## College of Arts \& Sciences

Robert A. Flowers, Dean; Kelly Austin, Associate Dean; R. Michael Burger, Associate Dean; Dawn Keetley, Associate Dean; Jessecae Marsh, Associate Dean
The College of Arts \& Sciences is the heart of Lehigh University, offering a wide variety of academic majors, minors, and interdisciplinary programs, while also providing essential liberal arts access to all Lehigh students. College of Arts \& Sciences faculty are engaged as active scholars, are highly accessible, and are committed to the teaching mission of our undergraduate programs. A hallmark of our college is the faculty's ability to engage students interactively and experientially in teaching, research, and scholarship.
Students in the College of Arts \& Sciences develop new ways of thinking and knowing that have become the hallmarks of a liberal arts education, testing assumptions, seeking evidence to support their understanding of the world, and probing the unknown with curiosity. These skills prepare our graduates to thrive in an uncertain world. Through a combination of college-wide distribution requirements and major field requirements in their chosen discipline, Lehigh College of Arts \& Sciences students investigate and acquire knowledge of human cultures and the physical and natural world by studying arts, humanities, mathematics, natural sciences, and social sciences.

Studying broadly in these areas while pursuing a deeper concentration in a major field helps develop the intellectual curiosity and timeless skills necessary to create lifelong learners as our graduates confront constant changes in society, technology, the economy, as well as their careers and personal lives.
The College of Arts \& Sciences offers several curricular options:

- A four-year College of Arts \& Sciences curriculum leading to a bachelor of arts or bachelor of science degree in designated fields;
- Dual degree programs within the college and in conjunction with the other three undergraduate colleges;
- A five-year Arts-Engineering curriculum leading to a bachelor's degree from the College of Arts \& Sciences and a bachelor of science degree from the College of Engineering and Applied Science;
- A five-year program leading to a bachelor's degree from the College of Arts \& Sciences and a master's degree in Education (http://catalog.lehigh.edu/coursesprogramsandcurricula/education/ initialteacherpreparation/) from the College of Education. Please see below for more information;
- Additional five-year programs leading to a bachelor's degree from the College of Arts \& Sciences and a master's degree through the Colleges of Business (https://catalog.lehigh.edu/coursesprogramsandcurricula/ businessandeconomics/), Engineering and Applied Science (https://catalog.lehigh.edu/coursesprogramsandcurricula/ engineeringandappliedscience/), and Health (https:// catalog.lehigh.edu/coursesprogramsandcurricula/health/).


## MAJOR DEGREE PROGRAMS IN THE COLLEGE

Bachelor of Arts and Bachelor of Science Degree Programs
Two distinct bachelor-degree programs are offered by the College are the Bachelor of Arts (BA) and the Bachelor of Science (BS). For the Bachelor of Arts degree, a student takes a comparatively smaller number of courses to fulfill the major requirements, allowing them greater flexibility for additional academic opportunities such as double majoring, pursuing a minor(s), and study abroad or experiential learning. For the Bachelor of Science degree (offered in designated disciplines), a student takes a more extensive concentration in the major field, along with a proportionally smaller number of courses outside the major. Except for this distinction, the same basic requirements must be met for both degree programs (including the minimum number of 120 hours for graduation and the minimum grade point average in the major of 2.0). No more than six hours of advanced military science credit or creative inquiry (CINQ) coursework may be applied toward either degree.

## Bachelor of Arts Degree <br> ba degrees are offered in the following areas: <br> ARTS

Architecture, art, art history, design, music, theatre

## HUMANITIES

Asian studies, English, Latin American \& Latino studies, modern languages \& literatures (Chinese, French \& francophone studies, German, Japanese, Spanish \& Hispanic studies), philosophy, religion studies

## Social Sciences

Africana studies, anthropology, cognitive science, economics, environmental studies, global studies, health, medicine \& society, history, international relations, joint global studies/modern languages \& literatures, joint international relations/economics, joint international relations/modern languages \& literatures, journalism, journalism/ science writing, political science, psychology, sociology, sociology \& anthropology, women, gender \& sexuality studies

## Mathematics and Natural Science

Astronomy, behavioral neuroscience, biology, chemistry, computer science, earth and environmental science, mathematics, molecular biology, physics, statistics
BA degrees in predental science or pre-optometry science are available to students who are admitted to certain combined degree programs (see Pre-Health Professional Programs).

## Bachelor of Science Degree

## BS degrees are offered in the following areas:

Astrophysics, behavioral neuroscience, biochemistry, biology, chemistry, cognitive science, computer science, earth and environmental science, economics, mathematics, molecular biology, pharmaceutical chemistry, physics, psychology, statistics

## GENERAL PLAN OF UNDERGRADUATE STUDY

Students in the College of Arts \& Sciences are encouraged to declare their major as soon as they are certain of their degree path, and are expected to do so by the end of their fourth semester. For most students, the credits earned for the major and those earned for college distribution requirements are not enough to meet the graduation requirement of 120 credit hours. Students normally take free elective courses in areas of interest to earn these remaining credits. Three types of courses - one in the student's area of concentration (major requirements), a second set drawn from certain designated disciplines (the distribution requirements), and a third set without constraints (the free electives) - comprise the educational program of the College.

## Major Field of Concentration

By majoring in a specific discipline a student establishes a foundation of knowledge and develops expertise and intellectual sophistication in their field.

The minimum number of credits for a major is 32. A student must maintain a minimum grade-point average of 2.0 in the major field, and in the entire coursework.

## Standard major sequences

When a student declares a major they are assigned a major advisor from that department or program's faculty. The major advisor assists students with course selection, research opportunities, internship selection, and other areas of professional development. In all cases, the final responsibility for meeting both major and non-major requirements rests with the student.

## Special interdisciplinary majors

In addition to our established major programs, specially structured interdisciplinary majors linking multiple disciplines are possible. For example, a student interested in a professional school of urban or regional planning might wish to structure a special major consisting primarily of courses in political science, environmental studies, sociology, or any other relevant disciplines.

Any student may, with the aid of faculty members chosen from the disciplines involved, devise an interdisciplinary major program to include no less than 32 credits of related course work, with at least 15 credits from advanced courses. The major advisors and the dean of the college must approve the program.

## Multiple majors and Dual degrees

A student who wishes to fulfill the requirements for more than one major program has two options: a double major or a dual degree. A double major is a single BA degree with two majors. A student pursues a double major by declaring both majors. Typically, double majors can be completed in four years, but declaring late, the sequencing of courses, and time conflicts with required courses can delay time to degree completion. No more than three overlapping courses may be used to meet both majors' requirements.
A dual degree program is a combined BA and BS program or two BS degrees in one or more of our undergraduate colleges. Fore example, the BA offered by the College of Arts \& Sciences may be combined with a BS in CAS or in one of the other undergraduate colleges. A student pursues a dual degree by declaring the first program and then requesting the second degree program by filling out a Dual Degree Petition Form, which must be accompanied by an approved semester-by-semester academic plan. The dual-degree student must satisfy major and distribution requirements for both degrees and earn a minimum of 30 additional credits beyond those required for the first degree. All of the 30 additional credits must be taken at Lehigh or in Lehigh residency programs. The requirement of 30 additional credits typically requires additional study beyond 8 semesters. There is no limit on the number of overlapping courses between two degrees, but there must be at least 30 credits of stand-alone coursework in each degree program. For administrative purposes, students who take two degrees or two majors must designate one as their primary major or primary degree program.

## Distribution Requirements

The CAS distribution requirements draw upon five primary domains of learning: arts, humanities, mathematics, natural sciences, and social sciences. Exposure to these broad areas across different fields will help students develop a wide range of timeless skills, helping to prepare them for an increasingly diverse and complex world. Specific credit hours are required in each of the following four domains: arts and humanities, mathematics, natural sciences, and social sciences.

## Distribution Requirements for the B.A. and the B.S.

## First-Year Seminar

One course during the first year 3-4

## English Composition

Two courses during the first year

## Mathematics ${ }^{1}$

Chosen from designated courses in mathematics or philosophy

## Natural Sciences ${ }^{1}$

Chosen from designated courses in astronomy, astrophysics,
biological anthropology, biology, chemistry, earth and
environmental sciences, neuroscience and physics
At least one science course must also include the associated laboratory.

## Social Sciences ${ }^{1}$

Chosen from designated courses in africana studies, anthropology, cognitive science, economics, environmental studies, global studies, health, medicine, \& society, history, international relations, journalism, political science, psychology, sociology, and women, gender \& sexuality studies.

## Arts and Humanities ${ }^{1}$

Chosen from designated courses in asian studies, architecture, art, design, history, Jewish studies, latin american \& latino studies, modern languages and literature
(Arabic, Chinese, French, German, Hebrew, Japanese,
Russian, Spanish \& Hispanic Studies), English, ethics, film \& documentary studies, music, philosophy, religion studies, and theatre.

Junior Year Writing Intensive
Only courses designated as "WI" in the class schedule or select independent studies may be used to fulfill this requirement.
Total Credits
1
Students and advisors should monitor closely the progress toward completion of requirements. Courses taken to satisfy a major program may be used to satisfy distribution requirements in only one distribution area.

## Total required for graduation: 120 credits

## FIRST-YEAR SEMINAR PROGRAM

During their first academic semester, every student in the College of Arts \& Sciences is required to enroll in a First-Year Seminar. FirstYear Seminars provide an intimate and supportive environment that facilitates the transition to university life. Within the seminar students develop skills that serve as a framework for their future scholarly work - how to read closely, think critically, write clearly, learn cooperatively, speak persuasively, and solve problems creatively.
Courses in this program are an excellent way to explore a subject that may be new, or to enter more deeply into an area of previous interest. Whatever the topic, First-Year Seminars emphasize reading assignments, papers, and oral presentations, while others include tests, laboratory work, or fieldwork.

## JUNIOR-YEAR WRITING CERTIFICATION

The faculty of the College of Arts \& Sciences value writing as an essential tool for learning. Writing well is indispensable for performing responsibly in any profession and in most areas of life. Beyond the two English courses required in the first year, students are encouraged to take courses that provide continued practice in writing. In particular, each student must complete at least one "writing-intensive" course, normally during their junior year. Students must follow the guidelines for this requirement set up by their major department. Some major programs require the writing-intensive course be taken in the major field, while others allow it to be chosen freely from writing-intensive courses offered by any department or program. Courses that satisfy the writing-intensive requirement may also be used to fulfill major or distribution requirements. Please note: only courses designated as "WI" on the course schedule, or select independent studies may be used to fulfill this requirement. Transfer credits may not be used to meet the Writing Intensive requirement.

## MINOR PROGRAMS IN THE COLLEGE

Certain departments, divisions, and programs in the College afford students an opportunity to minor in an additional field of concentration other than their major field of study.
Minors require a minimum of 15 credits, but the specific content is determined by the department, division, or program offering that minor. A minor is optional, and if successfully completed, will be shown on the university transcript in the same manner as the major field. A 2.0 minimum grade-point average is required for courses in the minor. Because of this requirement, no course in the minor program may be taken with Pass/Fail grading. No more than one course may be double-counted toward a major and a minor, and no more than one course may overlap between two minors.
8 The following are established minors in the College of Arts \& Sciences:

- Actuarial Science
- Africana Studies (Interdisciplinary Programs)
- Anthropology
- Apparel Design
- Applied Mathematics
- Architecture
- Asian Studies (Interdisciplinary Programs)
- Astronomy
- Biology
- Chemistry

Chinese

- Cognitive Science (Interdisciplinary Programs)
- Computer Science
- Creative Writing
- Data Science
- Documentary Storymaking (Interdisciplinary Programs)
- Earth and Environmental Science
- Economics
- English
- Environmental Studies (Interdisciplinary Programs)
- Film Studies (Interdisciplinary Programs)
- French and Francophone Studies
- German
- Global Studies (Interdisciplinary Programs)
- Graphic Design
- Health, Medicine, and Society (Interdisciplinary Programs)
- History
- History of Architecture
- History of the Visual Arts
- International Film
- International Relations
- Japanese
- Jewish Studies (Interdisciplinary Programs)
- Journalism: Science and Environmental Writing
- Latin American and Latino Studies (Interdisciplinary Programs)
- Mass Communication
- Molecular Biology
- Museum Studies
- Music
- Philosophy
- Physics
- Political Science
- Probability and Statistics
- Product Design
- Psychology
- Public Administration
- Pure Mathematics
- Religion Studies
- Russian
- Sociology
- Sociology and Anthropology
- Spanish and Hispanic Studies
- Studio Art
- Theatre
- Women, Gender, and Sexuality Studies (Interdisciplinary Programs)
- Writing
*For minors outside of the College of Arts \& Sciences, please see below.


## ECKARDT SCHOLARS PROGRAM

The Eckardt Scholars Program is a highly selective and unique honors program in the College of Arts \& Sciences. The program prioritizes intellectual curiosity, independent work, and close mentoring relationships between students and faculty. Each incoming class includes approximately twenty Eckardt Scholars. These students receive unique academic privileges that provide them with great opportunities at Lehigh and beyond. Students in the program are exempt from the Arts \& Sciences distribution requirements and work with their major advisor and the Eckardt Scholars Program Director to create a flexible course of study that best suits their academic interests and ambitions. Although exempt from distribution requirements, students will complete the requisite number of credits for their degrees and all correlative requirements for their majors. The
program includes participation in two Eckardt Scholar Seminars and completion of an independent project (e.g., a thesis, artistic creation, or other capstone experience) during the senior year.

Participation in the Eckardt Scholars Program is restricted to only the most well-qualified students. Some students are invited to enroll when first admitted to Lehigh, while others are identified by faculty and encouraged to apply during their first few semesters. Admission to the program is decided on the basis of academic records, written statements of educational goals, and at least two faculty recommendations.

## INTERNSHIPS

Many departments and programs offer credit for specific internship experiences. Students should consult with their home department for information on arranging internships. The University faculty has established three important criteria that must be met by all internships: 50 hours of work are required for each credit awarded, no credit can be awarded for an internship ex post facto, and the student must register for the internship course during the same term that the internship work is performed. Students must pre-arrange all internship experiences with the appropriate department. Internship credits cannot be awarded for work experiences lacking a distinct, identifiable educational component. A memorandum of understanding circulated among the employer, student, and departmental internship course director helps to promote a common understanding of the educational and work objectives of the internship. Students are advised that not all work experiences advertised as "internships" warrant academic credit, even though they may be otherwise worthwhile.

## PRE-LAW PROGRAM

In keeping with the policy of the Association of American Law Schools, the university does not have a prescribed pre-law curriculum; however, Lehigh has a strong pre-law tradition. Successful candidates for law school demonstrate skills in critical analysis, logical reasoning, and communication and have pursued rigorous coursework of significant breadth and depth. Lehigh students have attained entrance to law schools from diverse curricula in all three of the undergraduate colleges. Specifically law-related courses are offered in the College of Arts \& Sciences (e.g. Constitutional Law and Politics, Civil Rights and Civil Liberties, Law and Order) and the College of Business (e.g., Introduction to Law and Legal Environment of Business).
Advising is available to prospective pre-law students on a continuous basis from first-year orientation through the law school application process in the senior year. The pre-professional advisor in the Center for Career and Professional Development coordinates these pre-law counseling services.

## PRE-HEALTH PROFESSIONAL PROGRAMS

Schools of medicine, dentistry, optometry, podiatry, and veterinary medicine stress the importance of a strong liberal arts education as well as prescribed studies in the sciences. Although most pre-health students will choose a major in a pure or applied science, as long as candidates have the essential courses in biology, chemistry, physics, and mathematics, they may major in any of the three undergraduate colleges.
A health professions advisory committee, which includes the preprofessional advisor and faculty members from the sciences and social sciences, provides career and academic counseling and works closely with students from first-year orientation through the entire process of applying to professional schools. Students with an interest in the health professions are urged to consult with the pre-professional advisor in the Center for Career and Professional Development as early as possible in their academic career.

## Combined-Degree Program in Dentistry

In cooperation with the School of Dental Medicine at the University of Pennsylvania, Lehigh offers an accelerated program that enables selected students to earn both the baccalaureate degree (B.A.) with a major in predental science and the doctor of dental medicine degree (D.M.D.) after seven years of study at the two institutions. In the first three academic years at Lehigh, credit hours are earned toward the 120 credits required for the baccalaureate degree. The next four years are spent in the regular program of dental education at the Penn School of Dental Medicine in Philadelphia. By successfully completing
their first year at the dental school, students acquire the necessary additional credit hours for the Lehigh baccalaureate degree.
During their first three years at Lehigh, students are expected to make satisfactory progress in prescribed academic areas as well as in the area of personal growth, developing those attributes ultimately needed to become a dentist. Penn Dental School receives student grades and monitors student progress through feedback from Lehigh. Students are expected to attain specified grade point averages and DAT scores. Students' undergraduate credentials are processed through the Admissions Committee of Penn Dental School before a final definitive acceptance is offered. The dental college reserves the right to withdraw an acceptance, or require that a student spend additional time on the undergraduate level, on the grounds of academic or personal maturation concerns.
Application for admission to this program is made through Lehigh's Office of Admissions. Application deadline is January 1.
Required Science and Math Courses

## Chemistry

Select one of the following:

| $\begin{aligned} & \text { CHM } 030 \\ & \& \text { CHM } 031 \end{aligned}$ | Introduction to Chemical Principles and Chemical Equilibria in Aqueous Systems |
| :---: | :---: |
| CHM 040 <br> \& CHM 041 | Honors General Chemistry I and Honors General Chemistry II |
| CHM 110 <br> \& CHM 111 | Organic Chemistry I and Organic Chemistry Laboratory I |
| CHM 112 <br> \& CHM 113 | Organic Chemistry II and Organic Chemistry Laboratory II |
| Biology |  |
| $\begin{aligned} & \text { BIOS } 041 \\ & \text { \& BIOS } 042 \end{aligned}$ | Introduction to Cellular and Molecular Biology and Introduction to Cellular and Molecular Biology Laboratory |
| BIOS 115 <br> \& BIOS 116 | Genetics and Genetics Laboratory |
| $\begin{aligned} & \text { BIOS } 044 \\ & \text { \& BIOS } 045 \end{aligned}$ | Introduction to Integrative and Comparative Biology and Introduction to Integrative and Comparative Biology Laboratory |
| BIOS 371 | Elements of Biochemistry I |
| BIOS 372 | Elements of Biochemistry II |
| Physics |  |
| Select one of the following: |  |
| PHY 010 \& PHY 012 | General Physics I and Introductory Physics Laboratory I |
| PHY 011 \& PHY 012 | Introductory Physics I and Introductory Physics Laboratory I |
| Select one of the following: |  |
| PHY 013 \& PHY 022 | General Physics II and Introductory Physics Laboratory II |
| PHY 021 \& PHY 022 | Introductory Physics II and Introductory Physics Laboratory II |
| Math |  |
| MATH 012 | Basic Statistics |
| Select one of the following: |  |
| MATH 021 \& MATH 022 | Calculus I and Calculus II |
| MATH 051 \& MATH 052 | Survey of Calculus I and Survey of Calculus II |

BIOS 115
\& BIOS 116 and Genetics Laboratory
BIOS $044 \quad$ Introduction to Integrative and 4
\& BIOS 045
Comparative Biology and Introduction to Integrative and Comparative Biology Laboratory
BIOS $130 \quad$ Biostatistics 4
BIOS 235 Human Physiology 3
BIOS 276 Central Nervous System and 3
Behavior
Select one of the following:
BIOS 277 Experimental Neuroscience Laboratory
BIOS 278 Neurophysiology Laboratory
BIOS 279 Experimental Molecular Neuroscience Laboratory
BIOS $324 \quad$ Microbiology 5
\& BIOS 325 and Microbiology Laboratory
BIOS 371 Elements of Biochemistry I 3
BIOS $372 \quad$ Elements of Biochemistry II 3
BIOS $382 \quad 3$
Physics
Select one of the following:


## MINORS \& CERTIFICATES OUTSIDE OF CAS

Students also have the opportunity to pursue and/or apply to minor programs in the other undergraduate colleges and should review their requirements in their catalog listing. These include:

- Business, College of Business
- Biostatistics, College of Health
- Community Health, College of Health
- Education, College of Education (see below)
- Engineering, College of Engineering
- Entrepreneurship, College of Business
- Ethics, Intercollegiate
- Global Health, College of Health
- Health Policy and Politics, College of Health
- Indigenous Peoples, College of Health
- Marketing, College of Business
- Maternal and Child Health, College of Health
- Population Health, College of Health
- Real Estate, College of Business
- Supply Chain Management, College of Business


## EDUCATION MINOR

The education minor helps undergraduates explore career options in school teaching or other professional careers with learners ranging in age from young children through adulthood and including learners who have disabilities or are English Learners. The minor offers a systematic background of professional education experiences, coordinating practicum activities with theory courses designed to provide a foundation for future educational studies. Its focus is exploratory. The experiences of the minor are intended to enrich an individual's understanding of education as a central intellectual activity of our culture and to provide self-understanding of one's own potential as an educator.
An undergraduate may take these courses with the approval of the adviser and minimum GPA of 2.75 . Fifteen credit hours are required for the education minor. Completion of the minor does not assure admission to one of the Teacher Education Programs to become a certified elementary or secondary teacher.

For more information about our Education Minor, visit https:// ed.lehigh.edu/academics/programs/teacher-education (https:// ed.lehigh.edu/academics/programs/teacher-education/) or contact Dr. Brook Sawyer by email: lbs211@lehigh.edu

## ELEMENTARY \& SECONDARY EDUCATION 4:1 ACCELERATED MASTER'S PROGRAM

The College of Education offers a five-year degree program that is designed to allow students to earn both a bachelor's degree and a master's degree in five years instead of the traditional six.
The combined degree program leads to (1) a B.A./B.S. degree in an academic discipline from the College of Arts and Sciences, the P.C. Rossin College of Engineering and Applied Sciences, or the College of Business, and (2) an M.Ed. degree in elementary education or an M.Ed. degree in secondary education. In addition, students also earn eligibility for an Instructional I teaching certificate from the Pennsylvania Department of Education (PDE). These PDE certification areas are:

- Biology 7-12
- Chemistry 7-12
- Earth and Space Science K-12
- English 7-12
- General Science 7-12
- Grades PreK-4
- Mathematics 7-12
- Physics 7-12
- Social Studies 7-12

Freshmen, sophomores and juniors with a minimum overall GPA of 2.75 may apply to the 5 -year teacher education program. Those accepted typically begin education courses in the second semester of their sophomore year (junior year for those admitted later).
Criteria for admission to the program include:

- A demonstrable commitment to learning and intellectual growth
- An expressed interest in teaching as a career
- Previous experience in working with young people; this can be gained in the summers of freshman and sophomore years.
In the fall semester of their senior year, students must complete an application for admission to the graduate College of Education (Elementary Education or Secondary Education) in order to continue in the program and complete the master's degree/Instructional Level I teacher certification eligibility portion of the program.
For more information about the program, visit https://ed.lehigh.edu/ academics/programs/teacher-education (https://ed.lehigh.edu/ academics/programs/teacher-education/).

