Course Catalog

2023-24

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Information about Olin

Olin College statement of identity

Olin College of Engineering is a private, non-profit, undergraduate institution offering Bachelor of Science in Electrical and Computer Engineering, Bachelor of Science in Engineering and Bachelor of Science in Mechanical Engineering degrees. Olin College is located in Needham, Massachusetts and was founded in 1997. The legal name of the college is Franklin W. Olin College of Engineering.

History

Olin College is named for Franklin W. Olin (1860–1951), an engineer, entrepreneur and professional baseball player. Although he lacked a high school diploma, he qualified through self-study for entrance to Cornell University, where he majored in civil engineering and was captain of the baseball team. He played major league baseball during the summers to finance his education. He went on to found the company known today as the Olin Corporation, a Fortune 1000 company.

In 1938, Mr. Olin transferred a large part of his personal wealth to a private philanthropic foundation. In two-thirds of a century of existence, the F. W. Olin Foundation awarded grants totaling more than $800 million to construct and fully equip 78 buildings on 58 independent college campuses. In 1997, the Foundation announced its intention to create Olin College, its most ambitious project. In subsequent years, the Foundation transferred its assets to the college, for a total commitment of $460 million, one of the largest grants in the history of American higher education. The Foundation's generosity enabled Olin to start from a "clean slate" in designing its academic program, and, in the philanthropic spirit of Franklin W. Olin, to provide a tuition merit scholarship to every student. The faculty worked with 30 student "partners" in the year prior to the formal opening of the college to design the curriculum. The college welcomed its first freshman class in August 2002.

In creating the college, the Foundation was responding to calls for fundamental reform of engineering education from the National Science Foundation, the National Academy of Engineering, the accrediting organizations and the corporate community. To better prepare graduates for the challenges of the twenty-first century, these groups recommended that engineering education include more project-based learning, interdisciplinary teaching, and a greater emphasis on entrepreneurship, teamwork and communication. Olin College incorporated these suggestions, along with creative ideas of its own, into an innovative, hands-on curriculum that is attracting worldwide attention as a new model for engineering education.

Engineering education at Olin is in the liberal arts tradition, with a strong emphasis on the arts, humanities, social sciences, entrepreneurship, and design. Olin is committed to producing graduates who recognize the complexity of the world, who appreciate the relationship of their work to society and who are dedicated to creative enterprises for the good of humankind.

Olin College graduated its first class in May 2006. Members of that class and subsequent classes have gone on to graduate study and employment at many of the nation's top graduate schools and corporations. A significant proportion of the graduates have started entrepreneurial ventures, while others have sought alternative post-graduate occupations.

On July 1, 2020, Gilda A. Barabino became the second president of Olin College of Engineering, and Professor of Biomedical and Chemical Engineering.

A biomedical engineer trained in chemical engineering, with broad interest in global health, systems, and interdisciplinary engineering education, Dr. Barabino is a noted investigator in the areas of sickle cell disease, cellular and tissue engineering. She is an internationally recognized thought leader and highly sought after speaker and consultant on race/ethnicity and gender in science and engineering, with particular focus on creating cultures and climates that support a sense of belonging. She has led a number of initiatives in these areas including serving as the founder and Executive Director of the National Institute for Faculty Equity.

Dr. Barabino is an active member of the National Academy of Engineering and the National Academy of Medicine and serves on numerous committees of the National Academies of Science, Engineering and Medicine, including the Roundtable on Black Men and Black Women in Science, Engineering and Medicine; the Health and Medicine Division Committee; and the Committee on Women in Science Engineering and Medicine which she chairs.

The arrival of Olin's next president offered an opportunity for the community to reflect on the accomplishments of the college's first decade, to recommit to the founding values of innovation and collaboration, and to set an ambitious agenda for Olin's future.

In 2021, Dr. Barabino shared a strategic vision for Olin College which included a focus on reducing inequity within and through engineering.

Olin College Vision Statement

Engineering for Everyone

Olin College Mission Statement

Transforming engineering education toward a world in which engineering serves everyone

Olin College Values

Engineering for impact: thriving for all.

At Olin, we are engineering for impact: we strive to create a community and contribute to a world in which all can thrive.

As we pursue our vision of Engineering for Everyone, we work intentionally to reinforce the values to which we aspire. We reflect on who we are now and who we want to be and strive to embody the ideals we embrace.
We commit to serving the Olin community and society at large by enacting our values of **equity and justice, trust, learning and growth, sustainability,** and **collaboration** for the benefit of others, especially those who are most in need.As a community, we:

- Fight for **equity and justice.**
- Offer our **trust** and earn the **trust** of others through our words and actions.
- Continually strive to **learn**, to **grow**, and to **share** what we have learned.
- Protect and **sustain** our natural, built, and financial resources so that they might equitably benefit future generations.
- **Collaborate**; find meaning and joy in connection with others.

Intellectual Property

Intellectual Property, New Ventures and Copyright Policy
The College maintains a Board of Trustees approved policy on Intellectual Property, New Ventures and Copyright Policy for faculty, staff and students. The policy is based on the following ten principles. A copy of the current policy may be located on the Corporate, Foundation, and Sponsored Programs page in the policies and procedures section.

1. The policy should encourage creative and entrepreneurial activity, and catalyze the teaching of creative thinking and entrepreneurship.
2. The policy should help attract and retain the types of students, staff, and faculty we wish to have at Olin.
3. The policy should foster good will towards the college and encourage philanthropy.
4. The policy should be fair.
5. The policy should distinguish as little as possible between faculty, staff, and students since faculty, staff and students will work closely in teams.
6. The policy should safeguard an open and non-secretive atmosphere on campus.
7. The policy should safeguard the non-profit status of the college and minimize legal risks.

8. The policy should contribute to the college's financial health, e.g. by operating efficiently and by providing opportunities for growth of the endowment.
9. The policy should promote the dissemination of ideas and promote the public good.
10. The policy should be as simple as possible.

Accreditation

NECHE accreditation

Franklin W. Olin College of Engineering is accredited by the New England Commission of Higher Education (formerly the Commission on Institutions of Higher Education of the New England Association of Schools and Colleges, Inc.).

Accreditation of an institution of higher education by the Commission indicates that it meets or exceeds criteria for the assessment of institutional quality periodically applied though a peer review process. An accredited college or university is one which has available the necessary resources to achieve its stated purposes through appropriate educational programs, is substantially doing so, and gives reasonable evidence that it will continue to do so in the foreseeable future. Institutional integrity is also addressed through accreditation.

Accreditation by the Commission is not partial but applies to the institution as a whole. As such, it is not a guarantee of every course or program offered, or the competence of individual graduates. Rather, it provides reasonable assurance about the quality of opportunities available to students who attend the institution.

Inquiries regarding the accreditation status by the Commission should be directed to the administrative staff of the institution. Individuals may also contact:

New England Commission of Higher Education
3 Burlington Woods Drive, Suite 100
Burlington, MA 01803-4514
Phone: (781) 425-7785
Email: info@neche.org

ABET accreditation

Olin College's three degree programs – Electrical and Computer Engineering, Engineering, and Mechanical Engineering – are accredited by the Engineering Accreditation Commission of ABET. ABET is a nonprofit, non-governmental organization recognized by the Council for Higher Education Accreditation (CHEA).

Information specific to Olin's program goals and learning outcomes is further defined in the College Catalog under Academic Programs.

To learn more about this accreditation visit http://www.abet.org.

Catalog as a contract and right to modify

The Olin College Catalog is published online annually and is primarily intended for use by currently enrolled students, faculty, and staff. The catalogs provide an overview of the College's curriculum, academic programs, admission and financial aid programs, and educational resources. They also include academic policies, rules, regulations, and procedures; information about degree and certificate programs, including degree requirements; a listing and description of courses; and Board of Trustees, administration, and faculty information. Links to other related information are also included.

Information concerning academic requirements, courses, and programs of study contained in the catalog does not establish a binding contract between the student and the College. The College can change, discontinue, or add academic requirements, courses, and programs of study at any time, without notice. In the event that a change is made, students who enrolled under previous rules have the option of graduating under either catalog.

Time limit on degree requirements

Students are encouraged to complete the bachelor's degree within 4 academic years (8 semesters).

Students have a maximum of ten years to complete their Bachelor of Science program under degree requirements in effect at the initial term of matriculation. Students experiencing a break in enrollment during these ten years will follow their curricular requirements at the point of matriculation provided that the break in enrollment does not exceed two calendar years, subject to course availability and available substitutions. Students readmitted after two years are held to the curricular requirements in place at the term of readmission. Students maintaining continuous enrollment without completing their degree requirements within ten years may petition the College to complete their degree requirements under the curricular requirements in effect during the term of admission.

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Corporation name
Legal Title: Franklin W. Olin College of Engineering Inc.

Administration

Administration 2023-24 Academic Year

Gilda A. Barabino
President

Anne-Marie Dorning
Vice President for Marketing and Communication

Donna Golemme
Vice President for Finance and Administration

Jeremy Goodman
Head of Campus Operations

Nicholas Macke
Chief Human Resources Officer

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Alisha Sarang-Sieminski
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Albert Sacco, Jr.
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Jason Woodard
Dean of External Programs and Partnerships

Faculty

Faculty 2023-24 Academic Year

Sarah Spence Adams
Professor of Mathematics and Electrical and Computer Engineering
Ph.D. Cornell University

Jonathan Adler
Professor of Psychology
Ph.D. Northwestern University

Gilda A. Barabino
President
Professor of Biomedical and Chemical Engineering
Ph.D. Rice University

David Barrett *on leave Fall '23 and Spring '24*
Professor of Mechanical Engineering
Ph.D. Massachusetts Institute of Technology

Sarah Bloomer
Visiting Professor of Design
Academic Director of SCOPE
M.A. New York University

Debbie Chachra *on leave Fall '23 and Spring '24*
Professor of Engineering
Ph.D. University of Toronto

Diana Dabby
Professor of Electrical Engineering and Music
Music Program Director
Ph.D. Massachusetts Institute of Technology

Victoria Dean
Assistant Professor of Computer Science
Ph.D. Carnegie Mellon University

Zachary del Rosario
Assistant Professor of Engineering
Ph.D. Stanford University

Helen Donis-Keller *on leave Spring '24*
Professor of Biology and Art and Michael E. Moody Professor
Ph.D. Harvard University

Daniela Faas *on leave Fall '23 and Spring '24*
Associate Professor of the Practice
Director of Fabrication and Laboratory Operations
Ph.D. Iowa State University

Alessandra Ferzoco
Assistant Professor of Measurement Science
Ph.D. The University of North Carolina at Chapel Hill

John Geddes *on leave Spring '24*
Professor of Applied Mathematics
Ph.D. University of Arizona

Erhardt Graeff
Associate Professor of Social and Computer Science
Ph.D. Massachusetts Institute of Technology

Scott Hersey
Associate Professor of Chemical and Environmental Engineering
Ph.D. California Institute of Technology

Jean Huang
Associate Professor of Biology
Ph.D. California Institute of Technology

Christopher Lee
Professor of Mechanical Engineering
Associate Dean
Ph.D. University of Michigan

Benjamin Linder
Professor of Design and Mechanical Engineering
ADE Program Director
Ph.D. Massachusetts Institute of Technology

Whitney Lohmeyer *on leave Fall '23 and Spring '24*
Assistant Professor of Engineering
Ph.D. Massachusetts Institute of Technology

Caitrin Lynch
Professor of Anthropology
Ph.D. University of Chicago

Robert Martello *on leave Fall '23 and Spring '24*
Professor of the History of Science and Technology
Ph.D. Massachusetts Institute of Technology

Steve Matsumoto
Assistant Professor of Computer Science and Engineering
Ph.D. Carnegie Mellon University

Kenechukwu Mbanisi
Assistant Professor of Robotics Engineering
Ph.D. Worcester Polytechnic Institute

Samantha Michalka
Associate Professor of Computational Neuroscience and Engineering
Ph.D. Boston University

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Bradley Minch
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Lawrence Neeley
Associate Professor of Design and Entrepreneurship
Ph.D. Stanford University

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Associate Professor of Computational Physics and Planetary Science
Ph.D. University of California, Los Angeles

Joanne Pratt *on leave Fall '23 and Spring '24*
Associate Professor of Biological Sciences
Ph.D. University of Pennsylvania

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Alisha Sarang-Sieminski
Dean of Student Affairs
Professor of Engineering
Ph.D. University of Pennsylvania

Tim Ferguson Sauder *on leave Fall '23 and Spring '24*
Professor of the Practice in Design
B.A. Wheaton College

David Shuman
Professor of Data Science and Applied Mathematics
Ph.D. University of Michigan

Mark Somerville *on leave Fall '23 and Spring '24*
Professor of Electrical Engineering and Physics
Ph.D. Massachusetts Institute of Technology

Lynn Andrea Stein
Professor of Computer and Cognitive Science
Ph.D. Brown University

Jonathan Stolk
Professor of Materials Science and Engineering Education
Ph.D. University of Texas, Austin

Emily Tow
Assistant Professor of Mechanical Engineering
Ph.D. Massachusetts Institute of Technology

Jessica Townsend
Professor of Engineering

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Alison Wood
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Ph.D. University of Texas, Austin

Jason Woodard
Dean of External Programs and Partnerships
Professor of Engineering and Entrepreneurship
Ph.D. Harvard University

Yevgeniya Zastavker
Professor of Physics and Education
Ph.D. Massachusetts Institute of Technology

Federal Compliance Statements

Intended for the use of prospective and current Olin College of Engineering students and interested others, Olin College's webpage contains information, links and references to helpful information on a variety of subjects, including Olin's academic programs, cost of attendance, financial aid, and post-graduate activities of alumni. Click on each title to view or hide the information in that section.

The page includes disclosures required by the Higher Education Act, as amended, and its implementing regulations, along with other information that may be of interest.

Please Visit our Olin College Consumer Information Site.

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act (FERPA) ensures confidentiality of educational records for eligible students (including, but not limited to, academic and enrollment data, and financial data related to scholarships, educational loans, need-based aid, and Olin Dollars) and restricts disclosure to or access by third parties, except as authorized by law. Educational records do NOT include the following:

1. Records that are in the sole possession of the person who created them and are not accessible to others with the exception of a substitute;
2. Records created and maintained solely by and for the college law enforcement unit;
3. Records maintained and used solely in relationship to the college and employment;
4. Records of Health Services or psychological counseling; and
5. Records pertaining to individual information after the person is no longer a student at the college.

FERPA affords students certain rights with respect to their education records. You have the right to:

1. inspect your educational records, with certain exceptions. If you wish to inspect your records, you need to submit a formal request to the Registrar. An appointment will be made within 45 days of the date of the request.
2. request an amendment if you believe your educational records are inaccurate or misleading. If you wish to request an amendment, you must do so in writing directed to the Registrar's Office. If it is determined that the record will not be amended, you will be notified of your right to, and procedures for requesting, a hearing.
3. provide written consent before Olin College discloses personally identifiable information from the student's education records, except to the extent that FERPA authorizes disclosure without consent.
4. file a complaint if you believe that the college has failed to comply with the requirements of FERPA. Complaints can be addressed to:

   Family Policy Compliance Office
   U.S. Department of Education
   400 Maryland Avenue, SW
   Washington, DC 20202-5901
   Phone: 1.800.USA.LEARN

The college has designated certain types of personally identifiable information as "Directory Information." This includes your name, local address and telephone number, email address, photograph, degree program and major and concentration, dates of attendance, full and part time status and degrees, honors, and awards received. Your local address and telephone number are also contained in an annual directory published by the college and are accessible on an electronic directory. Both the printed and electronic directory are intended for the use of the college community. You may request, in writing, to restrict the disclosure of your directory information. Your request will remain in effect unless you revoke it. Additionally, if you do not want public directory information released, you must indicate that preference at the time the information is collected. You may request nondisclosure at any time during your enrollment by completing the "FERPA Request to Prevent Disclosure" form found in the Registrar's office.

The college, in compliance with the law, may disclose other (non-Directory) personally identifiable information without your prior consent under certain circumstances, including, but not limited to, the following:

1. To college officials, staff and others engaged in activities on behalf of the college with a legitimate educational interest (may include contracted individuals, person(s) serving on the Board of Trustees, student(s) serving on an official committee or assisting another school official in performing his/her tasks);
2. In compliance with a lawful subpoena;
3. To officials of another institution where you are enrolled or seek to enroll, or where you received services in connection with placement or participation in internships, practica, affiliations, and other programs related to your courses or program at the college;
4. To authorized representatives of institutions from which you have received financial aid or applied for financial aid;
5. To organizations conducting studies "for, or on behalf of" Olin College;
6. Under the provisions of the USA Patriot Act;
7. Under the provisions of the Campus Sex Crimes Prevention Act;
8. To appropriate parties in the event of an emergency when the information is necessary to protect the health, safety, and/or welfare of the student or others.

Equal Employment Opportunity Policy and Non-discrimination Policy

Franklin W. Olin College of Engineering rejects and condemns all forms of harassment, discrimination, retaliation, and disrespect, and is committed to sustaining a welcoming environment for every individual. It is the policy of Olin to adhere to all applicable state and federal laws prohibiting discrimination. Olin does not discriminate in admission to, access to, treatment in or employment in its programs and activities on the basis of a person's race, religion, color, national origin, age, marital or parental status, veteran status, sex, disability, genetic information, sexual orientation, gender identity or any other legally protected status.

Olin's commitment to non-discrimination includes an assertion that the College will not tolerate discrimination or harassment on the basis of sex, gender identity, and/or sexual orientation including, but not limited to sexual violence, dating and domestic violence, stalking, or retaliation in its community. The College follows through on that commitment, in part, through the implementation of a Title IX Policy that defines prohibited conduct and the process by which the College will address such conduct in different circumstances. Title IX of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Sexual harassment is also prohibited under Title VII of the Civil Rights Act, Massachusetts General Laws Chapter 151B, Massachusetts Fair Education Practices Act, Massachusetts General Laws 151 C, Section 2(g), and other applicable state and federal statutes.

If any member of the Olin community feels that they have been discriminated against on the basis of sex, gender identity, sexual orientation, and/or marital or parental status they should contact Olin's Title IX Coordinator Justin Bell at 781.292.2408. If any member of the Olin community feels that they have been discriminated against by a student on any other basis, they should contact Dean of Student Affairs Alisha Sarang-Sieminski at 781.292.2321 to discuss possible referral of the matter to the Honor Board. Similarly, if any member of the Olin community feels that they have been discriminated against by an employee on any other basis, they should contact the Director of Human Resources Sharon Woodward at 781.292.2409 to discuss investigation of the matter.

Admission to Olin

Olin College is a supportive learning community of 350 undergraduate students who are bound by a vibrant culture of innovation and define engineering as a creative enterprise that begins and ends with people. Olin is on a mission to change undergraduate engineering education to make it fun, engaging, meaningful, and powerful through multidisciplinary experiences, a team approach, and project-based learning.

There are two parts to the unique admission process at Olin College of Engineering: the Application and Candidates' Weekends.

Students applying to Olin will submit the Common Application, including Olin-specific member questions and application fee, online through the Common Application website. Our application deadline is January 4, 2024. The application must be submitted by 11:59 PM in the applicant's local time zone on that date.

All applications are reviewed in January. We have a holistic review process through which we carefully evaluate each applicant's academic and personal qualities. At the end of January, applicants will be notified as to whether or not they will be advancing to the second phase of the admission process, Candidates' Weekends.

After the three Candidates' Weekends, Candidates are notified of their final admission decisions by late March. For additional details about the admission process, as well as information about visiting the campus, please refer to the website: http://www.olin.edu/admission/.

Costs and financial aid

Committed to Affordability

Olin is committed to affordability. Olin's merit scholarship —complemented by our policy of meeting full demonstrated need—means finances should never stand in the way of an Olin education. Our combination of excellent academics and generous aid is why the 2020 Princeton Review named Olin a "Best Value College" and 2023 Fiske Guide calls us a "Best Buy College". In addition, The Chronicle of Higher Education recognized Olin on their list of "Colleges That Are the Most Generous to the Financially Neediest Students" (Jan 2020). Admission to Olin is need blind, meaning ability to pay is not a consideration when evaluating a student's admission application materials.

The Olin Tuition Scholarship

Currently valued at more than $115,000, the merit-based Olin Tuition Scholarship benefits all admitted students. Offered for eight semesters of required full-time study and covering half the annual tuition charges, this scholarship recognizes achievement inside and outside the classroom and represents our confidence in your ability to succeed in this unique academic environment. Our goal is to attract talented students committed to making a difference in the world and partnering with them to make an Olin education a reality.

Need-Based Aid at Olin

In addition to this merit scholarship, the College is committed to meeting full demonstrated need for up to eight semesters of required full-time study for those who apply by the appropriate deadline and are eligible for additional assistance.

Eligibility is determined by completion of the FAFSA. Currently, need-based aid is available to U.S. Citizens and Eligible Non-Citizens

Programs of Study and Degree Requirements

Curriculum, Goals and Outcomes

Overview

Our curriculum is based on the idea that engineering starts with people – understanding who we're designing for, what they value, and where opportunities to create value exist – and ends with people – appreciating the social context of our work and making a positive difference in the world. At Olin, students learn how to envision positive change and also how to realize and deliver that change.

Olin was founded to challenge the models and assumptions of undergraduate engineering education. The traditional curriculum teaches students how to solve problems, but not how to find the right problems to solve, nor how to get their solutions out of the lab and into the world.

At most schools, students spend their first semesters – sometimes years – taking prerequisites in math and science before they do any engineering. These programs discourage many of the students most interested in engineering, people who might have become transformative engineers if they had the chance.

At Olin, students start engineering right away, with three classes in the first semester that provide hands-on experiences in several areas of engineering. Throughout the curriculum, students stay engaged by working on projects connected to real-world challenges. Olin's integrated curriculum depends upon math and science courses to help students characterize and understand our world and to develop scientific and quantitative analysis tools that facilitate problem solving.

Students also begin to explore the arts, humanities, and social sciences and entrepreneurship in their first year, and directly integrate and apply this learning in all areas of the curriculum. Every student completes an Arts, Humanities and Social Science (AHS) foundation course in their first semester in order to build strong skills in communication and contextual awareness, and continues to develop these skills through self-designed AHS study that might include an AHS concentration and capstone experience. Olin students also take an introductory entrepreneurship course in their first year, where they begin to develop an entrepreneurial mindset and learn the tools that are essential to realizing true and sustainable positive change.

By their senior year, students are ready to solve real problems for companies and communities through engineering capstone experiences (SCOPE and Affordable Design and Entrepreneurship) that draw upon their prior curricular work.

The academic culture at Olin is collaborative. Many of our classes are taught in a studio environment where students have dedicated space, and all classes emphasize classroom activity (not just listening) and cooperative exploration. Students have flexibility to choose projects that align with their interests; faculty act as coaches, mentors and advisors, providing just-in-time instruction and helping student teams find the resources they need.

The curriculum is interdisciplinary. Students in all majors take a common set of classes that connect areas of engineering and integrate math, science, humanities, and social science. In keeping with this interdisciplinary approach, Olin faculty work and teach together. The faculty are organized as a single department that brings together engineers, scientists, mathematicians, arts and humanities faculty, designers, entrepreneurs, and social scientists.

Olin's collaborative culture actively involves its students as partners in the creation and ongoing development of the curriculum. Students serve on nearly all curricular and policy development committees; offer frequent feedback that helps faculty shape current and future courses; and exercise autonomy in their own education by selecting project goals, topics, and methods.

Program goals

Olin's academic programs are designed to support the institutional mission of preparing students to become engineering innovators. From a content perspective, the curricular emphases on engineering, analysis, design, and entrepreneurship are specifically aligned with the mission; through these experiences, students acquire facility in identifying needs, generating concepts that are responsive to people's needs, turning those concepts into technically realizable solutions, and marshaling the resources necessary to turn a vision into reality. The general education requirements support the graduation of liberally educated individuals who consider the ethical consequences of their work and create paradigms in which they can use their engineering education to effect positive change.

After graduation, Olin students in the Engineering, Electrical and Computer Engineering and Mechanical Engineering programs will demonstrate attainment of the following objectives:

- Graduates strengthen the teams and communities they are part of by cultivating collaboration, effective communication and leadership.
- Graduates apply a multi-disciplinary engineering approach to solving important technical and societal challenges.
- Graduates create value for society through entrepreneurial and design thinking that transforms needs and opportunities into systems, products and solutions.
- Graduates adaptively and independently extend their learning to excel in fields about which they are passionate.

Learning outcomes

Olin College of Engineering is committed to preparing graduates who recognize the complexity of the world, appreciate the relationship of their work to individuals, to society, and to sustainability, expect to work in diverse and inclusive environments, and are ready to engineer a better future for the world. What follows are the learning outcomes Olin intends to instill in graduates and represents a vision of the key abilities, skills, and mindsets necessary for success, both in the engineering field and beyond. The vision has been constructed through careful research and consideration into engineering practice and competencies necessary to approach emerging technical, environmental, and societal challenges in a global context. Through intentional educational design, the Olin community supports the development of graduates who:

Develop and Apply Knowledge, Skills, Approaches and Methods
Students build the appropriate breadth and depth of content, techniques, and methodologies from diverse fields in order to systematically and appropriately design experiments, gather data, model, analyze, and/or draw conclusions.

Think Critically
Students engage in analyzing, evaluating, synthesizing, and applying diverse information and experiences to support decision-making, attitude formation, action, and expression.

Develop and Apply Creativity
Students generate novel ideas and approaches, taking into account authentic constraints, that lead to innovative outcomes.

Prioritize Doing Good in the World
Students use a holistic approach that integrates diverse backgrounds, perspectives, ethics, beliefs, and values, and considers the individual, social, and environmental impacts of their decisions to produce positive transformations while minimizing unintended consequences.

Develop and Apply Self-Directed Learning Abilities
Students diagnose learning needs, set learning goals, identify learning resources, select and implement learning strategies, and self-evaluate and reflect on learning outcomes.

Collaborate Successfully
Students create and maintain successful working relationships, maintain accountability for contributions, and identify and resolve interpersonal teaming conflicts to achieve a common goal.

Design and Implement Processes to Achieve Desired Outcomes
Students scope, plan, and implement projects, continuously evaluate progress, navigate uncertainty and adversity, and iterate as needed.

Communicate Effectively
Students express meaning successfully through oral, written, and visual media and listen actively to comprehend the meaning of others.

Develop Personal and Professional Identity
Students actively reflect on their backgrounds and experiences and integrate them into their evolving sense of self.

In keeping with Olin's institutional value of continuous improvement, these learning outcomes are fluid, and they are assessed on a yearly cycle.

Graduation Requirements

All students must complete a minimum of 120 credits, and must maintain a minimum cumulative GPA of 2.0 in order to graduate from Olin.

Students must satisfy two classifications of requirements to graduate from Olin: General Requirements and Program-Specific Requirements. General requirements must be satisfied by all students regardless of degree or concentration. Program-Specific Requirements vary depending on the degree being sought (ECE, ME or E) and, for the E degree, on the chosen concentration.

General Requirements and Program-Specific Requirements are further broken down into Distribution Requirements and Course Requirements, both of which must be satisfied.

Distribution Requirements specify the minimum total number of credits that must be completed in each of five broad areas (Engineering, Math, Science, AHS and Entrepreneurship). Course requirements specify which courses must be completed. Some course requirements can be satisfied only by completing a particular course. Other course requirements allow more choice. Some courses may be used to satisfy one of several course requirements, but students must choose only a single requirement to be satisfied by each course.

A course completion can satisfy only one course requirement.

General Distribution and Course Requirements

The required minimum of 120 credits must be appropriately distributed among five areas of study. The table below gives the minimum credits required in each area.

Area	Minimum Credits Required
Engineering	46; where the required QEA 1, 2, and 3 course sequence contribute 2 engineering credits
Math and Science	30; of which at least 10 must be Math; where the QEA 1, 2, and 3 course sequence contribute 6 math credits and 4 science credits
AHS and Entrepreneurship	28; of which at least 12 must be AHS

A credit corresponds to an average of three hours of student work each week throughout an academic semester. Therefore, a four-credit course (the most common course size at Olin) generally requires students to spend 12 hours each week attending classes, completing homework, participating in laboratory activities, and fulfilling all other course responsibilities.

The course catalog lists, for each course, the number of credits earned and their area. Most courses provide credit in only one area. Some courses distribute their credits across more than one area. Students must register for at least 12 credits but no more than 20 credits each semester. Students typically register for 16 credits per semester. First year students are limited to 18 credits in the first semester. Some activities, like Passionate Pursuits and a few classes, provide non-degree credit, which appears on the transcript, but do not count toward minimum credit requirements. Non-degree credit counts toward the maximum credits per semester, but not toward the minimum.

General Course Requirements

All Olin students, regardless of degree or concentration, must satisfy the following course requirements. Students are strongly encouraged to complete all required 1000 level courses prior to the start of their junior year. Note: some courses are required to be taken during a specific semester/year of study while others are suggested.

Designated alternatives are identified in the registration materials as course numbers ending in 88 or 88A. A designated alternative may also be part of a Curriculum Innovation Experiment or Prototype (CIE) and described in a CIE#### course description.

Modeling Foundation

MTH1111	Modeling and Simulation of the Physical World	2 MTH
SCI1111	Modeling and Simulation of the Physical World	2 SCI

Mathematics Foundation

Foundational mathematics content in the following areas is required of all students: linear algebra, multivariable calculus, and probability and statistics.

For students studying Electrical and Computer Engineering, Engineering with a concentration in Robotics, and Mechanical Engineering, additional foundational mathematics content in ordinary differential equations is required.

The interdisciplinary three course sequence titled Quantitative Engineering Analysis delivers the content areas of linear algebra, ordinary differential equations, and multivariable calculus, along with the physics foundation requirement. Each course in the sequence blends mathematical content, physics content and engineering content and as such, a minimum of the first two courses in the full sequence must be completed in order to satisfy the foundational content required for all students. Each course builds on content from the previous and thus successful completion is a prerequisite to move on in the sequence.

In the event that the sequence cannot be completed, the following minimum content guide will provide alternative direction for the remaining content areas. Keep in mind that the interdisciplinary courses are designed to build upon mathematical, science and engineering concepts in a sequential manner.

Linear Algebra-Multivariable Calculus

Completion of:	Minimum Requirement Met:	Distribution of Credits Earned:
ENGX2000 (p. 58) Quantitative Engineering Analysis I	Linear Algebra	2 MTH1 SCI 1 ENGR
Quantitative Engineering Analysis 2	Multivariable Calculus	2 MTH1 SCI 1 ENGR

Probability and Statistics - One of

2 credits in Probability and Statistics, satisfied by one of:

MTH2130	Probability and Statistics	Variable Credits MTH
MTH2131	Data Science	2 MTH
MTH2133	Computational Bayesian Statistics	2 MTH
MTH2135	Neurotechnology, Brains and Machines	2 MTH
MTH2136	Astronomy and Statistics: AstroStats	2 MTH
	or designated alternative	

Science Foundation

Foundation Science content in the following areas is required of all students: Biology, Chemistry or Materials Science, and Physics.

Biology Foundation - One of:

The Biology Foundation is satisfied by one of the following courses at the 1000 level or by an intermediate or advanced biology course under the following circumstance:

- Students who successfully completed an AP biology class in high school are automatically eligible to place into an intermediate or advanced biology class. Olin typically offers one or two advanced biology courses per year. Students choosing this option should complete a course waiver form for the foundation biology requirement.

SCI1210	Principles of Modern Biology with Laboratory	4 SCI
SCI1220	Human Genetics and Genomics with Laboratory	4 SCI
SCI1230	Think Like a Biologist with Laboratory	4 SCI
SCI1240	Designing Better Drugs with Laboratory	4 SCI
SCI1250	Six Microbes that Changed the World with Laboratory	4 SCI
SCI1260	The Intersection of Biology, Art and Technology (IBAT)	4 SCI
	OR	
	An intermediate or advanced biology course	

To engage in advanced biology courses, please see courses in the SCI2200-SCI3299 range of numbers.

Chemistry/Materials Science Foundation - One of:

4 credits in Chemistry or Materials Science, satisfied by one of:

SCI1310	Introduction to Chemistry with Laboratory	4 SCI
SCI1320	Paper Panacea: Part I with Laboratory	4 SCI
SCI1399	Special Topics in Chemistry	Variable

		Credits SCI
SCI1410	Materials Science and Solid State Chemistry	4 SCI
SCI1420	Metals, Mining, and the Environment	4 SCI
SCI1430	Plastic Planet	4 SCI
SCI1440	Materials Creation, Consumption, and Impact	4 SCI
SCI2310	Environmental Analysis & Science or designated alternative	4 SCI

Physics Foundation - all of:

Miinimum of 2 credits in Physics, satisfied by the completion of the Quantitative Engineering Analysis 1 and 2.*

**Electrical and Computer Engineering, Engineering with a concentration in Robotics, and Mechanical Engineering majors will have additional foundational physics requirements.*

ENGX2000	Quantitative Engineering Analysis 1	2 MTH, 1 SCI, 1 ENGR
ENGX2005	Quantitative Engineering Analysis 2	2 MTH, 2 SCI

Engineering

Engineering Foundation - All of:

ENGR1125	Introduction to Sensors, Instrumentation and Measurement	4 ENGR
ENGR2110	Principles of Integrated Engineering	4 ENGR

Engineering Capstone - One of:

Eligible students will receive a detailed questionnaire from the capstone directors early in the spring semester before the capstone activity begins. Based on this student information, students will be assigned to ADE or SCOPE.

Each option is a two-consecutive-semester course requirement, totaling 8 credits.

ENGR4190	SCOPE: Senior Capstone Program in Engineering OR	4 ENGR
ENGR4290	Affordable Design and Entrepreneurship Engineering Capstone	4 ENGR

Subtotal: 8

Design

Design Foundation - All of:

ENGR1200	Design Nature	4 ENGR
ENGR2250	Collaborative Design	4 ENGR

ENGR1200, Design Nature is offered in the fall semester and is required to be taken by all first semester, first year students.

ENGR2250, Collaborative Design is offered in the spring semester and is required to be taken by all second semester, second year students.

Design Depth Course - One of:

The approved design depth courses listed below adhere to four criteria: 1) focus on a major theme in design thinking covered at an advanced level, 2) involve substantial theoretical consideration of design principles, processes or methods, 3) present the theme and theoretical consideration at an interdisciplinary level covering material that is relevant and accessible to multiple disciplines, and 4) provide substantial project experience that aims to create an artifact such as a component, process or system to meet needs, demonstrate possibilities or offer critique.

ENGR3210	Sustainable Design	4 ENGR

ENGR3220	User Experience Design	4 ENGR
ENGR3225	Systems	4 ENGR
ENGR3232	Biomedical Device Design	4 ENGR
ENGR3235	Biomimicry	4 ENGR
ENGR3240	Tell the Story of What You Make	4 ENGR
ENGR3242	Quantitative Engineering Design	4 ENGR
ENGR3252	Technology, Accessibility, and Design	4 ENGR
ENGR3260	Design for Manufacturing	4 ENGR
ENGR3290	Affordable Design and Entrepreneurship or an approved ENGR3299 Special Topics in Design Engineering course-see registration materials	4 ENGR

The design depth course chosen above may not be also used in a major plan of study.

AHS and Entrepreneurship

Students complete an AHS foundation, an Entrepreneurship foundation, and either a concentration in AHS or a concentration in Entrepreneurship.

AHS Foundation - One of:

AHSE1100	History of Technology: A Cultural & Contextual Approach	4 AHSE
AHSE1122	The Wired Ensemble -Instruments, Voices, Players	4 AHSE
AHSE1135	The Digital Eye: Photography, Vision, and Visual Communication	4 AHSE
AHSE1145	The Human Connection: Tools and Concepts from Anthropology for Understanding Today's World	4 AHSE
AHSE1148	Dirt to Shirt: Global Garments in Context	4 AHSE
AHSE1150	What is "I"?	4 AHSE
AHSE1155	Identity from the Mind & the Brain: Who Am I and How Do I Know	4 AHSE
AHSE1199	Arts, Humanities, Social Science Foundation Topic	4 AHSE

All AHS foundation courses offer:

- an introduction and overview of an AHS discipline
- writing instruction and practice
- an introduction to contextual and critical thinking
- examples of how to integrate content and perspectives of different disciplines.

Entrepreneurship Foundation

AHSE1515	Products and Markets	4 AHSE

AHSE1515 Products and Markets is required in the first year, second semester (spring only) for all students.

AHS or Entrepreneurship Concentration

Students may choose to concentrate in AHS or Entrepreneurship. An AHS/Entrepreneurship concentration is a 12 credit sequence of approved courses that coherently explore a chosen discipline or a disciplinary or interdisciplinary topic.

AHS and Entrepreneurship concentration courses are drawn from offerings at Olin, Wellesley, Babson, or other approved institutions. Concentrations that contain AHS courses often include a four credit AHS Capstone Project, AHSE4190 (p. 51). Concentrations that contain Entrepreneurship courses often include Entrepreneurial Project course work in AHSE2515 (p. 49), Iterate, or in AHSE3515 (p. 50), Launch.

Independent study and research credits (ISR) cannot be included in AHS or Entrepreneurship concentrations.

Academic Programs

The curriculum is designed to provide technical depth in the areas most relevant to students' program of study. Every student learns about software, electronics and mechanical systems, and every student works on interdisciplinary projects.

Our degree programs are designed to complement common experiences with specialization and technical depth. Olin offers ABET accredited degrees in Electrical and Computer Engineering (ECE) (p. 25), Mechanical Engineering (ME) (p. 32) and Engineering (E) (p. 26), a flexible degree program that lets students choose or create an area of concentration.

Electrical and Computer Engineering (ECE)

The ECE major provides advanced opportunities for students to analyze, design, and build computing and communication systems. Students apply the principles of linear systems, circuit theory, microelectronics, computer architecture, communication theory, software engineering and signal processing to understand and build these systems.

The Course Requirements of the ECE program are:

ECE - All of:

ENGX2011	Quantitative Engineering Analysis 3	2 MTH, 2 SCI
ENGX2134	Engineering Systems Analysis	2 ENGR
ENGR2410	Engineering Systems Analysis: Signals	2 ENGR
	OR	
	or designated alternative	
ENGR2420	Intro Microelectronic Circuits with laboratory	4 ENGR
ENGR2510	Software Design	4 ENGR
	or approved substitutions	
ENGR3410	Computer Architecture	4 ENGR

ENGR2410 (p. 56), Engineering Systems Analysis: Signals has a required corequisite of ENGX2134: Engineering Systems Analysis

Approved substitutions for ENGR2510 (p. 56), Software Design are: Complexity Science (p. 70), Software Systems (p. 69). These are all advanced-level E:C courses with a software design experience that is comparable in scope to the one in Software Design.

ECE - One of:

ENGR3415	Digital Signal Processing	4 ENGR
ENGR3420	Introduction to Analog and Digital Communication	4 ENGR

ECE - One of:

ENGR3110	Elecanisms	4 ENGR
ENGR3370	Controls	4 ENGR
ENGR3390	Fundamentals of Robotics	4 ENGR
ENGR3392	Robotics Systems Integration	4 ENGR
ENGR3415	Digital Signal Processing	4 ENGR
ENGR3420	Introduction to Analog and Digital Communication	4 ENGR
ENGR3426	Mixed Analog-Digital VLSI	4 ENGR
ENGR3430	Eclectronics	4 ENGR
ENGR3440	Principles of Wireless Communication	4 ENGR
ENGR3499	Special Topics in Electrical & Computer Engineering	Variable Credits ENGR
	any level 3000 or higher E:Computing course, or other approved course for the ECE major	

ENGR3415, ENGR3420: if not used above

ECE Math

MTH2110	Discrete Math	4 MTH

Engineering

The Engineering degree program gives students the option to pursue new areas of engineering and interdisciplinary combinations of engineering and other fields. Each student in the Engineering degree program designs a concentration that has depth, breadth, coherence, and rigor and also satisfies the Olin College graduation requirements. All paths to graduation with the Engineering degree provide for all outcomes required by the ABET General Criteria.

Students submit a plan of study when they declare a major. The plan lists the courses the student intends to take to fulfill graduation requirements, and demonstrates that these courses (along with additional required courses) constitute a major in engineering that has depth, breadth, coherence, and rigor.

A set of predefined concentrations in Bioengineering, Computing, Design, Robotics, and Sustainability are provided below. Students may design their plan of study using one of these predefined concentrations or may create a new concentration that addresses their own interests. Students choose a name for their Design, and self-designed concentrations. This concentration name appears on the diploma but not on the official transcript.

The plan of study must be signed by the student's advisor and two faculty members whose area of expertise is relevant to the proposed area of study (if the advisor's area is relevant, the advisor can count as one of the two).

Plans of study are reviewed by faculty from the Curriculum Working Group. This group is responsible for checking the following criteria:

- Do the proposed courses constitute a major in Engineering that has breadth, depth, coherence and rigor?
- Do the faculty who approved the plan have relevant expertise? Should other faculty be consulted?
- Is the plan feasible based on a reasonable forecast of course offerings? The availability of faculty and other resources determines which classes are offered and their schedule, which may limit a student's ability to complete a particular concentration.
- Is the plan comparable to the sample concentrations and previous student-designed concentrations? If a student-designed concentration is named, is the proposed name accurate and appropriate?

All course plans go through the same review process whether they are modeled after one of the sample concentrations or self-designed. The plan of study is provisional. If approved and completed, a student may use it to graduate. Minor substitutions may be made with advisor approval; substantive changes require approval of the Curriculum Working Group.

Engineering: Bioengineering (E:Bio)

Bioengineering (also called Biomedical Engineering) is a broad field. As such, the concentration is meant to be an interdisciplinary one, rooted in engineering problem solving and a deep understanding of biology. Bioengineering subspecialties include areas such as medical devices, biomechanics, assistive technology, bioinformatics, cell and tissue engineering, neurotechnology, computational biology, drug delivery, medical imaging, and many more. The Engineering major with a concentration in Bioengineering (E:Bio) prepares students to approach problems important to biology, medical research, and clinical studies, regardless of the subspecialty they choose to pursue. Note that some students interested in Bioengineering will take Bioengineering-relevant courses while pursuing another concentration (i.e. Mechanical Engineering, Computing, or Electrical and Computer Engineering).

Students wishing to pursue the E:Bio concentration should develop a program of study in consultation with bioengineering faculty. As Bioengineering encompasses many subspecialties, students develop a course plan that supports their area of study. E:Bio course plans may include classes at Babson, Brandeis, Wellesley, or other institutions.

Some of the courses that may be included in an E:Bio course plan are listed below. Students must take at least 4 credits of advanced Math and advanced Biology in addition to at least 16 credits of relevant Bioengineering courses.

E:Bio Bioengineering

Sixteen credits of coursework appropriate to the Bioengineering program of study form the core of a BioE focus. These courses may have the designation of 36xx (the Bioengineering prefix) but do not need to do so. They do not all need to be ENGR courses; however all students do have to meet the minimum number of engineering credits required for graduation. Relevant SCI (advanced Biology, relevant Physics, Chemistry), Mechanical Engineering, Electrical Engineering, and Computing courses that build relevant skills can be used for certain Bioengineering subspecialties.

Example courses include, but are not limited to:

(note: courses not hyperlinked are offered at Wellesley College)

ENGR2330	Introduction to Mechanical Prototyping	4 ENGR
ENGR2510	Software Design	4 ENGR
ENGR3232	Biomedical Device Design	4 ENGR
ENGR3260	Design for Manufacturing	4 ENGR
ENGR3520	Foundations of Computer Science	4 ENGR
ENGR3610	Biomedical Materials	4 ENGR
ENGR3650	Structural Biomaterials	4 ENGR
ENGR3699	Special Topics in Bioengineering	Variable Credits ENGR
ENGR3635	Neurotechnology, Brains and Machines	2 ENGR
MTH2135	Neurotechnology, Brains and Machines	2 MTH
BISC303	Bioinformatics	4 SCI
CS313	Computational Biology	4 ENGR

E:Bio Advanced Biology

Four credits of advanced Biology appropriate to the program of study, examples include, but are not limited to:

(note: courses not hyperlinked are offered at Wellesley College)

SCI2210	Immunology	4 SCI
SCI2214	Microbial Diversity	4 SCI
SCI2215	Emerging Technologies in Cancer Research, Diagnosis and Treatmt w/ Laboratory	4 SCI
SCI2299	Special Topics in Biological Sciences	Variable Credits SCI
BISC203	Comparative Physiology and Anatomy of Vertebrates with Laboratory	4 SCI

SCI2299 Special Topics in Biological Sciences offerings may be used as advanced biology by petition only (often the registration materials will specify if it will satisfy; otherwise students should petition to have it count via their plan of study).

E:Bio Math

A course in advanced Mathematics appropriate to the program of study, examples include, but are not limited to:

MTH2110	Discrete Math	4 MTH
MTH2131	Data Science	2 MTH
MTH3120	Partial Differential Equations	4 MTH

Engineering: Computing (E:C)

The Computing concentration integrates the study of computer science and software engineering within a broad interdisciplinary context. The E:C concentration offers significant flexibility, particularly with courses taken off-campus.

E:Computing - All of:

ENGR2510	Software Design	4 ENGR
ENGR3525	Software Systems	4 ENGR
	AND	
	One of:	
ENGR3515	Data Structures and Algorithms	4 ENGR
ENGR3520	Foundations of Computer Science	4 ENGR
	or approved substitutions	

E:Computing Electives

Eight additional credits in computing, examples include:

ENGR3220	User Experience Design	4 ENGR
ENGR3410	Computer Architecture	4 ENGR
ENGR3540	Complexity Science	4 ENGR
ENGR3590	A Computational Introduction to Robotics	4 ENGR
ENGR3599	Special Topics in Computing	Variable Credits ENGR
	advanced computer courses at Babson, Brandeis, Wellesley, or study away institutions by petition	

E:Computing Math

MTH2110	Discrete Math	4 MTH

Engineering: Design (E:D)

E:Design is an interdisciplinary concentration emphasizing synthesis, processes, and methods of practice that blends engineering and Arts, Humanities, Social Sciences, and Entrepreneurship (AHSE). The E: Design concentration prepares students to address important societal and environmental needs through design thinking.

E:Design students work closely with the design faculty at Olin to define individually customized programs of studies that meet Olin credit requirements. It remains the student's responsibility to ensure that their program of study also meets the requirements for graduate programs or professional practice.

Courses used by a student to meet the Design General Requirements, such as the Design Depth requirement, may not simultaneously be used to meet the E:Design or E:Design Electives requirements.

E:Design Elective courses may be drawn from any area including AHSE, Engineering, Science, or Math. Students are strongly recommended to consider one or more AHSE courses to meet this requirement. Design Research may be accomplished through an Independent study course advised by design faculty. Design Research may count toward the E:Design requirement with approval by design faculty.

E:Design courses may be drawn from cross registration or study away institutions with prior approval by design faculty. Note that courses at design schools will often meet the E:Design Electives requirement and not the E:Design requirement.

All E:Design programs of study should be consistent with the student's educational goals and must contain sufficient depth, breadth, coherence, and rigor. Each E:Design concentration must have an approved title consistent with the area of design represented by the coursework in the program of study. All programs of study must receive prior approval by design faculty.

All E:Design programs of study must fulfill the General Graduation Requirements.

E:Design

Eight credits of approved Intermediate or Advanced Design courses; four credits may be met by Design Research

E:Design Electives

Sixteen credits of approved coursework appropriate to the program of study

Engineering: Robotics (E:Robo)

Robotics is a multi-disciplinary field. A student may have a passion for the software, sensing, mechanics, controls or integration aspects of robotics. All of these are equally a part of the field of Robotics. Olin's Robotics concentration deals with the design, construction, operation, and application of robots and computer systems including actuation, control, sensory feedback and information processing, integrating significant technology from multiple disciplines, with a focus on the fusion of electrical, software, and mechanical engineering.

Students wishing to pursue the E:Robo concentration within the Engineering major must develop a specific program of study in consultation with robotics faculty members. In addition, a plan of study should contain both a statement of goals – including an explanation of focus area – and enough course material to support these goals. Robotics faculty members are available to help develop appropriate course selections.

E:Robo - Foundational Mathematics and Physics

Four credits of coursework in Ordinary Differential Equations and Physics

ENGX2011	Quantitative Engineering Analysis 3	2 MTH, 2 SCI

E:Robo - Software, One of:

Four credits of coursework in software

ENGR2510	Software Design	4 ENGR

Substitutions for Software Design may be made in consultation with appropriate faculty and added to a students plan of study.

E:Robo - Mechanical, One of:

Minimum of four credits of coursework in mechanical engineering.

ENGX2134	Engineering Systems Analysis	2 ENGR
	AND	
ENGR2340	Engineering Systems Analysis: Dynamics	2 ENGR
	OR	
ENGR2410	Engineering Systems Analysis: Signals	2 ENGR
	AND	
ENGR3370	Controls	4 ENGR
	or approved substitutions	

While all students take Engineering Systems Analysis, ENGX2134 for two credits, there are two typical pathways to meet the mechanical requirement for a robotics concentration. One involves two courses (see path 1). The other involves three courses (see path 2).

1. Engineering Systems Analysis ENGX2134 AND Engineering Systems Analysis: Dynamics ENGR2340 (a total of 4 credits)
2. Engineering Systems Analysis ENGX2134, Engineering Systems Analysis: Signals ENGR2410, and Controls ENGR3370 (a total of 6 credits)

Other mechanical engineering courses may be substituted if approved on a plan of study.

E:Robotics - One of:

Choose ENGR3390 or ENGR3590 based on a plan of study.

ENGR3390	Fundamentals of Robotics	4 ENGR
ENGR3590	A Computational Introduction to Robotics	4 ENGR

E:Robotics

ENGR3392	Robotics Systems Integration	4 ENGR

E:Robo Elective

Four additional credits of related coursework

E:Robo Math - One of:

Four credits of advanced Mathematics appropriate to the program of study.

MTH2110	Discrete Math	4 MTH
MTH3120	Partial Differential Equations	4 MTH
MTH3170	Nonlinear Dynamics and Chaos	4 MTH
	or approved substitutions	

Engineering: Sustainability (E:Sust)

E:Sust is an interdisciplinary concentration that embraces a broad definition of sustainability to prepare students for a wide range of personal and professional pathways. Sustainability is an inherently transdisciplinary field, drawing on engineering and science as well as social sciences, humanities, business, and the arts for various aspects of sustainability practice.

E:Sust students work closely with sustainability faculty at Olin to define individually customized programs of studies that meet Olin credit requirements. It remains the student's responsibility to ensure that their program of study also meets the requirements for graduate programs or professional practice.

Courses used by a student to meet the General Requirements may not simultaneously be used to meet the E:Sust concentration-specific requirements.

E:Sust courses may be drawn from cross-registration or study away institutions with approval by the CSTB, in consultation with sustainability faculty.

As with all Engineering programs of study, E:Sust programs of study should be consistent with the student's educational goals and must contain sufficient depth, breadth, and coherence. All programs of study must receive approval by the ARB, in consultation with sustainability faculty.

All E:Sust programs of study must fulfill the General Graduation Requirements.

E:Sustainability Requirements Overview

E:Sust programs of study require a four-credit introductory sustainability course, four credits of advanced sustainability coursework, and sixteen credits of approved elective coursework.

Sustainability coursework is defined for the purposes of this concentration as having a substantial component of sustainability theory and/or methods, or as having a substantial component addressing one or more of the UN Sustainable Development Goals (UN SDGs).

E:Sust Introductory

An introductory course as noted in the registration materials.

E:Sust Advanced

Coursework will be approved as "advanced" by the ARB in consultation with sustainability faculty. Advanced coursework generally adheres to four criteria in addition to being upper-level:

1. The course focuses primarily on one or more major themes in sustainability--involving causes and consequences for human and/or environmental justice, well-being, or flourishing--and covers them at an advanced level.
2. The course involves substantial consideration of sustainability principles, systems, processes, or methods, and/or experiential engagement with the practice of sustainability.
3. The course covers material in a way that is interdisciplinary as well as relevant and accessible to multiple disciplines.
4. The course engages students in reflective sustainability self-awareness, including attention to identity development.

Examples of approved, advanced courses include (but are not limited to):

Course Number	Course Name	Sustainability Elements
ENGR3290 (p. 64)	Affordable Design and Entrepreneurship	Sustainability theory and development; UN SDGs vary by project, includes UN SDGs 1-6, 8-10, 13 and 16
ENGR3235 (p. 61) / SCI2235 (p. 83)	Biomimicry	Sustainability theory; UN SDGs vary by project, includes UN SDGs 9, 11 and 12
AHSE2599 ENGR3299 ENGX2199	Environmental Consulting at Olin	Sustainability theory; UN SDG 13 Climate Action
ENGR3180 (p. 60)	Renewable Energy	Sustainability theory; UN SDGs 7 Affordable and Clean Energy, 1 No Poverty, 13 Climate Action, 16 Peace, Justice and Strong Institutions
ENGR3210 (p. 61)	Sustainable Design	Sustainability theory; UN SDGs vary by project, includes UN SDGs 1-5 and 8-16

E:Sust Electives

Sixteen credits of approved elective coursework should support the depth, breadth, and coherence of the plan of study; we recommend including four credits of social sciences or humanities along with physical or life sciences or engineering. Electives can include courses that are not primarily centered on sustainability that nevertheless support the student's learning goals in sustainability. E:Sust elective courses may be drawn from any area including Arts, Humanities, Social Science and Entrepreneurship, Engineering, Science, or Math, and may include up to four credits of research with a sustainability faculty member as the research advisor or disciplinary advisor. Courses counted as E:Sust electives cannot be double-counted for other graduation requirements.

Examples of elective courses include advanced courses taken in addition to the advanced requirement (outlined above) and the following courses:

Course Number	Course Name	Sustainability Elements
MTH2188A / SCI2099A	Decision-Making in Sustainable Systems	Sustainability theory; systems thinking; applications to UN SDGs of students' choice
SCI1399	Paper Panacea	Sustainability theory; holism; system dynamics principles; transformational action; UN SDGs 3 Good Health and Well-Being, 5 Gender Equality, 10 Reduced Inequalities, 17 Partnership for the Goals
SCI1420 (p. 81)	Metals, Mining, and the Environment	Sustainability theory; UN SDGs 6 Clean Water and Sanitation, 8 Decent Work and Economic Growth, 9 Industry, Innovation and Infrastructure, 10 Inequalities, 12 Responsible Consumption and Production, 15 Life on Land
SCI1430 (p. 81)	Plastic Planet	Sustainability theory; UN SDGs 6 Clean Water and Sanitation, 8 Decent

		Work and Economic Growth, 9 Industry, Innovation, and Infrastructure, 10 Reduced Inequalities, 12 Responsible Consumption and Production, 14 Life Below Water
SCI1440 (p. 82)	Materials Creation, Consumption, and Impact	Sustainability theory; UN SDGs 6 Clean Water and Sanitation, 8 Decent Work and Economic Growth, 9 Industry, Innovation, and Infrastructure, 10 Reduced Inequalities, 12 Responsible Consumption and Production, 14 Life Below Water, 15 Life on Land
ENGR3232 (p. 61)	Biomedical Device Design	UN SDG 3 Good Health and Well-Being
ENGR2141 (p. 53) / AHSE2141 (p. 47)	Engineering for Humanity	UN SDGs 3 Good Health and Well-Being, 10 Reduced Inequalities
AHSE2199	Change the World: Personal Values, Global Impacts and Making an Olin GCSP	Systems theory; UN SDG framework and goals
AHSE2199A	Democracy in Action: Election 2020	UN SDG 16 Peace, Justice and Strong Institutions

Mechanical Engineering (ME)

Mechanical Engineering majors develop skills in modeling, designing, fabricating, and analyzing thermal, fluid, and mechanical systems. The program aims to empower students to succeed in careers that serve society by cultivating curiosity, empowering students to tackle technical challenges, and providing opportunities to practice ME skills in contexts that matter.

The Course Requirements of the ME program are:

ME - All of:

ENGX2011	Quantitative Engineering Analysis 3	2 MTH, 2 SCI
ENGR2320	Mechanics of Solids & Structures	4 ENGR
ENGX2134	Engineering Systems Analysis	2 ENGR
ENGR2340	Engineering Systems Analysis: Dynamics	2 ENGR
ENGR2360	Introduction to Thermal-Fluid Systems	4 ENGR
ENGR3330	Mechanical Design	4 ENGR
ENGR3360	Thermal-Fluid Systems Analysis	4 ENGR

ME - One of:

ENGR3110	Elecanisms	4 ENGR
ENGR3180	Renewable Energy	4 ENGR
ENGR3232	Biomedical Device Design	4 ENGR
ENGR3242	Quantitative Engineering Design	4 ENGR
ENGR3260	Design for Manufacturing	4 ENGR
ENGR3345	Mechanical and Aerospace Systems	4 ENGR
ENGR3350	Finite Element Analysis	4 ENGR
ENGR3370	Controls	4 ENGR
ENGR3392	Robotics Systems Integration	4 ENGR
ENGR3820	Failure Analysis and Prevention	4 ENGR
	or other course approved by ME program group	

ENGR3225, ENGR3232, ENGR3242, ENGR3260: if not used to satisfy the Design Depth requirement

ME Math - One of:

MTH3120	Partial Differential Equations	4 MTH
	or other math course approved by ME program group	

Other Academic Programs and Opportunities

Study away program

The Study Away Program provides students with the opportunity to broaden their perspective and views of the world by studying for a semester at another approved academic institution, usually in another country. Olin has an extensive list of approved programs and students must follow Olin's set application process in order to apply for study away. Contact the International Programs Office for additional information.

Study away is limited to one semester and typically takes place during the junior year, unless on an Olin faculty led program. Study away may be approved on a case-by-case basis, with additional steps for approval, for seniors whose final semester takes place in the fall semester. Study away cannot take place in the final spring semester of senior year.

Full-time Study Away (which requires pre-approval) counts as one of the eight scholarship semesters. The student is maintained as full-time at Olin and is expected to pay Olin tuition after the merit scholarship and any additional costs associated with any such activity at the host institution including any tuition exceeding Olin's, room, board and fees if applicable. See the Home School Tuition Policy Statement on the Study Away webpage for more details. For questions about tuition policy contact Student Accounts.

For information about the planning and application process, see Study Away. In order to transfer credits from another institution, students follow procedures described in the academic policy section on Transfer credit (p. 100). Financial assistance may be available to eligible students. Contact the Financial Aid Office for additional information regarding eligibility and procedures.

Independent study and research

Olin offers many opportunities to engage in independent study and research activities. Independent Study activities give students an opportunity to explore academic topics of interest that are not available in regularly offered classes. Independent Study takes place during the semester. Research activities give students an opportunity to work with faculty on academic research projects, usually initiated by a faculty member. Research can take place both during the academic year and during the summer, though summer research is only available for pay, not credit.

Olin offers two forms of Independent Study or Research activity:

1. An ISR is an Independent Study or Research activity graded on a pass/no credit scale. An ISR cannot be used to satisfy a course requirement (which includes courses used as part of an AHS, Entrepreneurship, Certificate program or Engineering concentration). ISR activities are associated with the following course numbers, based on discipline, or as a generic listing of ISR: AHSE0177, AHSE0577, ENGR0077, MTH0077, SCI0077.

2. An ISR-G is an Independent Study or Research activity taken for a letter grade. An ISR-G might be used to satisfy a course requirement, pending approval, which approval must be specifically requested. Graded ISR-G activities are associated with the following course numbers, based on discipline, or as a generic listing of ISR: AHSE0177-G, AHSE0577-G, ENGR0077-G, MTH0077-G, SCI0077-G.Students may receive 1-4 academic credits per semester for each ISR or ISR-G activity and cannot receive pay for activities which receive credit in the same semester. Students will be productively engaged with an ISR or ISR-G activity for approximately 3 hours per week per credit.

   There is no limit on the total number of credits of ISR or ISR-G a student can earn while at Olin. ISR/ISR-G credit is academic credit that counts toward the overall 120 credit requirement. ISR/ISR-G credit may be applied toward credit requirements in Math, Science, AHS, Entrepreneurship, or Engineering, subject to approval by the faculty advisor if the advisor has relevant expertise, or by an additional disciplinary advisor otherwise.

   Students must submit a proposal prior to the start of an ISR or ISR-G. The ISR/ISR-G proposal form is located on the forms page under the Registrar's Office. Proposals are reviewed by the Registrar's Office and may be referred to the Curriculum Committee; a proposal might be rejected or returned for revision if it violates policies or guidelines.

Research Thesis

The Research Thesis Option enables students with research experience to work closely with an Olin faculty mentor to further develop and formalize their research skills. The Research Thesis Option consists of 2 semesters (or equivalent) of focused research with a faculty advisor and culminates in a thesis document written by the student and a presentation to the thesis committee. Enrollment in the thesis option is by thesis advisor approval, and not all faculty members are available to supervise research theses. Students accepted into the program will be enrolled in ISR-G Thesis Research for 4 credits in Semester 1 and ISR-G Thesis for 4 credits in Semester 2. Full-time summer research may substitute for a semester of ISR-G Thesis with faculty approval. Completion of the Research Thesis Option is subject to approval by your faculty advisor and committee and will be noted on the student transcript.

Semester 1 Activities: Thesis Research
During semester one, you should be engaging in research activities in collaboration with your research advisor. In addition, you will begin formalizing the plan for your research thesis. Note that a thesis proposal is an evolving document that is based on preliminary research, and should be updated as your project progresses.

1. Thesis Proposal: Develop a 3-4 page document that describes what you plan to accomplish for your thesis. Provide enough background for your committee to understand your proposed plan, include any preliminary data if available, and include a timeline towards Thesis completion.
2. Committee Meeting: By the 33rd instructional day, schedule a meeting with your Thesis committee to review your proposal. Your committee will provide feedback for your proposal. Once your proposal is approved, you can register for Semester 2 of the Thesis, continue to work on your thesis research, and plan your written Thesis document.

Semester 2 Activities: Thesis

1. Thesis Writing: Develop your written Thesis document. Please consult your Thesis adviser for suggested formats. You can also find past theses on the Olin Phoenix files for inspiration.
2. Thesis Presentation: Schedule a presentation with your committee to take place by the finals exams period during the Spring semester. You will make a presentation of your Thesis research and the committee will review and provide feedback for your final Thesis written document. While you are only required to present to your committee, we encourage you to have a public presentation and invite the Olin community in addition to your committee. You are also encouraged to present your thesis at other community events such as EXPO.
3. Thesis Document: Finalize your written Thesis document incorporating suggestions from your Thesis Committee. Your final thesis will be archived with the Olin Library.

Student led courses

Student Led Courses (SLCs) embody Olin's emphasis on team teaching and student-directed learning by enabling two or more students to work with Olin faculty as student teachers of a Special Topics course. These student teachers design and deliver their course to other students who receive up to four academic credits and a pass/no credit, EG, or ABCDF grade at the instructors' discretion. SLCs may not duplicate existing course offerings. SLCs might fulfill credit or course requirements depending on the topic and grading method.

All SLCs are overseen by faculty advisors who serve as instructors of record. The supervising Olin faculty members assign final grades and serve as points of contact for all students taking the course, in order to address concerns or questions. The student teachers receive guidance from the faculty advisors, and also receive Independent Study (ISR-G) credit in recognition of the pedagogical experience that they gain through this teaching experience.

Student teachers and faculty advisors need to submit a proposal and follow additional guidelines prior to offering a SLC. The proposal form and guidelines are available at the Registrar's page.

Passionate pursuits

A Passionate Pursuit is an intellectual or scholarly activity in which students propose a semester-long project, solicit faculty participation, and establish objectives. Students wishing to enroll in a Passionate Pursuit fill out a proposal form that indicates a title and description of the project, faculty sponsor, learning goals, and list of deliverables (often a presentation or performance) that constitute satisfactory completion of the project.

Successfully completed Passionate Pursuit projects earn non-degree credit, and the title of the project appears on the student's transcript.

Grand Challenges Scholars Program

Olin's Grand Challenges Scholars Program (GCSP) helps students leverage their educational experiences and participation in the Olin community to galvanize lifelong learning and community participation. The focus of the program is on developing the self ("I"), developing Olin ("we"), and developing the world ("all of us"). The program culminates with the creation of each student's personal vision and mission snapshot, reflecting their identity, values, experiences, and goals to date. Olin's GCSP uses a combination of formal courses and informal experiences to help students grow into their identities, participate in a community of practice, and find a role for themselves in fulfilling Olin's mission of doing good in the world.

4+1 Bachelor of Science Degree with Wellesley College

The Olin 4+1 Program offers Wellesley College students an opportunity to obtain a second bachelor's degree in engineering by completing a fifth year of study at Olin. Students enrolled in the 4+1 program begin their engineering study while enrolled at Wellesley; by the time they complete their Wellesley degree, 4+1 students must have completed all math and science prerequisites as well as five foundation courses, listed below. In their fifth year, 4+1 students enroll at Olin and spend both semesters in residence, completing major requirements as well as the engineering capstone.

The Engineering Certificate is not intended to serve as a pathway to the 4+1 Program. While there are some overlapping requirements between these two programs, the 4+1 Program requires an extensive set of course and credit requirements not only in engineering, but also in math and science. Students intending to apply for admission to the 4+1 Program will need to plan their schedules carefully and often take courses at different times compared to Engineering Certificate students.

Admission to the 4+1 program takes place in the student's junior year at Wellesley. Students admitted to the 4+1 program receive the Olin Tuition Scholarship for their year as Olin students, and may apply for additional need-based financial aid. Wellesley students who are admitted to the 4+1 Program must spend two full-time semesters in residence at Olin (living on campus).

4+1 Degree Requirements

All students wishing to complete the 4+1 program must fully satisfy Wellesley's degree requirements prior to matriculating at Olin, and must also satisfy specific science, math and engineering requirements. The minimum distribution requirements for the 4+1 Degree are shown in the table below.

Area	Minimum Credits Required
Engineering	46
Math and Science	30
Arts Humanities and Social Science	28
Total credits in all areas	120

Olin Foundation Courses

Must complete prior to the fifth year (the Olin year)

Note: courses not hyperlinked are Wellesley College equivalent options

MTH1111	Modeling and Simulation of the Physical World	2 MTH
	AND	
SCI1111	Modeling and Simulation of the Physical World	2 SCI
	OR	
PHYS120	Introduction to Simulation and Modeling	2 ENGR
ENGR1125	Introduction to Sensors, Instrumentation and Measurement	4 ENGR
	OR	
PHYS210/ENGR210	Experimental Techniques	4 SCI
ENGR1200	Design Nature	4 ENGR
	OR	
ENGR160	Fundamentals of Engineering	4 ENGR
ENGR2110	Principles of Integrated Engineering	4 ENGR
ENGR2250	Collaborative Design	4 ENGR
One of:		
AHSE1515	Products and Markets	4 AHSE
AHSE2515	Iterate	Variable Credits AHSE
AHSE3515	Launch	4 AHSE

credits from foundation courses listed above total a minimum of 20; also if AHSE2515 Iterate is selected, it must be taken twice for a total of 4 credits

Math and Science Prerequisites

Foundational math and science topics are prerequisites to the 4+1 program. These topics are:

- Linear Algebra
- Differential Equations
- Vector Calculus
- Physical science foundation (e.g. mechanics or electricity and magnetism)
- Biological science foundation
- Chemistry or Materials Science foundation
- Probability and Statistics as appropriate to the engineering major

Successful completion of courses in these topics must be prior to fifth year (Olin year)

In the listings below, courses not hyperlinked are Wellesley College equivalencies. Of these, where there is an option of two, the preferred choice is listed first.

	Biology Foundation (see note 2)	
	Chemistry or Materials Science Foundation (see note 3)	
	Physics Foundation, One of:	
PHYS107	Principles and Applications of Mechanics with Laboratory	4 SCI
PHYS108	Principles and Applications of Electricity and Magnetism	4 SCI
PHYS109	Principles and Applications of Electricity and Magnetism w/ Laboratory	4 SCI
Linear Algebra, One of		
PHYS207	Classical Dynamics	4 SCI
	OR	
MATH215	Differential Equations with Applied Linear Algebra	4 MTH
Differential Equations, One of:		
PHYS207	Classical Dynamics	4 SCI
	OR	
MATH215	Differential Equations with Applied Linear Algebra	4 MTH
Vector Calculus, One of:		
PHYS208	Intermediate Electromagnetism	4 SCI
	OR	
MATH205	Multivariate Calculus	4 MTH
Probability and Statistics, One of:		
MTH2130	Probability and Statistics	Variable Credits MTH
MTH2131	Data Science	2 MTH
MTH2133	Computational Bayesian Statistics	2 MTH
MTH2135	Neurotechnology, Brains and Machines	2 MTH
MTH2136	Astronomy and Statistics: AstroStats	2 MTH
MATH220	Probability	4 MTH
BISC198	The Applied Statistics and Data Science in Biology	4 SCI
PHYS305	Statistical Mechanics and Thermodynamics	4 SCI

Design Depth and Engineering Capstone Requirements

In addition to prerequisite course work and Olin foundation courses, all 4+1 students must complete a design depth and engineering capstone requirement.

Design Depth Course - One of:

The approved design depth courses listed below adhere to four criteria: 1) focus on a major theme in design thinking covered at an advanced level, 2) involve substantial theoretical consideration of design principles, processes or methods, 3) present the theme and theoretical consideration at an interdisciplinary level covering material that is relevant and accessible to multiple disciplines, and 4) provide substantial project experience that aims to create an artifact such as a component, process or system to meet needs, demonstrate possibilities or offer critique.

ENGR3210	Sustainable Design	4 ENGR
ENGR3220	User Experience Design	4 ENGR
ENGR3225	Systems	4 ENGR
ENGR3232	Biomedical Device Design	4 ENGR
ENGR3235	Biomimicry	4 ENGR
ENGR3240	Tell the Story of What You Make	4 ENGR

ENGR3242	Quantitative Engineering Design	4 ENGR
ENGR3252	Technology, Accessibility, and Design	4 ENGR
ENGR3260	Design for Manufacturing	4 ENGR
ENGR3290	Affordable Design and Entrepreneurship	4 ENGR
	or an approved ENGR3299 Special Topics in Design Engineering course-see registration materials	

The design depth course chosen above may not be also used in a major plan of study.

Engineering Capstone - One of:

Eligible students will receive a detailed questionnaire from the capstone directors early in the spring semester before the capstone activity begins. Based on this student information, students will be assigned to ADE or SCOPE.

Each option is a two-consecutive-semester course requirement, totaling 8 credits.

ENGR4190	SCOPE: Senior Capstone Program in Engineering	4 ENGR
	OR	
ENGR4290	Affordable Design and Entrepreneurship Engineering Capstone	4 ENGR

Subtotal: 8

Major Requirements

Choose one of the three Olin majors, Electrical and Computer Engineering (p. 25), Engineering (p. 26) or Mechanical Engineering (p. 32) and follow the degree requirements as outlined.
It is expected that an Olin major will be comprised of Olin engineering, or related courses. However, if approved, a maximum of two courses (or eight credits) may be transferred from another institution (Wellesley or other).

Notes regarding equivalences and terms

1. Credit Equivalences between Wellesley and Olin: 1 or 1.25 Wellesley Units = 4 Olin Credits
2. See the College Catalog for the list of options of biology foundation courses, typically in the SCI1210 through SCI1299 sequence; alternatively an applicant may petition for a Wellesley equivalent
3. See the College Catalog for the list of options of chemistry and materials science foundation courses; alternatively an applicant may petition for a Wellesley equivalent

For more information on the admission process for the 4+1 Program, see the Olin College Admission page.

For Babson, Brandeis and Wellesley Students: Engineering Certificate Program

Olin offers a Certificate in Engineering Studies for students at Wellesley College, Babson College, and Brandeis University who wish to gain a foundation in engineering content, skills, and perspectives, as well as some depth in one engineering field. The structure of this certificate gives students the flexibility to create course plans that meet their interests and needs.

To earn a certificate, the student must complete five Olin courses (four credits each) that must be taken for a letter or "EG" grade. Each student proposes their own set of five courses, which must satisfy the requirements below, and must be approved by Olin faculty.

Engineering Certificate Program Goals and Requirements

Olin's engineering certificate program has four overarching goals:

1. Provide a **foundation** to engineering concepts and practices. This goal is normally achieved by completing one foundation course from the list below.
2. Explore the **depth** of an engineering subject, field, or topic. This goal is achieved by proposing and completing a set of three depth courses as described below.
3. Experience Olin's **broader approach to engineering**, which includes projects, teamwork, user-centered design work, and interdisciplinary integration.

4. Choose a set of classes that achieve a reasonable degree of **coherence**. This goal is achieved if the student can articulate how the courses build upon each other and collectively achieve an outcome that is important to the student.

Foundation course

Choose one of, totaling a minimum of 4 credits

ENGR1125	Introduction to Sensors, Instrumentation and Measurement	4 ENGR
ENGR1200	Design Nature	4 ENGR
ENGR2250	Collaborative Design	4 ENGR
MTH1111	Modeling and Simulation of the Physical World	2 MTH
	AND	
SCI1111	Modeling and Simulation of the Physical World	2 SCI

standard fall offerings: ENGR1200, MTH1111 and SCI1111
standard spring offering: ENGR1125, ENGR2250

Depth courses (three courses, for 12 credits)

Each Engineering Certificate student proposes a set of three depth courses (12 credits total) that relate to a common theme (for example, design, mechanical engineering, human computer interaction). These courses must receive engineering (ENGR) credit.

Students can include one or more foundation courses, listed above, as depth courses. However, if a course is used to satisfy the foundation requirement, it cannot also be used as a depth course.

Elective (one course, for four credits)

Each student chooses a fifth course that is meaningful to them, and develops the depth or coherence of their plan.

Prerequisites and Expectations

Most Olin College engineering courses have general math and science prerequisites that are typically taken at the student's home institution, and students should check with instructors prior to registration to verify their readiness for each course.

In addition, Olin courses often have significant project components and require considerable team based work. Non-Olin students should be prepared to work closely with their Olin counterparts, both inside and outside class.

Credit for Courses Taken at Home Institution

A maximum of one course from a student's home institution may substitute for an Olin course, provided it covers equivalent material. This substitution has no bearing on whether or not it is used to satisfy other requirements at the home institution. A student should petition for this course substitution early in their program by contacting the Olin College Registrar. Wellesley College students may elect to transfer ENGR 160 from Wellesley to satisfy Olin's ENGR1200, Design Nature. Babson College students enrolling in EPS4515 at Babson may count their home course of Affordable Design and Entrepreneurship towards the Certificate without petition.

Enrollment and Completion of the Engineering Certificate Program

Students who wish to enroll in the Engineering Certificate Program must submit a Certificate Program Enrollment Form to the Olin Registrar's Office after they have completed their first course at Olin and before taking additional courses.

The form must be signed by the student's advisor at their home institution, as well as the Olin certificate advisor. After the proposed plan is approved, any subsequent changes must be approved by the Olin certificate advisor. A certificate can only be awarded if the student has completed an approved plan.

Note Regarding the 4+1 Program with Wellesley College

The Engineering Certificate is not intended to serve as a pathway to the 4+1 Program. While there are some overlapping requirements between these two programs, the 4+1 Program requires an extensive set of course and credit requirements not only in engineering, but also in math and science. Wellesley students in the Engineering Certificate Program intending to apply for the 4+1 Program should review the requirements and suggested course plans for both programs carefully to ensure they have completed all the necessary requirements for the year in residence at Olin.

Courses, Credits, Hours

Availability of Offerings

Information in this catalog and semester offerings are subject to change. Please go to the Registrar's webpage or the live semester course browser for up-to-date information including faculty teaching assignments. For more information about a specific course, talk to the course instructor listed in the current or previous registration booklets. Prerequisites and co-requisites may occasionally be waived with permission of the course instructor.

Course Numbering Nomenclature

Course numbers are composed of an alphabetic prefix and a numeric suffix. The alphabetic prefix indicates the primary area of the course, according to the following table. Note that some courses earn credit for multiple areas (see Course Listings Table below).

Alphabetic Prefix	Primary Area
AHSE	AHS/Entrepreneurship
ENGR	Engineering
ENGX	Cross-disciplinary engineering content
MTH	Mathematics
SCI	Science

The first digit of the numeric suffix indicates the nominal level of a course according to the following table.

Numeric Suffix	Level
0XXX	Any
1XXX	Introductory
2XXX	Intermediate
3XXX	Advanced
4XXX	Summative/Capstone

Hours/Week Nomenclature

The definition of a credit hour at Olin, is 1 credit is equal to 3 hrs of work per week. Olin's standard calendar is 15 weeks/semester.

To better allow teaching staff, facilities schedulers, and students to manage the time requirements of every course, the number of expected hours per week is indicated by a triplet of numbers, as follows: (Contact) – (Non-Contact) – (Preparation)

- Contact: The first number indicates approximately the number of hours per week teaching staff and students will spend together in scheduled school facilities.
- Non-Contact: The second number indicates approximately the number of hours students will spend each week working on their own in scheduled school facilities.
- Preparation: The third number indicates approximately the number of hours per week a well-prepared student with good study habits should expect to spend studying and completing homework, reading assignments, projects, etc.

For example, the AHSE1100 History of Technology: A Cultural and Contextual Approach course is described as a 4-0-8 course, so students in the course can expect to spend four hours in class with an instructor, and approximately eight hours outside of class completing course-related assignments.

At Olin, we expand this definition to include non-degree credit work in the form of Passionate Pursuits (p. 35). Passionate Pursuits may be a maximum of 1 credit and equal to 3 hours of student time/week during a semester.

Activities Not Eligible for Credit

Areas of student engagement in activities that are not eligible for credit and inclusion on the transcript are clubs and organizations (including competition teams), community service, recreation. As part of the Learning Continuum, we encourage students to engage and celebrate their love of learning within these spaces to the extent possible as time allows.

ADMN - Olin Administration

OIP1000 Olin Internship Practicum I

Internships during the summer can be integral to a student's major. This course provides an opportunity for the student to develop career-related competencies and reflections based on their full or part-time summer internship experience. OIP1000 also focuses on the connections of an internship experience with major coursework, thus enhancing student learning in their academic major. OIP1000 class meetings include a departure meeting in the spring before the summer internship, check-ins during the summer, and follow-up workshops in the fall. OIP1000 is offered each fall semester.

Please Note: International students must have authorization from the Principal Designated School Official or Designated School Official (PSDO/DSO) before they start their internship.

Credits: 1 ADMN. Recommended Requisites PGP Workshops. Hours: 0-0-15.

OIP1001 Olin Internship Practicum II

Internships during the school year can be integral to a student's major. This course provides an opportunity for the student to develop career-related competencies and reflections based on their part-time fall or spring semester internship experience. OIP1001 also focuses on the connections of an internship experience with major coursework, thus enhancing student learning in their academic major. OIP1001 is offered each fall and spring semester and must be taken concurrently with their part-time internship.

Please Note: International students must have authorization from the Principal Designated School Official or Designated School Official (PSDO/DSO) before they start their internship.

Credits: 1 ADMN. Recommended Requisites PGP Workshops. Hours: 0-0-15.

AHSE - Arts, Humanities, Social Science, and Entrepreneurship

AHSE0112 The Olin Conductorless Orchestra

The Olin Conductorless Orchestra (OCO) - an ensemble, minus conductor - features instrumentalists in leadership and collaborative roles. Dedicated to orchestral performance in the concerted spirit of chamber music, the orchestra forges individual participation, active listening,and group-motivation into performances that have established it as the only conductorless orchestra of its kind at an American college. (A student can apply up to 4 OCO credits to the 28 required credits in AHSE, or can petition to apply up to 4 OCO credits to the AHS concentration. Any additional credits, i.e., more than 4, earned by a student enrolling in OCO will show up as additional AHS credits, but will not count toward satisfying the requisite 28 credits in AHSE.)

Credits: 1 AHSE. Recommended Requisites Audition. Hours: 2-0-1.

AHSE1100 History of Technology: A Cultural & Contextual Approach

Throughout the semester we will investigate different history of technology narratives by employing a variety of analytical frameworks. Our narrative case studies range from bronze age societal studies to cutting edge AI and sustainability technologies, and throughout the semester we will compare and contrast these narratives in search of larger insights. We will identify and employ analytical frameworks such as large technological systems; paradigms and scientific revolutions; technologies and political values; ethical theories; and the environmental and sustainability implications of technologies. Throughout the semester we will engage these narratives and frameworks through targeted writing activities, debates, individual and group presentations, readings and videos, and in-class discussions. Students will have a high degree of autonomy, and will set and evaluate their own learning objectives, determine the topic for their final projects, and design and facilitate in-class activities throughout the semester.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1122 The Wired Ensemble -Instruments, Voices, Players

Three concurrent streams comprise The Wired Ensemble: 1) composition and performance of original works for instruments and voices; 2) development of a "Composer's Tool Chest"; and 3) musical analysis and reflection. As composers and performers, students concentrate on instruments, voices, and the symbolic language that brings them to life. They compose music for every family of instruments (woodwinds, brass, strings, percussion), as well as voice and spoken word. The course features biweekly performances of original compositions. Students also have the opportunity to hear their works performed in concert settings by professional and peer musicians with whom they have collaborated. Seminar trips to Boston and New York enable the class to gather musical and inspirational material,in addition to hearing some of the finest orchestral and vocal ensembles in concert. While actively engaged in composition and performance-all geared to an end-of-term production-students examine the worlds of earlier composers in order to provide context for their own lives and work.

Credits: 4 AHSE. Recommended Requisites Ability to read music.. Hours: 4-0-8.

AHSE1135 The Digital Eye: Photography, Vision, and Visual Communication

This course is all about developing a creative voice in the visual arts using digital photography as the medium of choice. The Digital Eye is a hands-on course taught in studio mode and it is project-based with weekly homework assignments that also includes several major projects allowing longer-term project engagement. Digital single-lens reflex (DSLR) cameras, digital editing tools and printing capabilities are provided and gaining technical facility with these tools is an important goal. As this is an AHS foundation course, students will also have an opportunity to further develop written communication skills and critical thinking ability. We will consider the many interpretations of art and the visual communication of ideas. The work of contemporary fine art photographers will be studied in depth and trips to museum and gallery exhibits will be scheduled as appropriate as will field trips with the class to capture images in interesting locations. Students with no prior experience with photography are strongly encouraged to enroll in this course and are as welcome as those who have already discovered a passion for creative expression using photography.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1145 The Human Connection: Tools and Concepts from Anthropology for Understanding Today's World

The book Wired to Care opens with the story of a designer who disguised herself as an elderly person to better understand the experiences of the elderly in our society. Author Dev Patnaik explains his interest in this experiment. It comes down to empathy: All of this is to reclaim a very old idea, that quantitative data and facts are no substitute for real-world experience and human connection. Anthropologists have long-argued for the importance of putting oneself in other people shoes for better understanding. The anthropologist Bronislaw Malinowski wrote in 1922 that the goal of the anthropologist is "to grasp the native's point of view, his relation to life, to realize his vision of his world." In this course, students will try out the anthropological methods of participation, observation, interviews, and analysis of cultural materials and texts. This is a hands-on course for students who want to get out and meet people all with the aim of greater understanding. The course focuses on three thematic topics important to our society in the twenty-first century. Past offerings have focused on aging, religion, health, and globalization. The class includes assignments, events, and interactions that will take students off campus (perhaps to the Needham Senior Center, local coffee shops, and to Boston's ethnic neighborhoods) and will include visitors from area institutions.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1148 Dirt to Shirt: Global Garments in Context

This course is an intensive study of the global supply chain for clothing. It examines social, economic, political, environmental, and technological issues all along the supply chain. This includes historical and contemporary production of components such as cotton, wool, and Kevlar; textile processing and garment production; and the after-life of the clothes we dispose of. The class will include readings, discussions, and engagement with multimedia sources; first-person contact with local people involved in the industry; and student projects on a chosen node of the supply chain. The course is multidisciplinary, but centered in cultural anthropology. In anthropology, empathy is a means to understanding, and a central premise of the course is the need to develop empathy. This class takes an empathetic approach to people and activities all along the global garments supply chain.

Credits: 4 AHSE.

AHSE1150 What is "I"?

This interdisciplinary exploration of identity draws on a diverse range of genres in the Humanities, Social Sciences, Arts and Sciences. Prior offerings have drawn from Anthropology, Artificial Intelligence, Biology, Film, History, Literature, Memoir, Neuroscience, Philosophy, Psychology, Political Science, Science Fiction, Sociology, and Visual Arts.

Our goal is to understand how individual perspective (or the illusion of same) comes into being and how our own unique perspectives shape the way that we see the world. Emphasis is placed on communication and context.

This course focuses more on philosophy and artificial intelligence while AHSE 1155: Identity from the Mind and the Brain is more focused on the science of psychology and neuroscience.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1155 Identity from the Mind & the Brain: Who Am I and How Do I Know

Perhaps the most fundamental question any developing individual asks himself/herself is: Who am I? The ways we answer this question have evolved over the course of history as the dominant ways of knowing (epistemologies) have shifted. Indeed, the question of how we come to know ourselves has captivated Western scholars since the days of Descartes, but a look at the last fifty to sixty years has also seen enormous changes. Many people invoke psychological and philosophical perspectives in describing their identity, focusing on their personality, their developmental history, and their place in society. But the explosion of neurobiological research has introduced a new and viable outlook: explaining identity at the chemical and electrical level of the brain. There is good reason to think that these different perspectives on identity are mutually exclusive and this tension will underlie everything we discuss in this interdisciplinary course. Indeed, when it comes to a topic as fundamental to human existence as identity, it is absolutely essential to wonder not only "who am I?" but to also ask "how do I know?" In this course, we will approach the question of identity from multiple perspectives, including psychology, postmodern philosophy, and neuroscience. In the process, we will critically examine not only the conception of identity that each perspective supports, but also the assumptions and limitations of each epistemology. This course focuses more on the science of psychology and neuroscience, while AHSE 1150: What Is "I"? is more focused on philosophy and artificial intelligence.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1160 Democracy and Media

Everyday, you have the opportunity to choose democracy. When we think of democracy, we usually think of a form of government: a representational democracy like the United States. But, the experience of participating in a representational democracy is not always democratic. Conversely, companies and colleges like Olin are not organized as democracies, and yet the people that work and study there have many opportunities to practice democracy. Democracy is something you, and those around you, can choose to create and practice. To achieve this, we must acknowledge that democracy is contextual and mediated. Dimensions such as gender, race, class, ideology, norms, economics, and institutional power all affect the political standing of citizens and issues. Media, too, has long shaped the experience of democracy: debate, writing, voting, and petitioning are ancient technologies. The design and use of contemporary information and communication technology dramatically shape how democracy plays out. This course will ask you to confront this tangle of interests, identity, technology, and power. We will ask ourselves the quintessential civic question: "What should we do?" and consider "What is my role and responsibility as a citizen? as an engineer? as a member of the Olin community?" You will explore ways to make the spaces you live and work in more democratic. You will practice using your voice and influence to make change through public narrative, collective action, and media.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1170 Infrastructure Studies

We live our lives embedded in systems that help take care of many of our basic needs, as well as some that are not so basic: warmth (or cooling), clean water, hygiene, and communications. At the same time, these systems provide the technological context for our engineering work. But we rarely notice infrastructure until something goes wrong. In this course, we'll investigate the systems that surround us, including water, sewage, electricity, telecommunications, transport, and more. We'll start thinking more broadly about infrastructure, asking questions like "what makes a system 'infrastructure', and why?". To do this, we'll draw from a wide range of fields and materials, from scholarly essays to videogames. And we'll consider our collective future: how might we make infrastructural systems more sustainable, resilient, and equitable? By the end of the semester, you will have a new awareness and understanding of these systems that underpin our lives and engineering work, and you will have the opportunity to document and share your own exploration of these systems.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1199 Arts, Humanities, Social Science Foundation Topic

Special Topics in Arts, Humanities and Social Science classes (AHSE X199) typically cover a specific topic in Arts, Humanities and Social Science and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1515 Products and Markets

In this foundational course on business and entrepreneurship, students engage with the concept of entrepreneurship as the pursuit of opportunity to create value for others. By working in teams to conceive and execute a series of entrepreneurial experiments, students in this course develop the skills necessary to design and test value propositions, assess and improve product-market fit, and create sustainable business models. The course places special emphasis on entrepreneurship as a way of doing good in the world, and invites students to approach all aspects of engineering with an entrepreneurial mindset. In addition, students are exposed to personal and interpersonal tools that enable high-performance teamwork, including project planning and peer feedback. These entrepreneurial experiences and their associated challenges provide a context in which students can develop broader self-awareness, productive self-reflection, and courage.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE1599 Entrepreneurship Foundation Topic

Special Topics in Entrepreneurship classes (AHSE X599) typically cover a specific topic in Entrepreneurship and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE2112 Six Books that Changed the World

Why and how do certain books reshape the course of human history? In this course, we will explore six books, selected from different times, societies, and genres, that have had an unquestionably major impacts upon the world in which we live. Class meetings will integrate contextual studies of the historical context of each book (including the author's background, the political and social setting, and other factors), careful analyses of the works themselves, and discussions of why they proved so influential. Our discussions will investigate each book's contemporary and modern impact while also exploring the qualities that caused all of our selections to have such an enduring and global effect. Students will be expected to contribute to class discussions, make presentations, and write a report on an additional book of their choosing. NOTE: this course lasts one half of the semester, will meet twice a week, and will require approximately 12 hours of student effort each week.

Credits: 2 AHSE. Recommended Requisites AHS Foundation. Hours: 4-0-8.

AHSE2114 Science Fiction and Historical Context

Science fiction is a wonderful genre that somehow captures a society's ideals, fears, assumptions, and major challenges. In the same way that a historian attempts to piece together complex cause-effect chains to make sense of the past, science fiction writers project the values, technologies, and beliefs of their own societies into alternate or future realities. Our class will work together to understand the conventions of science fiction and explore science fiction works (books, short stories, film) produced in different times, across various cultures, and in different sub-genres of this field.

Students will have the opportunity to analyze different works of science fiction through writings and class discussions, and can also choose to develop a science fiction idea of their own. NOTE: this course lasts one half of the semester, will meet twice a week, and will require approximately 12 hours of student effort each week.

Credits: 2 AHSE. Recommended Requisites AHS Foundation. Hours: 4-0-8.

AHSE2116 Framing History through Comics: Icons, Identities, and Impacts

Comic books and graphic novels unlock the epic potential of narrative storytelling. In Framing History we will explore how comics make history (what would you choose as the most impactful comics and graphic novels of all time?) as well as how they portray history. We will study a selection of classic graphic novels in different genres such as biography, autobiography, history, superhero, activism, children's fiction, and others. As we analyze the dynamic space where prose meets art, we will also learn how comics reflect their historical context while impacting so many aspects of our society in return. This course will rely heavily upon student input and feedback, and will use the co-design model to invite students to help test new assignments and design important elements of the class. Our journey will feature plot twists and cliffhangers and promises to be a true page-turner!

Credits: 2 AHSE. Hours: 4-0-8.

AHSE2131 Responsive Drawing and Visual Thinking

Drawing and Visual Thinking is a semester length course that meets twice per week during a standard 100 minute block and assumes no prior experience in drawing. Students will learn to visualize objects in three-dimensional space and commit them to the two-dimensional space of a sheet of paper. Students will draw subjects from life, i.e. stationary objects and life models using media including charcoal, graphite, conte, and ink. The emphasis will be realistic depiction as compared to non-objective abstraction. Students will begin with basic exercises in drawing and rapidly move to more complex intensive drawing experiences. Approximately one-third of the classroom time will be used for drawing from a life model. Class discussion and sketchbook homework assignments will be an essential element in the learning process. Homework assignments will include drawing and visual thinking exercises to be completed in personal sketchbooks. Reading selected text material is also part of the homework requirement. Invited speakers will contribute to the course and provide informal critiques of student work. At least one field trip is planned to a local art museum. Other in-class activities will include participation in discussion of drawings (old master, 19th century and contemporary) group critique sessions, and viewing documentary material. Assessment will be measured by improvement based on weekly homework assignments, classroom work, and three drawing projects to be completed outside of class. This can be fun, and you will surprise yourself with how well you can draw realistically by the end of the course.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE2135 Digital Photography: Seeing is Believing

This course is all about the communication of ideas and developing an independent creative voice in the visual arts using digital photography as the medium of choice. Fine art photography and documentary photography are the twin focus areas with individual expression fostered and doing good in the world using photography will be prioritized. Digital Photography: Seeing is Believing, will be a hands-on course taught in studio mode and will be project-based with weekly homework assignments that also includes several major projects allowing longer-term project engagement. Digital single-lens reflex (DSLR) cameras, digital editing tools and printing capabilities are provided and gaining technical facility with these tools is an important goal. We will consider the many interpretations of fine art photography from traditional landscape work to conceptual art. A second equally important focus is how photography can be used to do good in the world, in particular, to call attention to climate change and what to do about it. The work of contemporary fine art photographers and documentary photographers will be studied in depth and trips to museum and gallery exhibits will be scheduled as appropriate as will field trips with the class to capture images in interesting locations. Students with no prior experience with photography are strongly encouraged to enroll in this course and are as welcome as those who have already discovered a passion for creative expression using photography.

Credits: 4 AHSE. Recommended Requisites no prior experience is required (or expected). Hours: 4-0-8.

AHSE2141 Engineering for Humanity

This course introduces students to engineering problem solving, beginning with understanding client needs and ending with implemented, adaptable, adoptable, and sustainable solutions. This course will draw equally on empathetic and ethnographic methods and on a technical understanding of the problem and solution domains. Over the semester, we will learn about and with our clients; we will identify specific challenges that our clients face; and together with our clients we will develop concrete solutions to address these challenges. Students will leave Engineering for Humanity with a grounded understanding of the engineering problem solving process, experience in participant-observer fieldwork, and hopefully a feeling of satisfaction at having made a concrete difference in the lives of members of our community.

The projects will be specific service projects that students identify and design while working with senior citizens in surrounding communities. For example, students might design a device to help someone who has difficulty reaching up to change a light bulb, something to help hold a newspaper steady with shaky hands, or something to enable someone to get clothes out of a clothing dryer that is difficult to stoop down to reach. Some sessions of the course will be devoted to co-design with the client population or to team meetings. Other sessions involving guest speakers and fieldtrips, others with course discussion of topics relevant to aging. Students must simultaneously enroll in AHSE2141 and ENGR2141 for a total of 4 credit hours.

Credits: 2 AHSE. Concurrent Requisites: ENGR2141. Hours: 6-0-6.

AHSE2150 Six Microbes that Changed the World with Laboratory

Penicillium. Vibrio cholerae. Escherichia coli. Yeast. The Archaea. Microbes surround us, and impact our lives, our health, our societies, and our environment. Research with microbes, the smallest of all living creatures, has enabled discovery and understanding of the fundamental workings of life, opens up rich historical narratives of diseases and cures, and may provide sustainable solutions to problems we face from bioremediation to bioenergy. We will use six influential microbes as a window into a rich study of the interactions between science and societal context. This course connects biological concepts and historical knowledge through discussions, integrated assignments, presentations, and hands-on laboratory activities. Let's explore the thrill of biology and history, together.

Credits: 4 AHSE. Concurrent Requisites: SCI1250.

AHSE2155 Constructing and Performing the Self

In this course, theatrical and psychological approaches will be purposely inter-mingled: the questions we will ask and the answers we will derive will be informed equally by each. You will see, on a daily basis, how each field informs, supports, and speaks to the other as you oscillate between the roles of scholar, writer, actor, and critic. While we will have some class sessions and assignments explicitly grounded in only one field to build your fluency speaking their languages, the major activities of the semester will require both. The final deliverable for the course will be a short, personal monologue, informed by the scientific literature on identity, which you will write and then perform as part of a fully-mounted theatrical production in the Studio Theater at Babson. No playwriting or acting experience is necessary.

Registration note: This course brings together the psychological study of identity and the theater of solo performance to ask one of the most fundamental of all questions: who am I? The instructors received the inaugural BOW Curriculum Innovation Fellowship to develop the course, which will include students from all three colleges.

Credits: 4 AHSE.

AHSE2160 The Intersection of Biology, Art and Technology (IBAT)

This project-based course will encourage participants to cross boundaries between art, biology and technology with hands-on projects inspired by contemporary and historical work in these fields. How might biology inform art practice and how might art inform biology? What role does technology play in advancing or restricting each field and how might art and biology inspire technological breakthroughs? What are the implications of being able to change the genome of an organism? What is art anyway? These are just some of the questions we will pursue during this course. We will begin the course with an investigation of the phenomena of climate change and consider what steps we might take individually and collectively to contribute to the sustainability of the planet. Visualization technologies such as the scanning electron microscope (SEM) will be utilized to observe and create artworks. Final student-designed projects are informed by biology, art and technology and encourage deep exploration and integration of these topics. Laboratory studies will enhance an understanding of biology and its relation to technology as well as providing a possible means to create art. We will delve into a variety of written works, films and video resources, and listen first-hand to practitioners in these areas about the challenges and rewards of interdisciplinary work in fields that most would regard as unrelated. The goal by the end of the course is to acquire an attitude that allows fluid movement from one field to the other in thinking and doing so as to garner creative strength not possible from study of each field alone.

Credits: 4 AHSE. Concurrent Requisites: SCI1260.

AHSE2170 Teaching and Learning in Undergraduate Science and Engineering

This course will examine select topics in teaching and learning in undergraduate science, technology, engineering, and mathematics (STEM) courses. The goal of the course is to help participants become effective tutors, teaching assistants, mentors, and future instructors in these fields through a deep examination of teaching and learning in STEM courses. In a seminar format, participants will discuss research on best practices in pedagogy and curriculum design, cognition and learning, student classroom experiences, diversity, and assessment. Students will gain experience in instructional design, pedagogy, and assessment, and will develop a teaching portfolio. (Note: While the course readings are largely on research in science and engineering education, the course will touch on issues in mathematics education, and many course concepts can be extended to mathematics and technology instruction. As well, the theoretical and practical portion of the class may be extended to the K-12 domain.)

Credits: 4 AHSE. Recommended Requisites must have successfully completed the AHS foundation requirement. Hours: 3-0-9.

AHSE2180 Narrative Psychology

Humans are natural storytellers. Indeed, it has been suggested that the natural mode of human thought takes a narrative form. This course will present an examination of the scientific study of humans' approach to meaningmaking through the crafting and telling of personal stories. The course will include consideration of the ways in which we create meaning out of our experiences with a special emphasis on identity development, drawing on scientific research from personality, developmental, and clinical psychology.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE2199 Special Topics in Arts, Humanities and Social Science

Special Topics in Arts, Humanities and Social Science classes (AHSE X199) typically cover a specific topic in Arts, Humanities and Social Science and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits AHSE.

AHSE2515 Iterate

This course is about exploring the potential of ideas and their ability to create value "in the wild". If you have the seed of an idea, an inkling, or even are just curious, this class offers an explicit structure for you to test and validate your ideas. Each offering of the course will consist of three two-week sprints. During each, you will be compelled to test a different question, hypothesis or assumption about your idea by getting in front of real people. Outside resources, mentors and advisors will be substantively engaged based upon the specific needs of each project.

Students may enter as either individuals or teams. You don't have to have a pre-existing idea or business before the course. This is a 2-credit course and may be taken multiple times for full credit. Four credits of this course may also be used to satisfy the project requirement as part of an entrepreneurship concentration.

Credits: Variable Credits AHSE. Hours: 4-0-8. Prerequisite: AHSE1515.

AHSE2515A Iterate

This course is about exploring the potential of ideas and their ability to create value â€œin the wildâ€□. If you have the seed of an idea, an inkling, or even are just curious, this class offers an explicit structure for you to test and validate your ideas. Each offering of the course will consist of three two-week sprints. During each, you will be compelled to test a different question, hypothesis or assumption about your idea by getting in front of real people. Outside resources, mentors and advisors will be substantively engaged based upon the specific needs of each project.

Students may enter as either individuals or teams. You donâ€™t have to have a pre-existing idea or business before the course. This is a 2-credit course and may be taken multiple times for full credit. Four credits of this course may also be used to satisfy the project requirement as part of an entrepreneurship concentration.

Credits: 2 AHSE. Hours: 4-0-8. Prerequisite: AHSE1515.

AHSE2599 Special Topics in Business and Entrepreneurship

Special Topics in Entrepreneurship classes (AHSEX599*) typically cover a specific topic in Entrepreneurship and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits AHSE. Prerequisite: AHSE1515.

AHSE3130 Advanced Digital Photography

In this project-based course, students will develop a personal photographic point of view matched with consistently well-crafted imagery informed by the work of leading contemporary photographers. While communication with visual images is paramount, technical issues will be addressed in some depth. For example, there will be instruction and practice with image capture and editing including High Dynamic Range (HDR) exposure and processing, color management methods and printing, Adobe Lightroom/Photoshop tools and techniques, graphic design and book production methods. Initial projects will stimulate creative thinking and group critiques will help monitor progress and inspire new directions. The culminating project will be the design and production of a photography-based book by each member of the class. A critical awareness of the medium of fine art photography will be fostered through selected readings, discussions, and visits to galleries and museums.

Credits: 4 AHSE. Hours: 4-0-8.

AHSE3190 Arts Humanities Social Sciences Capstone Preparatory Workshop

This course offers the opportunity to begin researching your proposed AHS Capstone project topic, plan logistics, and write a proposal prior to enrolling in the AHS Capstone project. Students will work on a series of tasks throughout this semester in an independent manner, and can solicit feedback from other students in this course, Capstone teaching assistants, and Capstone teaching staff. Tasks include identification of the project area/topic and mentor, production of a partial annotated bibliography (that contextualizes each source with respect to one or more scholarly disciplines), and a detailed Capstone proposal (which includes a project statement, thesis, plan of work, etc.).

Credits: 1 AHSE. Hours: 0-0-3.

AHSE3199 Special Topics in Arts, Humanities and Social Sciences

Special Topics in Arts, Humanities and Social Science classes (AHSE X199) typically cover a specific topic in Arts, Humanities and Social Science and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits AHSE.

AHSE3515 Launch

This course emphasizes advancing your product, business, creative and impact ideas by seeking recognition and support from external stakeholders. Every student or team will apply to pitch their idea at the Babson B.E.T.A. Challenge. In addition, students will also be encouraged and supported in their efforts to apply to early stage funding sources such as Rough Draft Ventures and accelerators such as MassChallenge.

Students may take this course as either individuals or teams. A pre-existing idea or business isn't required, but is recommended. Each student must be fully committed to reaching the course milestones, including application and submission to external competitions. Outside resources, mentors and advisors will be substantively engaged based upon the specific needs of each project.

This is a 4-credit course and may be taken multiple times. It may also be used to satisfy the entrepreneurship project requirement of the entrepreneurship concentration.

Credits: 4 AHSE. Hours: 4-0-8. Prerequisite: AHSE1515.

AHSE3599 Special Topics in Business and Entrepreneurship

Special Topics in Entrepreneurship classes (AHSE X599) typically cover a specific topic in Entrepreneurship and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits AHSE.

AHSE4190 Arts Humanities Social Sciences Capstone Project

The AHS Capstone is an advanced, self-designed AHS project that builds upon a student's prior experience in one or more AHS disciplines. Students concentrating in the Arts, Humanities and Social Sciences must complete either a 12 credit concentration or an 8 credit concentration with an AHS Capstone in order to graduate. AHS Capstones must be proposed to the AHS Committee and approved by the end of the academic year prior to the Capstone except in extenuating circumstances. Additional information on the AHS Capstone is available at http://ahs.olin.edu/. AHS Capstone students will complete a proposal, a journal, a disciplinary deliverable, an analysis of their deliverable, and a presentation. Class sessions will vary between meetings of the entire class, small group workshops, and individual meetings. Olin strongly recommends that all AHS Capstone students first complete the AHS Capstone Preparatory Seminar. Please contact the AHS Committee at ahs@olin.edu with any questions.

Credits: 4 AHSE. Hours: 4-0-8. Prerequisite: AHSE3190.

AHSE4199 Special Topics in Arts, Humanities and Social Sciences

Special Topics in Arts, Humanities and Social Science classes (AHSE X199) typically cover a specific topic in Arts, Humanities and Social Science and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits AHSE.

ENGR - Engineering

ENGR1125 Introduction to Sensors, Instrumentation and Measurement

Conducting experiments and making measurements is an essential aspect of all branches of science and engineering. Nearly all of our current quantitative understanding of the natural and engineered world has come from the interplay between theory and measurements. Models and simulations of systems require experimental validation and performance of engineered systems must not only be predicted, but also measured and tested. In this course we will learn the basic tools of making physical measurements and conducting experiments. We will collect data, analyze data, conduct basic error analysis, and design experimental systems. Using inexpensive modern sensors, we will build the necessary supporting electronics and learn to collect data with computer based data acquisition systems. The first part of the course will focus on individual work and students will conduct labs on basic electrical, mechanical and environmental measurements. The later part of the course will involve a team project that involves designing and executing an experiment that involves measurement, data acquisition and data analysis.

Credits: 4 ENGR.

ENGR1199 Special Topics in Engineering

Special Topics in Engineering classes (ENGR X199) typically cover a specific topic in Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR.

ENGR1200 Design Nature

We take nature, an important source of inspiration and understanding, as a theme and develop bioinspired ideas into functional prototypes. Our focus is on the general principles and methods that shape the practice of engineering design. Students complete individual and team projects in a studio environment where we seek to develop a shared practice and understanding of engineering design. Students also gain experience in visualization, experimentation, estimation, fabrication, and presentation as they relate to designing.

Credits: 4 ENGR. Hours: 6-0-6.

ENGR1330 Fundamentals of Machine Shop Operations

This course covers the fundamentals of machine tool operations, classical machining techniques, and CAD methods. Students will learn principles of technical drawing, fabrication and assembly of mechanical systems, how to interpret and establish appropriate design requirements to make parts to specification and how to inspect parts to ensure that they meet specification. Students will come away with a sound understanding of drawing interpretation and creation, machine shop safety, bench work, measurement, part layout, and machine setup, operation and maintenance.

Assigned projects will involve significant machining time to fabricate mechanical components and a working mechanical system (e.g., tesla turbine).

Credits: 4 ENGR. Hours: 4-4-4. Prerequisite: ENGR1200.

CIE2223 Curriculum Innovation Prototype

The process of curriculum innovation at Olin College means that curricular prototypes (p. 85) are ongoing during most academic years. These experiments are courses that serve as designated alternatives for requirements in the curriculum. There may also be prototypes that replace a requirement in the curriculum. A curricular experiment is noted by a course code and number. Unless otherwise specified, each course prototype begins with CIE (Curricular Innovation Experiment), followed by the academic year in which it is offered, e.g. CIE2223. If more than one experiment is running, the course number will end in a letter.

Credits: variable.

CIE2324 Curriculum Innovation Prototype

The process of curriculum innovation at Olin College means that curricular prototypes are ongoing during most academic years. These experiments are courses that serve as designated alternatives for requirements in the curriculum. There may also be prototypes that replace a requirement in the curriculum. A curricular experiment is noted by a course code and number. Unless otherwise specified, each course prototype begins with CIE (Curricular Innovation Experiment), followed by the academic year in which it is offered, e.g. CIE2223. If more than one experiment is running, the course number will end in a letter.

Credits: Variable Credits.

ENGR2110 Principles of Integrated Engineering

Through a significant project experience, students will learn to integrate analysis, qualitative design, quantitative optimization, experiments, and simulations to improve their ability to engineer real systems. In each section of the course, students will work in small multidisciplinary teams to design and to build a mechatronic system of their own choosing. Each project must include both a nontrivial mechanical system design and a nontrivial electronic system design involving both hardware and software components. Projects will be subject to realistic materials, process, and budgetary constraints.

Credits: 4 ENGR. Hours: 4-4-4. Prerequisite: ENGR1125.

ENGR2141 Engineering for Humanity

This course introduces students to engineering problem solving, beginning with understanding client needs and ending with implemented, adaptable, adoptable, and sustainable solutions. This course will draw equally on empathetic and ethnographic methods and on a technical understanding of the problem and solution domains. Over the semester, we will learn about and with our clients; we will identify specific challenges that our clients face; and together with our clients we will develop concrete solutions to address these challenges. Students will leave Engineering for Humanity with a grounded understanding of the engineering problem solving process, experience in participant-observer fieldwork, and hopefully a feeling of satisfaction at having made a concrete difference in the lives of members of our community.

The projects will be specific service projects that students identify and design while working with senior citizens in surrounding communities. For example, students might design a device to help someone who has difficulty reaching up to change a light bulb, something to help hold a newspaper steady with shaky hands, or something to enable someone to get clothes out of a clothing dryer that is difficult to stoop down to reach. Some sessions of the course will be devoted to co-design with the client population or to team meetings. Other sessions involving guest speakers and fieldtrips, others with course discussion of topics relevant to aging. Students must simultaneously enroll in AHSE2141 and ENGR2141 for a total of 4 credit hours.

Credits: 2 ENGR. Concurrent Requisites: AHSE2141. Hours: 6-0-6.

ENGR2160 DREAM Designing Resources for Empowerment

DREAM is a studio for students to examine inequalities in places where hands-on making is encouraged and to understand what it means to develop empowering experiences. The class features hands-on projects that allow students to expand their skills as makers with media of their choosing, from computing to craft material and from CAD to CAM. Students will attend at least one of approximately four interactions with off-campus entities such as community technology centers, maker faires, and innovation spaces in schools or libraries. A group project will provide opportunities for students to grapple with the realities of facilitating hands-on making in scenarios where participants have a history of being marginalized. Weekly class meetings mix making time with studying cases of both effective and ineffective empowering interventions in a variety of settings. Students will draw from lessons learned from each case as they design their experiences pragmatically.

Credits: 4 ENGR.

ENGR2199 Special Topics in Engineering

Special Topics in Engineering classes (ENGR X199) typically cover a specific topic in Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR.

ENGR2250 Collaborative Design

Students develop detailed concepts and models of authentic new products and services. Our focus is on user-oriented, collaborative approaches to design and seeking holistic solutions integrating user and functional perspectives. We emphasize the importance of process and the development of strategies. Students observe and engage people to develop a deep understanding of their values and the patterns of their lives. They work collaboratively in a studio environment to create a shared understanding of the people they design for (and with) and the product ideas they develop. Topics covered include design thinking, ethnographic methods, concept development and interaction design.

Credits: 4 ENGR. Hours: 4-4-4.

ENGR2299 Special Topics in Design Engineering

Special Topics in Design Engineering classes (ENGR X299) typically cover a specific topic in Design Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR. Recommended Requisites Experience with computer-aided design and digital fabrication and appreciation for and knowledge of aesthetics are desirable. Experience with sketching, model making, welding, torch cutting, plasma cutting, angle grinding, metal casting, and glass blowing.

ENGR2320 Mechanics of Solids & Structures

This course covers the principles of statics of structures and mechanics of materials. The focus is on the concepts of stress and strain as related to applied loads (axial, shear, torsion, bending) and to resulting deformation. Students will learn how the principles of mechanics can be applied to mechanical design through modeling, quantitative analysis, strain gauge measurements, and computational simulation. The use of a commercial finite element package is introduced.

Credits: 4 ENGR. Hours: 4-0-8.

ENGR2330 Introduction to Mechanical Prototyping

Through project experiences, students will learn the techniques needed to both master the technical communication of mechanical designs and the fabrication skills needed to rapidly build them. Students will practice professional drafting techniques to describe a full range of fabricated components, including milled, lathed, sheet metal, water jet, injection molded, 3D printed and welded components. This course will include a significant machine shop component, where each student will gain exposure to advanced fabrication techniques. The final project will be the design and fabrication of a fully operational, complex mechanical system.

Credits: 4 ENGR. Prerequisite: ENGR1200.

ENGR2340 Engineering Systems Analysis: Dynamics

This course is an extension of Engineering Systems Analysis. This second half course extends material from the first half-semester to focus on the derivation, analysis, and simulation of translational and rotational equations of motion for particles and rigid bodies in 3D using physics-based models.

Along with ENGX2134, this course is required for ME majors.

Credits: 2 ENGR. Recommended Requisites SCI1130. Hours: 4-0-8. Prerequisite: ENGX2010 AND MTH1111.

ENGR2350 Thermodynamics

This course covers the fundamental principles of thermodynamics and physical chemistry as applied to engineering systems. This course provides a foundation in fundamental thermodynamic phenomena, including the first and second laws of thermodynamics, thermodynamic properties, equations of state in real and ideal gases, and chemical equilibrium. The basic laws are used to understand and analyze the performance and efficiency of systems, such as automobile engines, gas turbines, steam power plants, and refrigerators.

Credits: 4 ENGR. Hours: 4-0-8.

ENGR2355 Introductory Thermodynamics

This course covers the fundamental principles of thermodynamics as applied to engineering systems. It provides a foundation in fundamental thermodynamic phenomena, including the first and second laws of thermodynamics, thermodynamic properties, and equations of state in ideal gases and incompressible fluids. The basic laws are used to understand and analyze the performance and efficiency of engineered systems and the behavior of the natural world.

Students cannot also receive credit for ENGR2350: Thermodynamics

Credits: 2 ENGR. Hours: 3-0-9.

ENGR2360 Introduction to Thermal-Fluid Systems

This course covers the fundamental principles of thermodynamics, heat transfer, and fluid flow as applied to engineering systems. It provides a foundation in fundamental thermodynamic phenomena, including the first and second laws of thermodynamics for closed systems, thermodynamic properties, and equations of state in ideal gases and incompressible fluids. Topics in heat transfer include conduction, convection, and resistance networks, with an emphasis on thermal modeling. Topics in fluid flow include pipe flow networks, inviscid flows, and basic aerodynamics. Students will predict the behavior of engineered systems, design kites that fly, and develop curiosity about thermal-fluid phenomena in everyday life.

Credits: 4 ENGR. Hours: 4-0-8. Corequisite: ENGX2010.

ENGR2365 Introductory Transport Phenomena

This course introduces the basic physics and applications of heat transfer and fluid flow. Topics in heat transfer include conduction, convection, and resistance networks, with an emphasis on thermal modeling. Topics in fluid flow include dimensional analysis, pipe flow networks, inviscid flows, and basic aerodynamics. We will model sustainable technologies, create and fly kites, and consider thermal-fluid phenomena in everyday life.

Students cannot also receive credit for ENGR3310: Transport Phenomena

Credits: 2 ENGR. Hours: 3-0-9.

ENGR2399 Special Topics in Mechanical Engineering

Special Topics in Mechanical Engineering classes (ENGR X399) typically cover a specific topic in Mechanical Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR. Prerequisite: ENGR1125 AND ENGR2350.

ENGR2410 Engineering Systems Analysis: Signals

As a half-course, Engineering Systems Analysis: Signals extends material from the first half-semester to focus on fundamental concepts from linear systems such as frequency response, impulse response, and system identification. The course introduces sampling and aliasing, as well as discrete-time linear operators, transforms, and filtering.

Along with ENGX2134, this course is required for ECE majors.

Credits: 2 ENGR. Hours: 4-0-8.

ENGR2420 Intro Microelectronic Circuits with laboratory

This course will cover elements of linear circuits, such as the operation of basic circuit elements, fundamental circuit laws, and analytic techniques in both the time domain and the frequency domain. It will also cover the transistor-level design of complementary metal-oxide-semiconductor (CMOS) electronic circuits in the context of modern integrated-circuit technology. The course will include an introduction to the fabrication and operation of metal-oxide-semiconductor (MOS) transistors and to the design and operation of the basic building blocks of analog integrated circuits including single-transistor amplifier stages, current mirrors, CAS codes, differential pairs, and single-stage operational amplifiers. Throughout the course, an emphasis will be placed on design-oriented circuit analysis techniques and developing circuit reasoning skills.

Credits: 4 ENGR. Recommended Requisites MTH2210. Hours: 4-4-4. Prerequisite: ENGR1125.

ENGR2510 Software Design

Software Design (SoftDes) is an introductory course in computing that teaches students how to design, write, and maintain software in the Python programming language. SoftDes is not a programming course, but rather a course that explores and teaches the process of software engineering. This includes describing problems and their solutions in a logically precise way, writing well-styled code that clearly communicates the intent behind the code, and analyzing the design, usability, and performance of software.

Thus while much of the day-to-day work of SoftDes involves programming, the course concepts cover a far broader range of ideas. In addition to learning standard constructs in Python, including basic syntax, data types, common libraries and modules, classes, and object-oriented design, students will also learn how to debug faulty code, write unit tests to assess code correctness, how to break down large problem or systems into smaller, simpler components, how to obtain and handle data ethically, and how to maintain and collaborate on code using version control.

Credits: 4 ENGR. Hours: 4-0-8.

ENGR2599 Special Topics in Computing

Special Topics in Computing classes (ENGR X599) typically cover a specific topic in Computing and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR.

ENGR2600 Topics in Bioengineering

Broadly, Bioengineering can be defined as the application of engineering concepts and methods to the solution and study of biological and medical problems. Using a case study approach, this course aims to provide students with a broad understanding of the types of problems Bioengineers explore as well as the engineering and biological methods they employ. We will approach topics through seminar-style discussion of current primary articles from the literature as well as selected hands-on laboratory explorations of topics. Topics to be covered include tissue engineering, use of microfluidics devices for diagnostics, imaging disease states, and prosthetic limbs. In order to explore a topic of particular interest in more depth, students will also write and orally present a research paper on a topic of their choice.

This course is crosslisted with SCI2260. Taken under the ENGR2600 number, the course earns Engineering credit. To statisfy an advanced Biology requirement, enroll using SCI2260.

Credits: 4 ENGR. Recommended Requisites AP/IB Biology satisfies prerequisite if Olin Foundational Biology has not been taken.. Hours: 3-1-8.

ENGR2699 Special Topics in Bioengineering

Special Topics in Bioengineering classes (ENGR X699) typically cover a specific topic in Bioengineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR.

ENGR2810 Environmental Analysis & Science

How do we measure what's happening in our environment, what do we do with that information, and why do we care? This hands-on, project-based course will introduce approaches that environmental engineers and scientists use to analyze complex environmental systems in order to effectively design solutions to mitigate pollution. We will spend the semester making deep-dives into air quality and water quality, which are at the heart of the two leading causes of premature death in the world: chronic exposure to air pollution and lack of access to clean water. The class focuses on building hands-on skills with real-world data analysis, field sampling techniques and lab analysis skills through integrated projects like analyzing pollutant concentrations along the Charles River, and the course will incorporate strong communication themes as we work toward presenting our results to several diverse audiences. Throughout the course, we will study pollution in its broader social, political, and economic context, considering the complex motivations for pollution mitigation and the broader implications of water and air treatment processes.

This course is cross-listed with SCI2310.

Credits: 4 ENGR.

ENGX2000 Quantitative Engineering Analysis 1

Quantitative Engineering Analysis 1 is the first in a series of interdisciplinary math, science and engineering courses. The application of quantitative analysis of mathematical models and/or data can enable, improve, and speed up the engineering design process. Using quantitative analysis to answer engineering questions, you will be able to make the choices necessary to successfully complete an engineering design. Whether you are selecting the best part from a catalog, choosing an appropriate material, sizing a component, determining the effect of certain influences on your design, or optimizing your design within a parameter space, you often need to obtain (through experiment or calculation) and interpret quantitative information to inform your decisions. There are many different approaches to getting and interpreting the data you need: you may conduct an experiment, do a rough estimation, perform a detailed calculation based on mathematical models, or create a computer simulation. If you want to engineer effectively, you must be able to choose and use appropriate quantitative tools for a given situation.

In this class, you will be introduced to various approaches to perform quantitative engineering analysis through real-world examples. You will learn how to select between different tools and different approaches within the context of an engineering challenge, how to use many different tools for quantitative analysis, and how to acquire new tools on your own in the future.

This course fulfills the linear algebra requirement.

Credit distribution of this course is 2 MTH, 1 SCI, 1 ENGR.

Credits: 2 MTH, 1 SCI, 1 ENGR. Hours: 4-0-8.

ENGX2005 Quantitative Engineering Analysis 2

Quantitative Engineering Analysis 2 is the 2nd course in a 3 course interdisciplinary sequence.

The application of quantitative analysis of mathematical models and/or data can enable, improve, and speed up the engineering design process. Using quantitative analysis to answer engineering questions, you will be able to make the choices necessary to successfully complete an engineering design. Whether you are selecting the best part from a catalog, choosing an appropriate material, sizing a component, determining the effect of certain influences on your design, or optimizing your design within a parameter space, you often need to obtain (through experiment or calculation) and interpret quantitative information to inform your decisions. There are many different approaches to getting and interpreting the data you need: you may conduct an experiment, do a rough estimation, perform a detailed calculation based on mathematical models, or create a computer simulation. If you want to engineer effectively, you must be able to choose and use appropriate quantitative tools for a given situation.

In this class, you will be introduced to various approaches to perform quantitative engineering analysis through real-world examples. You will learn how to select between different tools and different approaches within the context of an engineering challenge, how to use many different tools for quantitative analysis, and how to acquire new tools on your own in the future.

This course fulfills the multivariable calculus requirement. Coupled with Quantitative Engineering Analysis 3 (ENGX2010), this course is also a designated alternative for the physics foundation.

Credit distribution of this course is 2 MTH, 2 SCI.

Credits: 2 MTH, 2 SCI. Hours: 4-0-8. Prerequisite: ENGX2000.

ENGX2006 Quantitative Engineering Analysis 2

Quantitative Engineering Analysis 2 is the 2nd course in a 3 course interdisciplinary sequence.

The application of quantitative analysis of mathematical models and/or data can enable, improve, and speed up the engineering design process. Using quantitative analysis to answer engineering questions, you will be able to make the choices necessary to successfully complete an engineering design. Whether you are selecting the best part from a catalog, choosing an appropriate material, sizing a component, determining the effect of certain influences on your design, or optimizing your design within a parameter space, you often need to obtain (through experiment or calculation) and interpret quantitative information to inform your decisions. There are many different approaches to getting and interpreting the data you need: you may conduct an experiment, do a rough estimation, perform a detailed calculation based on mathematical models, or create a computer simulation. If you want to engineer effectively, you must be able to choose and use appropriate quantitative tools for a given situation.

In this class, you will be introduced to various approaches to perform quantitative engineering analysis through real-world examples. You will learn how to select between different tools and different approaches within the context of an engineering challenge, how to use many different tools for quantitative analysis, and how to acquire new tools on your own in the future.

This course fulfills the multivariable calculus requirement.

Credit distribution of this course is 2 MTH, 1 SCI, 1 ENGR.

(This course will begin Spring 2024.)

Credits: 2 MTH, 1 SCI, 1 ENGR. Hours: 4-0-8. Prerequisite: ENGX2000.

ENGX2010 Quantitative Engineering Analysis 3

Quantitative Engineering Analysis 3 is the third course in the 12-credit QEA sequence. The course will revisit, reinforce, and build upon the contextualized math, science, and engineering tools and skills developed during QEA 1 and 2. Conceptual material in QEA 3 will draw from topics including ordinary differential equations, Fourier transforms, and equations of motion. QEA 3 will endeavor to place this foundational material in the broader engineering context, drawing connections to relevant examples and applications in engineering and beyond. The course will teach students how to select the appropriate set of tools and techniques for a given situation, ask critical questions about the consequences of their work, and develop the skills needed to acquire new knowledge beyond the course material. This course fulfills the ordinary differential equations requirement, and when coupled with Quantitative Engineering Analysis 2, the physics foundation. Upon completion of the full, 3 course, 12 credit interdisciplinary QEA experience students satisfy the foundational mathematical and physics requirements. The final credit distribution earned is 6 MTH, 4 SCI, 2 ENGR. Credit distribution of this course is 2 MTH, 1 SCI, 1 ENGR.

Credits: 2 MTH, 1 SCI, 1 ENGR. Hours: 4-0-8. Prerequisite: ENGX2005.

ENGX2011 Quantitative Engineering Analysis 3

Quantitative Engineering Analysis 3 is the third course in the 12-credit QEA sequence required for some degree programs. The course will revisit, reinforce, and build upon the contextualized math, science, and engineering tools and skills developed during QEA 1 and 2. Conceptual material in QEA 3 will draw from topics including ordinary differential equations, Fourier transforms, and equations of motion. QEA 3 will endeavor to place this foundational material in the broader engineering context, drawing connections to relevant examples and applications in engineering and beyond. The course will teach students how to select the appropriate set of tools and techniques for a given situation, ask critical questions about the consequences of their work, and develop the skills needed to acquire new knowledge beyond the course material. This course fulfills the ordinary differential equations requirement, and when coupled with Quantitative Engineering Analysis 2. Credit distribution of this course is 2 MTH, 2 SCI. (This course will begin Fall 2024.)

Credits: 2 MTH, 2 SCI. Prerequisite: ENGX2006.

ENGX2134 Engineering Systems Analysis

Engineering Systems Analysis involves building, developing, and practicing process-based quantitative analysis skills in the broad area spanning linear analysis of engineering systems. Concepts such as linearization, equilibrium, and stability will be applied to study dynamic response of electrical and mechanical systems in both the time and frequency domains through time-integration, transfer function, and state-space analysis. Ideas from feedback control are introduced. Coursework and projects will involve examples from robotics, communication systems, or aircraft/spacecraft.

This course is required for ME and ECE majors.

Credits: 2 ENGR. Hours: 4-0-8.

ENGX2199 Special Topics: Interdisciplinary Engineering

Interdisciplinary Special Topics course in the quantitative engineering analysis content area.

Credits: 4 ENGR.

ENGR3110 Elecanisms

Mechatronics involves the synergistic integration of mechanical engineering with electronics and intelligent computer control in the design of products. In this course, we will develop topics critical to the engineering of modern mechatronic systems including electromechanical actuators (e.g., DC motors, stepper motors, and solenoids), practical electronics design including interfacing sensors and actuators to embedded processors, and embedded software design in the C programming language. During the first part of the course, students will work in small groups on a series of miniprojects to gain experience with course concepts and develop core engineering competencies. During the second part of the course, students will work in teams to engineer a mechatronic system of their choosing subject to realistic constraints.

Note: This course can be used to satisfy either the ME and ECE advanced elective requirements.

Credits: 4 ENGR. Prerequisite: ENGR2110 AND ENGR2330; OR ENGR2110 AND ENGR3330; OR ENGR2110 AND ENGR2420; OR ENGR2110 AND ENGR3410;.

ENGR3180 Renewable Energy

Exploration of the science and dynamics of renewable energy technologies and their implementation, including grid and storage technologies. A systems-level exploration of renewable energy technology on human populations, economic, social and political power structures will be included as an integral part of this class. Course includes a renewable energy project design and simulation. Topics are: systems dynamics, thermodynamics, grid energy systems, solar photovoltaic, solar thermal, geothermal, hydroelectric and wind systems. Skills developed include the design and simulation of the energy performance of a renewable energy system using the National Renewable Energy Laboratory simulator.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGX2000 AND MTH1111.

ENGR3199 Special Topics in Engineering

Special Topics in Engineering classes (ENGR X199) typically cover a specific topic in Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR.

ENGR3210 Sustainable Design

This course provides a comprehensive overview of sustainable product design. Emphasis is placed on learning and using green design principles, methods, tools and materials. Examples include life cycle assessment, eco-efficiency and eco-effectiveness. A system perspective highlighting material and energy flows over the complete product life cycle is used to structure course material. Students complete substantial reading, investigate existing products and develop their own product ideas.

Credits: 4 ENGR. Hours: 4-0-8. Corequisite: ENGR2250.

ENGR3220 User Experience Design

A hands-on exploration of the design and development of user interfaces, taking into account the realities of human perception and behavior, the needs of users, and the pragmatics of computational infrastructure and application. Focuses on understanding and applying the lessons of human interaction to the design of usable applications that span connected devices of different scales and interaction methods; will also look at lessons to be learned from less-usable systems. This course will mix studio (open project working time) and seminar (readings and discussion) formats.

Credits: 4 ENGR. Recommended Requisites ENGR2510 or other software development experience recommended. Hours: 4-4-4. Corequisite: ENGR2250.

ENGR3225 Systems

This course introduces students to the art and science of interdisciplinary design. Students analyze the process used to develop example products that required expertise in many areas and creativity and trade-off consideration amongst all. Students learn about overarching principles that enable creators of broad interdisciplinary systems to succeed. Students will also work in teams and take on roles as design specialists in a variety of fields. Each team is given the task to design in detail a hypothetical product that can succeed only if interdisciplinary creativity is fostered and trade offs are made by every team member, as well as the group as a whole.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGR2250.

ENGR3232 Biomedical Device Design

Medical devices can be anything from a tongue depressor to a pacemaker with a microchip to a room-sized MRI, and everything in between. In this course, we will briefly consider the range of artifacts that are considered (bio)medical devices, how they are used, and who they are used for. We will primarily focus on the unique design constraints of and methods used in developing medical devices. We will touch on topics such as regulation and approval of devices, writing user requirements, writing product requirements, manufacturing practices, bioethics, and the body's response to implanted materials and surgical interventions. The first half of the semester will be spent developing skills through a case study model. In the second half of the semester, students will complete a major design project, with an external partner, that is focused at a particular stage of product development.

This course is open to students of all majors, satisfies a design depth requirement, and can be used as a mechanical engineering elective. While the examples used are from the biomedical industry, the skills developed are relevant to other highly regulated fields as well (e.g. aerospace).

Credits: 4 ENGR. Recommended Requisites Foundational Biology. Corequisite: ENGR2250.

ENGR3235 Biomimicry

We can learn from nature! From studying a leaf to make a better solar cell to emulating natural processes to develop living buildings, the discipline of Biomimicry views nature as "model, mentor and measure" (Benyus, 1997). Spiders spin protein silk with the strength of steel yet much lighter all at ambient temperature and pressure. Cuttlefish change color to match their surroundings in milliseconds by contracting their chromatophores and even bioluminesce. In this course we will study wonders like these to appreciate the beauty and sophistication of life by investigating the biological mechanisms and functions of organisms as well as the dynamics of whole ecosystems. By examining biological systems at multiple scales, we can draw insights from understanding how they work. By collecting data, running experiments, creating models, or building prototypes, we can translate these insights into design ideas and practice. We will examine and discuss big ideas and thinking in biology and design and then synthesize and reflect on the intersection of these fields. Students will develop skills and insights through critical analysis of readings and the development of projects that draw on both fields. Biological systems have undergone 3.8 billion years of evolution, resulting in time-tested approaches to living on earth that are efficient and embody sustainability. By exploring the intersection of biology and design, we might learn to do the same.

This course is crosslisted with SCI2235. Enrollment in ENGR3235 is as design depth as projects will be

focused on engineering design solutions. If advanced science credit is desired, enroll in SCI2235.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGR2250 AND SCI12.

ENGR3240 Tell the Story of What You Make

How do engineers creatively engage with multiple audiences and stakeholders for their work? Telling stories is critical for anyone who makes things: communicating technical work to non-experts, creating persuasive arguments for technology adoption, or projecting a future with better engineering in it. This course will cover how stories are built and how to craft your own, exploring communication design in multiple forms of media: print, images, film, music, and more. The course includes excursions to experience location-specific visual representation, multiple individual communication experiments, group collection of media, and a culminating project in which students will tell the story of one of their own projects.

We'll look at how music videos, cereal boxes, advertisements, grocery shopping, infographics and even people's outfits (just to name a few) can inform how you might build an effective story about one of your own projects.

This course is organized into 3 main sections: Introduction, Questions and Project.

Introduction: The first 4 lessons and associated assignments will act as a warmup for the class. They will help to develop a common language, encourage students to look more closely at the things around them, introduce critique into the class and set the tone for the course moving forward.

Questions: The majority of the class will look at visual communication as it relates to 7 questions which cover core understandings about design. These questions build a basis for a complete critique of a design and also provide a structure on which we will explore specific elements of design such as image, type, context, organization, etc. The questions are 1) Should we do this?, 2) What is the message?, 3) Who is the audience?, 4) Who else is doing this?, 5) What is the concept?, 6) What are the elements?, and 7) How is it organized?

Project: The last quarter of the course will be used by students to create a visual project that communicates the story of something that they have made. Parameters for thew project are decided on by the class but will include initial exploration rounds, multiple rounds of designs, in-class critique and a final deliverable visual artifact.

Credits: 4 ENGR. Corequisite: ENGR2250.

ENGR3242 Quantitative Engineering Design

The engineering design process can often be completed more quickly and efficiently by applying quantitative analysis at various points. In this course, students will apply their existing skills and knowledge and learn new tools to perform quantitative analysis in the context of the design process, including techniques for validation and verification of results and communicating those results to support and effectively guide design decisions. Introductory modules will involve computation simulation tools (e.g., commercial FEA software), optimization, and system integration. In the later part of the semester, students will define and carry out the full design process, starting and ending with a user, on their own multidisciplinary projects (e.g., electromechanical system or product).

Credits: 4 ENGR. Prerequisite: ENGR2250.

ENGR3252 Technology, Accessibility, and Design

This course equips students with an interdisciplinary set of tools to design, build, and critique technologies that mediate access to physical and digital worlds. We will use disability as a lens to examine the ways in which technology (e.g., assistive, medical, consumer) can both enhance and diminish access to economic, social, and informational resources. Students will examine the history of such technologies and analyze modern trends. Building from this perspective, students will learn about design processes and implementation strategies for maximizing the accessibility of the technologies they build.

During the course, student teams will work with a community partner to design a technology to enhance accessibility (along some dimension) for a user group with a disability. Students will learn and employ user-centered approaches throughout the course.

Credits: 4 ENGR. Corequisite: ENGR2250.

ENGR3260 Design for Manufacturing

Design for Manufacturing (DFM) will build the specialized design skills needed to professionally redesign a prototype in order to meet target price, reliability and functionality goals, whether the final market requires a single unit per year (i.e. space systems, like satellites) or fifty thousand units a week (i.e. consumer products). This course will be heavily team and project based and will involve the re-design for manufacture of several products, devices and services at the discretion of the instructor. The overall course projects will incorporate a significant mechanical, electronic and software components (but perhaps not all three in any one project) and will be drawn widely from the consumer, industrial, and sustainable market sectors. Course will potentially involve field trips to manufacturing facilities and invited DFM lecturers as appropriate to support the particular projects offered in a given semester.

Credits: 4 ENGR. Recommended Requisites Shop Training. Hours: 3-6-3. Prerequisite: ENGR2250.

ENGR3290 Affordable Design and Entrepreneurship

This course engages students in community-based, participatory design and action. Teams partner with communities and organizations to achieve positive social and environmental impact with a strong justice framing, working for change in areas like air quality, community development, food processing, global health, and rights and privacy (addressing mass incarceration) over several semesters.

Guided by an experienced faculty advisor, teams make change through design for impact, social entrepreneurship, community organizing, participatory research, political advocacy and other practices. All teams practice social benefit analysis, theory of change, assumption testing, cross-cultural engagement tools, dissemination of innovation methods, and ethical norms.

Students regularly engage stakeholders in inclusive processes, in person and virtually, to observe, strategize, plan, co-design, prototype, test, and implement approaches supported by a significant project budget. There are often opportunities to travel locally, nationally, or internationally to work with partners.

Students are exposed to mindsets and dispositions for working with integrity and responsibility in their stakeholders' contexts through guided exercises, case studies, guest speakers, readings, and reflections. Students learn and apply change-making practices through project work, and gain essential experience building relationships across difference and developing their own self- and cultural awareness.

This course is part of the BOW collaboration, offered jointly between Olin and Babson, and open to Wellesley students. Olin students can elect ADE to fulfill the Engineering Capstone requirement by registering for ENGR 4290 for two consecutive semesters beginning in the second semester of their junior year or the first semester of their senior year. Alternatively, students can take this course for one semester to fulfill the Design Depth requirement by registering for ENGR 3290. Students that take ENGR 3290 in their second semester junior year can opt to switch to ENGR 4290 for capstone credit.

Credits: 4 ENGR. Hours: 2-2-8. Prerequisite: ENGR2250.

ENGR3299 Special Topics in Design Engineering

Special Topics in Design Engineering classes (ENGR3299X) typically cover a specific topic in Design Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR. Prerequisite: ENGR2250.

ENGR3310 Transport Phenomena

This course introduces the basic physics and applications of the transport of heat, mass, and momentum. Topics in fluid dynamics include dimensional analysis, conservation laws, pipe networks, inviscid flows, and analysis of laminar flows. Topics in heat transfer include conduction, convection, radiation, and phase change, with an emphasis on thermal modeling. Applications include design for sustainability, such as designing a passive greenhouse, and understanding thermal-fluid phenomena in everyday life.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGR2350 AND ENGX2010.

ENGR3330 Mechanical Design

This course integrates basic mechanical sciences for application to machine design. Topics include stress, strain, deflection, stiffness, and failure of mechanical components including springs, bearings, gears, shafts and axles; steady and time-dependent loading; mechanical fastening and joining; and power transmission. Techniques for quantitative analysis and design optimization are introduced. The material of this course significantly draws and builds upon the concepts presented in ENGR 2320. Students will carry out a major design project.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGR2320.

ENGR3345 Mechanical and Aerospace Systems

Fundamental techniques for the analysis of the dynamic behavior of mechanical and aerospace systems are studied through modules that involve both computational simulation and experimental measurements. Topics will be selected from multi-degree-of-freedom systems, attitude dynamics and control, aerodynamics, astrodynamics, flexible structures, and aeroelasticity. The modules will run in parallel with a course-long project involving quantitative-analysis-based design, fabrication, evaluation, and refinement of a system to meet user-specified requirements and performance objectives.

Credits: 4 ENGR. Recommended Requisites one of ENGR2320, ENGR2330 or ENGR2340. Hours: 4-0-8.

ENGR3350 Finite Element Analysis

Computational simulation based on finite element methods is routinely used in engineering, especially in product design and development. In fact it is likely that the design and fabrication of any human-made, commercially-produced structure or mechanical system that you have come in contact with has been guided by finite element analysis. We'll start with fundamentals principles of FEA focusing on proper usage rather than mathematical theory. You'll learn to apply common analysis processes (e.g., static, dynamic, modal, thermal-mechanical, explicit dynamic). You'll then define your own project(s) where you will apply these tools for quantitative analysis.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGR2320.

ENGR3355 Intermediate Thermodynamics

This course invites students to deepen knowledge of thermodynamic principles and analyze sustainable technologies. Equations of state for real gases and ideal solutions are introduced. Conservation laws for open systems are used to analyze the efficiency of non-combustion cycles, such as geothermal heat pumps, and separation processes for water purification.

Students cannot also receive credit for ENGR2350: Thermodynamics

Credits: 2 ENGR. Hours: 3-0-9. Prerequisite: ENGR2355.

ENGR3360 Thermal-Fluid Systems Analysis

This course builds on the basic physics of energy, mass, and momentum conservation to enable analysis and design of open thermal-fluid systems. Conservation laws are used to analyze the efficiency of open non-combustion cycles, such as the organic Rankine cycle, with a particular focus on heat pumps. Students analyze heat and momentum transport using the heat equation and the Navier-Stokes equations. The pure substance model is used in tandem with heat and momentum conservation to design heat exchangers and model phase change processes. Students complete open-ended projects analyzing thermal systems of interest.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGR2360; OR ENGR2355 AND ENGR2365.

ENGR3365 Intermediate Transport Phenomena

This course builds on the basic physics of heat, mass, and momentum transport to enable analysis and design of thermal-fluid systems. Topics include conservation laws, the Navier-Stokes equations, heat exchanger design, and phase change. Students complete an open-ended project using thermal-fluid analysis to explore an area of interest and create a positive impact in the world.

Note: Students cannot also receive credit for ENGR3310 Transport Phenomena

Credits: 2 ENGR. Hours: 3-0-9. Prerequisite: ENGR2355 AND ENGR2365; OR ENGR2350.

ENGR3370 Controls

This course explores the techniques for changing the dynamics of a system using feedback control. The first portion of the course covers methods for analyzing the open-loop dynamics of generic systems in the frequency-domain (transfer functions) and time-domain (state-space equations). Then we will develop feedback techniques for shaping the system response. Students completing this course will have the analytical tools for controller design (both classical and modern) as well as a fundamental understanding of the concepts behind feedback control (stability, performance, controllability, observability, etc.). Students will have ample opportunity to experiment with control design by implementing their own designs in analog and digital hardware. Examples from field robotics, aircraft, and intelligent-structures will be used for both in-class and hands-on demonstrations.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGX2134.

ENGR3390 Fundamentals of Robotics

This course encompasses the fundamentals of perception, sensors, computer vision, navigation, localization, actuation, manipulation, mobility (e.g., walk, swim, roll, crawl, fly), and intelligence (e.g., control, planning, and mission execution). The course is built around the review and discussion of seminal technical papers in the robotics field with guest lecturers both from various Olin faculty and from external leaders in the robotics community. There is a significant project component to help solidify key concepts.

Credits: 4 ENGR. Hours: 4-0-8.

ENGR3392 Robotics Systems Integration

This course combines the components of Fundamentals of Robotics (sensing, cognition and actuation) into the testing and deployment of fully-working interdisciplinary robotic systems. There is a significant lab-based component in which teams of students compete in several main industrial robotics areas to optimize mission performance under real world time constraints.

Previous projects include: the design of a robot arm and vision system that plays checkers against human opponents; the design of closed-loop-controlled unmanned ground vehicles to autonomously circumnavigate the Olin Oval, and the design of an intelligent assembly system for autonomous processing of multi-well bio-assay trays.

Credits: 4 ENGR. Recommended Requisites ENGR3390 or Computational Robotics. Hours: 4-0-8.

ENGR3399 Special Topics in Mechanical Engineering

Special Topics in Mechanical Engineering classes (ENGR X399) typically cover a specific topic in Mechanical Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR. Recommended Requisites Junior or Senior standing; or permission of instructor.

ENGR3410 Computer Architecture

This course introduces a broad range of computation structures used in computation, from logic gates to specialized (e.g. DSP, cellular automata) as well as general purpose architectures. Design techniques for quantitatively optimizing performance are also taught. Students build a computer from the ground up.

Credits: 4 ENGR. Hours: 4-4-4. Prerequisite: ENGR1125.

ENGR3415 Digital Signal Processing

Signal processing - the modeling, transformation, and manipulation of signals and their content - underpins virtually all facets of our daily lives due to the coupling of computing and communications in consumer, industrial, and public sector applications. Discrete-time signals, obtained through the sampling of continuous-time signals, and their frequency domain equivalents, can undergo transformation via systems, e.g., finite-duration impulse response (FIR) and infinite-impulse response (IIR) filters. Digital filter design and analysis conjoins such topics as difference equations, the z-transform, stability, frequency response, the discrete Fourier transform, FFT algorithms, windowing, practical implementation structures, A/D and D/A conversion techniques. After researching signal processing applications during the first part of the course, students initiate and realize individual DSP projects by end-of-term.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: ENGR2410.

ENGR3420 Introduction to Analog and Digital Communication

This course teaches students design techniques for analog and digital communications, including elementary coding and information theory. Topics also include modulation schemes, data compression, error detection and correction, encryption, transmitter and receiver design, and routing protocols. Students build an operative communications link over an unreliable channel.

Credits: 4 ENGR. Recommended Requisites ENGR2410 or Permission of Instructor. Hours: 4-4-4.

ENGR3426 Mixed Analog-Digital VLSI

This course will provide an overview of mixed-signal (analog and digital) integrated circuit design in modern complementary metal-oxide (CMOS) technologies. Students will learn transistor-level design of digital and analog circuits, layout techniques for digital and analog circuit modules, and special physical considerations that arise in a mixed-signal integrated circuit. Students will design a custom mixed-signal integrated circuit that will be sent out for fabrication through MOSIS (assuming that the course funding request is approved by MOSIS) at the end of the semester if they will agree to test the chips when they come back from fabrication.

Credits: 4 ENGR. Hours: 4-4-4. Prerequisite: ENGR2420.

ENGR3430 Eclectronics

Through a series of projects, students will learn all aspects of printed-circuit board (PCB) design at the prototype scale of manufacturing, including electronic circuit/system design, component selection, schematic capture, PCB layout, assembly, and testing. Familiarity with circuits, electronics, and firmware development at the levels of ISIM (ENGR 1125) and PoE (ENGR 2110) are required to take the course. This course satisfies the ECE elective requirement.

Credits: 4 ENGR. Hours: 3-3-6. Prerequisite: ENGR1125 AND ENGR2110.

ENGR3440 Principles of Wireless Communication

Through a series of project based exercises and a final project using a combination of computer simulations and software defined radios, students will learn about and implement modern wireless communications systems. The project based exercises will culminate in an assignment where students design and implement an Orthogonal Frequency Division Multiplexing (OFDM) system, which is the modulation scheme used in many modern wireless communications systems such as WiFi and LTE. The final third of the course will be devoted to a project where students work in small teams to design and implement a wireless communications system of their own choosing.

Topics covered in the course include wireless channel modelling and characterization, synchronization, multi-antenna techniques, multiple access and OFDM.

Credits: 4 ENGR. Prerequisite: ENGR3420.

ENGR3499 Special Topics in Electrical & Computer Engineering

Special Topics in Electrical and Computer Engineering classes (ENGR X499) typically cover a specific topic in Electrical and Computer Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR. Prerequisite: ENGR1125.

ENGR3515 Data Structures and Algorithms

In this course, you will be introduced to the common data structures and algorithms that will enable you to grow as a programmer and problem solver. You will learn how to do mathematical analysis of data structures and algorithms, including run time analysis and proof of correctness. But you will also be practicing how to implement these concepts and evaluating performance in practice. By the end, you should feel comfortable approaching a computational problem from start to finish: writing pseudocode, choosing appropriate data structures, designing algorithms, and analyzing your program.

Credits: 4 ENGR. Recommended Requisites MTH2110, Discrete Mathematics recommended co-requisite, or prior to enrolling. Prerequisite: ENGR2510.

ENGR3520 Foundations of Computer Science

This course uses applications as vehicles for exploring the formal analytic toolkit of the computer scientist as well as aspects of algorithmic computing and intelligent software design. The course combines elements of automata theory, data structures and algorithms, programming languages, artificial intelligence, information management, and internet programming.

Credits: 4 ENGR. Recommended Requisites ENGR2510 or permission of instructor. MTH2110, Discrete Mathematics should be taken along with FOCS or prior to enrolling.. Hours: 4-0-8.

ENGR3525 Software Systems

An introduction to the design and implementation of system-level software, including operating systems, networks, and databases. Topics include processes and threads, memory and storage management, networking and inter-process communication, scheduling and synchronization.

Note: Permission of instructor may be obtained in lieu of prerequisite if appropriate.

Credits: 4 ENGR. Hours: 3-0-9. Prerequisite: ENGR2510.

ENGR3531 Data Science

Data Science is a powerful toolkit for using data to answer questions and guide decision making. It involves skills and knowledge from statistics, software engineering, machine learning, and data engineering. In this class, students work on data science projects that involve collecting data or finding data sources, exploratory data analysis and interactive visualization, statistical analysis, predictive analytics, model selection and validation. Course work involves readings and case studies on ethical practice in data science.

This course may be used to satisfy the Probability and Statistics requirement.

Credits: 2 ENGR. Recommended Requisites ENGR2510: Software Design or permission of instructor. Concurrent Requisites: MTH2131.

ENGR3533 Computational Bayesian Statistics

Bayesian statistics provide a powerful toolkit for modeling random processes and making predictions. The ideas behind these tools are simple, but expressing them mathematically can make them hard to learn and apply. This class takes a computational approach, which allows students with programming experience to use that knowledge as leverage. Students will work through a series of exercises in the book Think Bayes and help develop new material.

Credits: 2 ENGR. Concurrent Requisites: MTH2133.

ENGR3540 Complexity Science

The study of complex systems represents a new approach to science that investigates how relationships between parts give rise to the collective behaviors of a system and how the system interacts and forms relationships with its environment. (Wikipedia)

This class is about complexity science, data structures and algorithms in Python, and the philosophy of science:

1.Complexity science is an interdisciplinary field

- at the intersection of mathematics, computer science and other disciplines such as physics and economics

- that focuses on models of systems with many components, local interactions, and complex behavior. These models are often characterized by structure, rules and transitions rather

than by equations.

2.Data structures and algorithms in Python: This class picks up where Software Design leaves off, introducing

additional data structures, algorithms, language features, design patterns, and software engineering tools that are appropriate for modeling, simulating and analyzing complex systems.

3.Philosophy of science: The models and results in this class raise a number of questions relevant to the philosophy of science

- including the nature of scientific laws, theory choice, realism and instrumentalism, holism and reductionism

- which we will discuss as they arise, along with related readings.

Topics may include the structure and dynamics of complex networks; cellular automata, self-organized criticality, and generative systems; fitness landscape models of biological and technological evolution; and agent-based models of social and economic behavior.

Credits: 4 ENGR. Recommended Requisites ENGR2510 or permission of instructor. Hours: 4-0-8.

ENGR3590 A Computational Introduction to Robotics

This course will provide a computationally-focused introduction to the field of robotics. Students will learn how to both select and design algorithms for solving interesting problems in robotic perception and control. Additionally, students will learn to successfully balance tradeoffs between accuracy of an algorithm and its computational efficiency in both space and time. The course will move from structured labs to more open-ended projects as the semester progresses. Specific content areas that the course may address are: computer vision, machine learning, reinforcement learning, path planning, mapping and localization.

Credits: 4 ENGR. Prerequisite: ENGR2510.

ENGR3599 Special Topics in Computing

Special Topics in Computing classes (ENGR X599) typically cover a specific topic in Computing and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR. Prerequisite: ENGR2510.

ENGR3610 Biomedical Materials

The body is a harsh environment for synthetic materials; not only is it warm, wet, and salty, but there are enzymes and cells whose function is to identify and destroy anything foreign. Conversely, implanted materials can provoke unexpected responses from biological systems. This course is an overview of biological interactions with materials, with a special emphasis on the role of the in vivo milieu on failure in medical devices. Topics will include coagulation, inflammation, and immune responses to materials, cell-surface interactions, and the mechanical interactions of materials and tissue, together with emerging fields such as drug delivery and neuron-silicon interfaces. Readings will be drawn primarily from the current literature.

Credits: 4 ENGR. Recommended Requisites SCI1210 and SCI1410, or Permission. Hours: 4-0-8.

ENGR3635 Neurotechnology, Brains and Machines

Neurotechnology falls in the intersection of engineering, data science, and neuroscience. This area involves work in how humans can use machines to understand how we think and how to make machines that can think. Advances in neurotechnology will likely lead to new treatments for brain disorders, repair and augmentation of our sensory and motor systems, and shifts in computation strategies. In this course, students will learn about cutting-edge technologies used to understand and emulate the brain, develop statistical data analysis skills to conduct and understand neurotechnology research, and discuss the cultural and ethical implications of these advances. Course work will involve analysis of data from neuroscience, reading and synthesizing articles from research journals, and project work.

Credits: 2 ENGR. Concurrent Requisites: MTH2135.

ENGR3650 Structural Biomaterials

How is a blood vessel like a garden hose? Why are seashells strong (and beautiful) even though they are made of chalk? How can your opaque white tendons be made of the same material as your transparent corneas? This course focuses on the materials science of natural tissues, primarily ones that fill structural roles, including bone, teeth, tendon, nacre, and wood, with an emphasis on how they are similar and different to 'engineering' materials. Additional material may include scaffolds for tissue engineering, biomimetic materials and mechanical properties of individual cells.

Credits: 4 ENGR. Hours: 4-4-4. Prerequisite: Foundation Biology Course and Foundation Materials Science course.

ENGR3699 Special Topics in Bioengineering

Special Topics in Bioengineering classes (ENGR X699) typically cover a specific topic in Bioengineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR.

ENGR3820 Failure Analysis and Prevention

In this class, we learn failure analysis by doing failure analysis. By planning and implementing hands-on investigations in a laboratory setting, we will gain practical experience in the analysis of engineered components and systems that fail in expected or unexpected ways. Case study readings and class discussions will help us develop an understanding of technical topics such as failure analysis methodology, fracture classifications and micromechanisms, corrosion and degradation, and materials selection and design decision-making. Self-directed projects will enable skill building in laboratory methods and advanced materials characterization techniques, such as scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), x-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), optical microscopy, and fracture surface sample preparation.

We won't stop there. We will broaden our learning by critically analyzing how "engineering" failures intersect issues of economics, policy, regulation, justice, and ethical decision-making in complex systems. We will pay particular attention to the social and environmental consequences of larger systemic failures by examining concrete case studies (e.g., the Flint water crisis, Love Canal, e-waste in Guiyu) as well as more abstract and aspirational models for the future (e.g., material circularity, extended producer responsibility).

Written and oral communication assignments will support development of professional skills in synthesizing laboratory and research data, developing and supporting technical arguments, and contextualizing our findings.

This course is cross-listed with SCI3420.

Credits: 4 ENGR. Recommended Requisites Prerequisite required of a foundation materials science course.. Hours: 4-0-8. Prerequisite: SCI1410; OR SCI1420; OR SCI1440.

ENGR3899 Special Topics in Materials Science

Special Topics in Engineering classes (ENGR X899) typically cover a specific topic in Materials Science Engineering and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits ENGR. Recommended Requisites Prerequisite required of a foundation materials science course.. Prerequisite: SCI1410.

ENGR4190 SCOPE: Senior Capstone Program in Engineering

SCOPE is one of the two Engineering Capstone requirements for all Olin students. It incorporates formal, team-based, year-long engineering projects done in conjunction with 10 to 14 external companies. Each project will be executed by a single student team, supported by a dedicated faculty member, in partnership with one of these companies. Each student team will have between four and six members from the senior class. Students may conduct advanced research, perform market analysis, develop experimental prototypes, design new products or redesign existing products in the execution of this project.

As SCOPE is an 8 credit, year-long, fall/spring offering, a single grade will be given upon completion of 8 credits of SCOPE. After completion of the fall semester, a TBG grade will appear upon a students transcript until a grade is assigned at the end of the spring. The single grade assigned will appear in both the fall and the spring on transcripts. Students not completing a second semester of SCOPE will receive a grade for the fall and will therefore not satisfy the requirement of engineering capstone with the SCOPE program. Note that students not performing adequate work in the fall semester will receive an end-of-semester notice of concern (see the Grading at Olin section of the Olin College Catalog for more information).

Note: Cross-registered and Exchange students must obtain permission from the SCOPE Director to enroll.

Credits: 4 ENGR. Recommended Requisites Must be a senior.

ENGR4290 Affordable Design and Entrepreneurship Engineering Capstone

This course engages students in community-based, participatory design and action. Teams partner with communities and organizations to achieve positive social and environmental impact with a strong justice framing, working for change in areas like air quality, community development, food processing, global health, and rights and privacy (addressing mass incarceration) over several semesters.

Guided by an experienced faculty advisor, teams make change through design for impact, social entrepreneurship, community organizing, participatory research, political advocacy and other practices. All teams practice social benefit analysis, theory of change, assumption testing, cross-cultural engagement tools, dissemination of innovation methods, and ethical norms.

Students regularly engage stakeholders in inclusive processes, in person and virtually, to observe, strategize, plan, co-design, prototype, test, and implement approaches supported by a significant project budget. There are often opportunities to travel locally, nationally, or internationally to work with partners.

Students are exposed to mindsets and dispositions for working with integrity and responsibility in their stakeholders' contexts through guided exercises, case studies, guest speakers, readings, and reflections. Students learn and apply change-making practices through project work, and gain essential experience building relationships across difference and developing their own self- and cultural awareness.

This course is part of the BOW collaboration, offered jointly between Olin and Babson, and open to Wellesley students. Olin students can elect ADE to fulfill the Engineering Capstone requirement by registering for ENGR 4290 for two consecutive semesters beginning in the second semester of their junior year or the first semester of their senior year. Alternatively, students can take this course for one semester to fulfill the Design Depth requirement by registering for ENGR 3290. Students that take ENGR 3290 in their second semester junior year can opt to switch to ENGR 4290 for capstone credit.

Credits: 4 ENGR. Hours: 2-2-8. Prerequisite: ENGR2250.

ENGR4599 Engineering Capstone Alternative

This course serves as an alternative to the Engineering Capstone and meets all criteria for senior level cumulative engineering experiences.

The 2023-24 Offering is: The Tech Venture Capstone (TVC). TVC enables students to gain professional experience undertaking an authentic, team-based engineering project in the context of a prospective new venture. TVC is being offered on an experimental basis as a two semester sequence that fulfills the Engineering Capstone requirement.

Mastering key elements will prepare students for starting or contributing at a high level to an early stage company. These elements include: Understanding major user pain points and the value of a solution; understanding the market and segmentation (first/early market, beachhead; customer/user persona; customer buying habits/process); understanding how to go from a prototype to a manufacturable product for a specific customer (problem you are to solve; value of the solution for the customer; product vision; minimum viable product; prototype & productization; production, supply chain, BOM; product validation; quality & compliance; schedule, timing, launch; user experience). By the end of this capstone experience, students will be prepared to face the challenges of productizing prototypes to match market needs.

Assessment will be similar to SCOPE, with students evaluated on a combination of their individual learning goals, contribution to their team, and successful execution of the project. (Students are not evaluated on the success of the venture itself.)

Credits: 4 ENGR. Recommended Requisites Registration notes: Students must be in at least their sixth semester of study, and have successfully completed Products and Markets (AHSE 1515) and User-Oriented Collaborative Design (ENGR 2250).. Prerequisite: AHSE1515 AND ENGR2250.

MTH - Mathematics

MTH1111 Modeling and Simulation of the Physical World

This course provides an introduction to mathematical modeling and computer simulation of physical systems. Working with a broad range of examples, students practice the steps involved in modeling and analyzing a physical system, learn the role of models in explaining and predicting the behavior of the physical world, and develop skills with the programming and computational tools necessary for simulation. Students work in a studio environment on increasingly open-ended projects, and learn how to present their results, with an emphasis on visual and oral communication. (This course is taken with SCI1111.)

Credits: 2 MTH. Concurrent Requisites: SCI1111. Hours: 3-0-3.

MTH1199 Special Topics in Mathematics

Special Topics in Mathematics classes (MTH X199) typically cover a specific topic in Mathematics and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits MTH.

MTH2110 Discrete Math

Discrete Mathematics is a course that will introduce students to advanced counting and partitioning techniques as well as widely applicable discrete structures such as graphs and trees. This class will emphasize creative problem solving, mathematical writing, and collaboratively carrying out small-group projects.

Credits: 4 MTH. Hours: 4-0-8.

MTH2130 Probability and Statistics

An introduction to probability and statistics, with applications to science, engineering, and social science. Topics include discrete and continuous probability distributions; moments; conditional probability; Bayes' Rule; point and interval estimation; hypothesis testing.

Credits: Variable Credits MTH. Hours: 2-0-4.

MTH2131 Data Science

Data Science is a powerful toolkit for using data to answer questions and guide decision making. It involves skills and knowledge from statistics, software engineering, machine learning, and data engineering. In this class, students work on data science projects that involve collecting data or finding data sources, exploratory data analysis and interactive visualization, statistical analysis, predictive analytics, model selection and validation. Course work involves readings and case studies on ethical practice in data science.

This course may be used to satisfy the Probability and Statistics requirement.

Credits: 2 MTH. Concurrent Requisites: ENGR3531.

MTH2133 Computational Bayesian Statistics

Bayesian statistics provide a powerful toolkit for modeling random processes and making predictions. The ideas behind these tools are simple, but expressing them mathematically can make them hard to learn and apply. This class takes a computational approach, which allows students with programming experience to use that knowledge as leverage. Students will work through a series of exercises in the book, Think Bayes, and help develop new material.

Credits: 2 MTH. Concurrent Requisites: ENGR3533.

MTH2135 Neurotechnology, Brains and Machines

Neurotechnology falls in the intersection of engineering, data science, and neuroscience. This area involves work in how humans can use machines to understand how we think and how to make machines that can think. Advances in neurotechnology will likely lead to new treatments for brain disorders, repair and augmentation of our sensory and motor systems, and shifts in computation strategies. In this course, students will learn about cutting-edge technologies used to understand and emulate the brain, develop statistical data analysis skills to conduct and understand neurotechnology research, and discuss the cultural and ethical implications of these advances. Course work will involve analysis of data from neuroscience, reading and synthesizing articles from research journals, and project work.

Credits: 2 MTH. Concurrent Requisites: ENGR3635.

MTH2136 Astronomy and Statistics: AstroStats

It's not science unless you quantify your errors. Learn statistics and error analysis by studying our dynamic solar system. The first half of the class will provide you with a toolbox of standard statistical methods. You will learn these methods by studying data from planets, moons, and asteroids. The second half consists of student-designed projects. Your project will investigate an element of our solar system, and will include rigorous error analysis. This course will use data from NASA and ESA missions.

Credits: 2 MTH. Recommended Requisites Some experience with Python. Concurrent Requisites: SCI2136. Hours: 3-0-9.

MTH2188 Designated Alternative in Mathematics

Designated Alternatives in Mathematics courses (MTH X188) typically cover mathematical topics in a required subject. Offerings under this title provide approved substitions for an Olin requirement. They vary from semester to semester and are intended to expand the selection of offerings.

Credits: Variable Credits MTH. Concurrent Requisites: SCI2099.

MTH2188A Designated Alternative in Mathematics

Designated Alternatives in Mathematics courses (MTH X188) typically cover mathematical topics in a required subject. Offerings under this title provide approved substitions for an Olin requirement. They vary from semester to semester and are intended to expand the selection of offerings.

Credits: Variable Credits MTH.

MTH2188B Designated Alternative in Mathematics

Designated Alternatives in Mathematics courses (MTH X188) typically cover mathematical topics in a required subject. Offerings under this title provide approved substitions for an Olin requirement. They vary from semester to semester and are intended to expand the selection of offerings.

Credits: Variable Credits MTH.

MTH2199 Special Topics in Mathematics

Special Topics in Mathematics classes (MTH X199) typically cover a specific topic in Mathematics and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits MTH.

MTH3120 Partial Differential Equations

An introduction to the solution methods of partial differential equations that arise in describing a wide variety of problems in engineering, such as in fluid dynamics, elasticity, electromagnetic wave propagation, and transport phenomena. The course begins with the solution of boundary-value problems in ordinary differential equations (Sturm-Liouville theory), and then develops into the fundamentals of Fourier analysis and the solutions to the heat, wave, and Laplace's equations on finite and infinite domains. Additional topics will be addressed at the discretion of the instructor(s), examples of which include systems of hyperbolic equations, similarity solutions in infinite domains, or a brief introduction to numerical solutions.

Credits: 4 MTH. Recommended Requisites Linear Algebra, Vector Calculus, Differential Equations all are met via completion of the Quant Engr Analysis sequence. Hours: 4-0-8. Prerequisite: ENGX2010.

MTH3150 Numerical Methods and Scientific Computing

The speed of modern computers has allowed simulation to become a very powerful tool in the design and analysis of systems in science and engineering. This power is easily misused and scientific computing is full of pitfalls. This course introduces students to methods useful for accurately simulating complex systems in the physical sciences and engineering. The first half of the course focuses on iterative techniques for solving algebraic systems, interpolation of functions, and advanced techniques for solutions to ordinary differential equations. The second half of the course focuses on an introduction to solutions to boundary-value problems and solutions to partial differential equations, with the students required to choose an application in science and engineering to solve in detail.

Credits: 4 MTH. Hours: 4-0-8.

MTH3160 Intro to Complex Variables

This course provides an introduction to the analysis of functions in the complex plane. Topics include the Cauchy-Riemann equations, conformal mapping, Cauchy-Goursat theorem, Taylor-Laurent series, the residue theorem, Nyquist criterion, continuation of analytic functions, and applications in science and engineering.

Credits: 4 MTH. Hours: 4-0-8.

MTH3170 Nonlinear Dynamics and Chaos

This course will focus on the modern theory of dynamical systems including both discrete and continuous processes. The course will emphasize both theory and applications. Theory topics might include, for example, linear and nonlinear stability theory, periodic solutions, bifurcation theory, chaos, and strange attractors. Applications discussed might include, for example, mechanical oscillators and biological oscillators.

Credits: 4 MTH. Hours: 4-0-8.

MTH3199 Special Topics in Mathematics

Special Topics in Mathematics classes (MTH X199) typically cover a specific topic in Mathematics and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits MTH. Prerequisite: ENGX2000 AND ENGX2005 AND ENGX2010.

OFYI - Olin First Year Introduction

OIE1000 Olin First Year Introduction OFYI

Olin Introductory Experience is a first-year course that serves an introduction to different aspects of life and resources at Olin and a general first-year experience course. Students experience and examine different aspects of Olin's culture and tools are provided to assist with the transition to college and beyond. Teaming and feedback, professionalism, space stewardship and ethics, mental health, financial literacy, identity formation and diversity, academic support, post-graduate planning, and curriculum and registration are some examples of topics that are covered in this course, though topics may shift depending on the needs of the students and community.

Credits: 1 OIE. Hours: 1-0-3.

SCI - Science

SCI1111 Modeling and Simulation of the Physical World

This course provides an introduction to mathematical modeling and computer simulation of physical systems. Working with a broad range of examples, students practice the steps involved in modeling and analyzing a physical system, learn the role of models in explaining and predicting the behavior of the physical world, and develop skills with the programming and computational tools necessary for simulation. Students work in a studio environment on increasingly open-ended projects, and learn how to present their results, with an emphasis on visual and oral communication. (This course is taken with MTH1111.)

Credits: 2 SCI. Concurrent Requisites: MTH1111.

SCI1199 Foundation Topic in Physics

Foundation Topics in Physics classes (SCI X199) typically cover an introductory topic in Physics and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: 4 SCI.

SCI1210 Principles of Modern Biology with Laboratory

Most of the course material is concerned with our current understanding of the fundamentals of life at the molecular and cellular level. Concepts and information from the disciplines of biochemistry, molecular biology, genetics, evolutionary and cell biology contribute in different ways to provide a coherent view of the components, processes, interdependencies, and other properties common to all organisms. The structure and regulation of genes, properties and synthesis of proteins, and the organization and communication between cells and multi-cellular organisms are essential elements for cellular growth and differentiation that will be studied in detail. Special topics to be considered include, but are not limited to, human genetics, molecular medicine, cancer biology, evolution, genomics, synthetic biology, and ethical implications of the applications of biological research. Students will gain experience with research methods and scientific reasoning through laboratory section experiments, written laboratory research summaries and from other project work.

Credits: 4 SCI. Concurrent Requisites: SCI1210 L. Hours: 4-3-5.

SCI1220 Human Genetics and Genomics with Laboratory

While the core concepts amongst the versions of Principles of Modern Biology are held in common, the emphasis in this section is on human genetics and genomics. We will explore how the mechanisms of evolution unite all of biology and this will be a common theme throughout the semester. The classical mechanisms and molecular underpinnings of genetic inheritance will be investigated as well as an in-depth study more complex events that influence the outward expression of genes. Ethical implications of genetic manipulations such as CRISPR technology and diagnostic testing will be discussed in depth. Genomics examples from the human, and canine genomes including the latest breaking findings in genetics and genomics will be studied. How geneticists think and work in the laboratory as professionals is explicitly demonstrated through actual student laboratory experience and discovered implicitly through selected case studies.

Credits: 4 SCI.

SCI1230 Think Like a Biologist with Laboratory

In this survey course we learn fundamental principles of biology through a journey through the field from the molecular to systems levels. We examine different classes of biological problems and interactions across multiple scales through reading and discussion of primary and secondary literature in the field. We draw on examples from the environment, microbiology, biomimicry, and current events. Through analysis of numerous examples we uncover key principles of biology, a toolkit of which can be applied towards examining and solving multifaceted problems. Projects include examination of biology in the context of systems and exploration of ways in which biology informs interdisciplinary problem solving. Through projects and work in the laboratory students develop a practical and foundational understanding of biological principles and practice.

Credits: 4 SCI.

SCI1240 Designing Better Drugs with Laboratory

This class addresses the engineering grand challenge of "Engineering Better Medicines". In this class, students will learn to apply concepts and laboratory skills that are currently used in biological research to solve problems in health and disease and drug discovery and development. Students will also develop skills in technical writing and oral communication, and they will gain experience with the basics of designing, conducting and evaluating laboratory experiments. Students will demonstrate an understanding of the larger societal context in which biological concepts, tools and research play a role in everyday life and medicine, and how societal context shapes the advancement of research in biology and medicine.

Credits: 4 SCI.

SCI1250 Six Microbes that Changed the World with Laboratory

Penicillium. Vibrio cholerae. Escherichia coli. Yeast. The Archaea. Microbes surround us, and impact our lives, our health, our societies, and our environment. Research with microbes, the smallest of all living creatures, has enabled discovery and understanding of the fundamental workings of life, opens up rich historical narratives of diseases and cures, and may provide sustainable solutions to problems we face from bioremediation to bioenergy. We will use six influential microbes as a window into a rich study of the interactions between science and societal context. This course connects biological concepts and historical knowledge through discussions, integrated assignments, presentations, and hands-on laboratory activities. Let's explore the thrill of biology and history, together.

Credits: 4 SCI. Concurrent Requisites: AHSE2150.

SCI1260 The Intersection of Biology, Art and Technology (IBAT)

This project-based course will encourage participants to cross boundaries between art, biology and technology with hands-on projects inspired by contemporary and historical work in these fields. How might biology inform art practice and how might art inform biology? What role does technology play in advancing or restricting each field and how might art and biology inspire technological breakthroughs? What are the implications of being able to change the genome of an organism? What is art anyway? These are just some of the questions we will pursue during this course. We will begin the course with an investigation of the phenomena of climate change and consider what steps we might take individually and collectively to contribute to the sustainability of the planet. Visualization technologies such as the scanning electron microscope (SEM) will be utilized to observe and create artworks. Final student-designed projects are informed by biology, art and technology and encourage deep exploration and integration of these topics. Laboratory studies will enhance an understanding of biology and its relation to technology as well as providing a possible means to create art. We will delve into a variety of written works, films and video resources, and listen first-hand to practitioners in these areas about the challenges and rewards of interdisciplinary work in fields that most would regard as unrelated. The goal by the end of the course is to acquire an attitude that allows fluid movement from one field to the other in thinking and doing so as to garner creative strength not possible from study of each field alone.

Credits: 4 SCI. Concurrent Requisites: AHSE2160.

SCI1270 BCB: Biomes, Climate Change, and Biodiversity

Biology, by definition, is the study of life. In this course we will travel from the biosphere to the molecular level as we learn about how life works and the intersections between global warming and the resultant changes to climate that affect all organisms that inhabit planet Earth. Student experience will preference hands-on project-based learning including an experiential learning opportunity in the biology laboratory, in the kitchen laboratory learning how to prepare nutritious meatless meals, and there may be opportunities for fieldwork. There will be several student designed projects that encourage creativity and depth of understanding of topics of interest. Basic principles of genetics, evolution and molecular biology will form a framework for comprehensive understanding and from which biodiversity will be studied and biomes understood. Appreciation for the diversity and kinship of all living organisms is one important outcome and it also requires that all of us understand the obligation to stewardship of the earth through efforts to mitigate climate change and make room for wildlife. This course is for anyone interested in the sustainability of our planet from the perspective of biology. As such the course content is inextricably linked to topics such as environmental justice, agricultural practices, and human population growth. This course will fulfill the biology requirement, or it can be used as an E: Sustainability concentration elective.

Credits: 4 SCI. Hours: 4-3-5.

SCI1299 Foundation Biology Topics (with laboratory)

This topics course provides flexibility in offering our foundational biology

course. Reference semester registration materials for specific offerings.

Credits: 4 SCI.

SCI1310 Introduction to Chemistry with Laboratory

This course introduces students to the fundamental aspects of aqueous and solid state chemistry. Topics include stoichiometry, gas laws, atomic structure and bonding, atomic theory, quantum theory, acid/base chemistry, solubility, electrochemistry, kinetics, thermodynamics, and reaction equilibria.

Credits: 4 SCI. Hours: 4-3-5.

SCI1320 Paper Panacea: Part I with Laboratory

Paper technology is a nascent, ultra low-cost detection platform that has promise to address several of the United Nations Sustainable Development Goals. In this course, we'll learn (or re-learn!) the chemistry and material science foundations that make this technology work. This will happen through weekly laboratory experiments; about mid-course we will design a class project to advance paper technology together. The course is a means for people to learn: Foundational chemistry and materials science; Collaboration and Innovation; Laboratory skills and Self-directed and Team-based learning skills.

Credits: 4 SCI. Hours: 2-4-6.

SCI1399 Special Topics in Chemistry

Special Topics in Chemistry classes (SCI X399) typically cover a specific topic in Chemistry and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits SCI.

SCI1410 Materials Science and Solid State Chemistry

This laboratory-based course introduces students to the relationships among structure, processing, properties, and performance of solid state materials including metals, ceramics, polymers, composites, and semiconductors. Topics include atomic structure and bonding, crystallography, diffusion, defects, equilibrium, solubility, phase transformations, and electrical, magnetic, thermal, optical and mechanical properties. Students apply materials science principles in laboratory projects that emphasize experimental design and data analysis, examination of material composition and structure, measurement and modification of material properties, and connection of material behavior to performance in engineering applications.

Credits: 4 SCI. Hours: 3-3-6.

SCI1420 Metals, Mining, and the Environment

This course explores materials science through the lens of metallic materials and their environmental and social impacts. From iron and aluminum in mechanical structures, to cobalt and rare earth metals in electronics and renewable energy applications, today's technologies rely on metals and alloys for their unique physical and chemical properties. Metals are part of a larger technological system, however, with complex social, environmental, political, economic, and ethical implications. Through a series of projects, students in this class will explore the technical processing, microstructure, and behaviors of metallic materials, while researching and discussing sustainability issues related to mining operations, raw material processing, and recycling and disposal. We will critically examine the social and environmental costs of the metals industry and metallic products, and consider our professional and ethical responsibilities as scientists, engineers, designers and global citizens to address larger problems or initiate positive change. The course takes place in a studio-laboratory setting, where teams will implement self-directed project plans guided by their own interests and goals, apply a range of materials testing and analytical techniques, and produce a range of project deliverables that reflect an interdisciplinary understanding of metallic materials and their impacts.

Credits: 4 SCI. Hours: 6-0-6.

SCI1430 Plastic Planet

This course explores materials science and solid-state chemistry through the lens of plastics and their environmental and social impacts. The world is creating plastic materials at a staggering rate, with annual global production approaching 400 million tonnes. While plastics play critical roles in health, food packaging, transportation, and construction, the exponential demand for plastics raises significant questions about the human and ecosystem impacts of polymeric materials. For example, only small fractions of plastics are recycled, and recent policy shifts have left many countries struggling to manage their plastics waste streams. Through a series of self-directed team projects, students in this class will explore technical and contextual issues related to plastics processing, use, and disposal, such as the rise of single-use plastics, toxic chemicals and pollutants from polymer synthesis, biodegradation and recycling, life-cycle assessment of plastics versus alternative materials, and larger systemic challenges associated with the plastics industry. The course takes place in a studio-laboratory setting, where teams will implement and troubleshoot project plans, apply a range of materials testing and analytical techniques, and conduct research and reporting that enables critical thinking and reflection on the benefits and consequences of plastics technologies.

Credits: 4 SCI. Hours: 6-0-6.

SCI1440 Materials Creation, Consumption, and Impact

This course provides an introduction to materials science and solid-state chemistry via hands-on explorations of the materials we encounter in our everyday lives. In a series of team-based analytical projects, students select materials products or processes, and design experiments to answer materials-related questions that are personally interesting and culturally relevant. Each project integrates concepts and questions about the impacts of materials on our world, e.g., the toxicity of materials in consumer products, the energy of material processing, the recyclability or biodegradability of common plastics, or the social impacts of extractive industries. The course takes place in a studio-laboratory setting, where we learn to implement and troubleshoot project plans, and safely apply a wide range of materials testing and analytical techniques. The self-directed project work, combined with structured assignments, enable students to think critically about the connections among material chemistry, structure, processing, properties, and impacts. A variety of project deliverables - posters, presentations, and reports - help students gain skills in synthesizing, contextualizing, and communicating ideas and insights. In short, this course enables students to explain how materials behave, why they behave that way, and why it matters for maximizing technical performance or minimizing negative impacts on our world.

Credits: 4 SCI. Hours: 6-0-6.

SCI2099 Special Topics in Science

Special Topics in Science classes (SCI X099) typically cover a specific topic in Science and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits SCI. Concurrent Requisites: MTH2188.

SCI2136 Astronomy and Statistics: AstroStats

It's not science unless you quantify your errors. Learn statistics and error analysis by studying our dynamic solar system. The first half of the class will provide you with a toolbox of standard statistical methods. You will learn these methods by studying data from planets, moons, and asteroids. The second half consists of student-designed projects. Your project will investigate an element of our solar system, and will include rigorous error analysis. This course will use data from NASA and ESA missions.

Credits: 2 SCI. Recommended Requisites Some experience with Python. Concurrent Requisites: MTH2136. Hours: 3-0-9.

SCI2199 Special Topics in Physics

Special Topics in Physics classes (SCI X199) typically cover a specific topic in Physics and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits SCI.

SCI2210 Immunology

Immunology is a relatively new science, and our understanding of our immune system is evolving at a rapid pace. When the immune system functions properly, infectious pathogens and potential cancer cells are destroyed. When our immune system malfunctions, normally harmless microorganisms can cause serious infections, autoimmune diseases or allergies can develop and cancer cells can evade immune surveillance and grow unchecked. In this lecture and discussion-based class, we will investigate the molecular and cellular mechanisms that control our immune responses. Current research in immunology will be emphasized through analysis of primary literature and media articles.

Credits: 4 SCI. Recommended Requisites Foundation Biology, AP Biology score of 4 or 5 (or equivalent), or permission of the instructor. Hours: 4-0-8.

SCI2214 Microbial Diversity

This course is an introduction to the tremendous diversity of the microbial world. The focus will be on the study of environmental bacteria and their metabolic, physiological and genetic diversity. Topics will include: bacterial growth, nutrient cycling, symbiosis, bioremediation, and molecular methods to work with bacteria. A significant portion of the course will involve exploration of the microbial world in the laboratory through authentic research. Students will gain experience with techniques to study a variety of environmental bacteria and learn to use tools in bioinformatics. Students of this course will be able to apply knowledge about microbiology towards development of sustainable biological solutions in a variety of contexts.

Credits: 4 SCI. Hours: 3-3-6. Prerequisite: SCI12.

SCI2215 Emerging Technologies in Cancer Research, Diagnosis and Treatmt w/ Laboratory

More than thirty years have passed since the declaration of a "War on Cancer", yet nearly 600,000 Americans are predicted to die from cancer this year. This course will examine the environmental and biological causes of cancer. We will explore why traditional treatments (chemotherapy, surgery and radiation) and the early promise of biotechnology have not led to a significant improvement of life expectancy for most forms of cancer. Through analyses of journal articles and clinical trials, we will assess the diverse emerging technologies for cancer research, diagnosis and therapy. Some of the technologies to be explored are immune checkpoint inhibitors, CRISPR, angiogenesis inhibitors, microarrays, stem cell therapy, gene therapy, genomic analysis and biological and immunological modifiers. Class discussion and student presentation of primary literature will be integral parts of this course. The course will include a student-designed laboratory component.

Credits: 4 SCI. Recommended Requisites Foundation Biology, AP Biology score of 4 or 5 (or equivalent), or permission of the instructor. Hours: 2-2-8.

SCI2235 Biomimicry

We can learn from nature! From studying a leaf to make a better solar cell to emulating natural processes to develop living buildings, the discipline of Biomimicry views nature as "model, mentor and measure" (Benyus, 1997). Spiders spin protein silk with the strength of steel yet much lighter all at ambient temperature and pressure. Cuttlefish change color to match their surroundings in milliseconds by contracting their chromatophores and even bioluminesce. In this course we will study wonders like these to appreciate the beauty and sophistication of life by investigating the biological mechanisms and functions of organisms as well as the dynamics of whole ecosystems. By examining biological systems at multiple scales, we can draw insights from understanding how they work. By collecting data, running experiments, creating models, or building prototypes, we can translate these insights into design ideas and practice. We will examine and discuss big ideas and thinking in biology and design and then synthesize and reflect on the intersection of these fields. Students will develop skills and insights through critical analysis of readings and the development of projects that draw on both fields. Biological systems have undergone 3.8 billion years of evolution, resulting in time-tested approaches to living on earth that are efficient and embody sustainability. By exploring the intersection of biology and design, we might learn to do the same.

This course is crosslisted with ENGR3235. Enrollment in SCI2235 is for advanced science credit. If design

depth credit or ENGR credit is desired, enroll in ENGR3235 for projects with engineering design foci.

Credits: 4 SCI. Hours: 4-0-8. Prerequisite: ENGR2250 AND SCI12.

SCI2260 Topics in Bioengineering

Broadly, Bioengineering can be defined as the application of engineering concepts and methods to the solution and study of biological and medical problems. Using a case study approach, this course aims to provide students with a broad understanding of the types of problems Bioengineers explore as well as the engineering and biological methods they employ. We will approach topics through seminar-style discussion of current primary articles from the literature as well as selected hands-on laboratory explorations of topics. Topics to be covered include tissue engineering, use of microfluidics devices for diagnostics, imaging disease states, and prosthetic limbs. In order to explore a topic of particular interest in more depth, students will also write and orally present a research paper on a topic of their choice.

This course is crosslisted with ENGR2600. Taken under the SCI2260 number, the course statisfies advanced

Biology. If credit is warranted in Engineering, enroll using ENGR2600.

Credits: 4 SCI. Recommended Requisites AP/IB Biology satisfies prerequisite if Olin Foundational Biology has not been taken.. Hours: 3-1-8.

SCI2299 Special Topics in Biological Sciences

Special Topics in Biology classes (SCI X299) typically cover a specific topic in Biology and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits SCI.

SCI2310 Environmental Analysis & Science

How do we measure what's happening in our environment, what do we do with that information, and why do we care? This hands-on, project-based course will introduce approaches that environmental engineers and scientists use to analyze complex environmental systems in order to effectively design solutions to mitigate pollution. We will spend the semester making deep-dives into air quality and water quality, which are at the heart of the two leading causes of premature death in the world: chronic exposure to air pollution and lack of access to clean water. The class focuses on building hands-on skills with real-world data analysis, field sampling techniques and lab analysis skills through integrated projects like analyzing pollutant concentrations along the Charles River, and the course will incorporate strong communication themes as we work toward presenting our results to several diverse audiences. Throughout the course, we will study pollution in its broader social, political, and economic context, considering the complex motivations for pollution mitigation and the broader implications of water and air treatment processes.

This course is cross-listed with ENGR2810.

Credits: 4 SCI.

SCI2399 Special Topics in Chemistry

Special Topics in Chemistry classes (SCI X399) typically cover a specific topic in Chemistry and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits SCI.

SCI3130 Advanced Classical Mechanics

Classical mechanics revisited with the use of mathematical formulation that makes the "old and dusty" Newton's laws shine in all their beauty. Using differential equations and linear algebra tools, we will venture to look at things only hinted at in introductory physics: variational principles, the two-body problem, motion in accelerated frames, rigid body dynamics, oscillations, Lagrangian and Hamiltonian mechanics, continuum mechanics, nonlinear dynamics, and chaos.

Credits: 4 SCI. Recommended Requisites SCI1130, MTH2210, MTH2220, or permission of instructor. Hours: 4-0-8.

SCI3199 Special Topics in Physics

Special Topics in Physics classes (SCI X199) typically cover a specific topic in Physics and are intended to enhance and expand the selection of offerings from semester to semester.

Credits: Variable Credits SCI. Prerequisite: ENGR2510.

SCI3420 Failure Analysis and Prevention

In this class, we learn failure analysis by doing failure analysis. By planning and implementing hands-on investigations in a laboratory setting, we will gain practical experience in the analysis of engineered components and systems that fail in expected or unexpected ways. Case study readings and class discussions will help us develop an understanding of technical topics such as failure analysis methodology, fracture classifications and micromechanisms, corrosion and degradation, and materials selection and design decision-making. Self-directed projects will enable skill building in laboratory methods and advanced materials characterization techniques, such as scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), x-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), optical microscopy, and fracture surface sample preparation.

We won't stop there. We will broaden our learning by critically analyzing how "engineering" failures intersect issues of economics, policy, regulation, justice, and ethical decision-making in complex systems. We will pay particular attention to the social and environmental consequences of larger systemic failures by examining concrete case studies (e.g., the Flint water crisis, Love Canal, e-waste in Guiyu) as well as more abstract and aspirational models for the future (e.g., material circularity, extended producer responsibility).

Written and oral communication assignments will support development of professional skills in synthesizing laboratory and research data, developing and supporting technical arguments, and contextualizing our findings.

This course is cross-listed with ENGR3820.

Credits: 4 SCI. Recommended Requisites Prerequisite required of a foundation materials science course.. Hours: 4-0-8. Prerequisite: SCI1410; OR SCI1420; OR SCI1440.

Curricular and Experiential Learning Prototypes

The process of curriculum innovation at Olin College means that curricular prototypes are ongoing during most academic years. These experiments are courses that serve as designated alternatives for requirements in the curriculum. There may also be prototypes that replace a requirement in the curriculum. A curricular experiment is noted by a course code and number. Unless otherwise specified, each course prototype begins with CIE (**C**urricular **I**nnovation **E**xperiment), followed by the academic year in which it is offered, e.g. CIE2223. If more than one experiment is running, the course number will end in a letter.

Current Prototypes

In the fall semester of 2020, Olin began a strategic initiative to develop new educational approaches in engineering education to address three interlocking aspirations: 1) to create an education that is accessible and equitable, and moves toward dismantling systemic racism, 2) to create an education that is deeply transformative, that opens doors for students, and helps them grow and realize their potential, and 3) to create an education that has a sustainable business model that responds to financial challenges within higher education. Curricular prototypes developed under this initiative will involve a range of partners, be designed for equity and access, and enable institutional learning to shape Olin's future. Prototypes that award academic credit will be overseen by Olin faculty, enable student degree progression, offer meaningful learning experiences, and align with the Olin Learning Outcomes (p. 19).

Co-curriculars

Co-curricular offerings are (1) non-credit activities combining fun and intellectual awareness, (2) scheduled for a limited time (e.g., one semester), (3) led by a staff or faculty member or by a student working in concert with a faculty/staff member, and (4) funded by the Student Affairs and Resources office. They differ from curricular offerings in that they are not graded and attendance is not strictly enforced. They differ from extra-curricular activities in that they have an intellectual component, faculty/staff leadership, and limited lifespan.

Academic Policies and Procedures

Olin's official Academic Policies and Procedures are listed here. To access the practical resources needed for administrative tasks such as requesting a transcript, petitioning for a course substitution or cross-registering to another school, please visit the Registrar's Office on the Olin website.

Academic Integrity

It is expected that students will behave with integrity and according to the Honor Code.

All Olin students agree to follow the Honor Code (Student Handbook). There is a culture of honesty on campus that reaches into the classroom. As a student this means your are responsible for your behavior with regard to class deliverables. If it is unclear if an assignment is meant to be individual or group work, please clarify with our instructor(s). Suspicion of violations of the honor code should be addressed to your instructor(s) and then the Honor Board, if applicable. You may use this form to report a violation or send an email to honorboard.

Advising and Academic Support Services

Academic Advising

Every student at Olin has an advisor who is available to answer questions and offer guidance about a student's progress to graduation, major requirements, course options, and other aspects of academic health and decision-making at Olin.

Advising relationships can have a significant impact on a student's experience. Olin has a network of faculty, staff, students, and alumni who comprise a multi-faceted resource for guidance and support within and outside the classroom.

Students who wish to switch advisors can request to do so by contacting the Assistant Dean of Student Affairs. Any changes to faculty advising assignments will be made at the end or beginning of each semester.

Academic Assistance

One of the greatest strengths of our community is in the demonstrated care and effort made to work closely with students who have academic need. Though it may not feel this way, needing academic assistance is very common and is often seen as a positive sign of academic growth and learning. Olin offers multiple options for resources for support and academic assistance. On the part of the student in need, asking for help at the first sign of perceived need is most beneficial. Delay in reaching out tends to have a cumulative effect in courses that are largely project-based where work volume increases quickly and unpredictably. In other words, the sooner the student can reach out and connect with even one resource, the more support we can mobilize to work with that student.

Instructors

Students who need further clarification on course requirements and projects should feel empowered to seek assistance from their faculty instructors. Faculty instructors can arrange office hours as needed and can serve as an invaluable source of information as students work on any number of projects and assignments. Faculty can also help a student determine any need for additional resources. For some students, perceived academic need can be stressful, especially if the student does not have a frame of reference for their progress in a class. Your instructor can directly guide and support the student to better understand how individuals are doing.

Course Assistants (CAs)

Many faculty instructors employ CAs for class. These students have demonstrated strength in understanding course materials and are a vital resource for students with questions. CAs often hold office hours in the residence halls during times that are accessible to classmates. They can provide assistance in large and small group settings as well as on an individual basis.

Tutors

After working with instructors and CAs for the class, if students are in need of more assistance, they can also request a tutor. Students may do this for many different reasons, including that they feel that individualized attention will be beneficial for their success in a course. Tutors are often nominated by faculty instructors and are employed by the college. Students who feel that individual tutoring would be helpful to them should contact the Assistant Dean of Student Affairs as early in the semester as the need becomes apparent. Since the Student Affairs and Resources (StAR) office employs tutors on an as-requested basis, please allow time to locate and connect tutors and students together.

ARCs (Academic Resource Co-Designers)

Often, a student's academic need relates more to skills that have nothing to do with understanding the content of a course. ARCs are available as academic resources to students who may need assistance with academic skills such as time management, prioritization, study skills, stress management, etc. ARCs are trained in facilitation and listening skills, academic skills coaching, and peer mentorship. ARCs will be available to meet 1:1 and also as part of a walk-in service called the ARCaid, located in the Library. ARCs may also associate with particular classes as a resource for students, facilitate workshops on timely issues that affect students, and create resources for students to use. To connect with an ARC, please email the Assistant Dean of Student Affairs.

AP exams and advanced study

Olin College does not accept AP Exam credit for incoming students. Olin College does, however recognize that many students enter Olin with a strong background in various disciplines and works to ensure that all students are challenged by the curriculum.

In exceptional cases in which incoming students have taken college-level courses that are equivalent to required courses at Olin, students may petition the Course Substitution and Transfer Board (CSTB) to substitute a prior course for a relevant course requirement. In such cases, the corresponding distribution requirements remain undiminished.

Attendance

Students are expected to attend all classes at Olin. Each instructor will establish and publish the class attendance policies for reporting anticipated absences and making up missed work, including lab experiences and project work. If a student requires an extended absence, they (or a designee) should inform the Office of Student Affairs and Resources, their instructors, and their advisor.

Class standing

Class standing is determined by the number of degree credits a student has earned in relation to the 120 required for graduation. The following table is a breakdown of earned degree credits and their corresponding class year and represents a reasonable expectation of progress toward a degree over four years.

Class	**Earned Degree Credits**
First-Year	0–30
Sophomore	31–60
Junior	61–90

Senior	> 90

College withdrawal

Voluntary withdrawal

Students may wish to leave Olin College prior to completing their degree and can voluntarily withdraw from the College. Such a decision may be difficult to make. We encourage students to discuss the situation with their academic advisor and the Assistant Dean of Student Affairs. Students must request a withdrawal form from the Assistant Dean of Student Affairs. Withdrawing for non medical reasons during a semester will yield a grade of "W" (Withdrew) on the academic record for all courses enrolled. If Voluntary Withdrawal occurs after the last instructional day of the semester, grades from that semester will appear on the transcript.

Dropping all registered courses does not automatically result in an official withdrawal from the college. Financial Aid recipients who drop all registered courses and/or officially withdraw from the college prior to the 60% point of a semester should note that this action will result in a review of their financial aid eligibility and a possible refund of monies to the Department of Education.

Students should consider whether a leave of absence (LOA) might provide a more suitable means for them to address their needs. Students for whom an LOA is most appropriate should follow the procedures for requesting a Leave. Please refer to the Leave of Absence Policy.

Medical Withdrawal

Students who need to withdraw from Olin College for medical reasons should request a Withdrawal form from the Assistant Dean of Student Affairs and indicate Medical Withdrawal. Medical documentation may be required to complete the process.

Medical Withdrawals during a semester (by the last instructional day of a semester) will result in deletion of the semester’s registration from the student’s record. Students may be entitled to a full or partial refund of certain expenses and fees according to the guidelines of the College’s Refund Policy. Students who are on a Medical Withdrawal may not return to campus or attend college events (on-campus or off-campus) without written permission of the Dean of Student Affairs. Permission must be requested at least ten business days in advance of the event.

Required and Administrative Withdrawal

At times, the Dean of Student Affairs (or the Dean's designee) may require a student to withdraw from Olin College for academic or any other reasons. Students who are required to withdraw may not return to campus or attend college events (on-campus or off-campus) without written permission of the Dean of Student Affairs. Permission must be requested at least ten business days in advance of the event.

Once a Student is Withdrawn

Once a student withdraws they typically have 48 hours to vacate their residence hall room. Specific arrangements should be made with the Associate Director of Residence Life. Students must return their room key to the Associate Director of Residence Life and leave their room in the condition in which they found it. Students who are Withdrawn may not leave items in College storage unless it is appropriate for the circumstances and individual arrangements are made with the Associate Director of Residence Life.

Return Following Withdrawal

Each request for readmission after withdrawal (voluntary, medical, required, or administrative) is assessed on its individual merits. As such, readmission requirements will vary. Written approval from the Dean of Student Affairs is required for readmission. To request readmission the student must complete the Readmission Form and send it to the Dean of Student Affairs no later than 60 days prior to the first day on instruction for the semester in which the student plans to return. The Dean will follow up with any requests for additional information. When considering registration and housing needs, notification is best made in October for spring returns and April for fall returns. Requests to return are considered on a case-by-case basis.

Course overloads

Olin students may register for a maximum of 20 credits each semester. The maximum load of 20 credits does not include non-degree activities (e.g., passionate pursuits). In exceptional circumstances, students may petition the Committee on Student Academic Performance (COSAP) with the consent of their advisor for approval of a course overload. Additionally, COSAP may reduce the maximum credits allowed. This reflects Olin's commitment to reasonable expectations and academic success. First-year, first-semester students are limited to taking a maximum of 18 credits. Requests for overloads may be sent to COSAP via the Registrar's Office, using registrar@olin.edu.

Cross-registration

Olin has cross-registration agreements with Babson College, Brandeis University and Wellesley College (the BBW schools). These agreements increase the academic offerings available to Olin students.

Olin students, with the exception of first-semester, first-year students, are permitted to enroll for one course each semester at each of the BBW schools, subject to the continuation of the cross-registration agreements.

Cross-registering for a course at a BBW school will count toward a student's total degree credit load at Olin. Normally, Olin students are not permitted to take courses at BBW schools which would substantially duplicate the content of a course or set of courses available at Olin, but may petition the Course Substitution and Transfer Board (CSTB) for an exception to this rule.

Students are responsible for all deadlines and registration procedures related to the host school, including, but not limited to, pass/fail, drop, add, withdrawal policies. Information regarding procedures for cross-registration is provided in the semesters' registration booklet. NOTE: Due to the variation of grading deadlines at BBW schools, seniors are strongly encouraged not to cross-register during their final semester at Olin.

Curriculum and Policy Committees

Academic Recommendation Board (ARB)

- Subcommittee: Course Substitution and Transfer Board (CSTB)

Committee on Student Academic Performance (COSAP)

Academic Recommendation Board (ARB)

The Academic Recommendation Board (ARB) has the responsibility to foster change and act as a steward of the curriculum. Annually, the ARB processes student updates to plans of study (major/concentration). Students may petition the ARB if they need to apply for an exception to graduation requirements and/or academic policy. Petitions should be sent to arb@lists.olin.edu for review.

Course Substitution and Transfer Board (CSTB)

The Course Substitution and Transfer Board (CSTB) is a subcommittee of the ARB and has the responsibility of awarding Olin credit for classes taken at another institution.

There are three cases where a student can take a class at another institution and get credit toward an Olin degree: cross registration at Babson, Brandeis or Wellesley; classes taken during a Study Away experience; and classes taken at another institution during a summer or before enrolling at Olin (not including dual degree high school programs). For more information on transferring credit, see Transfer Credit section. When considering science courses at other institutions be sure they include a laboratory component and are courses within a science major.

The CSTB also determines what distribution and course requirements a non-Olin course can count for. Many courses at the BBW schools have been pre-approved. Prior to taking a non-Olin class not on the pre-approval list, students should request permission from the CSTB to count this class toward satisfying a distribution or course requirement.

Finding Forms:

1) to Substitute a Babson, Brandeis, Wellesley or a different Olin course for a requirement - use a Substitution Form

2) to transfer credit to Olin from (study away or other), use a (Pre-Approval) / Transfer Credit Form

Committee on Student Academic Performance (COSAP)

The Committee on Student Academic Performance (COSAP) is charged by the Dean of Student Affairs and is empowered to review, interpret and propose academic performance policies. This committee considers petitions to waive existing academic performance regulations and acts as an appellate body for students with academic performance grievances. The committee also examines the records of students who are not making satisfactory progress toward a degree.

This committee is chaired by the Dean of Student Affairs or the Dean's designee (non-voting, except in the case of a tie) and consists of the Registrar (non-voting), the Assistant Dean of Student Affairs and two faculty members. Students wishing to appeal a decision made by COSAP must submit their appeal to the Registrar within one week of the original decision.

COSAP also reviews student petitions for exceptions to academic performance policy. The twenty credit maximum course load policy is a typical example of a petition to COSAP. There is no form to complete. Interested students should discuss their course load with their advisor and then write a detailed petition that outlines the rationale. Students should include their advisor on the email petition, as the advisor is always asked for feedback. Petitions should be emailed to registrar@olin.edu no later than the last day to add a course.

Declaration of major/change of major

Students are expected to declare their major no later than the time of registration for the fifth semester (during their sophomore year). At this time, there is a *Major Declarathon Event* where curriculum and program advising is available and an introduction to the process is presented. After the advising event, each student receives a survey form that asks about their choice of courses to complete general and major/concentration requirements. These entries are then reviewed by faculty with curricular expertise and the results are sent to the student and their advisor, with a copy retained by the Registrar's Office.

Olin understands that a student's path toward their degree may change and, as a result, during the fifth or sixth semester, there is a *Junior Reality Check*, where students update or change their program, major, and/or concentration plans of study.

Lastly, senior audits take place during a student's final two semesters. Senior audits take many forms and begin via consultation between a student and their advisor. There are also drop in sessions with the Registrar's Office, and opportunities for plan of study updates. The process culminates with degree certification by the Registrar and Faculty.

Note: Students who change their major should be aware of their remaining degree requirements. Additionally, they are responsible for all tuition, room/board and fees for any semesters required ***beyond the eight covered by the Olin scholarship.***

Definition of full-time status

To earn a Bachelor's degree from Olin College, all students are required to be enrolled full-time for 8 semesters. The definition of full-time is a minimum of 12 attempted credits (not including passionate pursuits) each semester with a maximum* of 20 attempted credits (including passionate pursuits) each semester. Students are expected to follow the curriculum based on their entry year.

Part-time study is generally not available at Olin College; however, special cases will be considered by the Assistant Dean of Student Affairs. Any student in need of more than 8 semesters at Olin must petition with the Dean of Student Affairs.

*In the first semester, first-year students are limited to attempting a maximum of 18 credits of degree credits. Students wishing to enroll over the maximum may petition the Committee on Student Academic Performance (COSAP) by emailing their petition to registrar@olin.edu .

Disability-Services

Disability Services at Olin (DSO) is committed to providing equal opportunities and access to education programs, and activities for all students with disabilities. We engage in an interactive process with each student and review requests for accommodations on a case-by-case basis. Furthermore, we are available as a resource and source of information to all members of the Olin community around access and disability rights. Using a social model of disability, DSO aims to reduce barriers for students with disabilities to access their education.

If you have a documented disability (or think you may have a disability) and would like to register with Disability Services at Olin (DSO), please contact our Assistant Dean of Student Affairs, Adva Waranyuwat at adva.waranyuwat@olin.edu.

Confidentiality Statement

DSO works with students confidentially and does not disclose any medical or disability-related information without their permission. In partnership with faculty and other student services offices, information is shared only on an as-needed basis and in accordance with confidentiality policies and procedures.

Reasonable accommodations policy

Disability Services at Olin (DSO) collaborates with and empowers individuals who have documented disabilities by working together proactively to determine reasonable and appropriate accommodations in a variety of avenues that impact student life (academic, housing, dietary). We value a community approach to understanding disability as an integral part of diversity and work in collaboration with stakeholders on campus to promote a holistic and informed approach to accessibility.

It is Olin College’s policy to comply fully with all state and federal disability laws. Olin does not discriminate against applicants or students with disabilities, and will consider modification to academic programs where necessary to ensure that our requirements are not discriminatory, as long as the modifications do not fundamentally alter the nature of our programs. Student Affairs coordinates services for students with learning disabilities, sensory impairments, psychological disabilities and medical conditions.

Academic Accommodations

- The ADA does not require colleges or universities to lower academic standards or fundamentally alter the nature of the programs provided. Students with documented disabilities must meet all requirements for graduation. A reasonable accommodation is a modification or adjustment to a course, program, service, activity, or facility that removes an existing barrier to access, so that qualified students with disabilities have equal opportunities to attain the same levels of performance or enjoy equal benefits and privileges as are available to similarly situated students without disabilities. Please note that accommodations are not retroactive.
- Students are responsible for identifying themselves to the Assistant Dean of Student Affairs and providing appropriate documentation of their disability and need for accommodation. Services for students with learning disabilities may include, but are not limited to, academic accommodations, coaching on organizational and time management skills, and academic advising. Services for students with physical, sensory, or psychological impairments as well as medical conditions may include, but are not limited to, academic accommodations, assistance with adaptive technology, accessibility accommodations, and academic advising. Any specific modifications granted will be based on detailed discussions with each student about their particular situation, on information from a medical or health care provider concerning the student’s disability and related needs, and on an open dialogue about educational expectations. In other words, disability services is seen as an ongoing conversation that we are always open to having, depending on the student's needs and experiences.

Excused Absences for Final Assessments

Students who are unable to take their final assessment (including, but not limited to, written or oral exam, project, presentation, written report/paper) for legitimate reasons and wish to request a make-up generally must obtain advance authorization from the instructing faculty members and Student Affairs. In the event that advance authorization cannot be obtained due to extenuating circumstances, students should contact Student Affairs and the instructor(s) as soon as they are able.

If the assessment is not completed prior to the end of the grading period, a grade of I, Incomplete, will be recorded on the student record. An incomplete grade is a temporary grade that does not affect a grade point average.

Extra help

Extra Help is available for all courses. Resources for help include, but are not limited to, instructors, course assistants (CAs), Academic Resource Co-Designers (ARCs), peer tutors, and individual tutors. Individual tutors are assigned by Student Affairs and Resources.

Grade changes

Dispute of a grade

Students wishing to dispute a grade should first have a discussion with the instructing faculty member. If the student and faculty are in disagreement after the discussion, the student may appeal to the Dean of Faculty. The Dean of Faculty will meet with the student within 14 days of the appeal and will solicit a statement from the faculty member. Following this process, the Dean of Faculty will review the case and submit a recommendation to the faculty member. The faculty member will then make a final decision, in consultation with the Dean of Faculty. After one calendar year (from the end of the original grading period), all grades are final.

Grading at Olin

Grading rules and regulations

Standards-based grading: Course grading at Olin will be based on student progress toward defined course goals. Summary metrics (e.g., GPA) will be provided on the student's transcript, but relative summary metrics (e.g., class rank) are neither published nor tabulated.

1. Privacy: Olin will not publicly post either grades or summary metrics (e.g., GPAs) in any form that allows identification of any particular individual's performance. It is expected that students will respect the privacy of each other's grades.
2. Grading clarity requirements: On the first day of instruction, each Olin class will publish the following information:
    a. Learning objectives that specify the knowledge, skills and attitudes that students are expected to develop or attain in the class. The learning objectives should be an effective instrument for students to understand what they will learn and how their learning will be evaluated.
    b. Grading criteria that specify how the final course grade is determined. Some aspects of grading are necessarily based on the professional judgment of instructors, informed by their experience, and are subjective.

c. Feedback: Olin expects instructors to provide students with feedback on their performance. If an instructor feels a student will not pass a course, or if the instructor is otherwise concerned about a student's performance, the instructor will issue a notice, called a R.O.U.K., in a timely manner. Copies of this notice will be sent to the student, the student's faculty advisor and the Assistant Dean of Student Affairs. If a course is offered as year-long and utilizes a first semester TBG grade option, the course instructor will issue an end-of-semester notice of concern for any student not making satisfactory progress in the first half of the course. This end-of-semester notice will be considered a deficiency in the student's overall semester progress and the student will be reviewed at the end of the fall semester Academic Progress meeting of COSAP.

3. End of semester feedback to the advisor: Olin advisors have real-time access to advisees' course grades through the Student Information System. In addition, instructors will notify advisors of any significant concerns noted during the semester.
4. Pass/No Record first semester: In the first semester of the first year, students receive only a grade of Pass (P) or No Record (NR). A grade of No Record does not affect the student's GPA and does not appear on the student's official transcript. A student who receives a grade of NR cannot use the class to satisfy a course requirement or use it as a prerequisite. Courses where an NR is earned require a repeated attempt at the student's earliest convenience. All repeated attempts of first year, first semester courses at Olin will be graded as pass/no credit and the assessment earned will appear on the transcript, yet will not impact the student's GPA.
5. Course grades: Course grades at Olin provide students, their advisors, potential employers and graduate schools information about overall performance. Course grades are determined based upon a mix of demonstrated comprehension, skill, participation and effort.
6. Grading scale: The Olin College grading scheme contains letter grades with a resulting grade point average (GPA) on a four-point scale. Students will be assessed using the following interpretation:

Grade	Assessment Description	Point Value
A	Excellent	4.0
A-		3.7
B+		3.3
B	Good	3.0
B-		2.7
C+		2.3
C	Fair	2.0
C-		1.7
CR	Credit (for non-degree course activity)	n/a
D+		1.3
D	Poor	1.0
EG	Experimental Grading	n/a
F	Failing	0.0
I	Incomplete	n/a
IF	Incomplete Failing	0.0

IL	Incomplete/Leave of Absence (temporary grade)	n/a
IP	In Progress (temporary grade)	n/a
L/NR	Leave/No Record	n/a
MET	Objectives of the course have been MET	n/a
NC	No Credit for Pass/No Credit Option	n/a
NCR	No Credit (for non-degree course activity)	n/a
NG	No Grade Reported by Instructor (temporary grade)	n/a
NPP	No Passionate Pursuit Recognition (internal designation)	n/a
NR	No Record	n/a
P	Pass	n/a
PP	Passionate Pursuit Recognition	n/a
R	Course Repeated	n/a
TBG	To Be Graded (represents first semester placeholder for required yearlong courses)	n/a *
TR	Transfer Credit	n/a
UNM	Objectives of the course are UNMET	n/a
W	Withdrew from Course	n/a

**see item 3 related to notice of academic concern for academic progress standings*

7. Experimental grading: The 'EG' grade represents an "Experimental Grade" designation, implemented in a small number of courses during a curricular experiment that began in 2009. Each student may undertake no more than one "EG" course per semester. An 'EG' grade in a student's transcript indicates that a student completed the course's learning objectives and received instructor feedback based upon criteria that do not have direct mapping onto the ABCDF grading system. Students who do not complete the learning objectives will receive a "no credit" designation on their transcript (similar to the "no credit" option for pass/no credit courses).
8. Repeated courses: If a student retakes a course at Olin the original grade will remain, but will not be factored into the student's GPA. The new grade will appear on the transcript in the semester in which the course was retaken. There is no guarantee that any course will be offered for a student to repeat, as in the case of, but not limited to, Special Topics courses. For courses in the first year, first semester that require repeat see item #4 above. Repeated courses may be used in Financial Aid Satisfactory Academic Progress Pace of Progression calculations.
9. Minimally sufficient grades: A grade of D, EG, or Pass is sufficient to earn credit for a course. A grade of D or EG is sufficient to satisfy a course requirement. A grade of C-, EG, or Pass is sufficient to satisfy a prerequisite requirement.
10. Pass/No Credit: Up to 12 credits of a student's distribution requirements may be satisfied by taking classes that are usually offered for grades as Pass/No Credit. In such cases, a Pass is given for performance equivalent to a grade of C- or higher. Courses taken Pass/No Credit may not be used to meet course requirements unless the course is not offered for grades or is taken in the first semester of the first year. Courses that are only offered Pass/No Credit, Independent Study and Research do not count toward the 12 credit limit. Students must declare their Pass/No Credit grading option by the drop date of each semester. The Pass/No Credit option does not impact the GPA; either Pass or No Credit will appear on the transcript. Once a student decides to take a course Pass/No Credit, they cannot revert back to receive a letter grade.
11. Passionate Pursuits: Passionate Pursuits are non-degree credit, and will be listed on the transcript if the nature of the activity and the level of completion are sufficient to merit credit.
12. The Olin transcript: A student's academic transcript at Olin includes the following information:

a. A list of classes the student took in each semester, and a record of the student's final grades in those classes. First-semester first-year transcripts will show only classes that were passed. Classes taken Pass/No Credit after the first year appear either as a Pass or as a No Credit.
b. The student's GPA.
c. A list of non-degree activities taken each semester with a cumulative total of credits earned. There are no grades associated with non-degree activities.
d. Co-Curricular offerings in which the sponsoring staff or faculty member reported sufficient student participation for a transcript notation.

13. Grading and credits of cross-registered courses: Olin students who cross-register for a course at Babson, Brandeis, or Wellesley will receive credit for the course if they receive a passing grade. All grades will be recorded on their transcript and be factored into their grade point average. Credits from these schools will be counted on a one for one basis at Olin. For example, if a three credit course is taken at Babson, it will count as three Olin credits. A one unit Brandeis or Wellesley course is equal to four Olin credits. Courses that use other accounting schemes may be translated into equivalent Olin credits rounded to the closest integer.
14. Circumstantial grading: is used in a semester of extraordinary disruption (e.g., pandemic), and is authorized by a faculty vote or by the Provost/Dean of Faculty when a quorum of the faculty cannot be met. A grade of MET satisfies course, distribution, and prerequisite requirements. A grade of UNM (unmet) does not satisfy course, distribution, and prerequisite requirements.

Graduation

Petition survey

Students expecting to complete their degrees or walk in Olin's May commencement ceremony must complete an on-line petition survey. This survey indicates the students' intent to complete their Olin degree and initiates the final degree audit process. This survey is typically available six months prior to commencement.

Graduation walk policy

Degree candidates are allowed to walk in one ceremony for their degree. Students who are off sequence may walk with the class with which they entered or with their actual degree year class. If the choice is to walk with the entry year class, the student must file a degree plan for completion of the degree by March 1st of the walk year and must be within 16 credits of completing said degree.

Conferral dates

Olin College confers degrees yearly each May and has only one ceremony per year.

Completion date

When a student completes their degree requirements at the conclusion of the fall semester, their record will be marked as complete with a degree pending. The student must apply for their degree conferral in the following May ceremony. Their record will then be updated to graduate following the May date.

Student right-to-know act: Retention and graduation rates

Under the Student Right-to-Know Act, educational institutions are required to disclose to current and prospective students their retention and graduation rates. The calculations below are in accordance with the formulas and definitions of the United States Department of Education.

The retention of first-time, first-year students who return in the following fall semester is 99% for the 2021 cohort of new students.

The graduation rate is defined as the percentage of first-time students who complete their degree program within 150 percent of the normal completion time for that degree (six years for an Olin bachelor degree). For the 2017 entering class, the graduate rate is 92%.

Additional information is available from the Registrar and the Office of Institutional Research & Decision Support.

Half-semester courses

The Add, Drop and Course Withdrawal periods are prorated for half semester courses. The Add Period is the first 5 days of the session. The Drop Period is 10 days prior to the last day of instruction for that session. Course withdrawals can be done up through the last instructional day of the half-semester course.

Incomplete Policy

In the event that a student experiences an acute circumstance that prohibits them from participating in a portion of a course or courses, they can request an incomplete grade to have extra time to make up their missed work. In other words, an incomplete grade is generally approved only when some specific event or illness prevents the student from completing a specific part of the course (such as completing a paper, project or exam). Should the option of an incomplete grade emerge, students and instructors are strongly encouraged to contact the Assistant Dean of Student Affairs to discuss the viability and appropriateness of an incomplete, since discussion is necessary before issuing this grade option. An incomplete cannot be approved in instances where a student is demonstrating an overall difficulty covering or understanding the course materials and appears to need more time or additional instruction to learn the material. If such general difficulty occurs the student should discuss available options with his or her course instructor and advisor well before the end of the semester.

A student may request an incomplete ("I") grade by petitioning the Assistant Dean of Student Affairs. The **deadline** to request an incomplete is the **last day of classes**, unless the acute circumstance occurs during finals week, in which case an exception could be made. If an incomplete grade is approved, the student will be granted an extension period to complete the coursework. The Assistant Dean of Student Affairs, in consultation with others as appropriate, will determine the period of the extension with the instructor and student. In no circumstances may the extension be later than the end of the subsequent semester.

A grade of "I" will be listed as a temporary grade and will not affect the grade point average. If the work is not completed by the approved deadline, the incomplete grade of "I" will be changed to "IF", Incomplete Failing, or an alternate grade upon approval of the instructor. Note: an "IF" grade **does affect** the grade point average.

In some cases a student may need to leave during the semester for a medical reason but, given the timing of the request and the type of work that needs to be completed, the student may be able to complete the work for the semester away from Olin. If that is the case and the need occurs after the 33rd day of instruction, a student can request a Medical Incomplete ("MI") for each course. An agreement would need to be reached between the student and each individual faculty member, and may not be possible for all courses in which the student is enrolled, which may result in withdrawal from some courses. A Medical Incomplete must be requested prior to the last day of instruction for the semester and may not be requested after that point. A student taking a Medical Incomplete must inform the Assistant Dean of Student Affairs about their intention to complete the work or take a Medical Withdrawal by the last day of instruction for the semester. If the student does not inform the Assistant Dean of their plans then their status will be changed to Medical Withdrawal.

Leave of absence (LOA)

Students in good academic standing may request a leave of absence (LOA) for up to 180 days in any 12-month period. To initiate a leave of absence, students should meet with their advisor and request a leave of absence form from the Assistant Dean of Student Affairs. Documentation of the reason for the leave of absence (medical or otherwise) may accompany the request for a leave, if requested. The request, if approved, and any accompanying documentation will be forwarded to the Registrar for processing and placed in the student's academic file. Students may not transfer credits to Olin that are earned during a leave of absence.

When an LOA is approved, student status will be noted as "On Leave." If a leave is not approved, students have the right to appeal the decision to the Dean of Student Affairs within two weeks of the date of the denial of leave. There are two kinds of leaves:

- A leave of absence mid-semester: This type of leave is requested when a semester is in active session*. In this case, all courses for which the student is registered will be temporarily designated as Incomplete/ Leave of Absence (IL). Any course that is not subsequently completed will then be changed to a grade of Leave/No Record (L/NR) and will be recorded internally for that course. Incomplete/Leave of Absence and Leave/No Record grades do not affect the student's grade point average. The effective date of this leave is the approval date of the leave. Incomplete/Leave of Absence grades must be completed no later than 90 days after the student's return date, or at another date determined by the faculty member and advisor.

  **This active session does not include the study or final exam period. If a student has an unexpected event that impacts his or her ability to take a final exam, he or she should refer to the Excused Absences for Final Assessments policy.*
- A leave of absence between semesters: This type of a leave is requested for a future semester when there is a circumstance that impacts the student's ability to continue in sequence. In this type of leave, there are no grade entries made. The student's schedule for the ensuing semester will be deleted. The student will be placed on leave effective the first day of the upcoming semester for up to 180 days in any 12-month period.
- If a student does not return from a leave of absence or extends beyond the maximum 180 days in any 12-month period, the student will be withdrawn from the college back to the original date of the leave. All Incomplete/Leave of Absence grades will be changed to Leave/No Record. NOTE: this applies to both types of leaves.

Returning from a Leave

All students taking an LOA are expected to return in the semester following the leave. Therefore, they will be given a registration time and should contact Housing no later than 30 days before the start of a return semester. When considering housing needs, notification is best made in October for spring returns and April for fall returns.

Registration

Prior to each semester, there will be a designated registration period in which students will speak with their advisors and make choices on course selection. Advising is a key component to course selection. Each semester, student's are required to be enrolled in a minimum of 12 credits, of which, the minimum 12 are required for degree completion. Any credits beyond the minimum 12 may be used for exploration in areas beyond requirements.

Registration is done on-line. Instructions are available each semester in the published registration booklets. NOTE: Courses available at the time of registration may be subject to cancellation based on enrollment.

Remote Learning

Technology Requirements

Olin has a responsibility to verify that students enrolled in Olin courses are able to access their educational program. This includes ensuring that students have adequate technology for access. Therefore, students are required to have regular access to an adequate computer (minimum for video is operating camera and audio/speakers/microphone/headphones appropriate for group video engagement) and internet (at least1 megabit/second upload and 1 megabit/second download bandwidth, per person, and <500ms network latency). For computational coursework (including SolidWorks), a computer with a Windows 10 system, <5 years old, with Intel i7 dual-core 2ghz+ processor, discrete graphics, 8 gig RAM, and solid state hard drive are adequate. Olin student laptops, purchased Fall 2018 and later, meet this requirement. The Olin campus internet meets the internet requirement. The IT Wiki has more information on testing and maximizing internet connectivity.

Student Complaint Procedure for Online Learning

Student Complaint Process related to Distance Education and/or On-Line Learning:

Students with any concerns that they believe can be addressed by the Olin administration should request support through the Provost's Office, using this form. The Provost will route concerns to the appropriate internal processes.

While students are requested to seek resolution through Olin's processes first, a student who has exhausted these processes without receiving adequate resolution may file a complaint with the Massachusetts Department of Higher Education (MDHE) following the MDHE consumer complaint process.

Beginning in 2021, Olin is now approved to offer distance education under the authorization from the National Council for State Authorization Reciprocity Agreements (NC-SARA). For student complaints concerning distance education, if unsatisfied after pursuing remedy through Olin's processes (above), distance education students may pursue a complaint with the MDHE. Students located in Massachusetts, or in non-SARA member states and territories (e.g., California) should use the MDHE consumer complaint form, while those located in SARA member states and territories should use the MDHE SARA complaint form.

[MDHE consumer complaint form] https://www.mass.edu/forstufam/complaints/complaintform.asp

[MDHE SARA complaint form] https://www.mass.edu/foradmin/sara/complaints.asp

Student academic performance

The Committee on Student Academic Performance uses the following guidelines in determining the academic status of students. Students not in Good Academic Standing will be placed on probation. Students not in Good Academic Standing for two consecutive semesters will be reviewed by the committee and may be required to withdraw. The committee may consider extenuating circumstances in applying these general guidelines. NOTE: In accordance with federal regulations of Title IV Financial Aid Program Integrity Standards, the Financial Aid Office will review academic performance in accordance with the performance measures listed below and will include an overall pace of progression standard. See the financial aid section for more information.

Qualitative measure of academic performance

Student's first semester: Good Academic Standing is defined as receiving Pass grades in all courses by the start of the second semester.

Subsequent semesters: Good Academic Standing is defined as having a minimum cumulative grade point average of 2.00 by the end of the semester.

During times when circumstantial grading is in play (see Grading at Olin), the qualitative measure will be amended to mirror the binary standard of circumstantial grading (met/unmet). Good Academic Standing is defined as receiving all MET grades (or a minimum grade of C in any session I course) for the semester. Students who do not meet 'good academic standing' may be placed on academic probation.

Quantitative measure of academic performance

In order to complete the degree in four years (eight semesters), each student will normally take 16 credits (four courses) per semester. Olin College expects students to make reasonable progress toward their degree each semester. As a result, to remain in good standing a student must complete a minimum of 12 degree credits each semester. The Committee on Student Academic Performance will review this quantitative measure in addition to the qualitative measure of a minimum grade point average.

During times when circumstantial grading is in play (see Grading at Olin),the quantitative measure will remain unchanged, e.g. students must continue to earn a minimum of 12 credits in the semester to remain in good standing. Students who do not meet 'good academic standing' may be placed on academic probation.

Academic readmission

In making decisions on readmission petitions, the Committee on Student Academic Performance (COSAP) will expect the former student to produce timely evidence of good academic performance in college courses comparable to Olin courses, employment and/or community service references and a formal statement explaining changes that will contribute to their academic success at Olin. Credit for courses taken elsewhere while a student is withdrawn from Olin may be eligible for transfer to Olin.

The add period

During the first 10 instructional days of a semester, students may alter their schedules by adding and/or dropping a course on-line using my.olin.edu. Discussions between students and their advisors are strongly recommended. Students are responsible for submitting their request no later than the 10th class day. Courses cannot be added after the 10th class day. Special circumstances may be granted for BBW sponsored courses when there is a variation in the academic calendars.

Half semester courses have a prorated Add Period. It is the first five days of the session.

The drop period

After the Add Period, students may decide to drop a course from their schedule without penalty as long as they maintain a minimum of 12 degree credits. The drop date is the 45th instructional day of the semester. Course drops during this period must be made through the Registrar's office and require the advisor's signature. It is strongly recommended that the student notify the faculty teaching the course.

For half semester courses, the Drop Period is 10 days prior to the last day of instruction for that session.

Transfer credit

Olin College generally does not accept transfer credit for incoming students. The Course Substitution and Transfer Board (CSTB) may grant exceptions on a case-by-case basis for incoming students who have demonstrated strong performance in rigorous courses taken at accredited institutions of higher education. Under no circumstance will Olin accept courses for transfer that were part of a high school dual credit program with colleges/universities.

Enrolled students wishing to take a course at another college and transfer the credits to Olin must obtain prior approval from the CSTB. A student will need to provide detailed information about the school and the course including, but not limited to, a course description and syllabus. Minimal conditions to determine appropriate schools and courses are 1) the institution must be accredited, and 2) the institution should offer, at minimum, Bachelor degree programs (note: community college systems with articulation agreements to a university or college bachelor's degree may also be considered). Additionally, if the Olin course requirement includes a lab, studio, project and/or shop component, the course at the host school must also include similar experiences to be eligible for transfer. On-line courses may be accepted provided that items 1 and 2 above are fulfilled. Enrolled students considering transferring Olin foundation science courses must show evidence of significant laboratory experience along with relevant content.

The CSTB will ask appropriate faculty to review the course materials before granting approval. If approved, the CSTB will notify the student in writing. Once the course is completed, it is the student's responsibility to have an official transcript sent to Olin College. Provided the student meets the minimum grade (C or equivalent) requirement for transfer, the course and the credits will appear on the student's Olin transcript; the grade does not appear. To ensure standard equivalencies for transfer, the course must be taken for a letter grade or equivalent. Pass/fail grading does not transfer to Olin. In order to receive a degree from Olin, matriculated students must earn at least 60 of their credits from Olin or BBW courses.

Approved coursework will appear on student transcripts with the name of the institution issuing the academic credit, the course title and the credits earned (in equivalence to the Olin semester credit hour). These credits are included in the cumulative earned hours total. NOTE: The pace of progression calculation for financial aid satisfactory academic progress uses credits taken away in both attempted and earned categories. See the Student rights and responsibilities for more details on financial aid satisfactory academic progress.

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