeconomics (ECON 20010) is

suggested as a non-program elective, as a prerequisite to BASC 20250 and meets the University social science requirement.

Chemistry with Computing

Each student selects 15 credit hours of computer science and engineering and chemistry courses in consultation with a departmental advisor. Program electives require careful scheduling.

Sample Curriculum (Career Program):

First Year

<i>First Semester</i>	
CHEM 10181	4
CHEM 11181	0
MATH 10550	4
PHYS 10310	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Second Semester

CHEM 10182	4
CHEM 11182	0
MATH 10560	4
PHYS 10320	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Sophomore Year

<i>First Semester</i>	
CHEM 20283	3
CHEM 21283	1
CHEM 23201 ⁵	1
Language	3
University Requirement	3
Elective	4
	<hr/>
	15

CHEMISTRY AND BIOCHEMISTRY

Second Semester

CHEM 20284	3
CHEM 21284	1
CHEM 20262	3
Language	3
Electives	6
	<hr/>
	16

Junior Year*First Semester*

CHEM 30321	3
CHEM 30333	3
CHEM 31333	1
CHEM 23203 ⁵	1
Elective (or Language)	3
University Requirement	3
	<hr/>
	14

Second Semester

CHEM 30322	3
CHEM 31322	2
CHEM 40434 or CHEM 40436	3
University Requirement	3
Elective	3
	<hr/>
	14

Senior Year*First Semester*

CHEM 40420	3
CHEM 40443	3
CHEM 41443	2
Electives	3
University Requirement	3
	<hr/>
	14

Second Semester

CHEM 23202 ⁵	1
Science Electives ²	6
Electives	6
	<hr/>
	13

Sample Curriculum (Combination Program):**First Year***First Semester*

CHEM 10181	4
CHEM 11181	0
MATH 10550	4
PHYS 10310	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Second Semester

CHEM 10182	4
CHEM 11182	0
MATH 10560	4
PHYS 10320	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Sophomore Year*First Semester*

CHEM 20283	3
CHEM 21283	1
CHEM 23201 ⁵	1
Language	3
University Requirement	3
Elective	3
	<hr/>
	14

Second Semester

CHEM 20284	3
CHEM 21284	1
CHEM 20262	3
Language	3
Elective	4
	<hr/>
	14

Junior Year*First Semester*

CHEM 30321	3
CHEM 30333	3
CHEM 31333	1
Elective (or Language)	4
Program Elective	3
	<hr/>
	14

Second Semester

CHEM 23202 ⁵	1
CHEM 30322	3
CHEM 31322	2
CHEM 40434	3
University Requirement	3
Program Elective	3
	<hr/>
	15

Senior Year*First Semester*

CHEM 40420	3
CHEM 40443	3
Program Electives	6
CHEM 41443	2
	<hr/>
	14

Second Semester

CHEM 23202 ⁵	1
Science Elective ²	3
Program Elective	3
University Requirement	3
University Requirement	3
	<hr/>
	15

Notes:

1. Substitution with permission only.
2. Undergraduate research, CHEM 48498, is a recommended science elective in all programs beginning in the sophomore year, with typically one or two credits per semester.
3. The student should take three general requirement courses during the first year, including one course that is designated a University Seminar. Economics is required for the Chemistry with Business program.

4. One course in theology and philosophy should be completed by the end of the sophomore year. These courses may be taken in either semester of the first or second year.

5. In all the programs, one chemistry seminar is generally taken in each of the sophomore, junior and senior years.

BACHELOR OF SCIENCE WITH A MAJOR IN BIOCHEMISTRY

The biochemistry curriculum emphasizes the chemical basis of biological processes. All biochemistry majors are required to take the following courses:

General Chemistry (CHEM 10181 AND 11181 recommended; or optionally CHEM 10171, 11171)

Organic Chemistry (CHEM 10182, 11182, 20283, 21283)¹

Inorganic Chemistry (CHEM 20284, 21284)

Physical Chemistry (either CHEM 30338 or CHEM 30321/30322)

Analytical Chemistry (CHEM 30333, 31333)

Chemistry Seminars (CHEM 23201, 23202, 23203), three semesters

Biochemistry Seminar (CHEM 23212)

Biochemistry (CHEM 30341, 31341, 30342)

Mathematics (MATH 10550, 10560, and CHEM 20262)

Physics (PHYS 20210-20220 or PHYS 10310, 10320)

Biology (BIOS 10171-10172)

Genetics (BIOS 20303)

Cell Biology (BIOS 30341)

Molecular Biology (BIOS/CHEM 50531)

Sample Curriculum (Biochemistry Program):**First Year***First Semester*

CHEM 10181	4
CHEM 11181	0
MATH 10550	4
BIOS 10171	3
BIOS 11173	1
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

Second Semester

CHEM 10182	4
CHEM 11182	0
MATH 10560	4
BIOS 10172	3
BIOS 11174	1
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	<hr/>
	19

CHEMISTRY AND BIOCHEMISTRY

Sophomore Year*First Semester*

CHEM 20283	3
CHEM 21283	1
CHEM 23212	0
CHEM 23201 ⁵	1
BIOS 30341	3
Language	3
University Requirement	3
	14

Second Semester

CHEM 20284	3
CHEM 21284	1
BIOS 20303	3
CHEM 20262	3
Language	3
	13

Junior Year*First Semester*

CHEM 30341	3
CHEM 31341	2
CHEM 23203 ⁵	1
PHYS 20210	4
Elective (or Language) ⁴	3
	13

Second Semester

CHEM 30338	3
CHEM 30342	3
PHYS 20220	4
University Requirement	3
Elective	3
	16

Senior Year*First Semester*

CHEM 30333	2
CHEM 31333	2
BIOS/CHEM 50531	3
University Requirement	3
Elective	3
	13

Second Semester

CHEM 23202 ⁵	1
University Requirement	3
Electives	9
	13

Notes:

1. Substitution with permission only.
2. The student should take three general requirement courses during the first year, including one course that is designated a University Seminar. Economics is required for the Chemistry with Business program.
3. One course in theology and philosophy should be completed by the end of the sophomore year. These courses may be taken in either semester of the first or second year.

SUMMARY OF MINIMAL REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY AND BIOCHEMISTRY

	<i>Chemistry Career Program</i>	<i>Chemistry Combination Program</i>	<i>Biochemistry Program</i>
Chemistry	42	42	32
Biochemistry	3	3	8
Biological Sciences	—	—	17
Mathematics	8	8	8
Physics	8	8	8
Science Electives	6	3	2
Total Required Science	67	64	75
Program Electives	—	15	—
Total	67	79	75
Moreau First Year Experience	2	2	2
Language	Intermediate-Level Competency		
University Requirement	3	3	3
Philosophy+	6	6	6
Theology+	6	6	6
University Requirement	3	3	3
University Requirement	3	3	3
University Requirement	3	3	3
Free Electives	20 ⁺⁺	8 ⁺⁺	12 ⁺⁺
	124	124	124
+ One of these courses must be a University Seminar.			
++ Assumes intermediate-level competency in language was achieved by taking two 4-credit introductory-level and one 3-credit intermediate-level course.			

4. Undergraduate research, CHEM 48498, is a recommended science elective in all programs beginning in the sophomore year with typically one or two credits per semester. BIOS 21303 and BIOS 31341 are also recommended.

5. In all the programs, one chemistry seminar is generally taken in each of the sophomore, junior and senior years.

Honors in Chemistry and Biochemistry

Junior majors in chemistry and biochemistry may apply for the departmental honors program to receive the designation "honors in chemistry" or "honors in biochemistry" in their student transcript if they have a minimum grade point average of 3.5 and are enrolled in undergraduate research CHEM 48498 or CHEM 48499. The requirements for completion of the honors program are a minimum of two semesters of undergraduate research after the beginning of the junior year and the course CHEM 48500, with a grade of B or better. CHEM 48500 has to be taken in the semester the thesis is presented.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Chemistry and Biochemistry*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Graduate courses in chemistry are open to qualified advanced undergraduate students, subject to the approval of the departmental advisor. These courses are listed in the *Graduate School Bulletin of Information*.

MATHEMATICS

Mathematics

Chair:

Jeffrey Diller

Associate Chair:

Richard Hind

Director of Graduate Studies:

Peter A. Cholak

Director of Undergraduate Studies:

Sonja Mapes-Székelyhidi

William J. Hank Family Professor of Mathematics:

Anand Pillay

Charles L. Huisking Professor of Mathematics:

Julia F. Knight

John and Margaret McAndrews Professor

of Mathematics:

Mark Behrens

John A. Zahm, C.S.C., Professor of Mathematics

Stephen A. Stolz

Rev. Howard J. Kenna, C.S.C., Professor of

Mathematics

Karsten Grove

Glynn Family Honors Collegiate Professor:

Claudia Polini

Notre Dame Professor of Mathematics:

Gabor Székelyhidi

Professors:

Peter A. Cholak; Francis X. Connolly (emeritus);

Jeffrey A. Diller; William G. Dwyer (emeritus);

Matthew J. Dyer; Samuel R. Evens; Leonid

Faybusovich; Michael Gekhtman; Matthew

Gursky; Alexander J. Hahn (emeritus); Brian

C. Hall; Qing Han; David Hansen (emeritus);

Alex A. Himonas; Richard Hind; Alan Howard

(emeritus); Francois Ledrappier (emeritus);

Juan Migliore; Gerard K. Misiolek; Liviu

Nicolaescu; Timothy O'Meara (Kenna Professor

of Mathematics, emeritus, and provost emeritus);

Richard R. Otter (emeritus); Barth Pollak (emeritus);

Andrew Putman; Mei-Chi Shaw; Roxanne

Smarandache; Brian Smyth (emeritus); Dennis

M. Snow; Nancy K. Stanton; Sergei Starchenko;

Laurence R. Taylor; Warren J. Wong (emeritus);

Frederico Xavier (emeritus)

Associate Professors:

Katrina Barron; Mario Borelli (emeritus); John E.

Derwent (emeritus); David Galvin; Cladiu Raicu

Assistant Professors:

Andrei Jorza; Pavel Mnev; Annette Pilkington;

Marco Radeschi; Christopher Schommer-Pries

Special Professional Faculty:

Arthur Lim

Associate Special Professional Faculty:

Sonja Mapes-Székelyhidi

Program of Studies. Mathematics has had a profound effect upon civilization since ancient times, when the legend originally inscribed on the entrance to Plato's academy was "Let no one ignorant of geometry enter here." It was equally true during the medieval period, when arithmetic and geometry constituted two of the seven subjects considered essential for a liberal education. It has been said that the second most influential book in the span

of Western civilization—after the Bible—is Euclid's *Elements*. Although mathematics is usually associated with science and technology in the modern mind, it seems apparent from the writings of the great mathematicians of the 17th and 18th centuries that religious belief played a great role in their pursuit of mathematics. They saw the "system of the world" obeying mathematical laws and as a consequence felt impelled to study mathematics so as to better appreciate the world's Creator.

Mathematics continues to have a profound influence in our century. From the theory of relativity, with its applications to the study of the large-scale structure of the universe, to the development of the modern computer, with its manifold applications in science, technology and business, mathematics has played a fundamental role. It is surely the most universal of all scientific tools, and the student equipped with a strong mathematical background will be in the enviable position of being able to employ his or her expertise in any area in which rigorous thought and precision of results are mandated.

The department is dedicated to the development of undergraduate studies, to the teaching of mathematics to scientists, engineers and teachers, to graduate education and research, and to the discovery of new mathematics. The entire faculty is involved with undergraduate affairs, and students have the opportunity of associating with scholars of international repute. Mathematics at Notre Dame provides students with a discipline of the mind and a stimulation of the imagination par excellence.

Programs in mathematics prepare students for graduate studies or for professional work in fields in which mathematics plays a dominant role. They provide an excellent preparation for law school, medical school, business school and secondary school teaching. Graduates may enter careers in research institutes or industrial or government positions.

In addition to its undergraduate programs, the department offers programs of graduate study leading to the degree of doctor of philosophy, as described in the Graduate School *Bulletin of Information*.

The department recognizes that, besides those students who wish to pursue a career devoted primarily to mathematical research and teaching, many will wish to take positions in business, industry or government where they will be using their mathematical skills in close collaboration with engineers as well as biological, physical and social scientists. These students will find among the listed programs one well suited to their needs. Besides these programs a student may, in consultation with the director of undergraduate studies and the department chair, create a program especially tailored to his or her career goals.

BACHELOR OF SCIENCE WITH A MAJOR IN MATHEMATICS

The mathematics curriculum at Notre Dame includes seven course sequences or areas of concentration within the College of Science. These programs are designed to accommodate the academic and professional interests of all mathematics majors. Brief descriptions are given below, and more detailed descriptions of these programs are available on request from the Department of Mathematics.

College Requirements. All must take the following College of Science courses: (CHEM 10171, 10172) or (CHEM 10171, 10122); PHYS (10310 or 10093) and PHYS (10320 or 10094); and an additional science elective.

A student who takes two semesters of organic chemistry or two semesters of general biology is only required to take PHYS (30210 or 10095) and (30220 or 10096).

Mathematics Honors Program

This program is suited to students who are interested in graduate work in one of the mathematical sciences and to those whose career plans require a strong background in modern mathematics.

Honors Calculus I (MATH 10850)
Honors Calculus II (MATH 10860)
Honors Calculus III (MATH 20850)
Honors Calculus IV (MATH 20860)
Honors Algebra I (MATH 20810)
Honors Algebra II (MATH 20820)
Honors Algebra III (MATH 30810)
Honors Algebra IV (MATH 30820)
Honors Analysis I (MATH 30850)
Honors Analysis II (MATH 30860)
Electives (12 credit hours with six at the 40000 level)

Mathematics Courses for the Other Programs

All other mathematics programs (except the computing program) require the following mathematics core courses:

Calculus I (MATH 10550)
Calculus II (MATH 10560)
Calculus III (MATH 20550)
Ordinary Differential Equations (MATH 20750)
Linear Algebra (MATH 20610)
Introduction to Math Reasoning (MATH 20630)
Algebra (MATH 30710)
Real Analysis (MATH 30750)

In addition to this basic sequence, the following courses are required for each program:

Mathematics Career Program

This program is designed to give students a general background in mathematics. In addition to the basic sequence of courses listed above, 15 hours of mathematics electives are required, at least three of which are at the 40000 level.

MATHEMATICS

Mathematics and Life Sciences Program

This program is designed for mathematics majors who are interested in life-science-oriented careers.

The following mathematics courses are required in addition to the basic sequence of courses listed above:

Introduction to Probability (MATH 30530)
Mathematical Statistics (ACMS 30540)
Elective in Mathematics (three credit hours at the 40000 level)

The following College of Science courses are required:

Chemistry (CHEM 10171, 10172, 20273, 20274)
Biology I and II (BIOS 10171–10172)
Genetics (BIOS 20303, 21303)

Mathematics and Computing Program

This program is designed for students who plan to pursue graduate study or industrial careers in computing science. All of the mathematics core courses listed above are required, as well as 15 hours of mathematics electives, at least three hours of which are at the 40000 level.

In addition, the student must complete one of the following sequences of computing courses:

Software design option: CSE 20211, CSE 20212, CSE 20110, CSE 30331, CSE 30246, fourth elective
Theory option: CSE 20211, CSE 20212, CSE 20110, CSE 30331, CSE 30151, CSE 40113
Theory and compilers option: CSE 20211, CSE 20212, CSE 20110, CSE 30331, CSE 30151, CSE 40243
Computer architecture option: CSE 20211, CSE 20212, CSE 20221, CSE 30321, CSE 40322, fourth elective

Mathematics Education Program

This program is designed for students who plan a career in secondary education. The following mathematics courses are required in addition to the basic sequence listed above:

Introduction to Probability (MATH 30530)
Mathematical Statistics (ACMS 30540)
Geometry (MATH 361 at Saint Mary's College, 3 credit hours)
Discrete Math (MATH 30210, 40210 or 40220, 3 credit hours)
One Mathematics elective (3 credit hours)

(One of these classes must be at the 40000 level)

The following education courses are to be taken at Saint Mary's College: EDUC 201, 220, 340, 345, 346, 356, 451, and 475.

Mathematics and Business Administration Program

This program is designed to prepare students for a career in business or in the actuarial profession. The following mathematics courses are required in addition to the basic sequence:

Introduction to Probability (MATH 30530)
Mathematical Statistics (ACMS 30540)
Introduction to Operations Research (MATH 30210)
Two electives in Mathematics (including three credits at the 40000 level)⁵

Also required are ECON 20010 or its equivalent and the following courses from the College of Business: BASC 20100, BASC 20150, BASC 20200, BASC 20250 and one course from the following list: ACCT 20200, FIN 30210, FIN 30220, FIN 30220, FIN 30600.

Mathematics and Engineering Science Program

This program is designed for students interested in applied or industrial mathematics. In addition to the mathematics core courses, the student is required to take one of MATH 40480, MATH 40390 or MATH 40750, and 12 more credits of mathematics electives. The student must also complete one of the following two sequences of engineering classes:

Thermal option: AME 20221, AME 20222, AME 30331, AME 20231, AME 30334
Structures and design option: AME 20221, AME 20241, AME 20231, CE 30200, CE 30210

Mathematics as a Second Major

Students in the Mendoza College of Business or the College of Arts and Letters may pursue a second major in mathematics by completing all mathematics courses required for the career mathematics concentration. See the list below. To list mathematics as a second major on the transcript, the student must satisfy all of the requirements for a major in some department of the Mendoza College of Business or the College of Arts and Letters.

MATH 10550–10560–20550. Calculus I–III	11.5
MATH 20750. Ordinary Differential Equations	3.5
MATH 20610. Linear Algebra	3
MATH 20630. Introduction to Abstract Math	3
MATH 30710. Algebra	3
MATH 30750. Real Analysis	3
Mathematics Electives	15*
	42 credits

Supplemental Major in Mathematics for Engineering

Students in the College of Engineering may pursue a supplemental major in mathematics by completing all of the mathematics courses required for the career mathematics concentration in addition to completing the mathematics requirements for the engineering degree. In practice this means that students must take 24 unique credits of mathematics courses in addition to what is required for their engineering major and that this list must include MATH 20630, MATH 30710, and MATH 30750.

Supplemental Major in Honors Mathematics for Engineering

Students in the College of Engineering may pursue a supplemental major in honors mathematics by completing all of the mathematics courses required

for the career mathematics concentration in addition to completing the mathematics requirements for the engineering degree. In practice this means that students must take 24 unique credits of mathematics courses in addition to what is required for their engineering major and that their math requirements for both their engineering major as well as their math supplemental major will come from the honors sequences. Specifically, that students will take MATH 10850–10860; MATH 20850–20860; MATH 20810–20820; MATH 30810–30820; and MATH 30850–30860 in place of courses such as MATH 10550, 10560, 20550, and 20580.

Sample Curriculum**(Mathematics Career Program):****First Year**

First Semester	
MATH 10550. Calculus I	4
CHEM 10171. Chemical Principles	4
PHYS 10310. Engineering Physics I	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	19

Second Semester

MATH 10560. Calculus II	4
CHEM 10172 or 10122	4
PHYS 10320. Engineering Physics II	4
University Requirement	3
University Requirement	3
Moreau First Year Experience	1
	19

Sophomore Year

First Semester	
MATH 20610. Linear Algebra	3
MATH 20550. Calculus III	3.5
—Language	3
University Requirement	3
Science Elective	3
	15.5

Second Semester

MATH 20630. Introduction to Math. Reasoning	3
MATH 20750. Ordinary Differential Equations	3.5
Mathematics Elective	3
Language	3
University Requirement	3
	15.5

Junior Year

First Semester	
MATH 30710. Algebra	3
Mathematics Elective	3
Language	3
University Requirement	3
Elective	3
	15

NEUROSCIENCE AND BEHAVIOR

<i>Second Semester</i>	
MATH 30750. Real Analysis	3
University Requirement	3
Electives	9
	15

Senior Year

<i>First Semester</i>	
Mathematics Electives	6
Electives	9
	15

<i>Second Semester</i>	
Mathematics Elective	3
Electives	9
	12

¹ The student should take three general requirement courses during the first year, including one course that is designated a University Seminar. It is recommended that one course in history or social science be taken in the first year and one philosophy and one theology course be taken by the end of the sophomore year.

The Senior Thesis for Mathematics Majors

Students in the mathematics program have the option of writing a thesis on a subject in mathematics, or in an interdisciplinary area connected to mathematics. Such a thesis is strongly encouraged for math honors students and required of students in the SUMR program. This project is intended to give the student a better sense of how mathematics is done and used, and to develop in the student the habit of learning mathematics and its applications in an independent setting. In most cases, this work would be expected to be expository, but based on advanced-level readings. It should represent an effort that goes beyond what is found in an undergraduate course. It is especially desirable for a student to present a somewhat novel approach to an established subject, or to explore one of the many interesting connections that mathematics has with other disciplines.

During the second semester of the junior year and the first semester of the senior year, the student will work closely with a faculty advisor on a program of readings in preparation for the thesis, receiving 2 credits for each of these two semesters of work, under MATH 48800.

The thesis is to be crafted during the second semester of the senior year. The thesis must be submitted to the director of undergraduate studies by April 15 of the senior year. If the thesis is approved, the student will receive 2 credits under MATH 48900 and the citation of "Graduation with Senior Thesis" will appear on the transcript.

Students interested in writing a senior thesis should contact the director of undergraduate studies in the Department of Mathematics.

MINOR IN ACTUARIAL SCIENCE

The Department of Mathematics offers actuarial science as an academic minor. There is a heavy demand for the business courses which are required for this minor, and students are not guaranteed registration availability for these courses. Please see the academic advisor for more information. The actuarial science minor requires completion of the following ten courses:

MATH 30530. Probability	3
ACMS 30540. Statistics	3
MATH 30610. Introduction to Financial Mathematics	3
One mathematics elective at the 30000-level or above	3
BASC 20100 or ACCT 20100. Accountancy I	3
BASC 20150 or FIN 20150. Corporate Financial Management	3
FIN 30220. Macroeconomic Analysis	3
FIN 30600. Investment Theory	3
ECON 10010. Principles of Microeconomics	3
ECON 30331. Econometrics	3

Total: 30

Among the ten courses required for the minor, up to five courses can be double-counted for the student's major.

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Mathematics*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Certain graduate courses in mathematics are open to qualified advanced undergraduates, subject to the approval of the director of undergraduate studies. Other graduate courses are described in the *Graduate School Bulletin of Information*.

Neuroscience and Behavior

Director of Undergraduate Studies:

Nancy Michael

Program in Neuroscience and Behavior.

Neuroscience is a relatively young, exciting, and fundamentally interdisciplinary field devoted to the scientific study of the nervous system. Neuroscience encompasses the study of problems from multiple disciplinary perspectives at different levels of analysis in human and non-human organisms. It includes, for example, the study of molecular mechanisms in individual neurons and the coordination of millions of neurons into neural systems. Problems range from investigation of the evolution of nervous systems in basal vertebrates to the application of neuroscience to education and law. Neuroscientists also seek to develop neurologically plausible models of human thinking, affect and behavior.

At the University of Notre Dame, the neuroscience and behavior major is an interdisciplinary program that includes both Bachelor of Science and Bachelor of Arts tracks. This description covers the BS track only (see the Arts & Letters section for description of the BA track). The requirements for the major are essentially the same for both tracks, including a foundational requirement of an introductory neuroscience course with a laboratory in the fall of the sophomore year, however the two tracks differ in how they satisfy college level requirements. Required courses and electives for both the BS & BA that will satisfy the major credit requirements are drawn primarily from the Departments of Biological Sciences and Psychology. Undergraduate research and approved electives in other departments are also encouraged.

Research within the neuroscience and behavior program is reflective of the diversity of the field, with faculty pursuing research spanning from cellular and molecular approaches to architectural design and policy. Faculty are not housed within a specific department, but are affiliated based off their research interests; the uniting theme across disciplines is the understanding of the brain and behavior.

Students choosing an undergraduate major in neuroscience and behavior are well prepared for admissions to medical school, physical therapy or other professional schools, or to continue on for graduate study (Ph.D., M.D./Ph.D., M.S., MPH). Graduates who wish to enter the work force directly from their undergraduate studies are desirable candidates in careers ranging from industry, biotechnology, biotechnology sales, health-related research, health-related consulting, government, education, or policy.

This major requires a minimum of 61 credits in the College of Science. Students should discuss their specific choices with the program's undergraduate adviser.

NEUROSCIENCE AND BEHAVIOR

BACHELOR OF SCIENCE WITH A MAJOR IN NEUROSCIENCE AND BEHAVIOR

All neuroscience and behavior majors (BS track) take the following courses in science:

Biology (BIOS 10171/11173)	
Mathematics (MATH 10350 or 10550 or 10850) and (MATH 10360 or 10560 or 10860)	
General Chemistry (CHEM 10171/11171 or 10181/11181)	
Organic Chemistry (CHEM 10172/11172 or 10182/11182) and (CHEM 20273/21273 or 20283/21283)	
Physics (PHYS 10310/11310 or 20210/21210 or 10411/11411) and (PHYS 10320/11320 or 20435/21435 or 20220/21220)	
Neuroscience and Behavior Lecture and Lab (SC 20450/21450)	
One additional lab in Biological Sciences (genetics, cell bio, physiology accepted; others with prior approval)	

All majors to choose an additional 9 credits from the foundational science elective choices below:

Biology II & lab BIOS 10172/11174	
Genetics BIOS 20250/21250 (taken together) or 20303	
Cell Biology BIOS 20241 or 30341	
Biochemistry CHEM 40420	
Scientific Computing ACMS 20210	
Intro Applied Mathematical Methods I ACMS 20550	
Intro Dynamical Systems for Scientists MATH 20480	
Intro to Mathematical Reasoning MATH 20630	

All neuroscience and behavior majors take the following courses in Psychology:

Intro to Psychology PSY 10000 or 20000	
In addition all neuroscience and behavior majors take at least one course in statistics:	

BIOS 40411 or PSY 30100

All majors to take an additional 9 credits from a list of approved Biological Sciences electives, 9 more credits from a list of approved Psychology electives, and an additional 12 credits that may include a maximum of 6 credits of undergraduate research (with approved faculty advisers) and/or approved electives across several departments. See the undergraduate adviser for lists of approved courses and approved research advisers.

The major allows significant flexibility, depending on interests and career goals. The following is one example but students are urged to discuss their personal plans with the undergraduate adviser. The term "neuroelective" refers to elective choices pre-approved for the major.

SAMPLE CURRICULUM FOR A BS IN NEUROSCIENCE AND BEHAVIOR

Note that this sample curriculum assumes that no AP or language CE credits are included.

First Year*First Semester*

BIOS 10171 and 11173	4
MATH 10350 or 10550	4
CHEM 10171 and 11171	4
PSYCH 10000	3
WR13100	3
Moreau First Year Experience	1
	<hr/>
	19

Spring Semester

BIOS 10172 and 11174	4
MATH 10360 or 10560	4
CHEM 10172 and 11172	4
History *	3
Theology *	3
Moreau First Year Experience	1
	<hr/>
	19

Second Year*Fall Semester*

NSBH 20450 and 21450 Neuro & Behav + lab	4
CHEM 20273 and 21273	4
PSYC Neuroelective ¹	
PSYC 30501	3
Language	4
	<hr/>
	15

Spring Semester

BIOS 30341	3
Philosophy *	3
Language	4
PSYC Neuroelective ²	3
CHEM 40420 Biochem	3
	<hr/>
	16

Third Year*Fall Semester*

BIOS Neuroelective ¹	
BIOS 30407 Animal Behavior	3
PHYS 20210 and 21210	4
PSYC Neuroelective ³	
PSYC 30520 Intro Cognitive Psych	3
Theology *	3
Language	3
	<hr/>
	16

Spring Semester

BIOS Neuroelective ²	
BIOS 30339 Comparative Neuro	3
BIOS 40411	4
PHYS 20220 and 21220	4
Fine Art or Literature */ Free Elective	3
Additional Neuroelective ¹ / UG research	3
	<hr/>
	17

Fourth Year*Fall Semester*

BIOS Neuroelective ³	3
Additional Neuroelective ² / UG research	3
Philosophy *	3
Free Elective	3
	<hr/>
	15

Spring Semester

Additional Neuroelective ³	3
PSYC Neuroelective	3
Additional Neuroelective ⁴	3
Free Elective/Fine Art/Lit	3
Free Elective	3
	<hr/>
	15

** One of these must be a University seminar.*

COURSE DESCRIPTIONS

For a list of approved courses, contact the Director of Undergraduate Studies in the College of Science for this program Nancy Michael, (nmichael@nd.edu), or Anré Venter (aventer@nd.edu) the Director of Undergraduate Studies in the College of Arts & Letters. All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and searching within the home department of the course listing. Biological, psychological and additional courses for a given semester may be found within Class Search by selecting all subjects (CTRL/Shift) and selecting the NSBH attribute. Course descriptions can be found by clicking on the subject code and course number in the search results.

PHYSICS

Physics

Chair:

Peter M. Garnavich

Director of Graduate Studies:

Mark A. Caprio

Director of Undergraduate Studies:

Philippe Collon

Frank M. Freimann Professor of Physics:

Michael C.F. Wiescher

Aurora and Tom Marquez Professor of Physics:

Jacek K. Furdyna

Frank M. Freimann Professor of Physics:

Ani Aprahamian

Glynn Family Honors Collegiate Professor of Physics:

Christopher F. Kolda

Frank M. Freimann Assistant Professors of Physics:

Badih Assaf; Kenjiro K. Gomes

Rev. John Cardinal O'Hara, C.S.C., Professor of

Physics:

Margaret Dobrowolska-Furdyna

Ortenzio Family Assistant Professor in Applied Medical and Nuclear Physics:

Maxime Brodeur

Tom and Carolyn Marquez Assistant Professor of Physics:

Adam Martin

Professors:

Dinshaw Balsara; Daniel Bardayan; Timothy C. Beers; Bruce A. Bunker; Philippe Collon; Antonio Delgado; Morten Eskildsen; Stefan G. Frauendorf; Umesh Garg; Peter M. Garnavich; Michael D. Hildreth; J. Christopher Howk; Boldizsár Jankó; Colin Jessop; Craig S. Lent (concurrent); John M. LoSecco; Grant Mathews; Kathie E. Newman; Graham F. Peaslee; Terrence W. Rettig; Randal C. Ruchti; Steven T. Ruggiero; Jonathan R. Sapirstein; Rebecca Surman; Carol E. Tanner; Zoltán Toroczka; Mitchell R. Wayne

Associate Professors:

Mark A. Caprio; Justin Crepp; Kevin P. Lannon; Jeffrey Peng (concurrent); Sylwia Ptasinska

Assistant Professors:

Tan Ahn; Badih Assaf; Jeffrey Chilcote; Manoel Couder; Kenjiro Gomes; Anna Simon; Dervis Can Vural

Emeriti:

Gerald B. Arnold; H. Gordon Berry; Ikaros I. Bigi; Howard A. Blackstead; Samir K. Bose; Neal M. Cason; Anthony K. Hyder; Walter R. Johnson; Gerald L. Jones; James J. Kolata; A. Eugene Livingston; William D. McGlinn; John A. Poirier; Paul E. Shanley; Walter J. Tomasch

Program of Studies. Physics is the study and description of the structure and behavior of the physical universe. As such, it is fundamental to all physical sciences, pure and applied. A knowledge of physics is basic to an understanding of astronomy, chemistry, geology and even biology in that physics contributes to the interpretation and detailed description of many of the natural phenomena

which constitute the proper subjects of investigation in these sciences.

In addition to the undergraduate curricula, the Department of Physics offers programs for graduate study leading to the degrees of master of science and doctor of philosophy, as described in the *Graduate School Bulletin of Information*.

BACHELOR OF SCIENCE WITH A MAJOR IN PHYSICS

Science undergraduates may choose from two different majors within the Department of Physics: physics, and physics-in-medicine. The course sequences in these two programs are designed to accommodate the academic and professional interests of the majority of physics majors.

The basic physics major is a particularly flexible option for students, and is the one that will be chosen by the majority of undergraduates majoring in the department. Students following the physics major program will gain a broad understanding of physics. Depth is gained through the addition of one or more supplemental concentration programs offered through the department. Two of these concentration programs, **advanced physics** and **astrophysics**, help to prepare the student for graduate work in physics and astronomy or astrophysics. Students with interests in other areas have time to explore second-major, minor, or concentration options offered through departments in the College of Arts and Letters. Students with alternative interests are encouraged to discuss these with the director of undergraduate studies.

The **physics-in-medicine** major is designed for those students planning to attend medical school after completion of their degree, or who intend to work or study in the fields of biophysics or biomedical technology. The degree contains a core set of requirements in physics, augmented with courses in organic chemistry, biochemistry, biology, and biophysics.

No supplemental concentration is required of physics majors, but interested students are allowed and encouraged to follow as many concentrations as their schedules and interests allow. Students following the physics-in-medicine major program are not allowed to add concentrations; their major program is designed to accommodate the special interests of students intending careers in medicine, medical technology, or biophysics.

Physics as a second major is an option for students in the colleges of engineering, arts and letters, or business.

Requirements for the Physics Major

A total of 60 credits in science and mathematics is required for the physics major. The following outlines the course requirements:

Physics A: Mechanics (PHYS 10411¹)

Physics B: E&M (10422²)

Physics C: Thermo & Relativity (20433)

Physics D: Modern (20444)

Intro to Chemical Principles (CHEM 10171³) and General Chemistry Biological Processes (CHEM 10122³)

Calculus I, II, III (MATH 10550,⁴ 10560,⁴ 20550⁴)

Intro to Circuitry and Electronics (PHYS 20430)

Sophomore Seminar (PHYS 23411)

Mathematical Methods in Physics I, II (PHYS 20451, 20452)

Intermediate Mechanics (PHYS 20454)

Electricity and Magnetism (PHYS 30471)

A Modern Physics Course

Particle Physics & Cosmology (PHYS 40602)

or Intro to Solid State Physics (PHYS 50501)

or Intro to Nuclear Physics (PHYS 50701)

Modern Physics I Laboratory (PHYS 40441)

Thermal Physics (PHYS 30461)

Quantum Mechanics I (PHYS 40453)

Physics majors may add as many of the following concentrations as their interests and schedules allow. Completion of these concentrations is indicated on the student's final transcript.

Concentration in Advanced Physics

The following outlines the course requirements (totaling 14 credits) for the advanced physics concentration:

Junior Seminar (PHYS 33411)

Electromagnetic Waves (PHYS 30472)

Quantum Mechanics II (PHYS 40544)

Senior Seminar (PHYS 43411)

Modern Physics II Laboratory (PHYS 40442) or 40000-level ACMS or MATH level elective

40000-level or above physics course or Complex Variables (MATH 40480)⁵

Concentration in Astrophysics

The following outlines the course requirements (totaling 14 credits) for the astrophysics concentration:

Junior Seminar (PHYS 33411)

Intro. Astronomy and Astrophysics M (PHYS 20481)

Modern Observational Techniques (PHYS 50481)

Senior Seminar (PHYS 43411)

Advanced Astrophysics (PHYS 50201)

Relativity: Special and General (PHYS 50472)

Concentration in Applied Physics

The requirements are that the student completes at least 15 credits of engineering courses, chosen with the aid of the Director of Undergraduate Studies.

Requirements for the Physics-in-Medicine Major

A total of 77 credits in science and mathematics is required for the physics-in-medicine major. The following outlines the course requirements:

Physics A: Mechanics (PHYS 10411¹)

Physics B: E&M (10422²)

PHYSICS

Physics C: Thermo & Relativity (20433)	
Physics D: Modern (20444)	
Intro to Circuitry and Electronics (PHYS 20430)	
General Chemistry I–IV (CHEM 10171, 11171, 10172, 11172, 20273, 21273, 20274, 21274) ⁷	
Calculus I, II, III (MATH 10550 ⁴ , 10560 ⁴ , 20550 ⁴)	
Sophomore Seminar (PHYS 23411)	
Mathematical Methods in Physics I, II (PHYS 20451, 20452)	
Intermediate Mechanics (PHYS 20454)	
Electricity and Magnetism (PHYS 30471)	
Quantum Mechanics I (PHYS 40453)	
Biology I, II (BIOS 10171, 11173, 10172, 11174)	
Three specialized science electives (9 credits total) ⁶	

Requirements for Physics as a Second Major

The requirements for physics as a second major, for students in the colleges of engineering, arts and letters or business, consists of the physics and mathematics courses listed above for the physics major, except the chemistry sequence. To list physics as a second major on the transcript, the student must satisfy all of the requirements for a major in some department and college of the university.

Sample Curricula**MAJOR: PHYSICS****First Year***First Semester*

MATH 10550, 12550 ⁹	4
PHYS 10411, 11411	4
CHEM 10171, 11171	4
University Requirements	6
Moreau First Year Experience	1
	19

Second Semester

MATH 10560, 12560	4
PHYS 10422, 11422	4
CHEM 10122 or 10172, 11172	3
University Seminar	3
University Requirement	3
Moreau First Year Experience	1
	18

Sophomore Year*First Semester*

MATH 20550, 22550	3.5
PHYS 20433	3
PHYS 20430	1.5
PHYS 20451, 22451	3.5
PHYS 23411	1
Language ⁹	4
	16.5

Second Semester

PHYS 20454	3
PHYS 20444	3
PHYS 20452, 22452	3.5
Language ⁹	4
University Requirement	3
	16.5

Junior Year*First Semester*

PHYS 30461	3
PHYS 30471	3
PHYS 40453	3
Language ⁹	3
Elective	3
	15

Second Semester

[Semester Abroad]

or

University Requirements	6
Electives	9
	15

Senior Year*First Semester*

Modern Physics Electives ¹⁰	
PHYS 50501	3
PHYS 40441, 41441	3
University Requirement	3
Electives	6
	15

Second Semester

Modern Physics Electives ¹⁰	
PHYS 50602, 50701	3
University Requirement	3
Electives	9
	15

**MAJOR: PHYSICS
CONCENTRATION: ADVANCED PHYSICS****First Year** (See core physics major)**Sophomore Year** (See core physics major)**Junior Year***First Semester*

PHYS 30461	3
PHYS 30471	3
PHYS 33411	1
PHYS 40453	3
Language ⁹	3
Elective	3
	16

Second Semester

[Semester Abroad]

or

PHYS 30472	3
PHYS 40454	3
Physics Elective	3
University Requirement	3
Elective	3
	15

Senior Year*First Semester*

Modern Physics Electives ¹⁰	
PHYS 50501	3
PHYS 40441, 41441	3
PHYS 43411	1
University Requirements	6
Elective	3
	16

Second Semester

PHYS 40442, 41442 or MATH/ACMS elective at 40000-level	3
Modern Physics Electives ¹⁰	
PHYS 50502, 50701	3
University Requirement	3
Electives	6
	15

**MAJOR: PHYSICS
CONCENTRATION: ASTROPHYSICS****First Year** (See core physics major)**Sophomore Year***First Semester*

MATH 20550, 22550	3.5
PHYS 20433	3
PHYS 20430	1.5
PHYS 20451, 22451	3.5
PHYS 20481	3
PHYS 23411	1
Language ⁹	4
	19.5

Second Semester

(See core physics major)

Junior Year*First Semester*

PHYS 30461	3
PHYS 30471	3
PHYS 30481 or PHYS 50201 ⁸	3
PHYS 33411	1
PHYS 40453	3
Language ⁹	3
	16

Second Semester

(See core physics major)

Senior Year*First Semester*

Modern Physics Electives ¹⁰	
PHYS 50501	3
PHYS 40441, 41441	3
PHYS 43411	1
PHYS 30481 or PHYS 50201 ⁸	3
University Requirements	6
	16

PHYSICS

*Second Semester*Modern Physics Electives¹⁰

PHYS 50602, 50701

PHYS 50472

Electives

University Requirement

3
3
6
3

15

MAJOR: PHYSICS-IN-MEDICINE**First Year***First Semester*MATH 10550, 12550¹⁰

PHYS 10411, 11411

CHEM 10171, 11171

University Requirement

Moreau First Year Experience

4
4
4
6
1

19

Second Semester

MATH 10560, 12560

PHYS 10422, 11422

CHEM 10172, 11172

University Seminar

University Requirement

Moreau First Year Experience

4
4
4
3
3
1

19

Sophomore Year*First Semester*

BIOS 10171, 11174, 11173

MATH 20550, 22550

PHYS 20433

PHYS 20430

PHYS 23411

CHEM 20273, 21273

4
3.5
3
1.5
1
4

17

Second Semester

BIOS 10172, 11174

PHYS 20444

CHEM 20274, 21274

University Requirement

Language⁹4
3
4
3
4

18

Junior Year*First Semester*BIOS 20303⁶BIOS 30344⁶

PHYS 20451, 22451

Language⁹

University Requirement

3
3
3.5
4
3

16.5

*Second Semester*BIOS 30341⁶

PHYS 20454

PHYS 20452, 22452

University Requirement

Language⁹3
3
3.5
3
3

15.5

Senior Year*First Semester*

PHYS 40453

PHYS 30471

University Requirement

Electives

3
3
3
6

15

Second Semester

University Requirement

PHYS 50401⁷

Electives

3
3
9

15

Notes1. *Alternatively, PHYS 10310 and its laboratory and tutorial.*2. *Alternatively, PHYS 10320 and its laboratory and tutorial.*3. *Alternatives for CHEM 10171 and 10122 include CHEM 10171–10172 or CHEM 10181–10182 plus the associated laboratories and tutorials.*4. *Honors Calculus I through III (MATH 10850, 10860, and 20850) may substitute for Calculus I to III.*5. *Options include a 40000-level or above physics course, PHYS 48480 (Undergraduate Research: The student must take at least 3 credits in research with one advisor and the credits must be distributed over at least two semesters), or MATH 40480 (Complex Variables). Additional options are possible with approval of the Director of Undergraduate Studies. Physics electives cannot be double counted with requirements for the Astrophysics concentration.*6. *Students take three from the following: CHEM 40420 (Principles of Biochemistry), BIOS 20303 (Fundamentals of Genetics), BIOS 30344 (Vertebrate Physiology), BIOS 30341 (Cellular Biology), PHYS 50401 (Physics of Cells).*7. *Alternatives for CHEM 10171–10172 and 20273–20274 are CHEM 10181–10182 and CHEM 20283–20284.*8. *PHYS 50481 (Modern Observational Techniques) is offered in the fall of odd years.*9. *Assumes no AP credit or advanced placement.*10. *One of these courses, minimum, must be taken (Fall or Spring).***COURSE DESCRIPTIONS**

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on “Class Search” and selecting the subject *Physics*. Course descriptions can be found by clicking on the subject code and course number in the search results.

HONORS TRACK IN PHYSICS

The goal of this honors track is to give our most talented students an exceptional background in physics research. This track is open for both Physics majors and Physics in Medicine.

The track will accept physics majors in good academic standing as early as the spring of their sophomore year, who have identified their research advisor in the Physics Department and have already completed one semester of undergraduate research. Acceptance will be based on a research statement and transcript. At acceptance into the track a formal agreement will be set up between the student and the advisor.

To graduate with this honor, students will have to complete:

1. Typically at least three semesters and one summer of independent research either at Notre Dame or another university or research laboratory. Alternate research/internship venues and opportunities must be approved in advance by the DUS or Department Chair. Students are expected to apply for REU, COS-SURF or other summer funding as appropriate.
2. A substantial thesis that needs to be approved by the advisor (a manuscript submitted for publication can substitute only if the student has made substantial contributions to the work).
3. A presentation at a national or regional meeting, or at the Notre Dame COS-JAM conference.
4. Successful completion of all requirements for one of the physics concentrations, or completion of the physics in medicine degree.
5. A GPA of at least 3.33 in College of Science courses.

Thesis Requirements:

The final draft of the thesis will be written under the supervision of the advisor, and will be submitted by April 1. Each thesis will be reviewed by one member of the Undergraduate Research Committee. If the thesis is not approved, a second committee member will read the thesis and confer. The students will be notified by April 15 if a rewrite is needed. The rewrite will be due May 1.

The thesis is intended to support and develop each student's independence, scientific communication skills, critical review skills, and understanding of their research in the context of the larger field. It will have the added benefit of helping students prepare for graduate applications and fellowships.

The student's transcript will carry the notation “Honors Physics” to distinguish it from the Glynn Family Honors Program. If the student is also in the Glynn Family Honors program, the thesis presented in that program could be considered for the Honors Track in Physics, but would need approval by the Physics Undergraduate Research Committee.

PREPROFESSIONAL STUDIES

SUMMARY OF REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE IN PHYSICS

	Physics	Physics in Medicine
Mathematics	11.5	11.5
Physics	41.5	32.5
Chemistry	7	16
Biology	—	8
Science Electives	—	9
Language	Intermediate-Level	
WR 13100	3	3
Philosophy*	6	6
Theology*	6	6
History*	3	3
Social Sciences*	3	3
Literature/Fine Arts*	3	3
Moreau First Year Experience	2	2
Free Electives	28.5**	11.5**
	124	124

* One of these courses must be a University Seminar.

** Assumes intermediate-level competency in language was achieved by taking two 4-credit courses at the introductory level and one 3-credit course at the intermediate level.

Preprofessional Studies

Chair, Assistant Dean and Faculty:

Rev. James K. Foster, C.S.C., M.D.

Associate Dean for Collegiate Sequence

& Study Abroad:

Sr. Kathleen Cannon, O.P.

Assistant Dean, Advisor and Faculty:

Kathleen J.S. Kolberg, Ph.D.

Advisor and Faculty:

Susan Gursky Ph.D.

Hillebrand Center Director and Faculty:

Dominic Vachon, Ph.D.

Adjunct Professors:

Mark Fox, M.D.; Gary B. Fromm, M.D.; Robert

D. White, M.D.; Brandon Zabukovic, M.D.

Program of Studies. The Department of Preprofessional Studies offers several programs in the two major sequences, namely the program sequence in science preprofessional studies (SCPP) and the programs in the collegiate sequence (SCBU, SCCO, SCED).

SCIENCE PREPROFESSIONAL PROGRAM (SCPP)

Healthcare in the United States has been undergoing a sea change including health systems, best clinical practices, and training, extending even into the pre-professional undergraduate years. There is an emphasis on broader and deeper education and interest in professionals on the healthcare team beyond the physician is expanding rapidly. This major is designed to allow those seeking to enter any of the health professions to customize their undergraduate education to fulfill the prerequisites for a variety of health professions schools. The biggest change has come from medical admissions with a new 7.5 hour MCAT exam and a changing emphasis on competencies rather than a checklist of prerequisites. There is an emphasis on a depth of science competency (e.g. biochemistry, research methods, and statistics) and an added emphasis on the psychosocial aspects of care.

With the new holistic model of pre-medical education, this major offers flexibility to study across science departments and space in the schedule to add depth in the humanities or social science by adding a second major or minor. This department also provides general elective courses, open to all majors, that address clinical practice and medical systems (See the following section on the Hillebrand Center).

There are 24 credit hours of science elective courses required beyond the core sciences. These include most upper level science courses taught across the traditional science departments (biological sciences, chemistry, physics and mathematics). The classes are taken during the school year and only occasionally, with consultation with your advisor, should students take any of the major courses in the summer. The Notre Dame College of Science does not allow transfer of science courses with the exception

of preapproved courses through Notre Dame International Programs. Those students who wish to matriculate directly to medical school after graduation should plan to take cell biology, statistics and biochemistry by the end of junior year in order to take the MCAT at the end of that year. Students planning to attend PA or PT programs should plan physiology and anatomy during the junior year. Student involvement in research is encouraged and up to 2 credit hours per semester for 3 semesters taken in one of the traditional science departments can count toward the 24 science elective credits (total of 6 maximum).

Non-science courses are important in preparation for health professional schools. The AAMC Admissions Initiative has identified development of cultural competence, ethics, communication skills and background in human behavior as critical in the competencies of future physicians. Because of this, students should take multiple courses in social science, humanities and ethics.

The major allows students to customize their development for the scientific and non-scientific competencies for health professions schools. Students are also advised to chart their progress through an e-portfolio and fill out their academic preparation with experiences in service, clinical settings, teamwork, reliability, and in leadership. Experience in being responsible for the well-being of others is a key factors in preparation for the health professions.

Information concerning preparation for admission to schools of medicine, dentistry, physician assistant, optometry, podiatry, pharmacy, physical therapy, occupational therapy, public health, post-baccalaureate nursing, as well as information on several other allied health careers, is available for all majors from the Center for Health Science Advising, 219 Jordan Hall of Science.

BACHELOR OF SCIENCE WITH A MAJOR IN PREPROFESSIONAL STUDIES

PREPROFESSIONAL SCIENCE SEQUENCE

(124 semester hour credits; 64 science hour credits minimum)

First Year

First Semester

Writing	3
MATH 10350 Calculus I	4
CHEM 10171 Chemical Principles I	4
University Requirement*	3
University Requirement*	3
Moreau First Year Experience	1

18

PREPROFESSIONAL STUDIES

Second Semester

Philosophy or Elective	3
MATH 10360 Calculus II	4
CHEM 10172 Organic Chemistry I	4
Literature	3
University Requirement*	3
Moreau First Year Experience	1

18

Sophomore Year*First Semester*

CHEM 20273 Organic Chemistry II	4
BIOS 10171 General Biology I	3
BIOS 11173 General Biology I Lab	1
Elective(s)	3–6
Language	3

14–17

Second Semester

CHEM 20274 General Chemistry II	4
BIOS 10172 General Biology II	3
BIOS 11174 General Biology II Lab	1
Elective(s)	3
Language	3

14

Junior Year*First Semester*

Science Elective	3
PHYS 20210 Physics for Life Sciences I	4
Language or Elective	3
University Requirement	3
Science Elective	3

16

Second Semester

Science Elective	3
Science Elective	3
PHYS 20220 Physics for Life Sciences II	4
Electives	6

16

Senior Year*First Semester*

Science Elective	3
Science Elective	3
University Requirement	3
University Requirement	3
Elective	3

15

Second Semester

Science Elective	3
University Requirement	3
Elective	3
Science Elective	3

12

* One of these courses must be a University Seminar for those who start Notre Dame as First Year students; transfer students are exempt from the University Seminar.

Notes:

1. Students who have completed only six hours of mathematics in the first year of studies may transfer into the program but they will be required to complete a mathematics sequence equivalent to MATH 10350, 10360, or MATH 10550, 10560. Students having taken MATH 10250 may do this by taking MATH 10360, while those who have taken only one semester of lower-level calculus should take both MATH 10350, 10360. Those students should see also the discussion on degree credit found later in this section of the Bulletin. With the increased emphasis on Statistics, students should also plan to take a Statistics course as a science elective and for those with AP credit for MATH 10550/10560 the Statistics course will also fulfill their University Requirement for Quantitative Reasoning.
2. All students who have had previous exposure to language will be required to take a placement examination in that language for placement in the proper course if the student wishes to continue in that language for the college requirement. If a student wishes to take a new language, of course, he or she must start from the beginning. Spanish is encouraged.
3. PHYS 10310–10320 or PHYS 10411, 20435 may be substituted for PHYS 20210–21210.
4. Well developed communication skills are important in healthcare and patient safety and health professions schools require training in written communication. With this in mind, the SSCP major will require a Literature course taught in English, which will also fulfill the University Liberal Arts Requirement 4.
5. Behavioral and social issues have an immense impact on health, and effective healthcare provision and health professions schools have increased their requirements for training in social sciences. Students should plan on taking courses in psychology, sociology, or anthropology. One of these courses may also fulfill University Liberal Arts Requirement 5.
6. Undergraduate Research (e.g. BIOS 48498, CHEM 48498), Teaching Practicum (e.g. BIOS 37491), and Directed Readings (BIOS 48497) may count toward the 24 credits of Science Electives with limits. Undergraduate Research and Teaching is limited to 2 credit hours per semester, for up to three semesters, for a total of six combined credit hours. Credits above these numbers will be counted in General Electives. Directed Readings are limited to 3 credit hours total.
7. Interested parties may obtain additional information including various statistics from the department Web page. See preprofessional.nd.edu.

Summary of Requirements for the Degree of Bachelor of Science in Preprofessional Studies

	Credits
Biological Sciences	8
Chemistry	16
Mathematics	8
Physics	8
Language, Intermediate-level Competency	**11
University Requirements	21
Moreau First Year Experience	2
Science Electives	24
General Electives	**25
	124

* One of these courses must be a University Seminar.

** Assumes Intermediate-level Competency in Language was achieved by taking two four-credit and one three-credit courses.

HILLEBRAND CENTER FOR COMPASSIONATE CARE IN MEDICINE

As part of the Department of Preprofessional Studies, the Ruth M. Hillebrand Center for Compassionate Care in Medicine has the mission of advancing the scientific theory and evidence based practice of compassionate care in healthcare and of promoting effective communication skills in physicians, nurses, and allied health professionals. The Center offers courses, programs, and research opportunities to help students gain a scientific and humanistic understanding of the importance of compassionate caring in all patient care as well as an introduction to preventing burnout and promoting personal well-being in the health professions. Students can also be involved in research on the integration of compassionate care in clinical practice.

The following elective courses are regularly offered:

Medical Counseling Skills and Patient-Centered Medicine
 Science of Compassionate Care in the Medical Professions
 Introduction to Clinical Ethics
 Psychology and Medicine
 Film and the Physician
 Introduction to the American Healthcare System
 Spiritualities of Caring in the Helping Professions
 Introduction to Personalism in Medicine: The Pathos Project
 Introduction to Hospice and Palliative Care

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Science Preprofessional*. Course descriptions can be found by clicking on the subject code and course number in the search results.

PREPROFESSIONAL STUDIES

COLLEGIATE SEQUENCE PROGRAMS

The three collegiate sequence programs, science-business, science-computing, and science-education, were instituted in 1987. These three programs allow students to obtain a strong science background while simultaneously preparing them for professions in health care, business, computing or education.

SCIENCE-BUSINESS COLLEGIATE SEQUENCE

The Science-Business Collegiate Sequence in the Department of Preprofessional Studies is an individualized course of study which incorporates courses from the basic areas of business along with the four basic areas of science. The major prepares students to pursue health care professional education such as medical school, dental school, public health, or health care administration. It also enables students to attain a diversified background to enter an MBA program leading to a position in the scientific or health professions business area. It is also a complete and sufficient program to enable the B.S. graduate of the sequence to enter the scientific business market immediately upon graduation.

Information on the areas of public health and hospital administration, as well as the business needs of the pharmaceutical, biological and chemical industries are available in the office of the Department of Health Professions, 219 Jordan Hall of Science.

The other departments in the College of Science as well as the colleges of arts and letters and business administration provide all course instruction in the curricula of the Science-Business Collegiate Sequence.

BACHELOR OF SCIENCE WITH A MAJOR IN SCIENCE-BUSINESS

All science-business majors take the following basic sequence of science courses:

General Biology (BIOS 10170–10172 and 11170–11174)

CHEM 10171 and 11171 and 10172 and 11172 and two of the following: CHEM 20273 and 21273, CHEM 20274 and 21274, SC 20110, CHEM 10122

Calculus (MATH 10350–10360 or 10550–10560)^{1,2}

Physics (PHYS 20210–20220)³ and 21210, 21220 Statistics (ACMS 20340 or BIOS 40411)

They also are required to take 20–21 credits of science electives,⁴ completing a minimum of 64 credits of science courses.

Also required for the major are the following business and economics courses:

Principles of Microeconomics (ECON 10010 or 20010)^{5,6}

Accountancy I (BASC 20100)

Corporate Financial Management (BASC 20150)

Principles of Management (BASC 20200)

Principles of Marketing (BASC 20250)

One upper-level business elective for which prerequisites are completed.

Requirements for the program are summarized in the table following this section.

Notes:

1. *Equivalent or higher-level sequences in science may be substituted, e.g., MATH 10850–10860 for MATH 10550–10560.*

2. *Students who have completed only six hours of mathematics in their first year may transfer into the program, but they will be required to complete a mathematics sequence equivalent to MATH 10350, 10360 or MATH 10550, 10560. Students having taken MATH 10250, (or 10260 or 10270) may do this by taking MATH 10360, while those who have taken only one semester of lower-level calculus should take both MATH 10350, 10360. (See also the discussion on science degree credit, found later in this section of the Bulletin.)*

3. *PHYS 10310–10320 or PHYS 10411, 20435 may be substituted for PHYS 20210–20220.*

4. *The choice by the student of the elective courses in science for the program will be discussed with the student and will be based on the future industrial or health professions interests of the student. Any major-level College of Science courses (i.e., those taken to meet science-major requirements and not those designated as “Recommended University electives”) and that are not being used to fulfill other specific graduation requirements can be used to satisfy the “Science Elective” requirement. Major-level geology courses cross-listed as science courses may be taken as science electives. Students are restricted to no more than two credits per semester (six total) for science credit and three credits per semester (nine total) for graduation credit of courses such as Undergraduate Research or Directed Readings.*

5. *The economics requirement for this major is fulfilled by taking Principles of Microeconomics either in the first year (ECON 10010) or in the sophomore year (ECON 20010). Note: The course ECON 13181 (Social Science University Seminar) will not fulfill the economics requirement for this major.*

6. *For this major, the University social science requirement will be fulfilled by the required economics course. Additional social science courses are recommended and will count toward the student's general electives.*

Suggested Curriculum for the Degree of Bachelor of Science in the Science-Business Collegiate Sequence (124 semester hour credits: 64 science hour credits, minimum)

First Year

First Semester

CHEM 10171, 11171	4
MATH 10350 or 10550. Calculus (Note 2)	4
University Requirement	9
Moreau First Year Experience	1

18

Second Semester

CHEM 10172 and 11172	4
MATH 10360 or 10560 Calculus	4
University Requirement	6
ECON 10010*	3
Moreau First Year Experience	1
	18

Sophomore Year

First Semester

BIOS 10170 Biology I	3
BIOS 11170 Biology I Lab	1
CHEM 20273, 21273 (or SC 20110, 21110)	4
Language	3
Elective	3
	14

Second Semester

BIOS 10172 Biology II	3
BIOS 11174 Biology II Lab	1
CHEM 20274, 21274 or CHEM 10122	4 (3)
Language	3
BASC 20100 (ACCT)	3
	14 (13)

Junior Year

First Semester

Science Elective or	
SC 20110, 21110 Planet Earth	3 (4)
PHYS 20210, 21210 Physics for Life Sciences I	4
BASC 20200 (MGT)	3
University Requirement	3
Science Elective	3
	16 (17)

Second Semester

BIOS 40411. Biostatistics or	
ACMS 20340 Statistics for Life Sciences	4 (3)
PHYS 20220, 21220 Physics for Life Sciences II	4
BASC 20150 (FIN)	3
Science Electives	6
	17 (16)

Senior Year

First Semester

Science Electives	6
Elective	3
BASC 20250 (MKT)	3
University Requirement	3
	15

Second Semester

Science Electives	6
Electives	6
Business Elective	3
	15

* One of these courses must be a University Seminar.

PREPROFESSIONAL STUDIES

SCIENCE-COMPUTING COLLEGIATE SEQUENCE

The science-computing collegiate sequence in the Department of Preprofessional Studies is an individualized course of study which incorporates courses from the four basic areas of science along with a sequence of computing courses. The program will give the student working knowledge of various computer languages and experience using current computer technology. By choosing science electives appropriately, the student has the option of focusing in an area in science of particular interest. Graduates of this program earn a B.S. degree and are able to enter the scientific computing job market immediately upon graduation.

The other departments in the College of Science as well as the colleges of arts and letters and engineering provide all course instruction in the curricula of the Science-Computing Collegiate Sequence.

BACHELOR OF SCIENCE WITH A MAJOR IN SCIENCE-COMPUTING

All science-computing majors take the following basic sequence of science courses:

General Biology (BIOS 10171–10172 and 11173 and 11174)¹
 CHEM 10171 and 11171, 10172 and 11172 and two of (CHEM 20273 and 21273, CHEM 20274 and 21274, SC 20110), CHEM 10122
 Calculus (MATH 10350–10360 or 10550–10560)^{1,2}
 Physics (PHYS 20210–20220 and 21210–21220)³
 Statistics (ACMS 20340 or BIOS 40411)

They also are required to take 20–21 credits of science elective,⁴ completing a minimum of 64 credits of science courses.

They also are required to complete 14–15 credits in computing courses.

Please see advisor for information on possible sequences in computing.

Requirements for the program are summarized in the table on the following page.

Notes:

1. *Equivalent or higher-level sequences in science may be substituted, e.g., MATH 10850–10860 for MATH 10550–10560.*

2. *Students who have completed only six hours of mathematics in their first year may transfer into the program, but they will be required to complete a mathematics sequence equivalent to MATH 10350, 103600 or MATH 10550, 10560. Students having taken MATH 10250 (or 10260 or 10270) may do this by taking MATH 10360, while those who have taken only one semester of lower-level calculus should take both MATH 10350, 10360. (See also the discussion on science degree credit found later in this section of the Bulletin.)*

3. *PHYS 10310–10320 or PHYS 10411, 20435 may be substituted for PHYS 20210–20220.*

4. *The choice by the student of the elective courses in science for the Science-computing program will be based on the student's scientific interest as developed during his or her studies of the four basic areas of science. Any major-level College of Science courses (i.e., those taken to meet science-major requirements and not those designated as "Recommended University electives") and that are not being used to fulfill other specific graduation requirements can be used to satisfy the "Science Elective" requirement. Major-level geology courses cross-listed as science courses may be taken as science electives. Students are restricted to no more than two credits of courses such as Undergraduate Research or Directed Readings in the science elective total.*

Suggested Curriculum for the Degree of Bachelor of Science in the Science-Computing Collegiate Sequence (124 semester hour credits: 64 science hour credits, minimum)

First Year

<i>First Semester</i>	
CHEM 10171 and 11171	4
MATH 10550 Calculus (Note 2) or 10350	4
University Requirement	9
Moreau First Year Experience	1
	<hr/>
	18

Second Semester

CHEM 10172 and 11172	4
MATH 10560 Calculus or 10360	4
University Requirement	9
First Year Experience	1
	<hr/>
	18

Sophomore Year

<i>First Semester</i>	
BIOS 10171 Biology I	3
BIOS 11173 Biology I Lab	1
CHEM 20273 and 21273 or SC 20110/21110	4
Language	3
CSE Course	4 (3)
	<hr/>
	15 (14)

Second Semester

BIOS 10172 Biology II	3
BIOS 11174 Biology II Lab	1
CHEM 20274, 21274 (or CHEM 10122)	4 (3)
Language	3
Elective	3
	<hr/>
	14 (13)

Junior Year

<i>First Semester</i>	
Science Elective	3
CSE 20211 Fundamentals of Computing	4
PHYS 20210, 21210 Physics for Life Sciences I	4
University Requirement	3
Elective (or Language)	3
	<hr/>
	17

Second Semester

BIOS 40411 Biostatistics or	
ACMS 20340 Statistics for Life Sciences	4 (3)
PHYS 20220, 21220 Physics for Life Sciences II	4
CSE 20312 Data Structures	3
University Requirement	3
	<hr/>
	14 (13)

Senior Year**First Semester**

Science Electives	9
CSE Elective	4
Electives	3
	<hr/>
	16

Second Semester

Science Electives	9
CSE Elective	3
Electives	3
	<hr/>
	15

** One of these must be a University Seminar.*

SCIENCE-EDUCATION COLLEGIATE SEQUENCE

The science-education collegiate sequence in the Department of Preprofessional Studies is an individualized course of study which incorporates many courses from the four basic areas of science along with education courses that most states require to give the student the background necessary to receive a certificate to teach in a secondary education system. Information concerning the requirements for secondary education in the various states, as well as the general course requirements for a certificate necessary to teach science in a secondary education program, is available in the College of Science office, 248 Nieuwland.

The other departments in the College of Science and the other colleges of the University, as well as the Education Department at Saint Mary's College, provide all course instruction in the curricula of the Science-Education Collegiate Sequence.

BACHELOR OF SCIENCE WITH A MAJOR IN SCIENCE-EDUCATION

All science-education majors take the following basic sequence of science courses:

General Biology (BIOS 10171–10172 and 11173–11174)¹
 CHEM 10171 and 10172 and [CHEM 20273 and 21273, CHEM 20274 and 21274] or (CHEM 20273 AND 21273, ENVG 20110) OR (SC 20110, ENVG 20120)]
 Calculus (MATH 10350–10360 or 10550–10560)^{1,2}
 Physics (PHYS 20210–20220)³ and 21210, 21220

They also are required to take 20 credits of science electives,^{4,5} completing a minimum of 60 credits of science courses.

PREPROFESSIONAL STUDIES

Also required for the major are the following education courses taught by Saint Mary's College:

- EDUC 201 Teaching in a Multicultural Society
 EDUC 220 Applied Media and Instructional Technology
 EDUC 345 Curriculum and Assessment in the High School Setting
 EDUC 346 Instructional Strategies and Classroom Management in the High School Setting
 EDUC 350 Educational Psychology: Human Growth and Development of the Adolescent
 EDUC 356 Educational Psychology: Educating Exceptional Learners
 EDUC 449 Teaching Science in the Secondary School
 EDUC 475 Student Teaching in the Secondary School (spring of senior year)

The education courses are those required in the State of Indiana but are also those that are required most often by the educational accrediting agencies of most states. The practical teaching experience which is required will also be arranged through the Education Department at Saint Mary's College.

Requirements for the program are summarized in the table above.

Notes:

1. *Equivalent or higher-level sequences in science may be substituted, e.g., MATH 10850–10860 for MATH 10550–10560.*
2. *Students who have completed only six hours of mathematics in their first year may transfer into the program, but they will be required to complete a mathematics sequence equivalent to MATH 10350, 10360 or MATH 10550, 10560. Students having taken MATH 10250 (or 10260 or 10270) may do this by taking MATH 10360, while those who have taken only one semester of lower-level calculus should take both MATH 10350, 10360. (See also the discussion on science degree credit found in this section.)*
3. *PHYS 10310–10320 or PHYS 10411, 20435 may be substituted for PHYS 20210–20220.*
4. *The choice by the student of the elective courses in science for the Science-education program will be based upon the requirements and list of courses suggested by the various state educational systems. Since the timing of the course work is particularly constrained for this major, the student should work closely with his or her advisors: an associate dean in the College of Science and an assigned advisor in the Education Department at Saint Mary's College.*
5. *Any major-level College of Science courses (i.e., those taken to meet science-major requirements and not those designated as "Recommended University electives") and that are not being used to fulfill other specific graduation requirements can be used to satisfy the "Science Elective" requirement. Major-level geology courses cross-listed as science courses may be taken as science electives. Students are restricted to no more than*

SUMMARY OF MINIMAL REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE IN A COLLEGIATE SEQUENCE MAJOR			
	<i>Science- Business</i>	<i>Science- Computing</i>	<i>Science- Education</i>
Biological Sciences	8	8	8
Chemistry	8	8	8
Organic Chemistry/Geology	8	8	8
Mathematics	8	8	8
Physics	8	8	8
Statistics: ACMS 20340 or BIOS 40411	3–4	3–4	0
Science Electives	20–21	20–21	20
Total Required Science	64	64	60
Business Courses	15	0	0
Computing Courses	0	14–15	0
Education Courses	0	0	33
Language	Intermediate Level Competency		
University Requirement	24	24	24
Moreau First Year Experience	2	2	2
Free Electives	10"	10"	0"
Total	124	124	128

* One of these courses must be a University Seminar.
 " Assumes intermediate-level competency in language achieved by taking two 4.0-credit- and one 3.0-credit courses.

two credits of courses such as Undergraduate Research or Directed Readings in the science elective total.

Suggested Curriculum for the Degree of Bachelor of Science in the Science-Education Collegiate Sequence (124 semester hour credits: 60 science hour credits, minimum)

First Year*First Semester*

CHEM 10171 and 11171	4
MATH 10350 or 10550 Calculus (Note 2)	4
University Requirement	9
Moreau First Year Experience	1
	18

Second Semester

CHEM 10172 and 11172	4
MATH 10360 or 10560 Calculus	4
Elective*	3
University Requirement	9
Moreau First Year Experience	1
	18

Sophomore Year*First Semester*

BIOS 10171 Biology I	3
BIOS 11173 Biology I Lab	1
SC 20110 Planet Earth / 21110	
or	
CHEM 20273 and 21273	4
Language	3
Education 201F (SMC)	3
Elective	3
	17

Second Semester

BIOS 10172 Biology II	3
BIOS 11174 Biology II Lab	1
CHEM 20274 and 21274,	4 (3)
or CHEM 10122	
Language or Elective	3
Fine Arts/Literature	3
EDUC 220 (SMC)	3
	17 (16)

SPECIAL PROGRAMS

Junior Year*First Semester*

PHYS 20210, 21210 Physics for Life Sciences I	4
Science Electives	6
EDUC 345 (SMC)	3
EDUC 356 (SMC)	3
	16

Second Semester

PHYS 20220, 21220 Physics for Life Sciences II	4
Science Electives	8
EDUC 350 (SMC)	3
EDUC 346 (SMC)	3
	18

Senior Year*First Semester*

Science Electives	6
EDUC 449 (SMC)	3
University Requirement	6
	15

Second Semester

EDUC 475 (SMC)	12
	12

* One of these must be a University Seminar

Special Programs

DOUBLE MAJORS IN SCIENCE

In certain instances, students have the option of pursuing majors in two departments in the College of Science. Combinations that are normally approved include: Biological Sciences with Chemistry; Biological Sciences with Mathematics; Biological Sciences with Physics; Biochemistry with Mathematics; Biochemistry with Physics; Chemistry with Mathematics; Chemistry with Physics; Environmental Sciences (first major) with Mathematics; Mathematics with Physics; and Science Business, Science Computing, Science Education with supplementary major in ACMS or Statistics. Examples of combinations that are normally forbidden include: Preprofessional Studies with any other science majors, Collegiate Sequence majors (Science Business, Science Computing, Science Education) with any other science majors except supplementary majors in ACMS and Statistics, parallel subprograms such as Mathematics and Life Sciences with Physics-in-Medicine and either of those with Biological Sciences or Biochemistry, any majors among Mathematics, ACMS and Statistics. All requirements of each major must be met, with no exceptions. Failing to complete a required course terminates that major for a student. Every student who wishes to major in two departments in the College of Science must prepare an agenda of specific courses to be taken, which both advisors and the dean must approve. This should be done as early as possible, but absolutely no later than the seventh day of the senior year. In certain instances, a student may possibly receive approval of a normally forbidden combination of majors, but only if a specific program has been set up by the seventh day of the sophomore year.

All double major programs in science are extremely challenging programs that require that the student take four or five science courses at a time. Thus, only students of superior scholastic ability should consider this as an option.

Students are warned that it is almost certain that completing a double major in two sciences will require total credits well over the college minimum of 124. Conflicts in scheduling of required courses may occur; neither the college nor the departments undertake to reschedule courses for the sake of double majors. For these reasons, it must be emphasized that completing a double major may well require more than four years. Only one degree is awarded (degrees in science do not specify a field).

Dual Degree Program with the College of Engineering

Please refer to the *Bulletin* section under the heading "College of Engineering."

Dual Degree Program with the Mendoza College of Business

Coordinators:

Neil Mangus
Director of Admissions
Master of Business Administration Program
Malgorzata Dobrowolska-Furdyna
Associate Dean, College of Science

Program of Studies. The dual degree five-year program in the Mendoza College of Business and the College of Science enables the student to earn the master of business administration and bachelor of science degrees in a major in one of the five undergraduate departments in the College of Science.

This program, instituted in 1994, offers students the opportunity to better integrate studies in science and in management. The student completing this program will have a background in management as well as the first professional degree in one of the undergraduate majors of the College of Science. Because it is a demanding program, only those students of superior scholastic ability who have the aptitude, motivation and maturity necessary for the combined graduate and undergraduate program should apply. Those with outstanding internship experiences in business will be looked upon favorably. Advisors for the program are available for consultation about the advisability of applying for the program and about meeting the particular needs of students pursuing this program.

The program is open only to those currently enrolled Notre Dame students who have completed three years of an undergraduate science first major. Students interested in making application for the MBA/Science program should apply to the MBA program during their junior year. They should take the GMAT by December of their junior year. All candidates must schedule a personal interview as a part of the MBA admissions process. Students must also declare their intentions to the dean's office in the College of Science and request that a dean's eligibility letter be sent to the MBA Office for them.

An applicant who is not admitted to the dual degree MBA/Science program continues in the undergraduate program and completes his or her science major in the usual four-year period.

As a general guide, it is expected that a student accepted to this program will take two courses for the undergraduate degree during the summer session

NONDEPARTMENTAL COURSES • SCIENCE DEGREE CREDIT

following his or her junior year. Every dual-degree student is also expected to participate in the orientation for the MBA program. This program will occupy the entire day for the two weeks prior to the first day of classes. Orientation is mandatory for all students beginning the MBA program.

Students in the five-year science/MBA program are also required to:

- (1) Complete a minimum of 48 MBA credit hours and maintain a GPA of at least 3.0 to successfully complete the program.
- (2) Take all MBA courses in their fourth year.
- (3) Maintain full-time student status (minimum courseload of 12 credit hours per semester). Credit hours can come from science or MBA programs.

The MBA curriculum divides each semester into two modules. In addition to the courses required to complete undergraduate and University requirements, students must complete the following MBA course work:

Summer Session Following Junior Year:	
Math Review Workshop*	0
Accit Review Workshop*	0
(Science Undergraduate Requirements)	6)

Senior Year—(Science Undergraduate Requirements Each Semester 3–7)

<i>First Semester, Module 1:</i>	
ACCT 60100. Financial Accounting	2
MBET 60340. Conceptual Foundation of Business Ethics	2
MGT 60100. Statistics	2
MGT 60300. Organizational Behavior	2
<i>First Semester, Interterm Week:</i>	
Professional Development Seminar	0
Communications Seminar++	1
<i>First Semester, Module 2:</i>	
ACCT 60200. Cost Accounting	2
FIN 60400. Finance I	2
FIN 60210. Microeconomic Analysis	2
MARK 60100. Marketing Management	2
<i>Second Semester, Module 3:</i>	
FIN 70600. Finance II	2
FIN 60220. Macroeconomic Analysis	2
MGT 60900. Strategic Decision Making	2
Free Elective	2
<i>Second Semester, Interterm Week:</i>	
Values in Decision Making	1
Elective Course	1
<i>Second Semester, Module 4:</i>	
MGT 60400. Leadership and Teams	2
MGT 60700. Operations Management	2

Fifth Year—(Science Undergraduate Requirements Each Semester 3–7)

<i>First Semester, Module 1:</i>	
MGT 60200. Problem Solving	2
Management Communication Elective I	2
Free Elective*	2
<i>Interterm Week:</i>	

OPTIONAL: Two one-credit-hour electives (TBD) OR	
Corporate Case Studies OR	
Offshore Program: China or Brussels	2
<i>First Semester, Module 2:</i>	
Ethics Elective	2
Management Communication Elective II	2
<i>Second Semester, Module 3:</i>	
Free Electives	4
(Floating Optional Elective	2)
*Students have the option to take one additional two-credit-hour elective now or in any remaining module.	
<i>Second Semester, Interterm Week:</i>	
(OPTIONAL: Two one-credit-hour electives OR	
Corporate Case Studies OR	
Offshore Program: China or Brussels	2)
<i>Second Semester, Module 4:</i>	
Free Electives	4
(Floating Optional Elective	2)

+See "Arts and Letters Core" on the first page of the College of Engineering section.

++Special one/two-week courses. All other MBA courses are seven weeks in length.

*Occurs during August Orientation

Total for both degrees: 126–132 undergraduate, 48 MBA

Students involved in the MBA/Science program will complete their undergraduate program while completing MBA requirements. MBA course work will not apply to the undergraduate degree. Sample schedules for particular majors are available from advisors or the dean's office. Students who are behind in the completion of their major requirements are strongly recommended to obtain permission and advising before applying to the joint program.

Nondepartmental Courses

COURSE DESCRIPTIONS

All of the courses associated with this academic program can be found online at registrar.nd.edu/students/class_search.php. The scheduled classes for a given semester may be found by clicking on "Class Search" and selecting the subject *Science (Non-departmental)*. Course descriptions can be found by clicking on the subject code and course number in the search results.

Science Degree Credit

Courses are generally taken in the College of Science for one of three reasons: (1) for students in either the College of Arts and Letters, or the Mendoza College of Business, or the School of Architecture, to fulfill a University requirement; (2) for students in either the College of Engineering or the College of Science to fulfill a college requirement; and (3) for students in the College of Science, to fulfill a major requirement. As a result, the College of Science offers different sequences of courses which overlap considerably in content but not level. Thus it is possible for a student who has changed his or her college or major to have taken two courses which overlap in content. Both courses will appear on the student's transcript, but only one will count for degree credit.

As a guideline for the student and the student's advisors, listed below are the groups of courses that overlap considerably in content. (Courses within the same group are shown in the same row and are also enclosed within parentheses; courses listed within the same column generally show a typical normal progression through course work.) In every case, only one course per group should be counted for degree credit. Generally, only the course taken last should be counted. Students and advisors are warned not to use these groups when moving between course sequences but rather to seek advice from the offering department or the College of Science office.

For overlap with courses no longer taught in the year of publication of this *Bulletin*, please refer to previous editions of this *Bulletin*.

Credit is not given for both ACMS and MATH courses with the numbers 10140, 10150, 20210, 20340, 20610, 20750, 30440, 30530, 30540, 30610, or any course cross-listed between ACMS and MATH. In the following table the restrictions on MATH courses numbered 10140 and 20340 also apply to the ACMS courses with the same numbers.

**Applied and Computational
Mathematics and Statistics**

(10140 10141 10145/10091	20340	BIOS 40411	30540	MATH 30540)
	20210	MATH 20210)		
(	20620	MATH 20610)		
(	20550	PHYS 20451)		
(			30530	MATH 30530)
(			30610	MATH 30610)
(	20750	MATH 20750	PHYS 20452)	

Biological Sciences

(10101/10091 10110	10156		10191	10161/10098)
(10107/10097 10118	10155			10162/10099)
(		20241	30341)	
(		20250	20303)	

Chemistry and Biochemistry

(10101/10091 10113	10115	10117	10121	10125	10171/10097	10181)
(10102 10114	10116	10118	10122	10126)		
(			20223	20235	20247	10172 10182)
(			20224	20236	20248	20273 20283)
(						20274 20284)
(			40420	30341	60521)	
(				30342	60522)	

Mathematics

(10120 10110)						
(10250/10090 10240		10350	10550/10091	10850	10860	10460)
(	10260	10270	10360	10560/10092	10860	10460)
(		20210	ACMS 20210)			
(		20480	20610	ACMS 20620	20580/10094	20810)
(		20480	20610	ACMS 20620	20580/10094	20570)
(				20550/10093		20850)
(			20750	ACMS 20750	30650)	
(ACMS 10140/10141/10145/10091	ACMS 20340	BIOS 40411	30540	ACMS 30540)		
(			30530	ACMS 30530)		
(			30610	ACMS 30610)		
(				30390	40390)	

Physics

(10111/10091 10310/10093		10411	30210/20210/10095)
(10222/10092 10320/10094	10422	20435	30220/20220/10096)
(		20431	10424)
(	20330		20464)
(10052	20051	ENER 20201	STV 20304)
(10140	20140)		
(20451	MATH 20570	MATH 20610	MATH 20580)
(20452 MATH 20571	MATH 20750	MATH 30650)	

Note also that no degree credit is given to any students for MATH 10101; additionally, science majors will not receive degree credit for MATH 10120 or MATH 10110.

Officers of Administration

In the College of Science

MARY E. GALVIN, Ph.D.

Dean of the College of Science

MALGORZATA DOBROWOLSKA-FURDYNA, Ph.D.

Associate Dean of the College of Science

SR. KATHLEEN CANNON, O.P., DMin.

Associate Dean of the College of Science

MICHAEL D. HILDRETH, Ph.D.

Associate Dean of the College of Science

REV. JAMES K. FOSTER, C.S.C., M.D.

Assistant Dean of the College of Science

KATHLEEN J.S. KOLBERG, Ph.D.

Assistant Dean of the College of Science

In the Departments and Programs

CRISLYN D'SOUZA-SCHOREY, Ph.D.

Chair of the Department of Biological Sciences

BRIAN M. BAKER, Ph.D.

Chair of the Department of Chemistry and Biochemistry

ANDREW SOMMESE, Ph.D.

Chair of the Department of Applied and Computational Mathematics and Statistics

JEFFREY A. DILLER, Ph.D.

Chair of the Department of Mathematics

PETER M. GARNAVICH

Chair of the Department of Physics

REV. JAMES K. FOSTER, C.S.C., MD

Chair, Preprofessional Studies

KASTURI HALDER, Ph.D.

Director of the Center for Rare and Neglected Diseases

IAN CARMICHAEL, Ph.D.

Director of the Radiation Laboratory

MARK S. ALBER, Ph.D.

Director of the Center for Study of Biocomplexity

DAVID W. SEVERSON

Director of the Eck Family Global Health Institute

DAVID R. HYDE, Ph.D.

Kenna Director of the Center for Zebrafish Research

MARK A. SUCKOW, D.V.M.

Director of the Freimann Life Sciences Center

FRANCIS J. CASTELLINO, Ph.D.

Director of the W.M. Keck Center for Transgene Research

M. SHARON STACK, Ph.D.

Director of the Harper Cancer Research Institute

Advisory Council

DR. MONICA Y. ALLEN-ALEXANDER

West Bloomfield, Michigan

MR. JOHN J. ANTON

San Francisco, California

MR. STEVE ASELAG

Rancho Santa Fe, California

DR. DAVID M. ASMUTH

Carmichael, California

MR. PAUL F. BARANAY

New Haven, Connecticut

MR. WILLIAM C. BATEN

Midland, Texas

MR. MATTHEW J. BOLER

Inverness, Illinois

DR. GEORGE J. BOSL

Syosset, New York

MR. JACK BREEN

Shaker Heights, Ohio

DR. SAMUEL J. CHMELL

Riverside, Illinois

DR. WILLIAM D. CLAYPOOL

Newton Square, Pennsylvania

DR. ANNE CONKLIN REYNOLDS

Toledo, Ohio

DR. JAMES J. CREIGHTON JR.

Indianapolis, Indiana

MR. JOHN F. CROWLEY

Princeton, New Jersey

MR. EDWARD L. DELAHANTY

Naples, Florida

MR. JOHN DELLISANTI

Wilton, Connecticut

MR. STEPHEN M. DUFOUR

Wellesley, Massachusetts

DR. R. LAWRENCE DUNWORTH

Palm Beach, Florida

DR. DEBORAH L. FROGAMENI

Sylvania, Ohio

MR. MICHAEL J. GALLAGHER

Castle Rock, Colorado

MR. JOHN GARIBALDI

Houston, Texas

MR. PAUL J. GILSINGER

Winamac, Indiana

DR. ROBERT H. HARRIS

Holmdel, New Jersey

MS. JAN COREY HAWK

Lima, Ohio

DR. SANDRA URDANETA HARTMANN

Lancaster, Pennsylvania

MR. TOM HENDRICK

Bronxville, New York

DR. GREGORY A. HOFFMAN

Fort Wayne, Indiana

DR. JEFFREY P. HUML

Wheaton, Illinois

DR. FRANCIS I. KITTREDGE JR.

Bangor, Maine

DR. THOMAS M. KRIZMANICH

Warsaw, Indiana

DR. SUZANNE F. KRUEPER-SCHMIDT

White Hall, Maryland

MR. ROBERT L. LUMPKINS JR.

St. Louis Park, Minnesota

DR. PHILLIP MADONIA

Mobile, Alabama

MR. JAMES C. MARCUCCILLI

Fort Wayne, Indiana

MR. LAWRENCE A. MASTROVICH

Coto de Caza, California

DR. JILL B. McCORMACK

Glen Ellyn, Illinois

MR. JAMES E. McGRAW

Savannah, Georgia

DR. ANN HANK MONAHAN

Woodland, Minnesota

MR. JAMES M. MORRISON

Valparaiso, Indiana

MR. CHRISTOPHER J. MURPHY

Omaha, Nebraska

DR. BRUCE M. NAKFOOR

Naples, Florida

MS. BARBARA O'CONNOR

San Carlos, California

MR. ROBERT ORTENZIO

Camp Hill, Pennsylvania

DR. MIKE PARSEGHIAN

Tucson, Arizona

DR. JOHN G. PASSARELLI

Laurel Hollow, New York

MS. ANN POLCARI

Ridgewood, New Jersey

MR. RICHARD T. RILEY

West Chester, Pennsylvania

DR. MICHAEL D. RYAN

Mequon, Wisconsin

DR. CAROL LALLY SHIELDS

Bryn Mawr, Pennsylvania

MR. DENIS E. SPRINGER

Inverness, Illinois

DR. WILLIAM S. STAVROPOULOS

Naples, Florida

MR. DAVID L. TAICLET

Clarkson Valley, Missouri

DR. ELEANOR M. WALKER

Troy, Michigan

MR. PAUL F. WARE JR.

Concord, Massachusetts

DR. JOHN C. YORK II

Canfield, Ohio

Faculty

The following is the official faculty roster for the 2018–19 academic year as of June 27, 2018. This roster includes faculty members who are on leave during the academic year. The date in parentheses at the close of each entry is the year the individual joined the Notre Dame faculty.

Ruth Maree Abbey. *Professor, Political Science; Fellow, Kellogg Institute for International Studies; Editor- The Review of Politics.* Bachelor of Arts, Monash University, 1984; Master of Arts, McGill University, 1989; Philosophiae Doctor, *ibid.*, 1995 (2005)

Hussein Ali Abdulsater. *Assistant Professor, Classics.* B Electrical Engineering, American University of Beirut, 2006; Master of Arts, *ibid.*, 2007; Master of Philosophy, Yale University, 2010; Philosophiae Doctor, *ibid.*, 2013 (2016)

Christopher Paul Abram. *Associate Professor, English.* Bachelor of Arts, University of Cambridge, 1998; Master of Philosophy, *ibid.*, 1999; Philosophiae Doctor, *ibid.*, 2004 (2013)

Nicole Louise Achee. *Research Professor, Biological Sciences.* Bachelor of Science, Saint Louis University, 1992; Master of Science, Texas A&M University, 1995; Philosophiae Doctor, Uniformed Services Health Sci., 2004 (2013)

Carl Bruce Ackermann. *Nolan Professorship for Excellence in Undergraduate Instruction; Professional Specialist, Finance; Teaching Professor.* Bachelor of Arts (Latin), Amherst College, 1984; Philosophiae Doctor, UNC at Chapel Hill, 2000 (1998)

David Acton. *Assistant Professional Specialist, Snite Museum.* Bachelor of Arts, University of Michigan, 1976; Master of Arts, *ibid.*, 1979; Philosophiae Doctor, *ibid.*, 1993 (2013)

Christopher Adkins. *Associate Professional Specialist; Associate Teaching Professor; Rex and Alice Martin Director of the Notre Dame Deloitte Center for Ethical Leadership.* Bachelor of Arts, Coll of William & Mary, 1995; Master of Arts, Boston University, 2001; Doctor of Philosophy, Coll of William & Mary, 2009 (2016)

Sree Sai Satish Adusumilli. *Assistant Professional Specialist, Notre Dame Research; Concurrent Assistant Professional Specialist, Biological Sciences.* Master of Science, Indian Vet Research Inst., 2002; Philosophiae Doctor, Univ of Missouri-Columbia, 2007 (2016)

John Felix Affleck-Graves. *Executive Vice President; The Notre Dame Chair in Finance; Professor, Finance.* B.S. Mathematics, University of Cape Town, 1972; Master of Science, *ibid.*, 1974; Philosophiae Doctor, *ibid.*, 1977; B.S. Commerce, *ibid.*, 1982 (1986)

Pedro Aguilera-Mellado. *Assistant Professor, Romance Languages and Literatures.* Bachelor of Arts, University of Granada, 2009; Master of Arts, *ibid.*, 2010; Master of Arts, University of Michigan, 2013; Philosophiae Doctor, *ibid.*, 2017 (2018)

Tan Ahn. *Assistant Professor, Physics.* Bachelor of Science, SUNY at Stony Brook, 2002; Master of Science, *ibid.*, 2004; Philosophiae Doctor, *ibid.*, 2008 (2014)

Lauren Ajamie. *Assistant Librarian, Hesburgh Libraries.* Bachelor of Arts, Barnard College, 2006; Master of Library & Info Sci, Univ of Oklahoma-Norman, 2012 (2012)

Md. Suhail Alam. *Research Assistant Professor, Biological Sciences.* Philosophiae Doctor, Inst. of Microbial Technology, 2008 (2009)

Maurizio Albahari. *Associate Professor, Anthropology; Fellow, Joan B. Kroc Institute for International Peace; Fellow, Kellogg Institute for International Studies; Concurrent Associate Professor, Keough School of Global Affairs.* Bachelor of Arts, Università Degli Studi, 2000; Master of Arts, Univ California Irvine, 2002; Philosophiae Doctor, *ibid.*, 2006 (2008)

Nahid Erfan Alexandrou. *Associate Professional Specialist, First Year of Studies.* Bachelor of Science, Purdue University, 1979; Master of Science, *ibid.*, 1981; M.S. Engineering, *ibid.*, 1985 (1991)

Alex Himonas Alexandrou. *Professor, Mathematics.* Bachelor of Science, University of Patras, 1976; Master of Science, Purdue University, 1982; Philosophiae Doctor, *ibid.*, 1985 (1989)

Maria Alexandrova. *Assistant Professional Specialist, Biological Sciences.* Medical Doctor, Institute of Medical Education, 2002; Master of Science, Minnesota State University, 2008; Doctor of Philosophy, Southern Illinois University, 2012 (2018)

Roger Paul Alford. *Professor, Law School; Concurrent Professor, Keough School of Global Affairs; Fellow, Nanovic Institute for European Studies; Fellow, Kellogg Institute for International Studies.* Bachelor of Arts, Baylor University, 1985; Master of Divinity, Southern Baptist Theological S, 1988; Juris Doctor, New York University, 1991 (2012)

Robert Lawrence Alworth. *Associate Professional Specialist, College of Engineering; Associate Teaching Professor.* Bach of Sci in Mech Engr, University of Notre Dame, 1972; Master of Science, Cornell University, 1974 (2009)

George Alex Ambrose. *Associate Professional Specialist, Kaneb Center for Teaching and Learning; Concurrent Associate Professional Specialist, First Year of Studies.* Bachelor of Arts, Rutgers State University of NJ, 2002; Master of Arts Education, Rutgers University, 2003; Philosophiae Doctor, Nova University, 2013 (2008)

Brooke Ammerman. *Instructor, Psychology.* Bachelor of Science, North Dakota State University, 2011; Master of Arts, University of Northern Iowa, 2013; Philosophiae Doctor, Temple University, 2018 (2018)

Khaled Anatolios. *Professor, Theology; The Rev. John A. O'Brien Professor of Theology.* Bachelor of Arts, University of St Michaels Coll, 1990; Master of Theology, *ibid.*, 1992; Philosophiae Doctor, Boston College, 1996 (2015)

Selena Kathleen Anders. *Assistant Professor, School of Architecture.* Bachelor of Arts, DePaul University, 2005; Master of Architecture, University of Notre Dame, 2009; Philosophiae Doctor, La Sapienza Univ. of Rome, 2016 (2009)

Thomas Francis Anderson. *Professor, Romance Languages and Literatures; Department Chair, Romance Languages and Literatures; Fellow, Kellogg Institute for International Studies; Dr. Scholl Professor of Romance Languages and Literatures.* Bachelor of Arts, Bowdoin College, 1992; Master of Arts, Univ of Pennsylvania, 1994; Philosophiae Doctor, *ibid.*, 1998 (1998)

Gary A. Anderson. *Hesburgh Professor of Catholic Theology; Professor, Theology.* Bachelor of Arts, Albion College, 1977; Master of Divinity, Duke University, 1981; Philosophiae Doctor, Harvard University, 1985 (2003)

FACULTY

Corey M. Angst. *Professor, IT, Analytics and Operations.* Bach of Sci in Mech Engr, Western Michigan University, 2001; Master of Business Admin, University of Delaware, 2006; Philosophiae Doctor, University of Maryland, 2007 (2007)

Wendy Angst. *Associate Professional Specialist, Management & Organization; Assistant Department Chair, Management; Associate Teaching Professor.* Bachelor of Science, Michigan State University, 1995; Master in Health Administratio, University of La Verne, 2000 (2010)

Panos J. Antsaklis. *H. Clifford and Evelyn A. Brosey Professor of Electrical Engineering; Professor, Electrical Engineering; Concurrent Professor, Applied Computational Mathematics & Statistics; Concurrent Professor, Computer Science and Engineering.* Diploma, Natl Technical Univ of Athens, 1972; Master of Science, Brown University, 1974; Philosophiae Doctor, *ibid.*, 1977 (1980)

Robert Scott Appleby. *Marilyn Keough Dean of the Donald R. Keough School of Global Affairs; Dean, Keough School of Global Affairs; Professor, History.* Bachelor of Arts, University of Notre Dame, 1978; Master of Arts, University of Chicago, 1979; Philosophiae Doctor, *ibid.*, 1985 (1994)

Ani Aprahamian. *The Frank M. Freimann Professor of Physics; Professor, Physics.* Bachelor of Arts, Clark University, 1980; Philosophiae Doctor, *ibid.*, 1986 (1989)

Francisco Jose Aragon. *Associate Professional Specialist, Institute for Latino Studies.* Bachelor of Arts, Univ of California Berkeley, 1989; Master of Arts, New York University, 1990; Master of Arts, Univ California Davis, 2000; Master of Fine Arts, University of Notre Dame, 2003 (2003)

J. Douglas Archer. *Librarian, Hesburgh Libraries.* Bachelor of Arts, Duke University, 1968; Master of Divinity, Colgate Rochester Divinity Sch, 1972; Master in Library Science, Western Michigan University, 1981 (1978)

Elizabeth A. Archie. *Associate Professor, Biological Sciences.* Bachelor of Arts, Bowdoin College, 1997; Philosophiae Doctor, Duke University, 2005 (2009)

Neil Arner. *Assistant Professor, Theology; Fellow, Nanovic Institute for European Studies.* Bachelor of Science, Georgia Institute of Technology, 2001; Master of Divinity, Princeton Theological Seminary, 2006; Master of Sacred Theology, Yale University-Div School, 2007; Master of Philosophy, Yale University, 2011; Master of Arts, *ibid.*, 2011; Philosophiae Doctor, *ibid.*, 2012 (2013)

Carolina Arroyo. *Associate Professional Specialist, Political Science.* Bachelor of Arts, SUNY at Buffalo, 1983; Master of Arts, Stanford University, 1990 (1996)

Brandon Lee Ashfeld. *Associate Professor, Chemistry and Biochemistry.* Bachelor of Science, University of Minnesota, 1998; Philosophiae Doctor, Univ of Texas-Austin, 2004 (2007)

James Matthew Ashley. *Associate Professor, Theology; Interim Director, Master of Divinity Program.* Bachelor of Science, Saint Louis University, 1982; Master of Teacher Science, Weston School of Theology, 1988; Philosophiae Doctor, University of Chicago, 1993 (1993)

Badih Assaf. *Frank M. Freimann Assistant Professor of Physics; Assistant Professor, Physics.* Bachelor of Science, American University of Beirut, 2009; Philosophiae Doctor, Northeastern University, 2014 (2018)

Ann W. Astell. *Professor, Theology; Theology, Director of Undergraduate Studies.* Bachelor of Science, Marquette University, 1974; Master of Arts, *ibid.*, 1981; Philosophiae Doctor, Univ of Wisconsin-Madison, 1987 (2007)

Robert Audi. *Professor, Philosophy; Rev. John A. O'Brien Professor of Philosophy.* Bachelor of Arts, Colgate University, 1963; Master of Arts, University of Michigan, 1965; Philosophiae Doctor, *ibid.*, 1967 (2003)

Yury Petrovich Avvakumov. *Associate Professor, Theology; Fellow, Nanovic Institute for European Studies.* Master of Arts, Leningrad State University, 1981; Philosophiae Doctor, Russian Theological Seminary, 1990; Philosophiae Doctor, Ludwig-Maximilians Univ Munich, 2001 (2009)

Woutjin Baars. *Assistant Professor, Aerospace and Mechanical Engineering.* Bach of Sci in Aerospace, Technological Univ. of Delft, 2006; M.S. Aerospace Engr, *ibid.*, 2009; Philosophiae Doctor, Mechanical Engineering, Univ. of Texas-Austin, 2012 (2018)

Ruediger Bachmann. *Associate Professor, Department of Economics; Stepan Associate Professor of Economics.* Master of Arts, University of Mainz, 1999; Master of Arts, *ibid.*, 1999; Master of Arts, *ibid.*, 2001; Master of Arts, *ibid.*, 2001; Master of Arts, Yale University, 2002; Master of Philosophy, *ibid.*, 2004; Philosophiae Doctor, *ibid.*, 2007 (2014)

Brad Alan Badertscher. *Professor, Accountancy; PwC Faculty Fellow.* Master of Business Admin, University of Iowa, 2001; Bachelor of Arts, Univ. of Nebraska at Kearney, 2001; Philosophiae Doctor, University of Iowa, 2007 (2007)

William Baer. *Associate Librarian, Hesburgh Libraries; Concurrent Assistant Professional Specialist, First Year of Studies.* Bachelor of Science, Brigham Young University, 1992; Master of Library & Info Sci, *ibid.*, 1993 (2015)

Christopher Baglow. *Professional Specialist, McGrath Institute for Church Life; Concurrent, Theology; Concurrent Professional Specialist, Theology.* Bachelor of Arts, Franciscan Univ Steubenville, 1990; Master of Arts, University of Dallas, 1996; Philosophiae Doctor, Duquesne University, 2000 (2018)

Marcio Bahia. *Associate Professional Specialist, Romance Languages and Literatures; Associate Teaching Professor.* Bachelor of Arts, Federal Univ of Minas Gerais, 2001; Master of Arts, University of Ottawa, 2004; Doctor of Philosophy, *ibid.*, 2011 (2016)

Brian M. Baker. *Rev. John A. Zahm, C.S.C. Professorship of Structural Biology in the Department of Chemistry and Biochemistry; Professor, Chemistry and Biochemistry; Department Chair, Chemistry and Biochemistry.* Bachelor of Science, New Mexico State Univ. Park, 1992; Philosophiae Doctor, University of Iowa, 1997 (2001)

Aaron Bradley Bales. *Associate Librarian, Hesburgh Libraries.* Bachelor of Arts, Harvard University, 1988; Master in Library Science, Indiana Univ-Bloomington, 2001 (1992)

Timothy E. Balko. *Assistant Professional Specialist, Management; Assistant Teaching Professor.* Bachelor of Social Work, Valparaiso University, 1985; Juris Doctor, *ibid.*, 1989 (2013)

Christopher Gordon Ball. *Assistant Professor, Anthropology; Fellow, Kellogg Institute for International Studies; Fellow, Joan B. Kroc Institute for International Peace.* Bachelor of Arts, Univ of California Sta Barbara, 1996; Master of Arts, University of Chicago, 2003; Philosophiae Doctor, *ibid.*, 2007 (2013)

Rashna Dinshaw Balsara. *Research Associate Professor, W.M. Keck Center for Transgene Research.* Bachelor of Science, University of Bombay, 1985; Master of Science, *ibid.*, 1991; Philosophiae Doctor, *ibid.*, 1998 (2007)

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FACULTY

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LISTING OF CAMPUS LOCATIONS (ALPHABETICAL LISTING)

3D	Admissions (Main Building)	4G	Legends	1092
3F	Alumni Association / Eck Visitors Center	6H	Leighton Hall	1220
3E	Alumni Hall	3C	Lewis Hall	1078
6F	Athletic and Convocation Center (Joyce Center)	7E	Loftus Sports Center	1097
3E	Badin Hall	2D	Log Chapel	1018
6E	(Ricci) Band Rehearsal Hall	2E	Lyons Hall	1024
3D	Basilica of the Sacred Heart	3D	Main Building (Admissions and Graduate School)	
4E	Biolchini Hall of Law	3G	Main Gate	
2D	Bond Hall (Architecture)	4E	Malloy Hall	1165
3F	(Hammes Notre Dame) Bookstore	6D	McCourtney Hall	1249
4D	Breen-Phillips Hall	2F	McGlinn Hall	1154
3C	Brownson Hall	3F	McKenna Hall (Notre Dame Conference Center)	1079
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6H	Compton Family Ice Arena	3E	Morse Center for Academic Services	1163
5F	Corbett Family Hall	4G	Nanovic Hall	1250
3D	Corby Hall	4D	Nieuwland Science Hall	1050
4D	Crowley Hall of Music	4C	North Dining Hall	1057
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5E	Decio Faculty Hall	2D	Old College	1001
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2F	Duncan Hall	5F	(Joseph I.) O'Neill Hall	1253
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