2016-17

A MISSION TO TRANSFORM

Olin College
of Engineering

Course Catalog

Table of Contents

Catalog 2016-17

Information about Olin

Olin College mission statement

Olin College prepares students to become exemplary engineering innovators who recognize needs, design solutions and engage in creative enterprises for the good of the world.

Long-term aspiration

Olin College seeks to redefine engineering as a profession of innovation encompassing 1) the consideration of human and societal needs; 2) the creative design of engineering systems; and 3) the creation of value through entrepreneurial effort and philanthropy. The college is dedicated to the discovery and development of the most effective educational approaches and aspires to serve as a model for others.

Olin College core personal values

Integrity: Complete honesty is expected from everyone in every situation. Even the appearance of a conflict of interest will be avoided. Successful long-term relationships depend on trust and open communication.

Respect for Others: Each person is treated with respect and dignity in all situations. Criticize only ideas — not people, and share responsibility. There is no room for abusive language or arrogance in relationships with others.

Passion for the Welfare of the College: As exemplified by the Trustees, each person will passionately pursue the overall interests of the college, while maintaining fairness to all individuals in all transactions. Personal advancement at the expense of others is discouraged and cooperation is expected.

Patience and Understanding: Each person will listen constructively, keep an open mind and take the time to understand with empathy before reaching a conclusion. Effective teamwork depends on the confidence that others care and are willing to take the time to listen.

Openness to Change: Continuous improvement requires openness to change, even though this usually causes inconvenience, inefficiency and risk of failure. Olin College will constantly strive to innovate and improve in every area.

Olin College core institutional values

Quality and Continuous Improvement: Olin College will strive for quality in all that it does. It will also strive for continuous improvement in all areas, and will measure its progress with appropriate national standards.

Student Learning and Development: Olin College is a student-centered institution. It will strive to provide educational experiences of exceptional quality and a student life environment that provides for healthy personal development.

Institutional Integrity and Community: Olin College will strive to develop long-term relationships based on honesty, fairness and respect. It will further strive to provide a safe environment that supports freedom of inquiry, acceptance of diversity and a sense of well being.

Institutional Agility and Entrepreneurism: Olin College will strive to minimize bureaucracy, cost and institutional inertia in all forms. It will further strive to accept appropriate risks in pursuit of opportunity.

Stewardship and Service: Olin College will strive to provide responsible stewardship of its resources while encouraging a spirit of service to society.

Accreditation

NEASC accreditation

Franklin W. Olin College of Engineering is accredited by the New England Association of Schools and Colleges, Inc. through its Commission on Institutions of Higher Education. Accreditation of an institution of higher education by the New England Association 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 New England Association 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 New England Association should be directed to the administrative staff of the institution. Individuals may also contact:

Commission on Institutions of Higher Education
New England Association of Schools and Colleges
209 Burlington Road
Bedford, MA 01730-1433
Phone: (781) 271-0022, cihe@neasc.org

ABET accreditation

Olin College's three degree programs-electrical and computer engineering, mechanical engineering and engineering-are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Program goals

Olin's degree programs are designed to meet the relevant ABET Program Criteria. The program educational objectives for all majors are:

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

Learning outcomes

In addition to the four goals above, Olin has established nine competencies in which students are expected to be proficient upon graduation. The competencies are:

Qualitative analysis. Olin graduates will be able to analyze and to solve problems qualitatively in engineering and in other disciplines. In particular, students will be able to:
Use appropriate tools of the profession to conduct qualitative analysis;
Use science, math, and engineering concepts to conduct qualitative analysis; and
Identify, formulate, and solve engineering problems in a qualitative manner.

Quantitative analysis. Olin graduates will be able to analyze and to solve problems quantitatively in engineering and in other disciplines. In particular, students will be able to:
Use appropriate tools of the profession to conduct quantitative analysis;
Use science, math, and engineering concepts to conduct quantitative analysis; and
Identify, formulate, and solve engineering problems in a quantitative manner.

Teamwork. Olin graduates will be able to contribute effectively in a variety of roles on teams, including multi-disciplinary teams.

Communication. Olin graduates will be able to convey information and ideas effectively, to a variety of audiences, using written, oral, and visual and graphical communication.

Life-long learning. Olin graduates will be able to identify and to address their own educational needs in a changing world.

Contextual awareness. Olin graduates will demonstrate knowledge of the ethical, professional, business, social, and cultural contexts of engineering. In particular, students will be able to: Demonstrate the benefits of a broad education, an appreciation for contemporary issues, and an ability to connect these topics to their work as engineers; and
Articulate their professional and ethical responsibilities.

Design. Olin graduates will be able to develop creative, effective designs that solve real problems. In particular, they will be able to: Develop designs of products, systems, or processes that respond to authentic needs; Take into account the social, economic, or environmental constraints on the design; and Consider the potential social, economic, or environmental impact of the design.

Diagnosis. Olin graduates will be able to identify and resolve problems within complex systems. In particular, students will be able to: Develop hypotheses; Design and conduct experiments to test hypotheses; and Analyze and interpret the results of these experiments.

Opportunity assessment and development. Olin graduates will be able to identify opportunities, to predict challenges and costs associated with the pursuit of opportunities, and to muster resources in response to opportunities.

Board of Trustees

Board of Trustees

Kenneth R. Stokes, P’12, *Chairman*
Deborah L. Allinson
George R. Berbeco
Thomas Cecil, ’06, *Clerk*
Sunlin Chou
Michael A. Coleman, P’15, P’17
Sherwin Greenblatt, *Vice Chair*
Paul C. Jennings
R. Douglas Kahn
Lawrence W. Milas
Richard K. Miller
George M. Milne, Jr.
William B. Norden
James D. Plummer
Douglas Rauch
Richard T. Roca
Polina A. Segalova, ’06
Howard H. Stevenson
Tiana Veldwisch, ’08
Beverly Wyse, P’15

Trustees Emeriti

William R. Cotter
Tamara P. Davis
C. Scott Gibson
William F. Glavin
Carla L. Gude

Robert N. McBurney
John W. Prados

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

Administration

Faculty

Federal Compliance Statements

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act (FERPA) ensures confidentiality of your educational records (including, but not limited to, academic and enrollment data, 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 which 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 anytime 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 (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

In accordance with its own values and with federal and state regulations, Franklin W. Olin College of Engineering does not discriminate on the basis of race, color, creed, national or ethnic origin, sex, gender identity, religion, disability, age, sexual orientation, disabled veteran status, veteran of the Vietnam Era status, marital or citizenship status (except in those special circumstances permitted or mandated by law). This nondiscrimination policy encompasses the operation of the college’s educational programs and activities including admission policies, scholarship program, athletic and other college-administered programs. It also encompasses the employment of college personnel and contracting by the college for goods and services. The college is committed to taking affirmative action to employ and advance in employment qualified women and members of minority groups identified in state and federal Affirmative Action laws and executive orders, persons with disabilities (including qualified special disabled veterans) and veterans of the Vietnam Era. Further, the college pledges to provide all members of its community with a work and academic environment free of intimidation, coercion, unfair treatment or discrimination. The college seeks to create and maintain an environment that is free from inappropriate discrimination including harassment.

The college’s policy of nondiscrimination is consistent with Title IX of the Educational Amendments of 1972 (see Title IX Coordinator contact information below), Title VI of the Civil Rights Act of 1964, Title VII of the Civil Rights Act of 1964, Executive Order 11246, the Equal Pay Act, the Age Discrimination in Employment Act, the Americans with Disabilities Act, Section 504 of the Rehabilitation Act of 1973, Section 503 of the Rehabilitation Act of 1973, Section 402 of the Vietnam Era Veterans Readjustment Assistance Act of 1974, the Immigration Reform and Control Act of 1986, the relevant Governor’s Executive Orders and Chapter 151B of the Massachusetts General Laws.

If any member of the college community feels that they have been discriminated against by a student, she or he should contact Dean of Student Affairs and Interim Title IX Coordinator Rae-Anne Butera, at 781.292.2321 to discuss possible referral of the matter to the Honor Board. If any member of the college community feels that they have been discriminated against by an employee, she or he should contact Manager of Human Resources and Interim Deputy Title IX Coordinator Joanne Kossuth, at 781.292.2431 to discuss investigation of the matter.

Admission to Olin

Costs and financial aid

Olin is committed to affordability. Olin’s merit scholarship program — complemented by our policy of meeting full demonstrated need — means finances should never stand in the way of an Olin education.

Need–based aid process

Olin College offers need-based financial assistance in the form of federal, state and institutional programs. Aid is available to U.S. Citizens and Eligible non-Citizens who meet eligibility criteria as established by the U.S. Department of Education. International students and non-citizens are generally eligible for the merit scholarship program only, although limited need-based aid may be available.

Families interested in applying for additional assistance must complete a Free Application for Federal Student Aid (FAFSA) online at www.fafsa.ed.gov. Olin College's institutional code is 039463. Allow appropriate time for processing at the Department of Education.

The college is committed to meeting the full demonstrated need for those who apply by the appropriate deadline and are eligible for additional assistance. Similar to the merit scholarship, need-based aid is available for eight semesters of study. Please refer to the college website for applicable deadlines.

Olin College verifies all applications selected by the Department of Education as well as institutionally selected applications. The Financial Aid Office will notify you if you are required to participate in this process. Incoming students should note that their award may be subject to verification. The initial award letter is considered TENTATIVE until the verification process is complete. Upper class students will be required to submit verification documents prior to receipt of an award letter.

Aid is disbursed and posted to the individual student account at the beginning of the semester for which it is intended. All eligibility criteria are evaluated prior to disbursement. Should a student receive assistance in excess of their balance, the Student Accounts Office will issue a refund for the credit due the student or parent.

Please direct any questions regarding financial aid to finaid@olin.edu or 781.292.2215.

Programs of Study and Degree Requirements

Introduction and Program Goals

Engineering education at Olin is in the liberal arts tradition, with a strong emphasis on the Arts, Humanities, Social Sciences and Entrepreneurship. Olin is committed to preparing 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 endeavors to provide its education at little cost to the student. Olin College strives to foster in students:

- a deep appreciation and comprehension of the principles of engineering analysis and design
- a broad knowledge of social and humanistic contexts
- the ability to identify opportunities, articulate a vision, and see it to fruition
- dedication to intellectual vitality, community involvement and lifelong personal growth.

Program Goals

We hope that, after graduation, Olin students in the Engineering, Electrical and Computer Engineering and Mechanical Engineering programs will increasingly demonstrate attainment of the following objectives:

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

Pedagogy and Curriculum

Pedagogy

Olin College's educational perspective provides a distinctive student experience designed to foster student engagement and development. Some of the key features of the Olin College experience are described in the following paragraphs.

Hands-On Learning

Olin has a strong commitment to incorporating hands-on educational experiences through lab and project work in many courses. From the outset of the curriculum, students build technical knowledge and develop practical skills by analyzing, designing or fabricating engineering systems. First year mathematics, science and engineering classes provide hands-on projects involving the modeling, simulation and analysis of engineering systems. Science courses offer opportunities for experimental design and the use of modern instrumentation and testing techniques. The design stream offers opportunities for students to design, prototype and test solutions to authentic problems.

Open-Ended Project-Based Learning

Throughout the curriculum, Olin students gradually build competency in solving open-ended problems. Projects are found in all four years of the curriculum, and project experiences gradually increase in scale, complexity and realism as students develop their knowledge and skills. In open ended projects, student teams identify and define problems, assess opportunities, apply technical knowledge, demonstrate understanding of contextual factors, muster appropriate resources to solve problems, and apply skills such as teamwork, communication and idea generation. Olin's open-ended project emphasis culminates in an ambitious two-semester engineering capstone project that engages student teams in significant design problems with realistic constraints for an external partner.

Multidisciplinary Learning

Olin experiences are designed to build connections amongst fundamental science, mathematics and engineering; amongst different fields of engineering; amongst the arts, humanities and social sciences and technical disciplines; and amongst business, entrepreneurship and technology. As a result, the Olin curriculum is conceived and taught in a highly interdisciplinary way.

In the first year, each course in the Olin Introductory Experience (OIE) is designed to take advantage of the synergies that exist among mathematics, science and engineering topics, including coordinated opportunities for students to apply fundamental mathematics and science to real engineering problems that further elucidate important linkages among disciplinary topics.

In addition to the OIE, Olin builds multidisciplinary connections through tightly coupled, faculty team taught courses. Many other courses feature teaching or visits from faculty members who share different perspectives and thereby help students understand the broader context and implications of their work.

Competency Assessment

In addition to course-based graduation requirements, Olin develops and assesses student growth in a number of overarching competency areas. Olin has established nine competencies in which students are expected to be proficient upon graduation. The competencies are:

QUALITATIVE ANALYSIS. Olin graduates will be able to analyze and to solve problems qualitatively in engineering and in other disciplines. In particular, students will be able to:

- Use appropriate tools of the profession to conduct qualitative analysis;
- Use science, math, and engineering concepts to conduct qualitative analysis; and
- Identify, formulate, and solve engineering problems in a qualitative manner.

QUANTITATIVE ANALYSIS. Olin graduates will be able to analyze and to solve problems quantitatively in engineering and in other disciplines. In particular, students will be able to:

- Use appropriate tools of the profession to conduct quantitative analysis;
- Use science, math, and engineering concepts to conduct quantitative analysis; and
- Identify, formulate, and solve engineering problems in a quantitative manner.

TEAMWORK. Olin graduates will be able to contribute effectively in a variety of roles on teams, including multi-disciplinary teams.

COMMUNICATION. Olin graduates will be able to convey information and ideas effectively, to a variety of audiences, using written, oral, and visual and graphical communication.

LIFE-LONG LEARNING. Olin graduates will be able to identify and to address their own educational needs in a changing world.

CONTEXTUAL AWARENESS. Olin graduates will demonstrate knowledge of the ethical, professional, business, social, and cultural contexts of engineering. In particular, students will be able to:

- Demonstrate the benefits of a broad education, an appreciation for contemporary issues, and an ability to connect these topics to their work as engineers;
- and Articulate their professional and ethical responsibilities.

DESIGN. Olin graduates will be able to develop creative, effective designs that solve real problems. In particular, they will be able to:

- Develop designs of products, systems, or processes that respond to authentic needs;
- Take into account the social, economic, or environmental constraints on the design; and
- Consider the potential social, economic, or environmental impact of the design.

DIAGNOSIS. Olin graduates will be able to identify and resolve problems within complex systems. In particular, students will be able to:

- Develop hypotheses;

- Develop and conduct experiments to test hypotheses; and
- Analyze and interpret the results of these experiments.

OPPORTUNITY ASSESSMENT AND DEVELOPMENT. Olin graduates will be able to identify opportunities, to predict challenges and costs associated with the pursuit of opportunities, and to muster resources in response to opportunities.

Feedback

Olin College fosters a culture of continual feedback and improvement. Olin's curriculum, courses and extra-curricular activities are shaped by student input and feedback. Faculty solicit student feedback and routinely adjust course direction and areas of emphasis to better address student educational needs. Students are expected to be active learners and participants in the process of continual improvement.

Individualized and Student-Designed Options

Olin students may design or customize many aspects of their educational experience. Many Olin courses include student-designed components such as projects, self-study modules, and selection of emphasis areas. More substantial student-designed and student-driven learning may be found in the following activities:

Self-Study

All students are required to complete four credits of approved coursework in which each student works independently to select and study an area of interest. It is an opportunity to develop the skills and attitudes of life-long learning, a competency Olin considers vital for engineers working in an environment of rapidly changing technology.

Concentrations and Capstones

All students design a concentration in an area of interest within the Arts, Humanities, Social Sciences or Entrepreneurship with an opportunity to develop more depth through additional coursework or a capstone.

Cross-Registration

Most students choose to complete some degree requirements at Olin's neighboring institutions. Cross-registration agreements are in place at Babson, Brandeis and Wellesley enabling Olin students to benefit from other institutions' expertise in the arts, humanities, social sciences, natural sciences and business topics.

Self-Designed Engineering (E) Degree Concentrations

Besides designated concentrations, the Engineering (E) degree offers students the opportunity to design their own concentrations, subject to review and approval by the Engineering Program Group.

Away Experience

The Olin curriculum is designed so that students who wish to spend a semester away from the college can do so. The away experience may take several forms including experience abroad or at another U.S. institution in a new cultural setting. The away experience can occur during a semester or a combination of a semester and summer.

Research [1]

Some students choose to enhance their educational experience through participation in research activities. Olin offers many opportunities for faculty-directed undergraduate research, both during the academic year and during the summer. Students may receive either academic credit or pay for a research activity. Students are encouraged to become involved in research early in their undergraduate career, and may participate in research as early as their first year.

Independent Study [1]

In independent study activities, students work with faculty members to design and implement a learning and assessment plan for the study of topics not covered by listed Olin courses.

Passionate Pursuits [1]

Students are encouraged to undertake non-degree credit activities in the form of Passionate Pursuits. These programs seek to recognize the diversity of technical, artistic, entrepreneurial, humanist and philanthropic interests that students bring to the college. The college encourages the pursuit of such activities for both personal and professional development. Olin supports these endeavors by providing resources as well as recognition on the transcript.

Curriculum

The Olin College curriculum provides a strong foundation in engineering, mathematics and applied science subjects and promotes development of engineering analysis, diagnosis, modeling and problem-solving skills. A full list of courses is available here.

Engineering

Engineering is using technical knowledge to solve society's problems. Every Olin graduate takes a program of studies designed to provide a superb grounding in the technical material of engineering while simultaneously connecting that material to its applications and contexts of use. From the earliest modeling and simulation activities in the courses Modeling and Simulation of the Physical World and Modeling and Control and the hands-on projects of Design Nature through the project-intensive Principles of Engineering and User-Oriented Collaborative Design courses, Olin students are continually putting engineering knowledge to work.

Each Olin student also pursues a major program or concentration that is broad, deep, coherent and rigorous, in the field of Electrical and Computer Engineering, Mechanical Engineering, or another area of Engineering of the student's choice. Olin's Engineering curriculum culminates in an engineering capstone project.

Math and Science

Olin's mathematics and science curriculum serves two purposes. First, it provides students with an understanding of the deep and precise ideas that characterize science and mathematics. Second, it teaches fundamental ideas and techniques in science and mathematics whose application makes engineering possible.

A student's mathematics and science education begins at Olin with Modeling and Simulation of the Physical World. Their mathematics experience then continues with integrated mathematics courses covering vector calculus, linear algebra, differential equations and probability and statistics. Science at Olin consists of a breadth of classes in each of three disciplines: physics, chemistry and biology. Additional mathematics or science classes may be required by a particular program. Students may then focus their remaining science and mathematics distribution units in an area of their choice.

Design

Over the course of four years, students complete design projects that enable them to apply technical and non-technical knowledge and skills, develop understanding of design processes, identify and define problems, explore contextual factors that contribute to design decisions, and muster the resources necessary to realize solutions. Students undertake open-ended design problems in many courses, but design learning is emphasized and explicitly developed through a sequence of required design courses. All students complete Design Nature, User-Oriented Collaborative Design, and a further design depth course in an area of interest.

Arts, Humanities, and Social Sciences (AHS)

Olin students study the Arts, Humanities and Social Sciences in order to complete their liberal arts education, develop broad knowledge of social, cultural, and humanistic contexts, and foster their ability to apply contextual thinking in the study of engineering and other disciplines. A firm foundation in AHS content, skills and attitudes is an essential aspect of an engineering education. Students select AHS courses from offerings at Olin and neighboring institutions (Babson, Brandeis and Wellesley) in order to satisfy their individual needs and interests. All students complete a "foundation" AHS course that offers an overview of an AHS discipline, writing instruction and practice, an introduction to contextual and critical thinking, and integration of the content and perspectives of different disciplines. In addition, students complete additional AHS coursework in areas of interest.

Each Olin student also designs a sequence of AHS or Entrepreneurship courses to provide greater depth in a single field. In the AHS area, this sequence may culminate in a student-conceived AHS Capstone, providing students with an opportunity to integrate acquired skills and knowledge. AHS Capstone experiences include research or artistic works, service projects or advanced study.

Entrepreneurship

Entrepreneurship (abbreviated at Olin as E!) is the process of identifying opportunities, fulfilling human needs, and creating value. An understanding of the knowledge, skills and behaviors required for success in entrepreneurship will position students to become better engineers and to make a positive difference in the world. To this end, Olin's curriculum supports the learning of entrepreneurship, broadly defined. Olin graduates will demonstrate a capacity to identify social, technical and economic opportunities, to predict challenges and costs associated with the pursuit of opportunities, and to make decisions about which opportunities are most worthy of pursuit.

Olin students are required to complete a course in business and entrepreneurship. In addition, they have the opportunity to enroll in courses relating to business at Babson College, and interested students may design a sequence of courses to explore an entrepreneurship discipline in depth. Many Olin students pursue their entrepreneurial opportunities through the Olin business incubator, The Foundry, which provides support and space to student businesses.

Many students will also explore entrepreneurship and develop opportunity assessment abilities through their Engineering Capstone experience and out-of-class activities such as student clubs, community service and Passionate Pursuits. The Entrepreneurship experience can culminate in an Entrepreneurship Capstone, requiring students to integrate acquired skills and knowledge.

Communication

Throughout the curriculum, Olin College integrates the instruction and practice of written, spoken, visual and graphical communication. Thus, it is not only within the Arts, Humanities and Social Sciences that an Olin student can expect communication-intensive course work. The Olin curriculum reflects the college's commitment to the engineer as a highly skilled communicator.

Engineering Capstone

A student's final year at Olin centers on an ambitious year-long culminating capstone in engineering, through either the Senior Capstone Program in Engineering (SCOPE) project or the Affordable Design and Entrepreneurship (ADE) project. The engineering capstone project engages interdisciplinary student teams in significant design problems with realistic constraints for an external partner and prepares students for work in their chosen careers. The student's decision to enroll in SCOPE or ADE is required a month following the Spring semester SCOPE Summit. This deadline is strictly enforced in an effort to ensure appropriateness of projects based on the composition of student teams.

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 classes of requirements in order 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 only be satisfied 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 only satisfy one course requirement.

Olin Self Study

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
Math and Science	30; of which at least 10 must be Math
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 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. The table includes one or more current classes that satisfy each requirement. We strongly encourage students to complete all required 1000 level courses prior to the start of their junior year.

Math and Science

MTH1111	Modeling and Simulation of the Physical World	2 MTH
SCI1111	Modeling and Simulation of the Physical World	2 SCI
MTH2210	Linearity I	4 MTH
MTH2220	Linearity II	4 MTH

Probability and Statistics - One of

MTH2130	Probability and Statistics	2 MTH
MTH2131	Data Science	2 MTH
ENGR3531	Data Science	2 ENGR
MTH2132	Bayesian Inference and Reasoning	2 MTH
SCI2032	Bayesian Inference and Reasoning	2 SCI
	Or designated alternative	
MTH2133	Computational Bayesian Statistics	2 MTH
MTH2134	Regional Analysis in Development	2 MTH
ENGR2134	Regional Analysis in Development	2 ENGR

Biology Foundation - One of:

* AP score of 3, 4 or completion of an IB curriculum qualifies a student to sit for an oral exam that may exempt them from one of the foundations and place them into an advanced biology course.

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 OR An advanced biology course if a student received a score of 5 on AP biology	4 SCI

Chemistry/Materials Science - One of:

SCI1310	Introduction to Chemistry (with laboratory)	4 SCI
SCI1410	Materials Science and Solid State Chemistry (with laboratory)	4 SCI
SCI2320	Organic Chemistry (with laboratory)	4 SCI

Physics - One of:

SCI1121	Electricity and Magnetism	4 SCI
SCI1130	Mechanics	4 SCI
SCI2130	Quantum Physics	4 SCI
SCI3120	Solid State Physics	4 SCI
SCI3130	Advanced Classical Mechanics	4 SCI

SCI2130, SCI3120, SCI3130: with instructor permission

Engineering

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

Engineering Capstone - One of:

Both options are a two consecutive semester course requirement.

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

Design

ENGR1200	Design Nature	4 ENGR
ENGR2250	User-Oriented Collaborative Design	4 ENGR

Design Depth Course - One of:

See the current registration booklet for possible additional options, including special topics courses.

ENGR3210	Sustainable Design	4 ENGR
ENGR3220	Human Factors and Interface Design	4 ENGR
ENGR3230	Investigating Normal: Adaptive and Assistive Technologies	4 ENGR
ENGR3250	Integrated Product Design	4 ENGR
ENGR3260	Design for Manufacturing	4 ENGR
ENGR3710	Systems	4 ENGR
ENGR3290	Affordable Design and Entrepreneurship	4 ENGR

The Design Depth Courses listed above 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 a system, component or process to meet needs.

AHS and Entrepreneurship

AHS Foundation - One of:

AHSE1100	History of Technology: A Cultural & Contextual Approach	4 AHSE
AHSE1122	The Wired Ensemble -Instruments, Voices, Players	4 AHSE
AHSE1130	Seeing and Hearing: Communicating with Photographs,	4 AHSE

	Video and Sound	
AHSE1140	Culture & Difference: An Anthropological Approach	4 AHSE
AHSE1145	The Human Connection: Tools and Concepts from Anthropology for Understanding Today's World	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
AHSE1515	Products and Markets	4 AHSE
	AHS or Entrepreneurship Depth of Study	

AHS or Entrepreneurship Depth of Study: For the AHS Concentration, students design a sequence of approved AHS discipline courses and must complete a minimum of 12 credits in this area. The 12 credits may be 8 credits of course work and an AHS Capstone Project, AHSE4190, or the credits may come from a sequence of AHS courses without a project. For the Entrepreneurship concentration and capstone, students design a sequence of approved Entrepreneurship courses, totaling 8 credits. Students complete this study with a required capstone, AHSE4590.

One of:

AHSE4190	Arts Humanities Social Sciences Capstone Project	4 AHSE
AHSE4590	Entrepreneurship Capstone	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
- and examples of how one might integrate the content and perspectives of different disciplines.

Self-Study

The Olin Self Study Requirement is a graduation requirement that all Olin students must fulfill with 4 credits of approved advanced work. All activities give students experience in identifying areas and questions of interest; developing and following a plan of study in pursuit of understanding important concepts in the proposed area or in pursuit of an answer to the proposed question; and communicating the knowledge they gain, apply, analyze, synthesize, and/or evaluate through the investigation.

All OSS activities must explicitly achieve the following:

- Develop students’ skills in working independently to learn challenging material and to tackle challenging problems
- Develop students’ skills in communication relevant to the field and project
- Hone students’ skill and attitudes enabling life-long learning

Still have questions? Consult the complete User's Guide to Self Study @ Olin.

Approval varies depending on the type of project:

1. If fulfilling the OSS requirement with an AHS or E! capstone project, approval of the project will go through those program committees.
2. If fulfilling the OSS requirement with research, the research must be a second semester of research with the same faculty member to insure advanced level work at a 3000 or 4000 level. The research must also include a significant self-study component, receive a grade, and allow the student to contribute on an intellectual level to a field, and produce a relevant deliverable such as a literature review or work towards a research paper appropriate for submission.
3. If fulfilling the OSS requirement with an Independent Study, the work must be sufficiently advanced to be considered equivalent to a 3000 or 4000 level course, an Olin faculty member must be the primary point of contact for the activity, and the project must receive a grade. The Olin Self Study Requirement (OSS) form must be submitted to the Registrar’s Office by the semester add deadline. Signatures of the student, project adviser and disciplinary adviser (if appropriate) are required, as well as documentation that the proposal meets the standards set out above.
4. If fulfilling the OSS requirement with an ARB approved course, the student must take the class for a grade. Courses can only be submitted for qualification to the ARB by faculty members. If a student believes they are taking a course that should fulfill the OSS requirement they should discuss this with the faculty member.

Academic Programs

At many schools, degree programs are highly specialized. Students take many classes in their major, but few classes in other fields. At Olin, it's not just about what students know, but what they do with that knowledge. The curriculum is designed to provide technical depth in the areas most relevant to what students are likely to do after graduation. Every student learns about software, electronics and mechanical systems, and has several chances to work with students from other majors on interdisciplinary projects.

Every Olin student gets some basic electrical and computer engineering experience. In the first year, students learn basic circuit analysis, design, and testing and works with sensors, data acquisition, and signal processing in Introduction to Sensors, Instrumentation and Measurement. In the sophomore year, students gain experience with microcontrollers and embedded software development in Principles of Engineering.

In Design Nature, every Olin student gets mechanical engineering experience by designing a toy that hops or swims (mechanical design), building a working prototype of that toy (fabrication), and modeling and predicting the behavior of a system like a monkey swinging from tree to tree or an exploding fireworks shell (mechanical and thermal analysis).

Our degree programs are designed to complement these common experiences with specialization and technical depth. Olin offers ABET accredited degrees in Electrical and Computer Engineering (ECE) (p. 17), Mechanical Engineering (ME) (p. 21) and Engineering (E) (p. 18), 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 Math		
MTH2110	Discrete Math	4 MTH
ECE All of:		
ENGR2410	Signals and Systems	4 ENGR
ENGR2420	Intro Microelectronic Circuits with laboratory	4 ENGR
ENGR2510	Software Design	4 ENGR
ENGR3410	Computer Architecture	4 ENGR
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
ENGR3415	Digital Signal Processing	4 ENGR
ENGR3420	Introduction to Analog and Digital Communication	4 ENGR
ENGR3427	Mixed Analog-Digital VLSI II	4 ENGR
ENGR3430	EE Prototyping	4 ENGR
ENGR3440	Principles of Wireless Communication	4 ENGR
ENGR3450	Semiconductor Devices	4 ENGR
MTH3140	Error Control Codes	2 MTH
ENGR3140	Error Control Codes	2 ENGR
	any level 3000 or higher E:C course, or other course approved by ECE program group	

ENGR3415, ENGR3420: if not used above

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 who choose the Engineering degree must submit a plan of study along with their declaration of 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, Material Science, and Robotics 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 may choose a name for their self-designed concentration. This concentration name appears on the diploma but not on the official transcript.

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

Plans of study are reviewed by the Engineering Program 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 adviser approval; substantive changes require approval of the Engineering Program Group.

Engineering: Bioengineering (E:Bio)

Bioengineering is an interdisciplinary concentration rooted in engineering problem solving and a deep understanding of biology. The E:Bio concentration prepares students to approach problems important to biology, medical research, and clinical studies.

E:Bio Math

Four credits of advanced Mathematics appropriate to the program of study

E:Bio Biology

Four credits of advanced Biology

E:Bio Bioengineering

12 credits of coursework appropriate to Bioengineering

E: Bio Elective

Four additional credits supporting a student's Bioengineering focus area
Students wishing to pursue the E:Bio concentration within the Engineering major must develop a specific program of study in consultation with bioengineering faculty. As Bioengineering is a very broad field, students should specify the Bioengineering focus area they are interested in on their course plan and chose courses that support area of study. Below are some guidelines on course selection.

Advanced Mathematics courses include MTH3120 Partial Differential Equations and MTH3170 Nonlinear Dynamics and Chaos. Advanced Biology courses include SCI2210 Immunology and SCI3210 Human Molecular Genetics in the Age of Genomics. Bioengineering courses include all ENGR 36xx¬series courses, as well as ENGR3810 Structural Biomaterials. Bioengineering Electives are additional courses that support a student's chosen area of focus within Bioengineering (e.g. relevant Physics, Chemistry, Mechanical Engineering, Computing, Electrical Engineering courses that build supporting skills). E:Bio course plans may include classes at Babson, Brandeis, Wellesley, or other institutions. Note that this is not an exhaustive list of acceptable courses; other courses may be used to fulfill each of these requirements if they are part of an approved course plan.

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:C Math

MTH2110	Discrete Math	4 MTH

E:C Core

ENGR2510	Software Design	4 ENGR
ENGR3520	Foundations of Computer Science	4 ENGR
ENGR3525	Software Systems	4 ENGR
	or approved substitutions	

E:C Electives

eight additional credits in computing
Additional computing credits may include Olin courses such as ENGR3540 Computational Modeling, ENGR3410 Computer Architecture, advanced computer science courses at Babson, Brandeis, Wellesley, or study away institutions. ENGR3220 Human Factors and Interface Design may count toward the course requirements of E:C, but only if it is not used to satisfy the Design Depth requirement.

Engineering: Design (E:D)

E: Design is an interdisciplinary concentration emphasizing synthesis, processes and methods of practice that blends engineering and 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 may not simultaneously be used to meet the E: Design Core or Elective 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 the design faculty. Design Research counts as Advanced Design.

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 Elective requirement and not the E: Design Core 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. All programs of study must receive prior approval by design faculty.

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

E:D Core

Eight credits of approved Advanced Design courses; Four credits may be me by Design Research

E:D Electives

Twelve credits of approved coursework appropriate to the program of study

E:D Portfolio

Two credits of Independent Study on portfolio creation (optional)

Engineering: Materials Science (E:MS)

Materials Science is an inherently interdisciplinary field with a strong presence throughout most engineering and science disciplines. Olin's materials science concentration provides an integrated approach to materials, merging a variety of engineering design principles with concepts from solid-state physics and applied chemistry. Students who complete the E:MS concentration will achieve an understanding of structure, property, processing, performance relationships in materials, the ability to apply advanced scientific and engineering principles to materials systems, and the skills to synthesize appropriate technical and contextual information to solve materials selection and design problems.

Students wishing to pursue the Materials Science concentration within the Engineering major must develop a specific program of study in consultation with materials science and applied chemistry faculty. Such programs may emphasize different aspects of materials science, such as structural materials, solid state properties of materials, processing and manufacturing, or applied chemistry.

E:MS

20 credits of engineering subjects appropriate to the program of study with a minimum of twelve credits in materials science subjects.

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.

E:Robo Math

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

E:Robo Breadth

Four credits of coursework in software AND

Four credits of coursework in mechanical engineering

E:Robo Depth

One of:

ENGR3390	Fundamentals of Robotics	4 ENGR
ENGR3590	A Computational Introduction to Robotics	4 ENGR
	AND	
ENGR3392	Robotics Systems Integration	4 ENGR

E: Robo Elective

Four additional credits of related coursework
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.

Advanced Mathematics courses typically include MTH3120 Partial Differential Equations, MTH3170 Nonlinear Dynamics and Chaos, or MTH2110 Discrete Mathematics. Appropriate courses in Software may include ENGR2510 Software Design or other courses selected in consultation with cognizant faculty. Appropriate courses in Mechanical Engineering may include ENGR2340 Dynamics or ENGR3345 Controls or other courses.

Mechanical Engineering (ME)

The ME major provides advanced opportunities for students to design, build and analyze mechanical and thermal systems. Students apply theories of energy, heat, and fluid flow to systems ranging from microfluidic devices to jet engines and develop tools to design and analyze the mechanical strength of structures and the motion of mechanisms.

The Course Requirements of the ME program are:

ME Math - One of:

MTH3120	Partial Differential Equations	4 MTH
MTH3150	Numerical Methods and Scientific Computing	4 MTH
MTH3170	Nonlinear Dynamics and Chaos	4 MTH
	or other math course approved by ME program group	

ME - All of:

ENGR2320	Mechanics of Solids & Structures	4 ENGR
ENGR2340	Dynamics	4 ENGR
ENGR2350	Thermodynamics	4 ENGR
ENGR3310	Transport Phenomena	4 ENGR
ENGR3330	Mechanical Design	4 ENGR

ME - One of:

ENGR3110	Elecanisms	4 ENGR
ENGR3260	Design for Manufacturing	4 ENGR
ENGR3340	Dynamics of Mechanical and Aerospace Structures	4 ENGR
ENGR3345	Mechanical and Aerospace Systems	4 ENGR
ENGR3370	Controls	4 ENGR
ENGR3390	Fundamentals of Robotics	4 ENGR
ENGR3392	Robotics Systems Integration	4 ENGR
ENGR3610	Biomedical Materials	4 ENGR
ENGR3710	Systems	4 ENGR
ENGR3810	Structural Biomaterials	4 ENGR
ENGR3820	Failure Analysis and Prevention	4 ENGR
	or other course approved by ME program group	

ENGR3260, ENGR3710: if not used to satisfy the Design Depth requirement

Other Academic Programs and Opportunities

Study away program

One of the founding principles of Olin College was that each student should have the opportunity to have a learning experience "away" from the college. This ideal was articulated early in the creation of the college with the expressed objective of having students learn to be citizens of the world.

The Olin Away Program was created to deliver on this principle, and provide students with the opportunity to broaden their perspective and views of the world. Students in their junior year can choose among three types of away experiences: a Direct Exchange Program, a Pre-Approved Program, or a Student-Designed Program. Financial assistance may be available to eligible students. Contact the Financial Aid Office for additional information regarding eligibility and procedures. For additional information please visit: http://awayprograms.olin.edu

Grand Challenge Scholars Program

4+1 Bachelor of Science Degree with Wellesley College

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

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 will end up taking courses at different times compared to Engineering Certificate students to ensure that they are prepared for the upper-level engineering courses they will take at Olin in the 5th year.

Admission to the 4+1 program takes place in the student's junior year at Wellesley, and is contingent on the student having already made progress towards the engineering degree (typically this means that students needs to complete no more than 32 credits during the year in residence at Olin). Students admitted to the 4+1 program receive Olin's tuition scholarship, and may apply for additional financial aid.

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, as well as satisfying specific science, math, and engineering requirements (including distribution requirements and course requirements) for the engineering degree at Olin College. Units counted toward the Wellesley degree may be counted towards the Olin distribution requirements. The distribution requirements for the 4+1 Degree are shown in the table below.

Area	Minimum Credits Required
Engineering	48
Math and Science	32

The math and science coursework must meet the requirements listed in the table below. Suggested Wellesley College courses that satisfy these requirements are also provided.

Mathematics

Mathematics courses must include coverage of integral and differential calculus, multivariable calculus, linear algebra, and differential equations, and probability and statistics.

MTH115	Calculus I
MTH116	Calculus II

Choose one of the two sequences:

MTH205	Multivariate Calculus
MTH206	Linear Algebra
MTH210	Differential Equations
MTH215	Mathematics for the Sciences I
	AND
PHYS216	Mathematics for the Sciences II

Choose one of the two courses:

MTH220	Probability and Elementary Statistics
	OR
PHYS305	Statistical Mechanics and Thermodynamics

Science

Science courses must include at least one foundational, major-specific course from each of the physical sciences (physics, chemistry and biology)

PHYS107	Principles and Applications of Mechanics with Laboratory
BISC111	Introductory Organismal Biology with Laboratory

Choose one of the two courses:

CHEM105	Fundamentals of Chemistry with Laboratory
	OR
CHEM120	Intensive Introductory Chemistry with Laboratory

Engineering

The engineering coursework must meet the requirements listed in the table below. Students normally take ENGR160 Fundamentals of Engineering at Wellesley College prior to taking engineering classes at Olin.

Wellesley Pre-requisite

ENGR160	Fundamentals of Engineering

Foundational engineering requirements 2 courses/8 credits

ENGR1125	Introduction to Sensors, Instrumentation and Measurement	4 ENGR
	AND	
ENGR1200	Design Nature	4 ENGR

ENGR1125, ENGR1200: fall

Design Stream requirements 5 courses/20 credits

ENGR2110	Principles of Engineering	4 ENGR
ENGR2250	User-Oriented Collaborative Design	4 ENGR

ENGR2110: fall
ENGR2250: spring

A course that satisfies the Olin College Design Depth requirement

Engineering Capstone (Two-course sequence), choose one:

Students in the 4+1 Program are normally expected to complete the engineering capstone requirement during (and no earlier than) their year in residence at Olin.

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

Chosen engineering major requirements Normally 6 courses/24 credits

Major requirements for the 4+1 Program are the same as those described in the Academic Programs section of the Olin College Catalog.

Wellesley students must take a course that develops basic computing skills using Matlab, Python or another appropriate tool:

A course that develops basic scientific computing skills 1 course/4 credits

MTH1111	Modeling and Simulation of the Physical World	2 MTH
SCI1111	Modeling and Simulation of the Physical World	2 SCI
	OR	
CS112	Computation for the Sciences (at Wellesley College)	

MTH1111, SCI1111: fall
(Students may propose another appropriate Wellesley College course for this requirement)

Wellesley students must also complete the entrepreneurship foundation course:

Entrepreneurship foundation course 1 course/4 credits

AHSE1515 Products and Markets 4 AHSE
AHSE1515: spring

Wellesley students who are accepted into the 4+1 Program must spend two semesters in residence at Olin College (living on campus) and must complete a minimum of 28 credits at Olin during that time. Wellesley students must complete a minimum of 44 credits at Olin College during the period they are enrolled at Wellesley and completing the fifth year at Olin.

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

A Note Regarding the Revised Engineering Certificate and 4+1 Policies (for Wellesley Students Only)

The requirements for the Engineering Certificate Program and the 4+1 Program were substantially revised in November 2014. Wellesley students working on the Engineering Certificate or who intend to apply for the 4+1 Program may substitute ENGR160 Fundamentals of Engineering for ENGR1200 Design Nature as long as they took ENGR160 at Wellesley during or prior to Fall 2014. Wellesley students who completed ENGR160 by Fall 2014 and who are admitted to the 4+1 Program will not be required to complete the new foundational requirement (ENGR1125 Introduction to Sensors, Instrumentation and Measurements), but will be expected to develop a plan of study (in conjunction with their Olin faculty advisor) for their final year at Olin with appropriate depth in advanced engineering study.

Babson/Olin/Wellesley Sustainability Certificate Program

The Babson/Olin/Wellesley Sustainability Certificate Program is joint program designed to address the challenges of using earth's resources sustainably through a collaborative and disciplinary approach. In this program, students from Babson College, Olin College and Wellesley College perform basic research about the causes and consequences of environmental problems, develop an understanding of the incentives and processes for a largescale reworking of economic activity and explore and create the technology with which to reconfigure the human effect on the natural world. By truly integrating business, engineering, and the liberal arts in the service of environmental sustainability, this program will provide students with the cross-disciplinary academic preparation and the cross-campus cultural collaboration experiences needed to approach environmental issues holistically.

This program is administered through the Babson/Olin/Wellesley Three College Collaboration and program requirements can be found on the Three College Collaboration website. The Sustainability Certificate is awarded to Olin students upon completion of their Olin degree.

For Babson, Brandeis and Wellesley Students: Engineering Certificate Program

Olin College offers a Certificate in Engineering Studies for students at Wellesley College, Babson College, and Brandeis University who wish to gain exposure, education and experience in the art and science of engineering. Students completing the Certificate Program have the opportunity to expand their post-graduate options for careers or advanced study in technological fields. Because the student has flexibility to create a course plan that meets their needs, the Certificate Program can provide a broad and general introduction to engineering, or can provide (in conjunction with coursework at the home institution) added engineering depth and rigor to an existing math, science or technical degree.

The Certificate consists of five Olin courses that range from introductory to upper-level. These courses must be taken for a letter grade (with the exception of courses that have a unique grading structure). The focus of the Engineering Certificate can be of a student's choosing, provided that the set of five courses selected satisfy the requirements below.

Prerequisites

Babson College, Brandeis College and Wellesley College may have prerequisite courses that students need to complete before beginning the Certificate in Engineering Studies at Olin College. Students should check with their home institutions prior to beginning the Certificate program.

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 the course. Olin courses 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.

Foundational Engineering 1 course / 4 credits

ENGR1125	Introduction to Sensors, Instrumentation and Measurement	4 ENGR
	OR	
ENGR1200	Design Nature	4 ENGR

ENGR1125, ENGR1200: fall

Intermediate Engineering 1 course / 4 credits

ENGR2250	User-Oriented Collaborative Design	4 ENGR
	OR	
ENGR2110	Principles of Engineering	4 ENGR

ENGR2250: spring
ENGR2110: fall

Coherence and Depth 3 courses / 12 credits

The three remaining courses that make up the Engineering Certificate are related under a common theme (e.g. design, mechanical engineering, human computer interaction). Two of these remaining three courses must receive engineering (ENGR) credit AND be intermediate level or higher (i.e. have course designations of 2000 and above)

Wellesley students in the 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.

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. ENGR160 Fundamentals of Engineering at Wellesley College may not be substituted for a required certificate course.

Enrollment and Completion of the Certificate Program

Students who wish to enroll in the Engineering Certificate Program should submit a Certificate Program Enrollment Form to the Olin College Registrar's Office once they have completed their first course at Olin. The form must be signed by the student's advisor at their home institution, as well as the Olin College certificate advisor, and should include a course plan for completing the certificate. Students should notify the Olin College certificate advisor of any changes to the course plan as certificates will only be awarded to students with an up-to-date course plan on file with the Olin Registrar's Office.

Courses, Credits, Hours

Availability of Offerings

Information in this catalog and semester offerings are subject to change. Please go to the Student Accounts and Records Center website 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
MTH	Mathematics
SCI	Science
SUST	Sustainability

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

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 AHSE 1100 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.

Olin Administration

OIP1000 The Olin Internship Practicum

Students get the best preparation for their career by obtaining real life experience, preferably in a work setting. This course would require an international student (F-1 visa status) seeking this type of meaningful, career-building internship to receive the necessary career preparation by way of PGP workshops, obtaining the necessary internal authorizations, and completing, along with their employer, a final work experience evaluation. At least 100 work hours would be required at the internship. In addition, the student must participate in at least two Post Graduate Planning workshops. If two of these are not available, the student may take similar, related workshops, or meet with PGP individually to cover the required material.

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

AHSE - Arts Hum Soc Sci Entrepr

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 required.. Hours: 2-0-1.

AHSE1100 History of Technology: A Cultural & Contextual Approach

Throughout this semester we will use different history of technology narratives to explore larger themes. Our narrative case studies will range from bronze age societal studies to cutting edge computing and Internet technologies, and throughout the semester we will compare and contrast these narratives in search of larger trends. We will also identify and investigate broader issues 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 broader issues through targeted writing activities, debates, individual and group presentations, at least one field trip, movie and media studies, and numerous in-class discussions. Students will have a high degree of autonomy, and will set and evaluate their own learning objectives, determine the topic for 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.

AHSE1130 Seeing and Hearing: Communicating with Photographs, Video and Sound

Seeing and Hearing is a foundation course that is about the communication of ideas developed by research, reflection, and evolving thought, using contemporary digital media tools as a vehicle for expression. In this project-based course, students will have opportunities for hands-on learning in audio recording and editing, photography and printing, and video recording and editing. Science and engineering content are integrated in order to provide a reasonably comprehensive understanding of the devices we use to gather sound and images and in order to understand more fully the properties of seeing and hearing. A major goal is to enlarge our awareness of the environment we inhabit and to respond to the perceived environment by producing original visual and sonic artwork. Students will complete projects including a self-portrait, a sound-piece that is used as an audio track for a short video, a video documentary, and a staged narrative. Our process is to share work through discussion sessions as we follow projects from their initial stages to completion and final presentation. Additional context for Seeing and Hearing is provided by selected readings, visits by guest lecturers, additional faculty and staff participation and by viewing work of other professional practitioners. This course does not require prior experience with image/sound gathering or editing.

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

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

We live in a world that is fundamentally visual and yet formal teaching and learning about visual communication is almost entirely reserved for specialists. Similarly learning about the evolution of vision and the molecular foundations of human vision are not often dealt with in introductory biology courses. This course seeks to remedy the lack of engagement with these topics at the foundational course level. In this studio-based project-oriented course students will develop an understanding of what it takes to make original art through first-hand experiences in a supportive environment. As a means to this end, students will gain facility with digital single- lens reflex (DSLR) cameras, digital photo editing and printing methods using state-of-the-art equipment. As this is an AHS foundation course students will also have an opportunity to further develop writing communication skills and critical thinking ability. The course will also address the history of photography, consider the work of a number of contemporary fine art photographers and answer the question "Why has photography changed everything?"

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

AHSE1140 Culture & Difference: An Anthropological Approach

This course introduces students to key concepts and methods in cultural anthropology. Cultural anthropology is the study of how humans organize their lives as members of society, and the ways in which they make these lives meaningful. Through readings on such diverse topics as adolescence in Samoa, epilepsy among Hmong-Americans, and McDonald's in Hong Kong, this course will explore contemporary anthropological approaches to three central questions: 1) What is culture? 2) Does "culture" explain why people do what they do and believe what they believe? 3) What fate and value do cultural differences have in today's interconnected world?

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.

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.

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

Entrepreneur: one who owns and manages a business; a person who takes the risk of profit or loss. - O.E.D. The same source also reveals a broader definition found in the French root, entreprendre, which means "to undertake." An entrepreneur is defined as one who assumes the opportunity and full responsibility of any pursuit. A champion.

In this course, students explore and begin to realize in themselves the entrepreneur in both forms: the practical and the profound. In this foundational course in business and entrepreneurship they will conceive, create and manage a real, profitable business. They will be exposed to traditional business tools such as accounting, marketing and finance as well as the personal and interpersonal tools requisite for high-performance teamwork, including project planning, giving feedback and persuasive pitching. This business experience and its associated challenges will serve as the context in which we hope to develop broader self-awareness, productive self-reflection and courage. Broadly, these skills will apply to the bold imagining and realization of their lives at Olin and beyond.

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.

AHSE2110 The Stuff of History: Materials, Culture in Ancient, Revolut'nary and Contemporary Times

The lion's share of our history of technology course features a series of readings, lectures, and discussions on the relationship between materials, science, society, and the environment in three historical periods. We start with the material practices and paradigms of Copper and Bronze Age societies, shift to Paul Revere's "Revolutionary" work with various metals and fabrication processes, and conclude with a look at the technologies and challenges of tomorrow. We will emphasize the development of three skills that are vital to our studies: contextual thinking, communication (both written and oral), and historical research methods pertaining to source evaluation and narrative construction.

Credits: 4 AHSE. Concurrent Requisites: SCI1410A. 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 impact upon the world in which we live. Class meetings will alternate between contextual studies of the historical context of each book (including the author's background, the political and social setting, and other factors) and careful analyses of the works themselves. 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 will be offered during the first 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 will be offered during the second 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.

AHSE2125 The Engineer's Orchestra II: Theory, Orchestration, Composition

The Engineer's Orchestra II provides just-in-time harmonic and contrapuntal theory for the study of orchestration, with special attention to voice leading, instrumental doubling, spacing, balance, and color. Each week students complete preliminary exercises that target the skills necessary for that week's focus of study. They then orchestrate piano reductions of symphonic excerpts, and vice versa, in order to apply these developing skills. The course progresses from scoring for string, woodwind, and brass ensembles to woodwind-string and woodwind-brass-string combinations, and finally the full orchestra. Class discussions involve students defending their technical and artistic decisions, followed by close examination of the choices made by the original composer. Weekly recorded examples bring to life the fundamental concepts underlying the work of past and contemporary orchestrators. Guest appearances/demonstrations by instrumentalists allow students to sharpen their listening skills as they distinguish among the possibilities for bowings and articulations that inform orchestral writing. The course culminates with each student pursuing a final project, such as an original composition or arrangement.

Credits: 2 AHSE. Recommended Requisites Wired Ensemble or Permission of Instructor. Hours: 4-0-8.

AHSE2130 The Intersection of Art and Science

Science and Art are often considered entirely different worlds inhabited by practitioners who have nothing in common. In this course, we will debunk this myth by closely examining the discovery process in both disciplines and by comparing the culture of science to that of art, historically and in the present. We will consider the influence of scientific discoveries, from optics to "new media" on the production of art and discuss the corollary question "Has art influenced the progress of science?" We will also consider ways in which science allows us to understand artists and the work they create. In contemporary society, artists have begun to comment on science, sometimes with disastrous results, which leads us to ask, "What is needed in order to establish a meaningful dialogue between scientists and artists, and does it matter?"

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

AHSE2131 Responsive Drawing and Visual Thinking

The course 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 page, gaining critical experience with "idea sketching," an ability that can be put to many uses in future courses (e.g. project design). Students will also 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. Several invited speakers will contribute to the course and provide informal critiques of student work. One field trip is planned to the Fogg Art Museum at Harvard University in Cambridge to view art. Other in-class activities will include participation in discussion of drawings (old master and contemporary) that are presented to illustrate various objectives of classroom work (e.g. use of line to indicate form) and group critique sessions. Assessment will be based on weekly homework assignments, classroom work, and three drawing projects to be completed outside of class.

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

AHSE2140 Anthropology: Culture, Knowledge and Creativity

Anthropological theories and methods help us understand human behavior and values. Broadly speaking, anthropologists ask, "Why do people do what they do and believe what they believe?" Today, anthropologists study a wide range of contemporary social issues, such as international development, garment manufacturing, the production of scientific knowledge, female "circumcision," and intellectual property. In this course, we will read about, debate, and discuss these and other issues in order to probe into the meanings of culture, knowledge, and creativity.

o What do anthropologists mean by culture?

o What does it mean to take cultural difference seriously?

o Does culture have an influence on what is considered legitimate "knowledge"?

o If knowledge is "situated," what happens when one form of knowledge comes in contact with another (for instance in discussions of global human rights)?

o What is the relationship between cultural difference, situated knowledge, and human creativity?

o Does globalization threaten to destroy creativity, stifle innovation, and erase difference?

After we learn how anthropologists deal with these questions at a range of research sites, we will end the course with our own anthropological studies that utilize what we have learned earlier in the course. Students will conduct short research projects that examine social issues pertaining to the use of the Internet in the United States. By ending with a study of ourselves, students will see how creative we really are; that we, too, have culture; and that what we consider legitimate knowledge is culturally situated. The professor will assume no prior knowledge of anthropology. Skills to be developed include critical reading, critical thinking, writing and analysis, presenting arguments in oral and visual form, and working on projects in small groups. The following texts will be used, among others: Jean Davison, Voices from Mutira: Change in the Lives of Gikuyu Women, Daniel Miller and Don Slater, The Internet: An Ethnographic Approach, Jeremy MacClancy, Exotic No More: Anthropology on the Front Lines.

Credits: 4 AHSE. Recommended Requisites AHS Foundation. 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

Credits: 4 AHSE. Concurrent Requisites: SCI1250.

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.

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.

AHSE3100 Issues in Leadership and Ethics

This course examines the intersection of leadership and ethics in business, engineering, and more general contexts. Readings will include material on the definition and history of ethics and morality in the U.S., the definition and development of leadership skills in a professional context, the role of ethics in the professions, and case studies involving the intersection of leadership and ethics. The course will be structured as a seminar, involving guest speakers and interactive case studies. Enrollment will be limited to 8 students from each college in the final semester of their undergraduate program. The course is typically taught by the Presidents from the Three College Collaboration.

Credits: 2 AHSE. Recommended Requisites Students must be in their final year.. Hours: 2-0-4.

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. Recommended Requisites AHSE1130 or Permission of Instructor. Hours: 4-0-8.

AHSE3190 Arts Humanities Social Sciences Capstone PreparatoryWorkshop

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.

AHSE3510 New Technology Ventures

Creating a new venture that has technology as a basis for its products or services presents special challenges. On one hand is the "push" of new technology, as evidenced by the plethora of scientific invention and technological innovation. On the other hand is the "pull" of the market as it presents new entrepreneurial opportunities. Other key challenges present themselves in areas of intellectual property protection, team building and funding opportunities. In this course we will explore entrepreneurship in technology industries in depth with the hope of penetrating the popular veneer, and uncovering the guts of starting a growing new technology ventures. Of course, there is a lot about new technology venturing that is common to all new venture creation, and also the qualities entrepreneurs demonstrate are valuable in a wide spectrum of life's activities. A unique aspect of this course is its desire to include students from both Babson College and Olin College. Particular value from this intermingling will be evidenced in the true interdisciplinary nature of the course field project teams that are formed, and the ability for students to begin to develop networks of relati onships outside their individual domains of business or engineering.

Primary Course Objectives:

1. To investigate the components, tools, and practices of technology entrepreneurship: identifying new venture opportunities, evaluating the viability of a new business concept, calibrating risk of successful technology development, protecting intellectual property, building a team that possesses the attributes necessary for success, obtaining appropriate financing, writing a business plan, and developing an investor presentation, creating an entrepreneurial culture that increases the odds of success, and creating liquidity for shareholders.

2. To identify and exercise entrepreneurial skills through classrooms debate and assignments.

3. To introduce students to a variety of technology entrepreneurs. Case studies are used as tools for discussion, and are augmented with readings and guest speakers. The core project for this course will be the development of a technology based business plan. Students will form teams to explore a business opportunity, and develop a business plan and investor presentation.

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

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.

AHSE4590 Entrepreneurship Capstone

The Entrepreneurship Capstone is an advanced, intensive experience designed to complete a student's undergraduate study of entrepreneurship. The Entrepreneurship Capstone is designed as a seminar that enables students to interact with an experienced entrepreneur in order to accomplish three objectives. First, students will spend the majority of the semester focused on an individual project, the goal of which is expertise in a particular entrepreneurial or business topic. These projects are defined by each student in collaboration with the instructor, and are expected to include a substantial educational component that builds knowledge and expertise throughout the course of the semester. Second, students will undertake one or two assigned projects to strengthen their understanding of entrepreneurship. For example, this may involve an assigned paper/presentation and a community outreach project. Third, students will have the chance to fill knowledge gaps regarding the theory and practice of entrepreneurship. Please contact the instructor with any questions about the course or prerequisites.

Credits: 4 AHSE. Recommended Requisites Entrepreneur track; 8 qualifying credits. Hours: 2-0-10.

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.

CIE2016A Curriculum Innov Experiment: Quantitative Engineering Analysis I

For first year students only. This is the first class of a two class, 8 credit each sequence. This 2 class, 16 credit sequence is a designated alternative for the following courses: Linearity 1 and Linearity 2, the Physics Foundation course, Signals and Systems, and Dynamics. **You must commit to enrolling in both classes, although you will only register for the Spring 2017 class at this time.**

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'll 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.

Credits: 8 ENGR.

CIE2016B Curriculum Innov Experiment: Quantitative Engineering Analysis II

This is the second class of a two class, 8 credit each sequence. This two-class, 16-credit sequence is a designated alternative for the following courses: Linearity 1 and Linearity 2, the Physics Foundation course, Signals and Systems, and Dynamics. **Open only to students who took CIE 2016A in Spring 2016.**

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'll 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.

Credits: 8 ENGR.

ENGR2110 Principles of 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.

ENGR2125 The Engineer's Orchestra I: Acoustics, Waves and Vibrations

The Engineer's Orchestra provides an introduction to acoustics, waves, and vibrations via musical instruments. Students address the physics of orchestral instruments (winds, strings, and percussion) both qualitatively and quantitatively. Topics include one-dimensional transverse and longitudinal waves, traveling and standing wave solutions to the wave equation, and an introduction to spherical waves with relevant hands-on demonstrations. Modeling and analysis concepts will be introduced to support students in the design and construction of their own physical or virtual musical instruments.

Credits: 4 ENGR. Recommended Requisites MTH 2140 or Permission of Instructor. Hours: 4-4-6.

ENGR2134 Regional Analysis in Development

Students perform qualitative and quantitative analyses at the regional level to gain insight into development challenges and propose new ways of thinking, with an emphasis on the role of technology. For example, a student might study maternal health in Sub-Saharan Africa. Students select topics and regions based on interest and levels of unmet need, as well as other considerations such as cultural, climatic, technological, economic, political, and ecological ones.

Students will gain experience with analysis and modeling tools and data sets relevant to development with an emphasis on probability and statistics, GIS, and dynamic systems modeling. Guest speakers will share their experiences practicing data driven development. Students will create formal briefings with recommendations supported by a synthesis of quantitative data, analysis, and visualization and informed by the published literature. Students may have an opportunity to publish their work.

This course provides valuable preparation for students planning to enroll in ENGR 3290/4290 Affordable Design and Entrepreneurship (ADE) or perform research or work in international development. Wellesley and Babson students are encouraged to enroll.

Credits: 2 ENGR. Concurrent Requisites: MTH2134.

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.

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 User-Oriented 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.

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 Dynamics

With an emphasis on understanding fundamental concepts, students will learn to create and analyze mathematical models for mechanical and electromechanical systems that are changing in time. Equations of motion for 3D rigid bodies and systems will be derived using conservation of momentum and energy methods. Concepts involving equilibrium, linearization, and stability will be applied to study dynamic response in both the time and frequency domains through time-integration, transfer function, and state-space analysis. The idea of feedback control is introduced. Coursework and projects will involve examples such as robots, mechanisms, vehicles, and aircraft/spacecraft.

Credits: 4 ENGR. Recommended Requisites SCI1130. Hours: 4-0-8. Prerequisite: MTH1111, MTH2210.

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.

ENGR2410 Signals and Systems

Linear system theory is a powerful set of mathematical tools used broadly across science and engineering. Signals represent the transfer of information or power, while systems represent operations on these signals. This course presents fundamental concepts from linear systems such as convolution, impulse and step response, Fourier transforms, sampling and modulation. These concepts are presented within the framework of linear operators and/or transforms in discrete and/or continuous time. Applications include filters, system identification, deconvolution, feedback and control, and communications.

Credits: 4 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

This course is an introduction to software design. It focuses on a model of computation as a set of simultaneous ongoing entities embedded in and interacting with a dynamic environment, for example: computation as it occurs in spreadsheets, video games, web applications, and robots. A major component of the class is a weekly three-hour, in class laboratory. Much of this laboratory is spent in collaborative work on program development, with an emphasis on student-student interaction and student-student teaching, facilitated and enriched by the course staff. In addition, design and implementation work is supplemented with observational laboratory assignments, inviting students to consider not only how to build a program, but how to anticipate its behavior and how to modify that behavior. Both students with no prior background and students with background comparable to the CS AP should both find this course interesting and worthwhile.

Credits: 4 ENGR. Hours: 5-0-7.

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.

ENGR2620 Biomechanics

Why is a giraffe's head so small in comparison to the rest of its body? Why do babies' heads flatten when they sleep in the same position? Why do knees bend only in one direction? Why are people taller in the morning? In this course, we will study the nature and function of human body and its movement with specific emphasis on movements produced in sport, dance, and every day physical activities. The principles of Newtonian mechanics, statics, and dynamics will be applied to discuss behavior of bones, tendons, ligaments, and muscles during human movement. This course is cross-listed as SCI 2220.

Credits: 4 ENGR. Recommended Requisites MTH2220, SCI1130, SCI1210 Or permission of instructor. Hours: 4-0-8.

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.

ENGR3110 Elecanisms

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

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.

Credits: 4 ENGR. Prerequisite: ENGR2210 and ENGR2330; or ENGR2110 and ENGR2420; or ENGR2110 and ENGR3330; or ENGR2110 and ENGR3410.

ENGR3140 Error Control Codes

Error-control codes are used to detect and correct errors that occur when data are transmitted across a noisy channel. This course provides an introduction to error-control codes, including linear, cyclic, binary, and non-binary codes. Mathematics such as modular arithmetic and introductory ring and field theory will be introduced and used extensively. Students must simultaneously enroll in MTH 3140 and ENGR 3140 for a total of 4 credit hours.

Credits: 2 ENGR. Recommended Requisites MTH2110 or another proof based mathematics course. Concurrent Requisites: MTH3140. Hours: 4-0-8. Prerequisite: MTH2210.

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. Prerequisite: ENGR2250.

ENGR3220 Human Factors and Interface 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 computer applications; 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 ENGR 2510 or other software development experience recommended. Hours: 4-4-4. Prerequisite: ENGR2250.

ENGR3230 Investigating Normal: Adaptive and Assistive Technologies

Assistive technologies usually refer to prosthetics and medical aids: tools, devices, and other gear that either restore or augment the functioning of body parts. Historically, these have been designed for people with diagnosable disabilities. In this course, we look at medical as well as cultural tools that investigate the 'normal' body and mind, and we design our own devices high-tech, low-tech, digital or analog with these ideas in mind. Through readings, site visits, guest speakers, and projects, we investigate both traditional and unusual prosthetics and assistive technologies, broadly defined. We talk to end-users, to engineers and industrial designers, to artists, and to others whose technologies assist with visible and invisible needs, externalize hidden dynamics, and create capacities far beyond or outside ordinary functionality. The course is organized to facilitate both functional projects in design-engineering and projects that are much more speculative and experimental.

Credits: 4 ENGR. Prerequisite: ENGR2250.

ENGR3250 Integrated Product Design

You will work with industrial design students from the Massachusetts College of Art and Design (in Boston) and business students from Babson College to develop new products through a project sponsored by a company. Projects have an Internet of Things (IOT) theme that is informed by contexts chosen by students, such as food, recreation, health, and education. Students learn first hand about the techniques and contributions different disciplines bring to product design and practice cross-functional collaboration common in professional design settings. Multiple guest speakers from local product design companies provide first-hand insight into this practice. This course provides valuable preparation for students interested to work in design firms, such as Continuum, IDEO, Frog, Altitude and Essential to name a few, or develop and launch their own consumer products. Class will be held once a week and rotate among all three campuses. Babson students should enroll in MOB 3578. Wellesley students should cross-register into this course and not MOB 3578 at Babson.

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

ENGR3260 Design for Manufacturing

In the process of creating a new product, device or system, a "proof of principle" prototype is built to demonstrate both that such an object can be built and to test how well it works. At a practical level, in the process of creating this prototype, many sub-optimal design concessions are made in the choices of components, cost and functionality in order to meet prototyping time and budget constraints. Upon the completion and successful testing of a prototype, the next phase in the design stream required to bring the product, device or system to a final user or market, is to re-design the prototype such that it can be manufactured at both an acceptably low price point and at an acceptably high enough level of quality to give enduring value to the final end user.

Design for Manufacturing 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. Hours: 4-0-8. Prerequisite: ENGR2250.

ENGR3270 Real Products, Real Markets

This course is intended to completely re-imagine the product design + entrepreneurship process. Each participant in the course will imagine, design, prototype, test, market and sell a product in the span of the semester. The products and customers will be real. A key measure of success will be the number of products successfully sold and shipped to complete strangers. To achieve these lofty goals, we will have to explore, understand and analyze each element of existing processes with an eye towards exploiting best practices, redesigning them when relevant and, if needed, creating processes anew.

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

ENGR3290 Affordable Design and Entrepreneurship

Students gain experience innovating to address social challenges through a design and entrepreneurship approach that emphasizes context, collaboration, and sustainability. The focus is on alleviating poverty by deploying innovations in communities that generate income and meet daily human needs in areas like energy, water, health, agriculture, transportation, and communication. For example, students might create and test the technology for a micro energy utility, such as a concentrated-solar battery charging station, and the business model that makes it viable.

The course is run as a firm where students work in teams with community partners nationally and internationally to co-create and launch new products and ventures. Topics covered include the conditions and causes of poverty, approaches to poverty alleviation, cultural awareness and community engagement, affordable design principles and practices, and social venture models and strategies including financing and scaling. Groups of students travel to partner sites in countries like India, Morocco, Ghana and the U.S. to build relationships, gain contextual awareness, and implement projects.

This course is part of the ADE Program that also includes placement assistance to help students find internship and job opportunities in social enterprise. ADE is offered jointly with Babson College where students enroll in EPS 4515. Olin students can elect ADE as an alternative to the SCOPE Program to fulfill the 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. They cannot change programs once they have completed registration. Alternatively, students can take this course for one semester to fulfill the Design Depth requirement by registering for ENGR 3290. Students who take ENGR 3290 can 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 (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. 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 kinematics, conservation laws, dynamic similarity, and laminar flow solutions. Topics in heat and mass transfer include internal and external convection, free convection, boiling and condensation, and the analogy between heat and mass transport. Applications in aerodynamics, geophysical flows, manufacturing processes, and biological systems will be discussed.

Credits: 4 ENGR. Recommended Requisites MTH2210 and MTH2220 recommended, ENGR 2350 or Permission of Instructor. Hours: 4-0-8.

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.

ENGR3340 Dynamics of Mechanical and Aerospace Structures

Fundamental techniques for the analysis of the dynamic behavior of mechanical and aerospace structures are studied through case projects that involve both computational analysis and experimental measurements. Topics will be selected from areas such as vibration analysis, flexible body dynamics, aerodynamics, and aero-elasticity. Projects may include the design and construction of vibration absorbers or energy harvesting systems, the dynamics and stability of aerospace vehicles, lift and drag of airfoils, or flutter instability of elastic structures.

Credits: 4 ENGR. Recommended Requisites ENGR2340 or ENGR2410. Hours: 4-0-8. Prerequisite: MTH2188, MTH2210.

ENGR3345 Mechanical and Aerospace Systems

A student team will work in the manner of a small engineering research and development company to develop a mechanical or aerospace system to address a current market need. A comprehensive system design will be developed based upon quantitative analysis using commercial simulation software. Prototype systems will be fabricated, evaluated and refined to meet requirements, specifications, and performance objectives.

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

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. Recommended Requisites The prerequisites are an either / or requirement. You do not need both to enroll.. Hours: 4-0-8. Prerequisite: ENGR2340, ENGR2410.

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. Prerequisite: MTH2188, MTH2210.

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: ENGR1121, 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 ENGR 2410 or Permission of Instructor. Hours: 4-4-4.

ENGR3426 Mixed Analog-Digital VLSI I

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 at the end of the semester if they enroll in MADVLSI II (ENGR3427).

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

ENGR3427 Mixed Analog-Digital VLSI II

This course will provide an overview of mixed signal testing methodologies, exposure to more advanced integrated circuit topics, and an opportunity to test the custom chips designed in MADVLSI I through the design and fabrication of a custom printed circuit board (PCB) featuring their own integrated circuit. Students will participate in collaborative teaching of some advanced topics in a seminar-style format.

Credits: 4 ENGR. Hours: 4-4-4. Prerequisite: ENGR3426.

ENGR3430 EE Prototyping

Through a series of projects, we will learn to design, build, and debug electronic prototype systems. We will cover multiple aspects of the prototyping process, including circuit and system design, soldering, deadbugging, troubleshooting, component selection, schematic capture, printed-circuit board (PCB) layout, PCB fabrication, PCB assembly, and thermal analysis. We will discuss the tradeoffs among "faster, better, cheaper", and explore examples in the realms of analog, digital, RF, and power. In addition to hands-on reverse engineering and fabrication experience, students will learn technical communication through design documentation. This course is approved for use as an advanced ECE elective.

Credits: 4 ENGR. Recommended Requisites ENGR2410. Hours: 2-2-2. Prerequisite: ENGR2210.

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.

ENGR3450 Semiconductor Devices

Introduction to semiconductor device fabrication, operation, and design. Emphasis on diodes and transistors, with some exploration of speculative technologies. Students will conduct a project of their own choosing involving either device characterization or device simulation using modern tools.

Credits: 4 ENGR. Recommended Requisites SCI 1410 or SCI 3110. Hours: 4-4-4.

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.

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 recommended pre or corequisite; although not required in 2016-17. 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.

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

ENGR3530 Synchronization

When multiple programs run at the same time, they can interact in complex ways, yielding unpredictable behavior at best and impenetrable bugs at worst. Synchronization is the process of imposing timing constraints in order to guarantee the correct execution of programs. This class presents a series of synchronization "puzzles" and gradually develops a set of tools for dealing with even the hairiest synchronization problems.

Credits: 2 ENGR. Hours: 2-2-2.

ENGR3531 Data Science

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

Data Science lies at the intersection of statistics, machine learning, database design, and data visualization. The goal of this class is to prepare students to work on data science projects that involve collecting data or finding data sources, exploratory data analysis and interactive visualization, statistical analysis and machine learning, predictive analytics, model selection, and validation. Class work includes a substantial project on a real world application of the students' choice; projects might involve work with a social change organization like those on DataKind, or participating in a competition like those on Kaggle.

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

ENGR3540 Computational Modeling

The availability of cheap computation has created a new way of understanding the world. Along with experiment and theory, computational modeling provides new tools for analysis, explanation and prediction. This class looks at the history of this revolution and the technology that underlies it. We will survey a range of literature, from the skeptical to the exuberant, and make a critical evaluation of this putative paradigm shift. Students will learn the skills of computational modeling, with an emphasis on discrete and stochastic models, and apply them to problems in a range of fields including engineering and the natural and social sciences. Basic programming ability, in any language, is a prerequisite.

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.

ENGR3600 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. Topics to be covered include tissue engineering, use of microfluidic 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.

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

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 SCI 1210 and SCI 1410, or Permission. Hours: 4-0-8.

ENGR3620 Cellular Bioengineering

This course aims to give students an appreciation of the power of using quantitative approaches to increasing our understanding of biological phenomena. Receptor-ligand binding will be considered and compared to experimental data to discuss mechanisms in cell signaling studies. Basic binding models will be expanded to consider the effect of forces in situations such as white blood cells rolling, detaching, and adhering during surveillance of blood vessels. We will consider the effects of forces from the molecular to the whole cell level. How do cells exert force? And how can we measure those forces? How do the properties of the substrates cells attach to affect their behaviors? How can we translate observations made in the 2D environment to the 3D environment? And how are these similar and different? These concepts will be explored to study the effect of forces in cellular processes such as migration, traction generation, differentiation, signaling and gene expression.

Credits: 4 ENGR. Hours: 4-0-8. Prerequisite: SCI1210.

ENGR3630 Transport in Biological Systems

Transport phenomena play a vital role in numerous biological processes. For example, the blood flow patterns arising from the particular geometry of branching blood vessels are thought to drive the formation of atherosclerotic plaques. Mass transport plays a role in events such as tissue differentiation during development, oxygenation of blood in the lungs, and glomerular filtration in the kidneys. The entire field of drug delivery has been driven and advanced by understanding transport of pharmacological agents within biomaterials and tissues. Further, combination of fluid and mass transport allow us to understand flow through porous media which is critical for understanding problems such as delivery of chemotherapeutics and tumor metastasis. The roles of transport in understanding and treating cancer will be a theme throughout this course. We will study and analyze mathematical models of these key biological problems using both analytical and computational tools. Through a series of readings and projects, this course will combine engineering fundamentals of mass, energy, and momentum conservation with modeling approaches to enhance exploration and understanding of fluid and mass transport within the body. This course will be of value to students interested in biology, mathematical modeling, and bioengineering.

Credits: 4 ENGR. Recommended Requisites Strong background in Calculus. Hours: 4-0-8. Prerequisite: SCI1210.

ENGR3640 Tissue Engineering

Tissue engineering is often defined as growing or regenerating tissues. To grow engineered tissues requires an understanding of the cell and tissue biology as well as understanding of how culture conditions (transport of oxygen and biochemical factors, application of mechanical forces, etc.) affect the growing tissues. This course will begin with an overview of developmental biology and the types of biochemical and biophysical cues cells receive and respond to during development that direct them to form specific tissues, followed by an overview of the larger field of tissue engineering. We will discuss cell source, the use of natural or synthetic biomaterials, development of bioreactors, the use of biochemical supplements, as well as motivations and applications of engineered tissues from replacement of damaged tissues to models of tissue function. The bulk of this course will be dedicated to the design, implementation, and analysis of experiments to grow engineered tissues. This will be an intensive lab-based course in which groups of students will choose the particular aspect of tissue engineering (e.g. scaffold choice, biochemical culture conditions, mechanical stimulation, functional readouts) they would like to pursue and perform their own experiments and analysis (e.g. biochemical, mechanical, histological). Some lab experience required.

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

ENGR3650 Biological Thermodynamics

The beauty and depth of this subject cannot be described better than with the words of one of the greatest physicists of the 20th century, Arnold Sommerfeld, "Thermodynamics is a funny subject. The first time you go through it, you don't understand it at all. The second time you go through it, you think you understand it, except for one or two points. The third time you go through it, you know you don't understand it, but by that time you are so used to the subject, it doesn't bother you anymore". In this course we will venture into the depths of thermodynamics and statistical mechanics, while concentrating on applications of the abstract concepts to biological, biochemical, and biophysical phenomena and drawing from contemporary bioengineering problems. This course provides an introduction to the study of energy transformations in biological systems as well as thermodynamics and kinetics of structure formation and association of biomolecules. Topics covered include energy and its transformation, the First and Second Law of Thermodynamics, Gibbs Free Energy, statistical thermodynamics, binding equilibria and reaction kinetics, and a survey of other interesting areas of biological thermodynamics, particularly the origin of life on Earth. Topics have relevance to numerous pertinent biological/bioengineering applications including diseases based on phase transitions (e.g., cataract of the eye, Alzheimer's disease, etc.), oxygenation of hemoglobin; protein folding, aggregation, and binding; assembly of everything from the phospholipids bilayer to biomaterials; the macroscopic mechanical properties of biomaterials and even cells; creation and operation of devices at the nano- and micro-scales; understanding the basis of mass transport; osmotic pressure relevant to cells and microvascular filtration; receptor-ligand binding; the melting and annealing of DNA. The concepts employed in this course have relevance to students interested in many disciplines, including Bioengineering, Materials Science, Biology and Chemistry.

This course is cross-listed as SCI 3250.

Credits: 4 ENGR. Recommended Requisites MTH 1111, SCI 1130, SCI 1210 or Permission of Instructor. Hours: 4-0-8.

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.

ENGR3710 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 tradeoffs are made by every team member, as well as the group as a whole.

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

ENGR3810 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: SCI1210, SCI1410.

ENGR3812 Solid State Physics

Why do metals conduct heat well while insulators do not? Why is silicon a better semiconductor than diamond, even though they have the same structure? Why is lead a good superconductor at low temperature, while copper is not? We will explore the current understanding of insulators, metals, semiconductors and superconductors through some of the basic tools of solid state physics, and will learn how to apply these tools to the novel materials being developed today. This course is cross-listed as SCI 3120.

Credits: 4 ENGR. Recommended Requisites SCI2130. Hours: 4-0-8.

ENGR3820 Failure Analysis and Prevention

Students will complete projects and case studies to gain practical experience in the analysis of fractured and failed engineering materials and components. The course focus will be on material microstructure and the micromechanisms of fracture, and topics will include failure analysis methodology, mechanisms of failure, fracture classifications, corrosion and environmental factors, fractography, and design for failure prevention. Students will learn advanced materials characterization techniques including scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS) and compositional dot mapping, x-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), optical microscopy, and fracture surface sample preparation.

Credits: 4 ENGR. Hours: 4-4-4. Prerequisite: SCI1410.

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. 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 (p. 66) 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.

ENGR4199 Alternative Capstone 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: 4 ENGR.

ENGR4290 Affordable Design and Entrepreneurship

Students gain experience innovating to address social challenges through a design and entrepreneurship approach that emphasizes context, collaboration, and sustainability. The focus is on alleviating poverty by deploying innovations in communities that generate income and meet daily human needs in areas like energy, water, health, agriculture, transportation, and communication. For example, students might create and test the technology for a micro energy utility, such as a concentrated-solar battery charging station, and the business model that makes it viable.

The course is run as a firm where students work in teams with community partners nationally and internationally to co-create and launch new products and ventures. Topics covered include the conditions and causes of poverty, approaches to poverty alleviation, cultural awareness and community engagement, affordable design principles and practices, and social venture models and strategies including financing and scaling. Groups of students travel to partner sites in countries like India, Morocco, Ghana and the U.S. to build relationships, gain contextual awareness, and implement projects.

This course is part of the ADE Program that also includes placement assistance to help students find internship and job opportunities in social enterprise. ADE is offered jointly with Babson College where students enroll in EPS 4515. Olin students can elect ADE as an alternative to the SCOPE Program to fulfill the 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. They cannot change programs once they have completed registration. 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 can switch to ENGR 4290 for Capstone credit.

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

MTH2110 Discrete Math

Topics for this course include combinatorics, number theory, graph theory, an emphasis on creative problem solving, and the ability to read and write rigorous proofs.

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

MTH2131 Data Science

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

Data Science lies at the intersection of statistics, machine learning, database design, and data visualization. The goal of this class is to prepare students to work on data science projects that involve collecting data or finding data sources, exploratory data analysis and interactive visualization, statistical analysis and machine learning, predictive analytics, model selection, and validation. Class work includes a substantial project on a real world application of the students' choice; projects might involve work with a social change organization like those on DataKind, or participating in a competition like those on Kaggle.

Credits: 2 MTH. Concurrent Requisites: ENGR3531.

MTH2132 Bayesian Inference and Reasoning

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

This course is an introduction to probability and statistics, with applications to mathematics, science, and engineering. The approach is Bayesian and emphasizes making decisions based on incomplete information. Topics include discrete and continuous probability distributions, conditional probability, prior and posterior probabilities, hypothesis testing, Shannon information, decision making, history of the Bayesian approach, and its advantages over the orthodox (frequentist) approach. Applications include: p values and confidence intervals, statistical mechanics and entropy, the Monty Hall problem, code breaking, plausible reasoning in mathematics, how Laplace estimated the mass of Saturn, and playing games of imperfect information such as blackjack or Mastermind.

Credits: 2 MTH. Concurrent Requisites: SCI2032.

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.

MTH2134 Regional Analysis in Development

Students perform qualitative and quantitative analyses at the regional level to gain insight into development challenges and propose new ways of thinking, with an emphasis on the role of technology. For example, a student might study maternal health in Sub-Saharan Africa. Students select topics and regions based on interest and levels of unmet need, as well as other considerations such as cultural, climatic, technological, economic, political, and ecological ones.

Students will gain experience with analysis and modeling tools and data sets relevant to development with an emphasis on probability and statistics, GIS, and dynamic systems modeling. Guest speakers will share their experiences practicing data driven development. Students will create formal briefings with recommendations supported by a synthesis of quantitative data, analysis, and visualization and informed by the published literature. Students may have an opportunity to publish their work.

This course provides valuable preparation for students planning to enroll in ENGR 3290/4290 Affordable Design and Entrepreneurship (ADE) or perform research or work in international development. Wellesley and Babson students are encouraged to enroll.

Credits: 2 MTH. Concurrent Requisites: ENGR2134.

MTH2160 Introduction to Mathematical Modeling

This course centers on the interdependency of mathematics and the sciences and engineering.

Through this codependency, knowledge of the specific discipline is better understood through the development of a mathematical description and its solution. Often, these descriptions are appropriate over a wide range of disciplines well beyond the original context of the first problem. Over the seven-week session, we look at individual cases in biology, chemistry, physics, fields of engineering and business to see how to formulate a mathematical description, and the techniques used for its solution. The course follows a case-study format, with modeling subjects chosen from the media (for example, the Science Times section of the New York Times).

Credits: 2 MTH. Hours: 2-0-4. Prerequisite: MTH1111, MTH2130.

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: 4 MTH.

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. Concurrent Requisites: ENGR2199B.

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.

MTH2210 Linearity I

The fundamentals of linear algebra and differential equations are taught through the lens of discrete- and continuous-time dynamical systems. Applications such as population ecology, mechanics and dynamics, circuits, networks, information processing and/or other areas relevant to engineering will be stressed.

Credits: 4 MTH.

MTH2220 Linearity II

An intradisciplinary approach that builds upon material covered in Linearity 1 to address topics in vector calculus and introductory partial differential equations. Topics include functions of more than one variable; vector-valued functions; gradient, divergence, and curl; boundaryvalue problems; and solutions to common partial differential equations. Emphasis on both numerical and analytical approaches. Note: students who have previously taken multi-variable calculus should consult with mathematics faculty to determine whether taking Linearity 2 is appropriate for their needs.

Credits: 4 MTH.

MTH2220A Linearity II Project Based Approach with Electricity and Magnetism

This two credit Linearity II version is taught along with SCI1121: Electricityand Magnetism using a project based approach. Linearity II is intradisciplinary in nature and builds upon material covered in Linearity I to address topics in vector calculus and introductory partial differential equations. Topics include functions of more than one variable; vector-valued functions; gradient, divergence, and curl; boundaryvalue problems; and solutions to common partial differential equations. Emphasis on both numerical and analytical approaches.

Credits: 2 MTH. Concurrent Requisites: SCI1121A.

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 MTH2210, MTH2220 or permission of instructor. Hours: 4-0-8.

MTH3130 Mathematical Analysis

An introduction to real analysis; construction of the real number system; metric spaces and metric topology; compactness; connectedness; functions. Emphasis on mathematical rigor, logic, and proof.

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

MTH3140 Error Control Codes

Error-control codes are used to detect and correct errors that occur when data are transmitted across a noisy channel. This course provides an introduction to error-control codes, including linear, cyclic, binary, and non-binary codes. Mathematics such as modular arithmetic and introductory ring and field theory will be introduced and used extensively. Students must simultaneously enroll in MTH 3140 and ENGR 3140 for a total of 4 credit hours.

Credits: 2 MTH. Recommended Requisites MTH2110 or another proof based mathematics course. Concurrent Requisites: ENGR3140. Hours: 4-0-8. Prerequisite: MTH2210.

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.

OIE - Olin Intro Experience

OIE1000 Olin Introductory Experience

This course aims to introduce and develop skills that facilitate a successful transition into Olin. This course will cultivate critical and creative thinking skills, self reflection, teamwork, leadership, and intrapersonal relationships with peers, faculty, and staff. This course is required.

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.

SCI1121 Electricity and Magnetism

Electricity and magnetism, including electric charges, forces, and fields, Gauss's Law, potential, electrostatic energy and capacitors, magnetic fields and energy, mutual and self-induction, Ampere's Law, Maxwell's Equations and electromagnetic waves.

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

SCI1121A Electricity and Magnetism with Laboratory

see information under SCI1121

Credits: 4 SCI. Concurrent Requisites: MTH2220A.

SCI1130 Mechanics

This course provides a thorough introduction to classical mechanics. We will cover kinematics, the basis of Newton's laws, particle dynamics, the concepts of momentum, work, energy, and rotational motion, and oscillations. Additionally, the course will establish the basics of solid and fluid mechanics, concluding with introductory topics in thermodynamics. Our goal is to share with you the excitement of discovering the material universe at its most basic levels and to equip you with the basic knowledge and analytical skills necessary to become a scientist or an engineer. This course is offered in two different flavors. Course sections with a prefix of A are taught as Theoretical Mechanics. Course sections with a prefix of B are taught as Experimental Mechanics and are laboratory based.

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

SCI1199 Foundation Topic 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: 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. Hours: 4-3-5.

SCI1210A Principles of Modern Biology with Lab

Credits: 4 SCI.

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.

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.

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 (with laboratory)

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. The course is offered in four "flavors." Each flavor has a different emphasis in some of the course projects, but all course flavors provide for significant student choice in project topics and experimental processes.

A. Historical Context (co-taught with AHSE 2110)

B. Environmental and Societal Impact of Materials

C. Biomaterials, Polymers and Mechanical Properties

D. Electrical and Magnetic Properties

Course flavors will be differentiated by the appropriate letter as a prefix to the section. The course number will be SCI 1410 for all versions.

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

SCI1410A Materials Science and Solid State Chemistry with lab

Credits: 4 SCI. Concurrent Requisites: AHSE2110.

SCI2032 Bayesian Inference and Reasoning

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

This course is an introduction to probability and statistics, with applications to mathematics, science, and engineering. The approach is Bayesian and emphasizes making decisions based on incomplete information. Topics include discrete and continuous probability distributions, conditional probability, prior and posterior probabilities, hypothesis testing, Shannon information, decision making, history of the Bayesian approach, and its advantages over the orthodox (frequentist) approach. Applications include: p values and confidence intervals, statistical mechanics and entropy, the Monty Hall problem, code breaking, plausible reasoning in mathematics, how Laplace estimated the mass of Saturn, and playing games of imperfect information such as blackjack or Mastermind.

Credits: 2 SCI. Concurrent Requisites: MTH2132.

SCI2050 Art of Approximation in Science and Engineering

For historical reasons, our courses are organized by disciplinary area, be it mechanics, calculus, differential equations, or molecular biology. However, there are modes of reasoning that span many areas of science or engineering. Nine such crosscutting modes of reasoning are the focus of the proposed course. The nine modes group themselves into three approaches to the complexity of the world: (1) organizing the complexity (for example, with divide-and-conquer reasoning); (2) discarding apparent complexity (for example, with symmetry or dimensional analysis); and (3) discarding actual complexity (for example, by approximating with spring models or lumping).

Credits: 4 SCI.

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.

SCI2130 Quantum Physics

This course is an introduction to quantum physics. Although quantum physics is the most successful description of natural phenomena that has ever been devised, quantum "reality" is so intuitively frustrating that Nobel laureate Richard Feynman once famously said: "Nobody understands quantum mechanics!" The course material includes the origin and development of quantum mechanics and quantum statistics, with the goal of providing an appreciation for the quantum rationale for the structure and characteristics of nuclei, atoms, molecules, fluids and solids (including semiconductors). With permission of instructor, this course can be used for Physics Foundation credit.

Credits: 4 SCI. Recommended Requisites Physics Foundation or Permission of Instructor. Hours: 4-0-8.

SCI2140 Relativity

When it was first introduced, Einstein's Special Theory of Relativity rocked the foundations of classical physics with a plethora of "paradoxes" such as identical twins who could have different biological ages. Like swimming or bicycle riding, Special Relativity can be completely mastered without formal physics prerequisites, and this course will be taught from first principles that do not require any specialized physics knowledge. This approach will naturally lead to an introduction of General Relativity, including some characteristics of Black Holes.

Credits: 2 SCI. Hours: 2-0-4.

SCI2145 High Energy Astrophysics

The universe is full of hot stuff! The oldest radiation that we can measure originally arose where the temperature was only thousands of degrees, but there is indirect evidence for the early universe that requires temperatures of trillions of degrees. As the universe expands and cools there are still occasional (but quite frequent) episodes involving temperatures of millions or even billions of degrees that are manifested in phenomena like supernovae and black holes. These high energy episodes are not just curiosities: supernovae are responsible for most of the chemical elements associated with life on Earth, and giant black holes are present at the cores of virtually all galaxies. This course will examine how the theoretical and empirical study of X-rays and gamma-rays can probe the high energy universe.

Credits: 2 SCI. Recommended Requisites Physics Foundation or permission of instructor. Hours: 2-0-4.

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. Hours: 4-0-8.

SCI2214 Microbial Diversity

This course is an introduction to the tremendous diversity of the microbial world and its applications. Topics include: bacterial growth, energy metabolism, nutrient cycling, symbiosis, bioremediation, biofilm formation, and techniques for culturing and working with bacteria. This course approaches the study of environmental bacteria and their metabolic, physiological and genetic diversity through primary literature and laboratory work. Students will learn biochemical, molecular and bioinformatics techniques for working with microbial systems. Students will explore the microbial world first through guided laboratory exercises followed by development of individual and group special laboratory projects. Students will develop working knowledge of microbiology that may be applied to a range of situations, from study of systems were microbes are a problem to development of biological solutions using microbes.

Credits: 4 SCI. Hours: 2-2-2. Prerequisite: SCI1210.

SCI2220 Biomechanics

Why is a giraffe's head so small in comparison to the rest of its body? Why do babies' heads flatten when they sleep in the same position? Why do knees bend only in one direction? Why are people taller in the morning? In this course, we will study the nature and function of human body and its movement with specific emphasis on movements produced in sport, dance, and every day physical activities. The principles of Newtonian mechanics, statics, and dynamics will be applied to discuss behavior of bones, tendons, ligaments, and muscles during human movement.

This course is cross-listed as ENGR 2620.

Credits: 4 SCI. Recommended Requisites MTH2220, SCI1130, SCI1210 Or permission of instructor. Hours: 4-0-8.

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.

SCI2320 Organic Chemistry (with laboratory)

An introduction to the fundamentals of organic chemistry with an emphasis on applications in biology, biotechnology, synthetic polymers, and the environment. Topics include structure and bonding in organic compounds; chemical and physical properties of organic molecules and bulk organic materials; reaction mechanisms and kinetics; structure-reactivity relationships; chemical and physical transformations; synthesis of organic molecules; and characterization techniques. It is strongly suggested that students who intend to take SCI 2320 first take Introduction to Chemistry, or an equivalent college level course.

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

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.

SCI3120 Solid State Physics

Why do metals conduct heat well while insulators do not? Why is silicon a better semiconductor than diamond, even though they have the same structure? Why is lead a good superconductor at low temperature, while copper is not? We will explore the current understanding of insulators, metals, semiconductors and superconductors through some of the basic tools of solid state physics, and will learn how to apply these tools to the novel materials being developed today.

This course is cross-listed as ENGR 3812.

Credits: 4 SCI. Recommended Requisites SCI2130. Hours: 4-0-8.

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.

SCI3210 Human Molecular Genetics in the Age of Genomics

It is now understood that many, if not the majority, of human disorders, including cancers, have an underlying genetic component. In this modern age of healthcare, we are expected to choose amongst an array of therapeutic options for ourselves and for our children rather than respond to specific directives from the medical establishment. In addition, we are called upon as voting citizens to make ethical decisions, e.g. the appropriateness of stem cell cloning. Therefore, it is in the interest of each person to learn more than the fundamentals of biology and genetics in order to make educated choices. In this course we will be concerned with the traditional concepts of human genetics including pedigree analysis, linkage mapping, Mendelian, multi-locus and complex traits, and genetic testing. However, for the most part, the course will view human genetics through a molecular lens. For example, the molecular basis of pathological conditions such as Huntington's disease, hypercholesterolemia, Fragile-X and others will be examined in detail, as will gene imprinting and imprinting-related abnormalities (e.g. Angelman and Prader-Willi syndromes). Comparative genomics will be applied to the study of heritable traits in humans. The structure, function, and evolution of the sex chromosomes will also receive special attention. Gene therapy, cloning (stem cell, germ line) and the associated ethical issues will be considered in some depth. Students who are interested in bioengineering or medical school should find this course useful as well as those who have a general interest in the human as an organism.

Credits: 4 SCI. Recommended Requisites SCI1210 (Olin); BISC219 (Wellesley); or permission of instructor. Hours: 4-0-8. Prerequisite: SCI1210.

SCI3220 Bacteriophage Genomics Research Project Laboratory

The process of discovery in biology must be experienced, not simply read about in a textbook, in order for one to fully appreciate what it takes to do science and how it feels to discover something not previously known. Bacteriophages (viruses of bacteria) are particularly interesting and relevant subjects for study because they constitute the majority of all biological entities. An estimated 1031 tailed phages inhabit the planet earth! Knowledge of phages and their host bacteria is important from a public health perspective and phages present an opportunity for study of bioengineering organisms. This hands-on course provides a guided primary research experience in the isolation, purification, characterization, and sequence annotation of bacteriophages of M. smegmatis.

Purified viruses, named by their discoverers, will be investigated by a variety of means including Transmission Electron Microscopy (TEM) and DNA sequencing of their entire genomes. Students in this course will gain experience with the fields of genomics and bioinformatics from the analysis of new phage genomes. Putative new genes will be identified and compared with those from similar organisms in order to better understand the extent of diversity and evolution of mycobacteriophages.

Weekly journal club discussions including visits by seminar speakers enhance understanding of phage biology and genomics.

Credits: 4 SCI. Hours: 2-2-2. Prerequisite: SCI1210.

SCI3250 Biological Thermodynamics

The beauty and depth of this subject cannot be described better than with the words of one of the greatest physicists of the 20th century, Arnold Sommerfeld, "Thermodynamics is a funny subject. The first time you go through it, you don't understand it at all. The second time you go through it, you think you understand it, except for one or two points. The third time you go through it, you know you don't understand it, but by that time you are so used to the subject, it doesn't bother you anymore". In this course we will venture into the depths of thermodynamics and statistical mechanics, while concentrating on applications of the abstract concepts to biological, biochemical, and biophysical phenomena and drawing from contemporary bioengineering problems. This course provides an introduction to the study of energy transformations in biological systems as well as thermodynamics and kinetics of structure formation and association of biomolecules. Topics covered include energy and its transformation, the First and Second Law of Thermodynamics, Gibbs Free Energy, statistical thermodynamics, binding equilibria and reaction kinetics, and a survey of other interesting areas of biological thermodynamics, particularly the origin of life on Earth. Topics have relevance to numerous pertinent biological/bioengineering applications including diseases based on phase transitions (e.g., cataract of the eye, Alzheimer's disease, etc.), oxygenation of hemoglobin; protein folding, aggregation, and binding; assembly of everything from the phospholipids bilayer to biomaterials; the macroscopic mechanical properties of biomaterials and even cells; creation and operation of devices at the nano- and micro-scales; understanding the basis of mass transport; osmotic pressure relevant to cells and microvascular filtration; receptor-ligand binding; the melting and annealing of DNA. The concepts employed in this course have relevance to students interested in many disciplines, including Bioengineering, Materials Science, Biology and Chemistry.

This course is cross-listed as ENGR 3650.

Credits: 4 SCI. Recommended Requisites MTH 1111, SCI 1130, SCI 1210 or Permission of Instructor. Hours: 4-0-8.

SCI3320 Organic Chemistry II (with laboratory)

After undertaking the introductory course in organic chemistry, students will be able to learn more advanced topics and master the reactions of the more biologically-relevant functional groups.

Some of the topics this will include are sugars and carbohydrates, the chemistry of enolates and carbonyls, advanced NMR techniques, and pericyclic reactions. At the end of the course, there will be an introduction to biochemistry from an organic perspective. This course will culminate in a large organic laboratory synthesis that the students will develop and plan themselves for half of the semester.

Credits: 4 SCI. Hours: 4-4-4. Prerequisite: SCI2320.

SEM - Seminar

SEM101 Seminar: Product Management

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM102 Seminar: Olin Workshop on the Library

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM103 Seminar: Big Ideas in Pedagogy and Educational Technology Trends

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM104 Seminar: Work, Play, Balance

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM105 Seminar: Industrial Media Super-Taster

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM201 Seminar: An Intro to Product Design and Engineering in a Large(r) Corporate Environment

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM301 Seminar: Fundamentals of Mechanical Design

Have you ever wanted to make a thing, but had absolutely no idea how to get started designing it? Have you ever wondered why McMaster-Carr has 8,215 parts called "Machine Screws", gotten upset about why there could possibly be so many, and despaired at the thought of ever finding the appropriate fastener for your project? Do you want to be able to design simple, effective structures on your own without needing to spend multiple semesters in the Mechanical Engineering curriculum? This course is for you.

In Fundamentals of Mechanical Design, we'll go over the basics of structural design, material selection, parts selection, and component sizing, with the practical goal of enabling students to design simple, robust assemblies on their own by the end of class. The class will include optional design challenges throughout the semester, designed to demonstrate basic concepts of mechanical engineering like structural design, power transmission, and mechanism design.

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM302 Seminar: Intro to Pneumatic and Hydraulic Systems

Have you ever wanted to design a system that can lift 10 pounds? How about 100 pounds? How about 100,000 pounds? Do you have any applications that call for controlled linear motion, and are you at a loss for how to make a motor do such a thing effectively? Do you want to learn about how to move stuff around without using electric motors? Take Introduction to Pneumatic and Hydraulic Systems.

In this class, we'll learn the basics of system design, component sizing, part sourcing, and assembly of pneumatic (air powered) and hydraulic (liquid powered) systems. These types of systems are relatively easy to design if you know where to look for parts, are easy to control with binary logic, and are immensely useful in robotics, factory automation, and other motion control applications. The practical goal of the class will be to give students the ability to size, design, order, and (safely) assemble a pneumatic and hydraulic system from scratch.

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM303 Seminar: Musical Instrument Design and Engineering

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM401 Seminar: Introductory Power Supplies

An introduction to power supplies with an emphasis on design for mass production. Power supplies covered include linear, buck, boost, SEPIC, and switched capacitor. Emphasis on using actual parts with actual part numbers, and the imperfections that entails.

Pre-requisites: Successful completion of required first year courses

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree.. Prerequisite: ENGR1125.

SEM402 Seminar: Danger! High Voltage!

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM501 Seminar: Five More Skills for Software Designers

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM502 Seminar: Data Dashboard Design

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SEM503 Seminar: Intro Embedded Software

Credits: 1 SEM. Hours: Hours earned are applicable only toward the minimum 120 required for a degree..

SUST - Sustainability

SUST2201 Introduction to Sustainability

Addressing the challenge of using earth's resources sustainably requires a collaborative and interdisciplinary approach. This course introduces students to the basic concepts and tools that business, engineering, and the liberal arts (science, social science, and the humanities) bring to a consideration of sustainability. Students from Wellesley, Olin, and Babson Colleges engage in hands-on challenges to develop the cross-disciplinary awareness and collaboration skills needed to approach environmental issues holistically. This course meets the first requirement in the Sustainability Certificate Program (bow3colleges.org/sustainability-certificate) awarded by all three colleges. Four total credits may be used toward the 28 AHS/Entrp minimum distribution credit requirement if this course and SUST3301: Sustainability Synthesis are successfully completed.

Credits: 4 SUST. Recommended Requisites sophomore and/or junior standing; first years by permission only. Hours: 4-0-8.

SUST3301 Sustainability Synthesis

This project-based course provides students with a chance to apply and integrate the concepts and the tools of business, engineering, and the liberal arts (science, social science, and the humanities) to address sustainability. It is team-taught by three faculty members, one from each institution, with coursework fully integrated across the three approaches. Students will work in multi-campus groups on a project with a client throughout the semester, along with common readings and discussions about processes and project stages taking place in class time.

Credits: 4 SUST. Recommended Requisites Strongly recommended: Declared participation in the certificate program, and completion of the Introductory Course and three out of four elective courses for the program.. Hours: 4-0-8. Prerequisite: SUST2201.

Independent Study and Research

All Olin students are eligible to register for Research or Independent Study courses after completion of their first semester. These activities are graded on a pass/no credit basis.

Research opportunities are available for credit. If interested in doing research in a particular area, students should approach a faculty member in that area about possible openings. In addition to research projects that are regularly offered by faculty, students have the opportunity to design their own research projects under the guidance of a faculty member. Students who have their own ideas for research projects should contact a faculty member with appropriate expertise to discuss their ideas.

Olin offers opportunities for undergraduate research experiences both during the academic year and during the summer. Students may receive academic credit or pay for a research activity, but not both. Summer research may not be taken for credit.

In **Independent Study** activities, students work with faculty members to design and implement a learning and assessment plan for the study of topics not covered by listed Olin courses. Evaluation is normally on a Pass/No Credit basis. Independent study activities can only be taken with Olin faculty members. Students are strongly recommended to plan Independent study activities in the semester prior to the start of the activity, and contact a qualified faculty mentor at the earliest possible time in order to receive input on the plan of study and ensure their availability.

For either research or independent study, a paper form (Independent Study/Research Cover Sheet) must be filled out by the student and signed by the faculty Project Adviser in the appropriate academic area. If the project is being advised by someone who is not part of the program group in which the credits are being awarded, then the signature of a Disciplinary Adviser is also required.

A Plan of Study and an Assessment plan must accompany the form. All materials are due in the Registrar’s Office by the end of the Add period.

Using Independent study and Research credit courses in a degree program IS and RS credit may be applied toward credit requirements in particular areas (Math / Science / AHS / Entrepreneurship / Engineering) and toward the overall 120 credit requirement. In order to use independent study to satisfy a major, AHS, or E! course requirement, prior approval must be obtained from the CSTB and the activity must be taken for a grade. Only in exceptional cases will research activities be approved to satisfy a course requirement. If the project fulfills a major, AHS or E! course requirement, then a disciplinary signature from that area is required. A letter grade will be given.

Curricular Experiments

The process of curriculum innovation at Olin College means that curricular experiments are going on during most academic years. Typically, these experiments are courses that students opt-in to and serve as designated alternatives for requirements in the curriculum.

Beginning in the 2015 – 16 academic year, a new sequence of courses will be offered to create a coherent approach to developing engineering analysis skills. This is a three year experiment and will allow students in the classes of 2019, 2020 and 2021 to opt in to this sequence of courses which will serve as designated alternatives to Linearity 1, Linearity 2, Mechanics, Signals and Systems, and Dynamics.

Passionate Pursuits

Success occurs most often in those who have a passion for their work. Olin believes that learning to be passionate about one's work, to persevere through difficult times, and to enjoy play freely, are all tremendously important life lessons. We actively and explicitly promote this integrated approach to learning, work and life. Our support of passionate pursuits promotes the idea that hobbies can be more than pastimes — they can become gateways to life-long learning and passionate endeavors. This is one of many ways in which Olin College gives acknowledgement to well roundedness and personal initiative.

A Passionate Pursuit is an intellectual or scholarly activity in which students propose a semester-long project, solicit faculty participation and establish objectives (i.e., learning goals, a deliverable and/or a presentation or performance) that constitute satisfactory completion of the pursuit. These activities are taken for non-degree credit, may receive funding, and are included on a student's transcript.

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

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. The Dean of Student Affairs will grant exceptions for illness, religious observance, or other reasons deemed appropriate.

Olin Exposition (EXPO)

The Olin Exposition is a public event at the end of each semester where students present academic and non-academic work to an audience that includes the entire Olin community and external visitors. It is an opportunity for students to reflect on the semester, celebrate their achievements and share them with others, practice communication skills, and demonstrate their activities and abilities.

Expo is also an opportunity for people outside the college to see what Olin students can do, and it is an important way of involving external constituencies in the activities of the school. Normally all registered students are required to participate in Expo in the fall. In the spring, first through third year students are required to present at Expo while seniors are required to participate in the end of year SCOPE Summit. Students who cannot attend Expo for any reason should petition the Dean of Student Affairs as early as possible for an excused absence.

Definition of full-time status

Enrollment at Olin College is for full-time study in engineering. Students are expected to follow the curriculum design for each class year and carry a usual load of 16 degree credits. The definition of full-time study is a minimum of 12 attempted degree credits each semester with a maximum of 20 attempted degree credits each semester.

Part-time study is generally not available at Olin College; however, special cases will be considered by the Assistant Dean of Student Affairs for Advising.

Course overloads

Olin students may register for a maximum of 20 credits each semester. The maximum load of 20 credits is a total of degree and non-degree activities. In exceptional circumstances, students may petition the Committee on Student Academic Performance (COSAP) with the consent of their adviser for approval of a course overload. This reflects Olin's commitment to reasonable expectations. First-year, first-semester students are limited to taking a maximum of 18 credits.

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

Declaration of major/change of major

Students are expected to declare their major no later than the time of registration for the fourth semester. Major declaration forms are available on the Student Affairs website and must be signed by the student and his or her adviser.

Students declaring the Engineering major must also complete and submit a Plan of Study form at the same time. The instructions and form can also be found on the Olin website under Resources of Engineering Majors

Change of majors can be submitted using a declaration of major form and a Plan of Study(if appropriate). Students who change their major should be aware of their remaining degree requirements. Additionally, they are responsible for tuition, room/board and fees for any semesters required beyond the eight covered by the Olin scholarship.

Registration

Prior to each semester, there will be a designated registration period in which students will speak with their advisers and make choices on course selection. 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.

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 in the natural and mathematical sciences, arts, humanities, social sciences, business and entrepreneurship.

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. With prior approval from the CSTB, students may use courses taken at the BBW schools to satisfy general course requirements, distribution requirements and program specific course requirements.

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.

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 advisers 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.

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 in person at the Registrar's office and require the appropriate instructing faculty signature and the student adviser signature.

Course withdrawal

Students may withdraw from courses up through the last day of instruction in the semester. To withdraw from a course, students need written approval from the instructing faculty member and their adviser. Students must then process the course withdrawal with the Registrar's Office. A grade of Withdrawn (W) will be entered for the course and will not affect the grade point average. Credits attempted will be noted, but course credit will not be earned. Students are responsible for meeting with their adviser to determine how the credits, and/or requirement will be completed in the future. Olin students cross-registered at one of the BBW schools must follow the academic policy on course withdrawals for the host school.

Half-semester courses

The Add, Drop and Course Withdrawal periods are prorated for half semester courses. The Add Period is the first five 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.

Grading at Olin

Philosophy

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. The Dean of Faculty will annually conduct a review of grade distributions and grading procedures.

Grading rules and regulations

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.
        - 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, she or he will issue a notice of academic concern in a timely manner. Copies of this notice will be sent to the student, the student's faculty adviser and the Assistant Dean of Student Affairs for Advising. 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 adviser: Olin advisers have real-time access to advisees' course grades through the Student Information System. In addition, instructors will notify advisers of any significant concerns noted during the semester.
4. Pass/no Record first semester: In the first semester, first-year, Olin instructors may report the student's grade to the student and to the adviser, but will report only a grade of Pass (P) or No Record (NR) to the Registrar. A grade of No Record does not affect the student's GPA. In subsequent semesters, Olin instructors will report the student's final course grade, according to the scale outlined below, to the Registrar.
5. Course grades: Course grades at Olin provide students, their advisers, 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
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
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. 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, he or she 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.

Academic Integrity

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

Incompletess

In extenuating circumstances, a student may request an Incomplete (I) grade by petitioning the Dean of Student Affairs. If an Incomplete grade is approved, the student will be granted an extension period to complete the coursework. The period of the extension will be determined by the Dean of Student Affairs in consult with the instructor and student.

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 and the Dean of Faculty. An IF grade does affect a grade point average. An Incomplete 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).

An Incomplete will not 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 adviser well before the end of the semester.

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. All grade changes must be made in writing and signed by the Dean of Faculty.

Excused Absences for Final Exams

Students who are unable to take their final exams for legitimate reasons and wish to request a make-up exam 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 exam 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.

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 96% for the 2013 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 2009 entering class, the graduate rate is 93%.

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

Curriculum and Policy Committees

Academic Recommendation Board (ARB)

The Academic Recommendation Board (ARB) has the responsibility to foster change and act as a steward of the curriculum. The ARB regularly reviews the curricular structure and course options and reviews and authorizes changes in degree requirements. Students may petition the ARB if they need to apply for an exception to graduation requirements.

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. For more information on transferring credit, see Transfer Credit section (p. 73).

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.

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 for Advising and three faculty members. Students wishing to appeal a decision on policy must submit their appeal to the Registrar within one week of the original decision.

COSAP also reviews student petitions for exceptions to 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 adviser and then write a detailed petition that outlines the rationale. Students should include their adviser on the email petition, as the adviser is always asked for feedback. Petitions should be emailed to registrar@olin.edu no later than the last day to add a course.

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.

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.

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 will be transferable to Olin only if approval is obtained from the CSTB prior to enrollment in each course.

Program group recommendations

The Program Groups (ECE, ME, E) will periodically review the progress of every student with a declared major. The program groups will work with students and their faculty adviser if performance in program specific course requirements is unsatisfactory or if trends indicate that such performance may become unsatisfactory.

College withdrawal

At times, the Dean of Student Affairs (or her/his designee) may require a student to withdraw from Olin College for academic or any other reasons, without following Honor Code procedures. Students who are required to withdraw may not reenroll at Olin without written approval from the Student Affairs and Resources office. Students who are required to withdraw may need to obtain permission from the Dean of Student Affairs to return to campus or attend college events (on-campus or off-campus).

Students may wish to leave Olin College prior to completing their degree. Such a decision may be difficult to make. Therefore, we encourage students to discuss the situation with their faculty adviser and the Assistant Dean of Student Affairs for Advising. A student should consider whether a Leave of Absence might provide a more suitable means for them to address the underlying circumstances for the withdrawal. The student's decision to withdraw indicates she or he does not intend to return. Students who need a leave of absence should follow the procedures described below for requesting a leave. 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.

Voluntary withdrawal

Students can voluntarily withdraw from Olin College. Students must file a College Withdrawal Form with the Assistant Dean of Student Affairs for Advising. Withdrawing for nonmedical 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.

Medical withdrawal

Students who need to withdraw from Olin College for medical reasons should complete a College Withdrawal Form with the Assistant Dean of Student Affairs for Advising. If a student intends to return to the college, he or she should follow the procedure outlined in the Leave of Absence policy. Medical Withdrawals during a semester (i.e., 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 in these circumstances to a full or partial refund of certain expenses and fees according to the guidelines of the college's refund policy.

Medical documentation may be required to complete the process.

Return following withdrawal

Each request for readmission after withdrawal (required, voluntary, medical or administrative) is assessed on its individual merits; as such, readmission requirements will vary. Written approval from the Student Affairs office is required for readmission.

Leave of absence (LOA)

Students in good academic standing may request a leave of absence for up to 180 days in any 12-month period. Leaves of absence may not be used for study away. To initiate a leave of absence, students should meet with their adviser and complete a Leave of Absence Form. The request is then forwarded to the Assistant Dean of Student Affairs for Advising for approval. Documentation of the reason for the leave of absence (medical or otherwise) should accompany the request for a leave. The request, when approved, and any accompanying documentation will be forwarded to the Registrar for processing and placed in the student's academic file.

The deadline for applications is the Monday prior to the start of course registration for the subsequent semester.

When a Leave of Absence 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 adviser.

  ** 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 Final Exam Policy for Excused Absences.*

- 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.

Transfer credit

Olin College generally does not accept transfer credit for incoming students, but 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.

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: In general, Olin does not accept transfer credit from community colleges. On-line courses may be accepted provided that items 1 and 2 above are fulfilled.

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 (B- or equivalent) requirement for transfer, the course and the credits will appear on the student's Olin transcript. 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 financial aid section for more details.

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.

Academic Appeals & Complaints

Academic Support Services

Academic advising

Coursework and advising are different aspects of the same process — developing a well-educated person. Olin College views advising as a central role of our faculty. Students' relationships with their advisers are among the most important ones they will establish here and can have a significant impact on their Olin education. The advising system includes, but is not limited to: individual advising, advising families, the Sibbs program, career development and course planning.

NINJAs

Extra help

For all courses, faculty members provide extra help for students as appropriate. In addition, individual tutors are assigned by Student Affairs. Students who feel that individual tutoring would be helpful to them should contact the Assistant Dean of Student Affairs for Advising as early in the semester as the need becomes apparent.

Academic Accommodations policy

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.

Students are responsible for identifying themselves to the Assistant Dean of Student Affairs for Advising and providing appropriate documentation of their disability and need for accommodation in a timely manner. Students requesting accommodation should contact the Assistant Dean of Student Affairs for Advising as soon as possible after matriculation. Services for students with learning disabilities may include, but are not limited to, academic accommodations, coaching on organizational and time management skills, faculty notification 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, and on information from a medical care provider concerning the student's disability and related needs.

Index

Important Phone Number

In an emergency, contact the Babson College Police Department	781.239.5555

Academic Affairs	781.292.2590
Admission and Finanacial Aid	781.292.2222
Marketing and Communication	781.292.2250
Development	781.292.2290
Facilities Services	781.292.4444
Family and Alumni Relations	781.292.2264
Financial Affairs	781.292.2415
Information Technology	781.292.2430
Office of the President	781.292.2301
Operations	781.292.2620
Post-Graduate Planning	781.292.2280
Student Affairs and Resources	781.292.2320

Olin College
of Engineering

Olin Way | Needham, MA 02492-1200 | Main Phone: 781.292.2300 | www.olin.edu