

Catalog 2011-12



Olin College Honor Code

As a member of the Olin College community, I will strive to embody the spirit of honor and integrity as defined by the five core personal values and will take action to address any breach of that spirit.

Integrity

Each member of the college community will accept responsibility for and represent accurately and completely oneself, one's work, and one's actions.

Respect for Others

Each member of the college community will be considerate of fellow community members and honor each individual's inherent dignity and worth.

Passion for the Welfare of the College

Each member of the college community will express a personal commitment to the welfare of the community through a spirit of cooperation, concern for others, and responsibility for the reputation of Olin College.

Patience and Understanding

Each member of the college community will strive to foster harmonious relationships through empathy and mindfulness of others.

Openness to Change

Each member of the college community will be receptive to change and will strive for innovation and improvement within the community.

Do Something

When aware of a potential violation of the Honor Code, a member of the college community must take action in a timely manner to address the situation. While all violations are treated with utmost concern, academic and non-academic cases differ in nature and therefore often call for different courses of action. Suspected violations of integrity in academic work must be reported to the professor of the course or directly to the Honor Board. Other suspected violations must either be addressed informally to the satisfaction of all parties involved or reported to the Honor Board.



Catalog 2011-12



Franklin W. Olin
College of Engineering

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Message from the Provost

From its inception, Olin College has been about innovation and high standards. Our curriculum is the product of a vibrant and substantive collaboration among faculty, students and staff that is aimed at continually improving our academic



program. In a sense, our curriculum will never be a finished product. We will always be enhancing it in pursuit of our dual mission of providing a superb engineering education to some of the nation's brightest and most enterprising students and of

transforming engineering education nationally and internationally.

As you will see when you look through this catalog, Olin's academic program consists of much more than traditional engineering courses. Olin students often work in interdisciplinary teams in a project-based learning environment. The curriculum provides not only a first-rate engineering education, but also opportunities to explore entrepreneurship and a broad selection of the liberal arts.

Olin views its program as a "learning continuum" that connects and often blends the formal academic program with Co-Curricular activities, research with faculty, community service, Passionate Pursuits and clubs. The learning continuum is vital for the student-centered culture of intellectual and personal challenge we continually nurture at Olin – a culture that fosters hands-on learning, creativity, entrepreneurial thinking and discovery.

We invite you to explore Olin College.

Dr. Vincent P. Manno
Provost and Dean of Faculty

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 History

Olin, the Man

Franklin W. Olin (1860–1951) was an engineer, entrepreneur, and professional baseball player. Raised in Vermont lumber camps and lacking a high school diploma, he qualified for entrance to Cornell University through self-instruction. At Cornell he majored in civil engineering and was captain of the baseball team. He even played major league baseball during the summers to finance his education. He went on to found the company known today as the Olin Corporation, a Fortune 1000 company.

Olin, the Foundation: F. W. Olin Foundation

In 1938, Mr. Olin transferred a large part of his personal wealth to a private philanthropic foundation. Over the subsequent two-thirds of a century, the F. W. Olin Foundation awarded grants totaling nearly \$800 million to construct and fully equip 78 buildings on 58 independent college campuses. Recipients include Babson, Bucknell, Carleton, Case-Western, Colgate, Cornell, DePauw, Harvey Mudd, Johns Hopkins, Marquette, Rose-Hulman Institute, Tufts, University of San Diego, University of Southern California, Vanderbilt and Worcester Polytechnic. In 2004 the Foundation announced its intention to transfer its remaining assets to Olin College and close its doors. This final grant brought the Foundation's total commitment to Olin College to more than \$460 million, which is one of the largest such commitments in the history of American higher education.

Olin, the Vision

Starting in the late 1980's, the National Science Foundation and engineering community at-large began calling for reform in engineering education. In order to serve the needs of the growing global economy, it was clear that engineers needed to

have business and entrepreneurship skills, creativity and an understanding of the social, political and economic contexts of engineering. The F. W. Olin Foundation decided the best way to maximize its impact was to create a college from scratch to address these emerging needs.

Olin, the College

The Franklin W. Olin College of Engineering received its educational charter from the Commonwealth of Massachusetts in 1997, the same year the Foundation announced its ambitious plans for the college. Planning and architectural design work for a state-of-the-art campus began almost immediately. By the end of 1999, the new institution's leadership team had been hired and site development work commenced on 70 acres adjacent to Babson College. Olin's first faculty members joined the college by September 2000.

The college officially opened its doors in fall 2002 to its inaugural first-year class. In the year prior to the opening, 30 student "partners" worked with Olin's world-class faculty to create and test an innovative curriculum that infused a rigorous engineering education with business and entrepreneurship as well as the arts, humanities and social sciences. They developed a hands-on, interdisciplinary approach that reflects actual engineering practice. State-of-the-art facilities matched with first-rate students, nationally renowned professors and unbridled enthusiasm, have quickly established Olin as a nationally recognized center for innovation and excellence in engineering education. Olin graduated its first class in May 2006.



Program Descriptions

Objectives, Pedagogy and Curriculum

Introduction

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; and
- dedication to intellectual vitality, community involvement and lifelong personal growth.

Objectives

Olin's educational program helps students become individuals who:

1. Can make a positive difference within their profession and their community.
2. Demonstrate technical competence and creative problem-solving skills that foster success in a variety of postgraduate environments, including professional practice and graduate school.
3. Are prepared for and capable of appropriate response to social, technical and global changes.

We hope that, after graduation, our students will increasingly demonstrate achievement of these objectives as follows:

1. They will demonstrate the ability to recognize opportunity and to take initiative. They will be able to communicate effectively and to collaborate well with others. They will understand the broad social, economic and ethical implications of their work, and will be cognizant of their professional responsibilities.
2. They will have a solid grounding in fundamental principles of science and engineering and the ability to apply this knowledge to the design, analysis, and diagnosis of engineering systems. They will be able to develop creative design solutions that are responsive to technical, social, economic and other realistic considerations.
3. They will demonstrate the results of a broad education that spans math, science, engineering, the arts, humanities, social sciences, and entrepreneurship. They will build on this foundation throughout their careers by engaging in independent learning in order to identify and respond to emerging technical and social developments.

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 SCOPE project that engages student teams in significant design problems with realistic constraints sponsored by an industry 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 such as the Paul Revere: Tough as Nails course block that links history of technology with materials science. 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. Through Olin's competency learning and assessment system, students demonstrate skill in essential areas such as communication, qualitative understanding and quantitative analysis, teamwork, contextual thinking, opportunity assessment, diagnosis, design, and life-long learning.

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.

SCOPE and Capstones A student's final year at Olin centers on an ambitious year-long Senior Capstone Program in Engineering (SCOPE) project. A typical SCOPE project is undertaken by a team of four to six students under the supervision of an Olin faculty member and serves an external partner. The SCOPE project prepares students for life and work in their chosen profession. In ad-

dition, each student undertakes a self-designed one-semester Capstone project in an area of interest within the Arts, Humanities, Social Sciences, or Entrepreneurship.

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 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 students may participate in research as early as their first year.

Independent Study 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 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.

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 the Senior Capstone Program in Engineering (SCOPE) project, in which interdisciplinary teams of students work for a full year to solve an authentic, intensive, real-world engineering problem.

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 courses in vector calculus, linear algebra, 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 com-

plete 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. This sequence culminates in a student-conceived AHS or Entrepreneurship Capstone, requiring students 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 EI) 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 SCOPE 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.

Through a special arrangement with the Babson College Graduate School, Olin students have the opportunity for a “fast track” to a Master’s Degree in Management with a specialization in Technical Entrepreneurship.

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.

Sample Four-year Schedule

The curriculum provides for considerable flexibility and student choice about how to meet requirements. This chart is an example of one of many ways a student might progress through the four-year program.

1ST YEAR

1st Semester	ENGINEERING MC: Modeling and Control	MATH and SCIENCE Modeling and Simulation of the Physical World	ENGINEERING Design Nature	AHS Arts, Humanities, Social Science Foundation	= 15 credits
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2nd Semester	ENGINEERING MC: Real World Measurements	MATH Vector Calculus	SCIENCE Physics	SCIENCE e.g., Biology OR Material Science	E! FOUNDATION The Entrepreneurial Initiative	= 17 credits
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2ND YEAR

1st Semester	MATH Linear Algebra Probability and Statistics	ENGINEERING Principles of Engineering	SCIENCE e.g., Chemistry OR Math and Science OR Materials Science	AHS Arts, Humanities, Social Science	= 16 credits
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2nd Semester	MATH	ENGINEERING Program Specific Engineering	ENGINEERING Program Specific Engineering	ENGINEERING User-Oriented Collaborative Design	= 16 credits
	MATH or SCIENCE				

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

3RD YEAR

1st Semester	ELECTIVE	ENGINEERING Program Specific Engineering	ENGINEERING Program Specific Engineering	AHS Arts, Humanities, Social Science	= 16 credits
	ELECTIVE	ENGINEERING Program Specific Engineering	ELECTIVE	AHS/E! Arts, Humanities, Social Science or Entrepreneurship	
2nd Semester	ELECTIVE	ENGINEERING Program Specific Engineering	ELECTIVE	AHS/E! Arts, Humanities, Social Science or Entrepreneurship	= 16 credits

4TH YEAR

1st Semester	SCIENCE or MATH	ENGINEERING Design Depth	ENGINEERING SCOPE	AHS/E! Arts, Humanities, Social Science or Entrepreneurship	= 16 credits
	MATH or SCIENCE				
2nd Semester	ELECTIVE or SELF-STUDY	ENGINEERING Program Specific Engineering	ENGINEERING SCOPE	AHS/E! Capstone	= 16 credits

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.

Some activities, like Passionate Pursuits and a few classes, provide non-degree credit, which appears on the transcript, but does not count toward Credit Requirements. Non-degree credit counts toward the maximum credits per semester, but not toward the minimum.

General Distribution and Course Requirements

General Distribution 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.

* *The AHS Capstone does not count toward the 12 credit AHS 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

Title	Number	Notes
Modeling and Simulation of the Physical World	MTH 1111 and SCI 1111	
Vector Calculus	MTH 1120	Or designated alternative
Linear Algebra	MTH 2120	Or designated alternative
Probability and Statistics	MTH 2130	Or designated alternative
Foundations of Modern Biology (with laboratory)	SCI 1210	
Chemistry/Material Science – One of: <ul style="list-style-type: none"> • Introduction to Chemistry (with laboratory) • Materials Science and Solid State Chemistry (with laboratory) • Organic Chemistry (with laboratory) 	SCI 1310 SCI 1410 SCI 2320	
Physics – One of: <ul style="list-style-type: none"> • Electricity and Magnetism • Mechanics • Other physics class by petition 	SCI 1121 SCI 1130	

Engineering

Title	Number	Notes
Modeling and Control	ENGR 1110	
Real World Measurements	ENGR 1121	
Principles of Engineering	ENGR 2210	
SCOPE	ENGR 4190	This is a two-semester course requirement

Design

Title	Number	Notes
Design Nature	ENGR 1200	
User-Oriented Collaborative Design	ENGR 2250	
Design Depth Course – One of: <ul style="list-style-type: none"> • Sustainable Design • Human Factors and Interface Design • Usable Products • Distributed Engineering Design • Product Design and Development • Design for Manufacturing • Systems 	ENGR 3210 ENGR 3220 ENGR 3230 ENGR 3240 ENGR 3250 ENGR 3260 ENGR 3710	See the current registration booklet for possible additional options, including special topics courses.

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

Title	Number	Notes
AHS Foundation – One of: <ul style="list-style-type: none"> History of Technology: A Cultural and Contextual Approach The Wired Ensemble – Instruments, Voices, Players Seeing and Hearing: Communicating with Photographs, Video and Sound Culture & Difference: An Anthropological Approach What is “I”? 	AHSE 1100 AHSE 1122 AHSE 1130 AHSE 1140 AHSE 1150	All AHS foundation courses offer: <ul style="list-style-type: none"> 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.
The Entrepreneurial Initiative	AHSE 1500	
AHS or Entrepreneurship Concentration		Students must design a sequence of at least eight credits of courses in an approved AHS or Entrepreneurship discipline.
AHS or Entrepreneurship Capstone	AHS 4190 or AHS 4590	Students must complete an authentic, four credit AHS or Entrepreneurship project (or advanced AHS course) in their area of AHS or Entrepreneurship concentration.

Self-Study

The Self-Study Requirement is a graduation requirement that all Olin students must fulfill. Each Olin student will fulfill the institution’s self-study requirement by completing four credits of approved coursework that contains the label “This course fulfills the Olin Self-Study requirement.” Presently this list includes AHS or E! Capstone Projects (AHSE 4190, AHSE 4590); and Failure Analysis and Prevention (ENGR 3820); certain advanced research projects; or approved independent study activities. All activities that fulfill the self-study requirement will 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 throughout the investigation. All activities that fulfill Olin’s Self-Study requirement must explicitly achieve the following: (1) develop students’ skills in working independently to learn challenging material and to tackle challenging problems; (2) develop students’ skills in communication relevant to the field and project; (3) hone students’ skills and attitudes enabling life-long learning (identifying and addressing one’s educational needs in a changing world). Finally, self-study should be sufficiently advanced to be considered equivalent to 3000 or 4000 level material by the supervising faculty member.

Independent Study and Research

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.

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. Independent study and research credit may be applied toward credit requirements in particular areas (Math/Science/AHS/Entrepreneurship/Engineering) and toward the overall 120 credit requirement.

These activities are normally taken Pass/No Credit. In order to use independent study to satisfy a 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 be approved to satisfy a course requirement.

Program-Specific Requirements

Olin College offers three degrees: Bachelor of Science in Electrical and Computer Engineering (ECE), Bachelor of Science in Mechanical Engineering (ME), and Bachelor of Science in Engineering (E). Course Requirements for each of these degrees are outlined below. A course that is used to satisfy a General Course Requirement cannot also be used to satisfy a Program-Specific Requirement.

Electrical and Computer Engineering (ECE)

Electrical and Computer Engineering is a degree program designed to meet ABET Program Criteria in Electrical and Computer Engineering. Olin's ECE degree focuses on the devices and structure of computing and communications systems, with an emphasis on hardware design. The Electrical and Computer Engineering Program has the following three educational objectives:

Program Educational Objective I: *Our graduates will be recognized as individuals who can make a positive difference within their profession and their community.*

Elaboration: Our graduates will demonstrate the ability to recognize opportunity and to take initiative. They will be able to communicate effectively and to work effectively on teams. They will understand the broad social, economic and ethical implications of their work, and will be cognizant of their professional responsibilities.

Program Educational Objective II: *Our graduates will demonstrate technical competence in electrical and computer engineering and creative problem-solving skills that foster success in a variety of postgraduate environments, including professional practice and graduate school.*

Elaboration: Our graduates will have a solid grounding in fundamental principles of science and electrical and computer engineering and the ability to apply this knowledge to analyze and diagnose electrical and computer engineering systems. They will be able to develop creative design solutions that are responsive to technical, social, economic and other considerations.

Program Educational Objective III: *Our graduates will be prepared for and capable of appropriate response to social, technical and global changes during their lifetimes.*

Elaboration: Our graduates will demonstrate the results of a broad education that focuses on electrical and computer engineering, but also encompasses the arts, humanities, social sciences, and entrepreneurship. They will build on this foundation by engaging in independent learning in order to identify and respond to emerging technical and social developments.

The Course Requirements of the ECE program are:

Requirement	Course Name	Number
ECE Math – All of:	Differential Equations Discrete Mathematics	MTH 2140 or designated alternative MTH 2110
ECE – All of:	Signals and Systems Introduction to Microelectronic Circuits Software Design Computer Architecture	ENGR 2410 ENGR 2420 ENGR 2510 ENGR 3410
ECE – One of:	Digital Signal Processing Analog and Digital Communications	ENGR 3415 ENGR 3420
ECE – One of:	Controls Robotics Modern Sensors Semiconductor Devices Error Control Codes any level 3000 or higher E:C course, or other course approved by ECE program group	ENGR 3370 ENGR 3390 ENGR 3440 ENGR 3450 MTH 3140/ENGR 3140

Mechanical Engineering (ME)

Mechanical Engineering is a degree program designed to meet ABET Program Criteria in Mechanical Engineering. The ME requirements emphasize the design of mechanical and thermal/fluid systems. The Mechanical Engineering Program Educational Objectives are::

Program Educational Objective I: *Our graduates will be recognized as individuals who can make a positive difference within their profession and their community.*

Elaboration: Our graduates will demonstrate the ability to recognize opportunity and to take initiative. They will be able to communicate effectively and to work effectively on teams. They will understand the broad social, economic and ethical implications of their work, and will be cognizant of their professional responsibilities.

Program Educational Objective II: *Our graduates will demonstrate technical competence in mechanical engineering and creative problem-solving skills that foster success in a variety of postgraduate environments, including professional practice and graduate school.*

Elaboration: Our graduates will have a solid grounding in fundamental principles of science and mechanical engineering and the ability to apply this knowledge to analyze and diagnose mechanical engineering systems. They will be able to develop creative design solutions that are responsive to technical, social, economic and other considerations.

Program Educational Objective III: *Our graduates will be prepared for and capable of appropriate response to social, technical and global changes during their lifetimes.*

Elaboration: Our graduates will demonstrate the results of a broad education that focuses on mechanical engineering, but also encompasses the arts, humanities, social sciences, and entrepreneurship. They will build on this foundation by engaging in independent learning in order to identify and respond to emerging technical and social developments.

The Course Requirements of the ME program are:

Requirement	Course Name	Number
ME Math:	Differential Equations	MTH 2140 or designated alternative
	One of:	
	• Partial Differential Equations	MTH 3120
	• Numerical Methods and Scientific Computing	MTH 3150
ME – All of:	• Nonlinear Dynamics and Chaos	MTH 3170
	• other math course approved by ME program group	
	Mechanics of Solids and Structures	ENGR 2320
	Dynamics	ENGR 2340
	Thermodynamics	ENGR 2350
ME – One of:	Transport Phenomena	ENGR 3310
	Mechanical Design	ENGR 3330
	Dynamics of Mechanical and Aerospace Structures	ENGR 3340
	Mechanical and Aerospace Systems	ENGR 3345
	Renewable Energy	ENGR 3355
	Topics in Fluid Dynamics	ENGR 3360
	Controls	ENGR 3370
	Design for Manufacturing (if not used to satisfy the Design Depth requirement)	ENGR 3260
	Robotics	ENGR 3390
	Biomedical Materials	ENGR 3610
	Systems (if not used to satisfy the Design Depth requirement)	ENGR 3710
	Structural Biomaterials	ENGR 3810
	Failure Analysis and Prevention	ENGR 3820
	Phase Transformation in Ceramic and Metallic Systems	ENGR 3830
	other course approved by ME program group	

Engineering

The Engineering degree program offers a major in Engineering that is both rigorous and flexible. This program gives students the option to pursue new areas of engineering and interdisciplinary combinations of engineering and other fields. It is also intended to give the college mechanisms for investigating new areas and creating new concentrations. All paths to graduation with the engineering degree provide for all outcomes required by the ABET General Criteria. The Engineering Program has three educational objectives:

Program Educational Objective I: *Our graduates will be able to make a positive difference within their profession and their community.*

Elaboration: Our graduates will demonstrate the ability to recognize opportunity and to take initiative. They will be able to communicate effectively and to work well on teams. They will understand the broad social, economic and ethical implications of their work, and will be cognizant of their professional responsibilities.

Program Educational Objective II: *Our graduates will demonstrate technical competence and creative problem-solving skills that foster success in a variety of postgraduate environments, including professional practice and graduate school.*

Elaboration: Our graduates will have a solid grounding in fundamental principles of mathematics, science, and engineering and the ability to apply this knowledge to the design, analysis and diagnosis of engineering systems. They will be able to develop creative design solutions that are responsive to technical, social, economic and other realistic constraints and considerations.

Program Educational Objective III: *Our graduates will be prepared for and capable of appropriate response to social, technical and global changes during their careers.*

Elaboration: Our graduates will possess a broad understanding of math, science, engineering, the arts, humanities, social sciences, and entrepreneurship. They will build on this foundation throughout their careers by engaging in independent learning in order to identify and respond to emerging technical and social developments.

Students who choose the Engineering degree may specify a concentration, which is a set of classes that constitute a coherent area of study. A student's concentration appears on the diploma but not on the official transcript. The college offers designated concentrations in Bioengineering, Computing, Materials Science, and Systems. Alternatively, students may design a concentration in another area.

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.

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 designated concentrations and previous student-designed concentrations? If a student-designed concentration is named, is the proposed name accurate and appropriate?

The designated concentrations are examples of recommended programs, but all course plans go through the same review process. 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, biology, and chemistry. The E:Bio concentration prepares students to approach problems important to biology, medical research, and clinical studies; it provides some of the background required for medical school.

Requirement	Course Name	Number
E:Bio Math	Four credits of advanced Mathematics appropriate to the program of study	
E:Bio Biology	Four credits of advanced Biology	
E:Bio Chemistry/Materials Science	Four credits of Chemistry, Materials Science, or Organic Chemistry in addition to the General Course Requirements	SCI 1310, SCI 1410, SCI 2320
E:Bio Bioengineering	12 credits of coursework appropriate to Bioengineering	

Students wishing to pursue the E:Bio concentration within the Engineering major must develop a specific program of study in consultation with bioengineering faculty. Below are some guidelines on course selection:

Advanced Mathematics courses include MTH 3120 Partial Differential Equations and MTH 3170 Nonlinear Dynamics and Chaos (note that both these courses have MTH 2140 Differential Equations as a prerequisite). Advanced Biology courses include SCI 2210 Immunology and SCI 3210 Human Molecular Genetics in the Age of Genomics. Bioengineering courses include all ENGR 36xx-series courses, as well as ENGR 3810 Structural Biomaterials. 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.

Students interested in pursuing medical, dental or veterinary school admission should contact Dr. Janey Pratt, Olin Senior Partner in Health Science, as early in their Olin studies as possible, and ensure that their course plan meets the requirements of the programs they are considering.

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.

Requirement	Course Name	Number
E:C Math	Discrete Mathematics	MTH 2110
E:C – All of:	Software Design Foundations of Computer Science Software Systems eight additional credits in computing	ENGR 2510 ENGR 3520 ENGR 3525

Additional computing credits may include Olin courses such as ENGR 3540 Computational Modeling, ENGR 3410 Computer Architecture, advanced computer science courses at Babson, Brandeis, Wellesley, or study away institutions. ENGR 3220 Human Factors and Interaction 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.

Requirement	Description or Course Name	Number
E:D Core	Eight credits of approved Advanced Design courses; Four credits may be met 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	

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.

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.

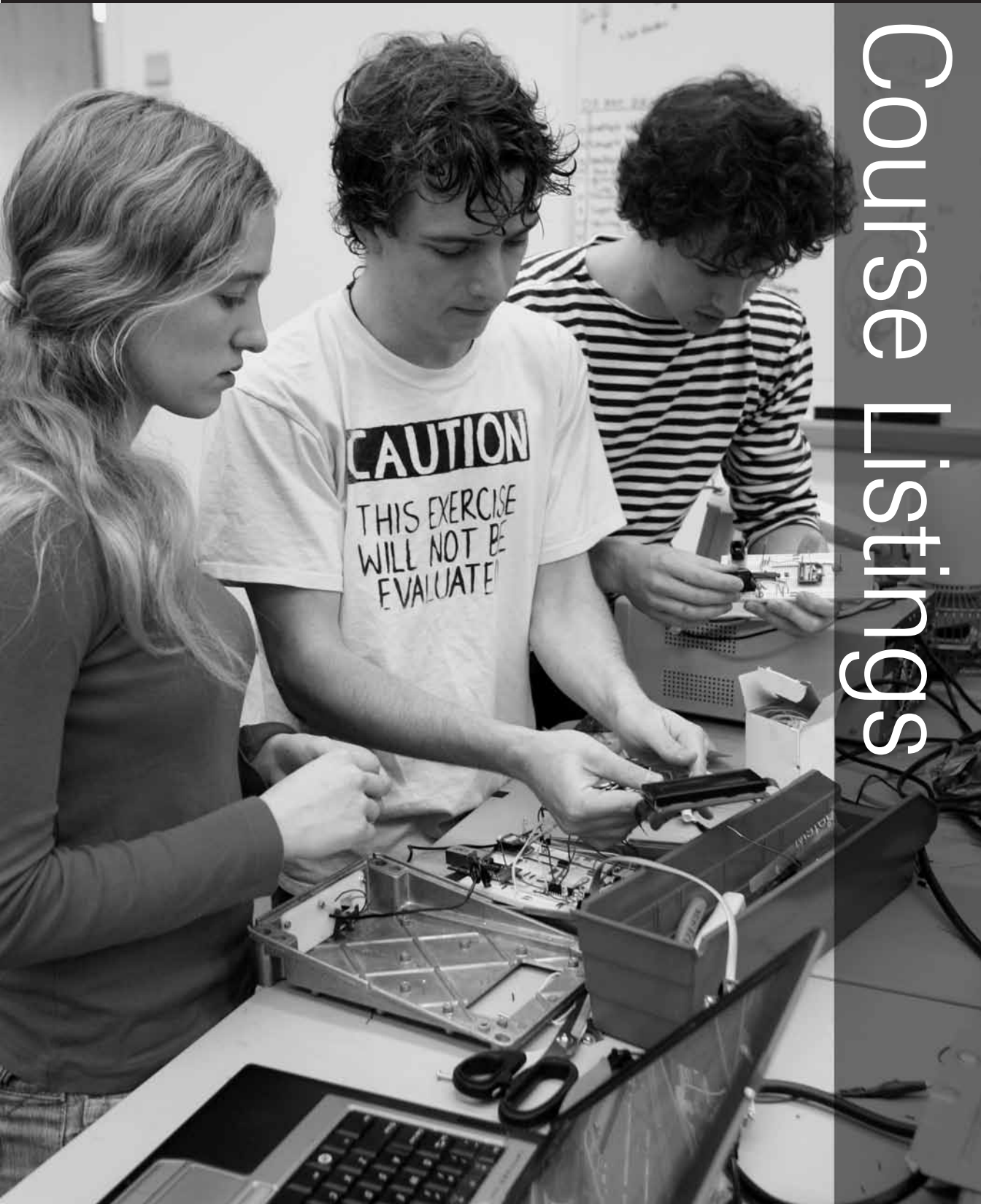
Requirement	Course Name	Number
E:MS Math	Differential Equations	MTH 2140 or designated alternative
E:MS	20 credits of engineering subjects appropriate to the program of study with a minimum of twelve credits in materials science subjects.	

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.

Engineering: Systems (E:SYS)

The Systems concentration focuses on the design of products that integrate significant technology from multiple disciplines, with a focus on products that merge ECE and ME. Such products are particularly hard to create because designers tend to have specialized, rather than broad, knowledge of disciplines.

Requirement	Course Name	Number
E:SYS Math	Differential Equations	MTH 2140 or designated alternative
E:SYS ECE - Any two of:	Signals and Systems Introduction to Microelectronics Circuits Software Design Computer Architecture Analog and Digital Communications	ENGR 2410 ENGR 2420 ENGR 2510 ENGR 3410 ENGR 3420
E:SYS ME - Any two of:	Mechanics of Solids and Structures Dynamics Thermodynamics Transport Phenomena Mechanical Design	ENGR 2320 ENGR 2340 ENGR 2350 ENGR 3310 ENGR 3330
E:SYS	Systems	ENGR 3710



Course Listings

Offerings

Information in this catalog is subject to change. Please go to the Student Accounts and Records Center website: <http://star.olin.edu> 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.

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

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/SCOPE

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.

Prerequisites and Co-requisites

Prerequisites and co-requisites may occasionally be waived with permission of the course instructor.

Course Listings Summary

Number	Name	Prerequisites	Co-requisites	Credits	Hours	Offered
AHSE 0112	The Olin Conductorless Orchestra	Audition		1 AHS	2-0-1	Fall, Spring
AHSE 1100	History of Technology: A Cultural and Contextual Approach			4 AHS	4-0-8	Fall
AHSE 1122	The Wired Ensemble – Instruments, Voices, Players	Ability to read music		4 AHS	4-0-8	Fall
AHSE 1130	Seeing and Hearing: Communicating with Photographs, Video and Sound			4 AHS	4-0-8	Fall
AHSE 1140	Culture and Difference: An Anthropological Approach			4 AHS	4-0-8	Fall
AHSE 1150	What is “I”?			4 AHS	4-0-8	Fall (not offered every year)
AHSE 1155	Identity from the Mind and the Brain			4 AHS	4-0-8	Fall
AHSE 1500	The Entrepreneurial Initiative			4 AHSE	4-0-8	Fall, Spring
AHSE 2110	The Stuff of History: Materials and Culture in Ancient, Revolutionary and Contemporary Times		SCI 1410	4 AHS	4-0-8	Spring
AHSE 2112	Six Books that Changed the World	AHS Foundation		2 AHS	4-0-8	TBA
AHSE 2114	Science Fiction and Historical Context	AHS Foundation		2 AHS	4-0-8	TBA
AHSE 2120	Heroes for the Renaissance Engineer: Leonardo , Nabokov, Bach, Borodin			4 AHS	3-0-9	Alt Spring (odd years)
AHSE 2125	The Engineer’s Orchestra II: Theory, Orchestration, Composition			2 AHS	4-0-8	Alt Fall (odd years)
AHSE 2130	The Intersection of Art and Science			4 AHS	4-0-8	TBA
AHSE 2131	Responsive Drawing and Visual Thinking			4 AHS	4-0-8	Spring
AHSE 2140	Anthropology: Culture Knowledge and Creativity	AHS Foundation		4 AHS	4-0-8	Spring
AHSE 3130	Advanced Digital Photography	AHSE 1130		4 AHS	4-0-8	Alt Fall (odd years)
AHSE 3190	Arts, Humanities, Social Sciences Capstone Preparatory Workshop			1 AHS	0-0-3	Fall, Spring
AHSE 3510	New Technology Ventures	AHSE 1500		4 AHSE	4-0-8	Fall

Number	Name	Prerequisites	Co-requisites	Credits	Hours	Offered
AHSE 4190	Arts, Humanities, Social Sciences Capstone	AHSE 3190 or Permission of Instructor(s)		4 AHS	4-0-8	Fall, Spring
AHSE 4590	Entrepreneurship Capstone	Entrepreneurship track: 8 qualifying credits		4 AHSE	2-0-10	Fall, Spring
ENGR 1110	Modeling and Control		SCI 1111, and MTH 1111	3 ENGR	3-3-3	Fall
ENGR 1121	Real World Measurements			3 ENGR	3-3-3	Spring
ENGR 1200	Design Nature			4 ENGR	6-4-2	Fall
ENGR 1330	Fundamentals of Machine Shop Operations			4 ENGR	4-4-4	Fall, Spring
ENGR 2125	The Engineer's Orchestra I: Acoustics, Waves, and Vibrations			4 ENGR	4-2-6	TBA
ENGR 2210	Principles of Engineering	ENGR 1110		4 ENGR	4-4-4	Fall, Spring
ENGR 2250	User-Oriented Collaborative Design			4 ENGR	4-4-4	Spring
ENGR 2320	Mechanics of Solids and Structures	ENGR 1121		4 ENGR	4-0-8	Spring
ENGR 2330	Introduction to Mechanical Prototyping	ENGR 1200		4 ENGR	5-3-4	Spring
ENGR 2340	Dynamics	ENGR 1121		4 ENGR	4-0-8	Fall
ENGR 2350	Thermodynamics			4 ENGR	4-0-8	Spring
ENGR 2410	Signals and Systems			4 ENGR	4-0-8	Spring
ENGR 2420	Introduction to Microelectronic Circuits	ENGR 1121		4 ENGR	4-4-4	Spring
ENGR 2510	Software Design			4 ENGR	5-0-7 (F) 6-0-6 (S)	Fall, Spring
ENGR 2620	Biomechanics	MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI1130, SCI1210, or Permission of instructor(s)		4 ENGR	4-0-8	Spring (even years)
ENGR 3140	Error Control Codes	MTH 2120 (required) and MTH 2110 (or another proof based math class)	MTH 3140	2 ENGR	4-0-8	Spring
ENGR 3210	Sustainable Design	ENGR 2250		4 ENGR	4-0-8	Fall
ENGR 3220	Human Factors and Interface Design	ENGR 2250		4 ENGR	4-4-4	Fall, Spring
ENGR 3230	Usable Products: Analyzing the User Experience for Redesign	ENGR 2250		4 ENGR	4-4-4	Spring
ENGR 3310	Transport Phenomena	MTH 1120		4 ENGR	4-0-8	Fall

Number	Name	Prerequisites	Co-requisites	Credits	Hours	Offered
ENGR 3240	Distributed Engineering Design	ENGR 1200, ENGR 2250		4 ENGR	4-2-6	TBA
ENGR 3250	Product Design and Development	ENGR 2250		4 ENGR	4-0-8	Spring
ENGR 3260	Design for Manufacturing	ENGR 2250		4 ENGR	4-0-8	Spring
ENGR 3330	Mechanical Design	ENGR 2320		4 ENGR	4-4-4	Fall
ENGR 3340	Dynamics of Mechanical and Aerospace Structures	MTH 2140, ENGR 2340 or Permission of Instructor(s)		4 ENGR	4-0-8	Fall
ENGR 3345	Mechanical and Aerospace Systems	ENGR 2210 or Permission of Instructor(s)		4 ENGR	4-0-8	Spring
ENGR 3355	Renewable Energy	ENGR 2350		4 ENGR	4-0-8	Fall
ENGR 3360	Topics in Fluid Dynamics	ENGR 3310		4 ENGR	4-0-8	Spring
ENGR 3370	Controls	ENGR 2410 or ENGR 2340		4 ENGR	4-0-8	Spring
ENGR 3390	Robotics			4 ENGR	4-0-8	Fall
ENGR 3410	Computer Architecture	ENGR 1121		4 ENGR	4-4-4	Fall
ENGR 3415	Digital Signal Processing	ENGR 2410		4 ENGR	4-0-8	Spring
ENGR 3420	Introduction to Analog and Digital Communications	ENGR 2410		4 ENGR	4-4-4	Fall
ENGR 3426	Mixed Analog-Digital VLSI I	ENGR 2420		4 ENGR	4-4-4	Fall
ENGR 3427	Mixed Analog-Digital VLSI II	ENGR 3426		4 ENGR	4-4-4	Spring
ENGR 3440	Modern Sensors	ENGR 1121, ENGR 2410		4 ENGR	4-4-4	TBA
ENGR 3450	Semiconductor Devices	ENGR 1121, SCI 1410 or SCI 3110	4 ENGR	4-4-4	TBA	
ENGR 3520	Foundations of Computer Science	ENGR 2510	MTH 2110	4 ENGR	4-0-8	Every 3rd semester (beginning Fall 04)
ENGR 3520A	Foundations of Computer Science Project		ENGR 3520	2 ENGR	1-0-5	TBA
ENGR 3525	Software Systems			4 ENGR	4-4-4	Every 3rd semester (beginning Spring 05)
ENGR 3530	Synchronization			2 ENGR	2-2-2	Every 3rd semester (beginning Spring 05)
ENGR 3540	Computational Modeling	ENGR 2510		4 ENGR	4-0-8	Every year (beginning Fall 05)

Number	Name	Prerequisites	Co-requisites	Credits	Hours	Offered
ENGR 3550	Computer Systems and Public Policy			2 AHS + 2 ENGR	4-0-8	TBA
ENGR 3600	Topics in Bioengineering			4 ENGR	4-0-8	Fall
ENGR 3610	Biomedical Materials	SCI 1210, SCI 1410		4 ENGR	4-0-8	Fall
ENGR 3620	Cellular Bioengineering	SCI 1210 or Permission of Instructor(s)		4 ENGR	4-0-8	
ENGR 3650	Biomedical Thermodynamics	MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI1130, SCI1210, or Permission of Instructor(s)		4 ENGR	4-0-8	Alt Spring (odd years)
ENGR 3710	Systems	Completion of other E:SYS requirements		4 ENGR	4-0-8	Fall
ENGR 3810	Structural Biomaterials	SCI 1410, SCI 1210		4 ENGR	4-4-4	Spring
ENGR 3820	Failure Analysis and Prevention	SCI 1410		4 ENGR	4-4-4	Fall
ENGR 3830	Phase Transformations in Ceramic and Metallic Systems	SCI 1410		4 ENGR	4-4-4	TBA
ENGR 4190	Senior Capstone Program in Engineering (SCOPE)		Must be a Senior	4 ENGR	4-0-8	Fall, Spring
ENGR 4190A	Senior Capstone Program in Engineering (SCOPE)		Open to non-Olin students	variable 2 or 4	4-0-8 (4) 2-0-4 (2)	
MTH 1111	Modeling and Simulation of the Physical World		SCI 1111	2 MTH	3-0-3	Fall
MTH 1120	Vector Calculus			2 MTH	2-0-4	Spring
MTH 2110	Discrete Mathematics			4 MTH	4-0-8	Fall
MTH 2120	Linear Algebra			2 MTH	2-0-4	Fall, Spring
MTH 2130	Probability and Statistics			2 MTH	2-0-4	Fall, Spring
MTH 2140	Differential Equations	MTH 1120		2 MTH	2-0-4	Fall, Spring
MTH 2160	Introduction to Mathematical Modeling	MTH 1111	MTH 2120, MTH 2130, and MTH 2140	2 MTH	2-0-4	TBA
MTH 3120	Partial Differential Equations	MTH 2120, MTH 2140		4 MTH	4-0-8	TBA
MTH 3130	Mathematical Analysis	MTH 1120		2 MTH	2-0-4	TBA
MTH 3140	Error Control Codes	MTH 2120 (required), and MTH 2110 (or another proof based math class)	ENGR 3140	2 MTH	4-0-8	Spring
MTH 3150	Numerical Methods and Scientific Computing	MTH 2120, MTH 2140		4 MTH	4-0-8	TBA

Number	Name	Prerequisites	Co-requisites	Credits	Hours	Offered
MTH 3160	Introduction to Complex Variables	MTH 1120 MTH 2140		4 MTH	4-0-8	TBA
MTH 3170	Nonlinear Dynamics and Chaos	MTH 2120, MTH 2140		4 MTH	4-0-8	Spring
OIE 1000	Olin Introductory Experience			1 non-degree	1-0-3	Fall
OIP 1000	The Olin Internship Practicum	PGP workshops		1	0-0-15	Fall, Spring
SCI 1111	Modeling and Simulation of the Physical World		MTH 1111	2 SCI	3-0-3	Fall
SCI 1121	Electricity and Magnetism		MTH 1120	4 SCI	4-0-8	Spring
SCI 1130	Mechanics			4 SCI	3-3-6	Fall, Spring
SCI 1210	Principles of Modern Biology (with laboratory)			4 SCI	4-3-5	Fall, Spring
SCI 1310	Introduction to Chemistry (with laboratory)			4 SCI	4-3-5	Spring
SCI 1410	Materials Science and Solid State Chemistry (with laboratory)			4 SCI	3-3-6	Fall, Spring
SCI 2130	Modern Physics (formerly SCI 3110)	SCI 1121 or SCI 1130		4 SCI	4-0-8	Fall
SCI 2140	Relativity			2 SCI	2-0-4	Fall (odd years)
SCI 2145	High Energy Astrophysics	SCI 1111		2 SCI	2-0-4	Fall (even years)
SCI 2210	Immunology	SCI 1210		4 SCI	4-0-8	Fall
SCI 2220	Biomechanics	MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI 1130, SCI 1210, or Permission of Instructor(s)		4 SCI	4-0-8'	Spring (even years)
SCI 2320	Organic Chemistry (with laboratory)			4 SCI	4-3-5	Fall
SCI 3120	Solid State Physics	SCI 2130		4 SCI	4-0-8	Alt Spring (odd years)
SCI 3130	Advanced Classical Mechanics	SCI 1130, MTH 2120, MTH 2140		4 SCI	4-0-8	Alt Fall
SCI 3210	Human Molecular Genetics in the Age of Genomics	SCI 1210 or BISC 219 (Wellesley)		4 SCI	4-0-8	Fall
SCI 3320	Bacteriophage Genomics Research Project Laboratory	SCI 1210		4 SCI	2-2-4	Fall, Spring
SCI 3250	Biological Thermodynamics	MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI 1130, SCI 1210, or Permission of Instructor(s)		4 SCI	4-0-8	Spring (odd years)
SCI 3320	Organic Chemistry II (with laboratory)	SCI 2320		4 SCI	4-4-4	Spring

Course Listings

Courses within the Olin Introductory Experience (OIE)

OIP 1000

The Olin Internship Practicum

Credits: 1

Hours: 0-0-15

Prerequisites: PGP workshops (see description)

Usually offered: Fall, Spring

Grading Type: Pass/No Credit

For information contact: Professor Mark Somerville

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.

ENGR 1110

Introduction to Modeling and Control

Credits: 3 ENGR

Hours: 3-3-3

Co-requisites: MTH 1111 and SCI 1111

Usually offered: Fall

For information contact: Professor Brian Storey

A hands-on class in the modeling and control of compartment systems, including first- and second-order thermal, mechanical, and electrical systems, the nature of effort and flow (across and through state variables) as universal concepts, power and energy, impedance, damping, passivity, qualitative feedback stability, and hysteretic, P, PI, and PID control. Students will also learn to use MATLAB

and Simulink, and to write basic real-time control and simulation software.

ENGR 1200

Design Nature

Credits: 4 ENGR

Hours: 6-4-2

Usually offered: Fall

For information contact: Professor Benjamin Linder

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.

MTH 1111 and SCI 1111

Modeling and Simulation of the Physical World

Credits: 2 MTH, 2 SCI

Hours: 6-0-6

Usually offered: Fall

For information contact: Professors John Geddes and Mark Somerville

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.

OIE 1000**The Olin Introductory Experience Seminar****Credits: 1 non-degree****Hours: 1-0-3****Usually offered: Fall****For information contact: Nick Tatar**

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.

Arts, Humanities, Social Science Foundation Course

Options may include one of the following courses or a range of other topics made available:

AHSE 1100**History of Technology: A Cultural and Contextual Approach****Credits: 4 AHS****Hours: 4-0-8****Usually offered: Fall****For information contact: Professor Robert Martello**

This course operates on three levels of inquiry and exploration. In the most detailed sense, we look at several major History of Technology themes, such as Technological Systems, Technology and Culture, and Technology and the Environment. We address larger historical questions, such as the interpretation of evidence and the combination of analysis and narrative. Finally, we conduct writing, presentation, creativity, and analysis exercises that contribute to competencies such as communication and contextual understanding.

AHSE 1122**The Wired Ensemble: Instruments, Voices, Players****Credits: 4 AHS****Hours: 4-0-8****Prerequisites: Ability to read music****Usually offered: Fall****For information contact: Professor Diana Dabby**

Three concurrent streams comprise The Wired Ensemble:

- composition and performance of original works for instruments and voices
- development of a “Composer’s Tool Chest”
- 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.

AHSE 1130**Seeing and Hearing: Communicating with Photographs, Video and Sound****Credits: 4 AHS****Hours: 4-0-8****Usually offered: Fall****For information contact: Professor Helen Donis-Keller**

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.

AHSE 1140**Culture and Difference:
An Anthropological Approach****Credits: 4 AHS****Hours: 4-0-8****Usually offered: Fall****For information contact: Professor Caitrin Lynch**

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?

AHSE 1150**What is "I"?****Credits: 4 AHS****Hours: 4-0-8****Usually offered: Fall (not offered every year)****For information contact: Professor Lynn Stein**

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.

**Arts, Humanities, Social
Science, and Entrepreneurship****AHSE 0112****The Olin Conductorless Orchestra****Credits: 1 AHS****Hours: 2-0-1****Prerequisites: Audition****Usually offered: Fall, Spring****Grading type: Pass/No Credit****For information contact: Professor Diana Dabby**

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.)

AHSE 1100**History of Technology: A Cultural and
Contextual Approach****Credits: 4 AHS****Hours: 4-0-8****Usually offered: Fall****For information contact: Professor Robert Martello**

See description in the Olin Introductory Experience (OIE) section

AHSE 1122

The Wired Ensemble: Instruments, Voices, Players

Credits: 4 AHS

Hours: 4-0-8

Prerequisites: Ability to read music

Usually offered: Fall

For information contact: Professor Diana Dabby

See description in the Olin Introductory Experience (OIE) section

AHSE 1130

Seeing and Hearing: Communicating with Photographs, Video and Sound

Credits: 4 AHS

Hours: 4-0-8

Usually offered: Fall

For information contact: Professor Helen Donis-Keller

See description in the Olin Introductory Experience (OIE) section

AHSE 1140

Culture and Difference: An Anthropological Approach

Credits: 4 AHS

Hours: 4-0-8

Usually offered: Fall

For information contact: Professor Caitrin Lynch

See description in the Olin Introductory Experience (OIE) section

AHSE 1150

What is “I”?

Credits: 4 AHS

Hours: 4-0-8

Usually offered: Fall (not offered every year)

For information contact: Professor Lynn Stein

See description in the Olin Introductory Experience (OIE) section

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.

AHSE 1155

Identity from the Mind and the Brain

Credits: 4 AHS

Hours: 4-0-8

Usually offered: Fall

For information contact: Professor Jonathan Adler

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.

AHSE 1500

The Entrepreneurial Initiative

Credits: 4 AHSE

Hours: 4-0-8

Usually offered: Fall, Spring

For information contact: Steve Gold

The Entrepreneurial Initiative provides an introduction to the art and science of entrepreneurial thought and action – meaning being able to succeed at times when resource constraints are the norm and the future is uncertain (which describes many of life’s most important situations). In this class, you will learn a conceptual and practical framework for taking the entrepreneurial initiative, no matter what the realm. You expect to succeed at Olin, in graduate school, on the job, and possibly in your own venture, and this course will help you to do so by engendering a sense of what it means to be entrepreneurial. The course centers on three competencies: strategy, resourcefulness and persuasive communication. Strategy includes an understanding of, and ability to apply, both causal and effectual logic. Resourcefulness represents a talent for identifying, securing and leveraging resources through the concepts of value exchange and networks. Last but not least, persuasive communication is what enables us to influence others to support our ideas and endeavors with their contributions of time, talent, money and other resources. Mid-semester, you will have the opportunity to put your newfound knowledge and skills to the test during a multi-week, intensive challenge during which you (and several team members) will apply your entrepreneurial skills to effect a positive social or economic change in a real-world setting. In the final section of the course, we will touch upon entrepreneurship as a business endeavor – meaning concepts specifically relating to starting and operating a business. Several speakers will also visit class. In this past, these have included one of the foremost venture capitalists in the U.S., the Chairman of the New York Stock Exchange, and a host of young entrepreneurs. The goal of the course is to introduce you to the art and science of entrepreneurship, and to inspire you to use these concepts to accomplish great things.

AHSE 2110

The Stuff of History: Materials and Culture in Ancient, Revolutionary and Contemporary Times

Credits: 4 AHS

Hours: 4-0-8

Co-requisites: SCI 1410 Section 2

Usually offered: Spring

For information contact: Professor Robert Martello

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.

AHSE 2112

Six Books that Changed the World

Credits: 2 AHS

Hours: 4-0-8

Pre/Co-requisites: AHS Foundation

Usually offered: TBA

For information contact: Professor Robert Martello

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.

AHSE 2114**Science Fiction and Historical Context****Credits: 2 AHS****Hours: 4- 0-8****Pre/Co-requisites: AHS Foundation****Usually offered: TBA****For information contact: Professor Robert Martello**

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.

AHSE 2120**Heroes for the Renaissance Engineer: Leonardo, Nabokov, Bach, Borodin****Credits: 4 AHS****Hours: 3-0-9****Usually offered: Alt Spring (odd years)****For information contact: Professor Diana Dabby**

To what extent have artists exhibited extraordinary knowledge and ability in science? Does this necessarily infuse their art, and if so, how? Source documents provide the key focus for analysis and critical thought. Artists in the fields of literature, art, and music include Vladimir Nabokov (writer and lepidopterist), Leonardo da Vinci (artist and engineer), Alexander Borodin (composer and chemist), and J. S. Bach (composer, performer, and acoustician). Each of these achieved a self-sufficiency enabling the articulation and realization of work that reveals a singular vision, shaped in part by fluency in both technical and artistic dis-

ciplines. Class trips to concerts and museums in Boston and New York enable students to explore firsthand the works of these individuals. Students also have the opportunity to realize projects that meld the arts and sciences in order to experience firsthand the satisfaction and challenges faced by Bach, Borodin, Nabokov, and Leonardo in their desire for knowledge, discovery, and creative expression.

AHSE 2125**The Engineer's Orchestra II: Theory, Orchestration, Composition****Credits: 2 AHS****Hours: 4-0-8****Prerequisites: Wired Ensemble or Permission of Instructor(s)****Usually offered: TBA****For information contact: Professor Diana Dabby**

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.

AHSE 2130**The Intersection of Art and Science****Credits: 4 AHS****Hours: 4-0-8****Usually offered: TBA****For information contact: Professor Helen Donis-Keller**

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?”

AHSE 2131**Responsive Drawing and Visual Thinking****Credits: 4 AHS****Hours: 4-0-8****Usually offered: Spring****For information contact: Professor Helen Donis-Keller**

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, conté, 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.

AHSE 2140**Anthropology: Culture, Knowledge and Creativity****Credits: 4 AHS****Hours: 4-0-8****Prerequisites: AHS Foundation****Usually offered: Spring****For information contact: Professor Caitrin Lynch**

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.

- What do anthropologists mean by culture?
- What does it mean to take cultural difference seriously?
- Does culture have an influence on what is considered legitimate “knowledge”?
- If knowledge is “situated,” what happens when one form of knowledge comes in contact with another (for instance in discussions of global human rights)?

- What is the relationship between cultural difference, situated knowledge, and human creativity?
- 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*.

AHSE 3130 **Advanced Digital Photography**

Credits: 4 AHS

Hours: 4-0-8

Prerequisites: AHSE 1130 or Permission of Instructor(s)

Usually offered: Alt Fall (odd years)

For information contact: Professor Helen Donis-Keller

In this course, students will develop a personal photographic vision and become acquainted with the work of leading contemporary photographers. A critical awareness of the medium of photography and the history of the still photographic image will also be fostered through selected readings, discussions, and visits to galleries and museums. While communication with visual images is paramount, technical issues will be addressed in some depth. For example, there will be instruction and practice with color management methods, advanced Adobe Photoshop, basic bookbinding

methods, and lighting techniques. Regular assignments and group critiques will help monitor progress and inspire new directions. The culminating project will be the design and construction of an artist's book by each member of the class.

AHSE 3190 **Arts, Humanities, Social Sciences** **Capstone Preparatory Workshop**

Credits: 1 AHS (pass/no credit)

Hours: 0-0-3

Usually offered: Fall, Spring

For information contact: Professor Gillian Epstein

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.). Olin strongly recommends that all students complete the AHS Capstone Preparatory Seminar before taking AHSE 4190 (AHS Capstone Project).

AHSE 3510 **New Technology Ventures**

Credits: 4 AHSE

Hours: 4-0-8

Prerequisites: AHSE 1500

Usually offered: Fall

For information contact: Professor Stephen Schiffman

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 fund-

ing 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 as well as the F.W. Olin College of Engineering. 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 relationships 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.

AHSE 4190

Arts, Humanities, Social Sciences (AHS) Capstone

Credits: 4 AHS

Hours: 4-0-8

Prerequisites: AHSE 3190 or Permission of Instructor(s)

Usually offered: Fall, Spring

For information contact: Professor Robert Martello

The AHS Capstone is an advanced, self-designed AHS project that builds upon a student's prior experience in one or more AHS disciplines. All students must complete either an AHS Capstone or an Entrepreneurship 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://projects.olin.edu/ahs>. 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.

AHSE 4590

Entrepreneurship Capstone

Credits: 4 AHSE

Hours: 2-0-10

Prerequisites: Entrepreneurship track; 8 qualifying credits

Usually offered: Fall, Spring

For information contact: Professor Stephen Schiffman

The Entrepreneurship Capstone is an advanced, intensive experience designed to complete a student's undergraduate study of entrepreneurship. All students are required to complete an AHS or Entrepreneurship capstone in order to graduate. 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 particu-

lar 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.

Engineering

ENGR 1110

Modeling and Control

Credits: 3 ENGR

Hours: 3-3-3

Co-requisites: MTH 1111 and SCI 1111

Usually offered: Fall

For information contact: Professor Brian Storey

See description in the Olin Introductory Experience (OIE) section

ENGR 1121

Real World Measurements

Credits: 3 ENGR

Hours: 3-0-3

Usually offered: Spring

For information contact: Professor Brian Storey

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 where measurements are made outside the controlled environment of the classroom.

ENGR 1330

Fundamentals of Machine Shop Operations

Credits: 4 ENGR

Hours: 4-4-4

Prerequisites: ENGR 1200

Usually offered: Fall and Spring terms

For information contact: David Anderson and Bruce Andruskiewicz

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).

ENGR 2125

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

Credits: 4 ENGR

Hours: 4-2-6

Prerequisites: ENGR 1121

Co-requisites: Math 2140 or Permission of Instructor(s)

Usually offered: TBA

For information contact: Professors Christopher Lee and Diana Dabby

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.

ENGR 2210 **Principles of Engineering**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 1110
Usually offered: Fall, Spring
For information contact: Professor Bradley Minch

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 non-trivial 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.

ENGR 2250 **User-Oriented Collaborative Design**

Credits: 4 ENGR
Hours: 4-4-4
Usually offered: Spring
For information contact: Professor Benjamin Linder

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.

ENGR 2320 **Mechanics of Solids and Structures**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: ENGR 1121
Usually offered: Spring
For information contact: Professor Christopher Lee

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.

ENGR 2330 **Introduction to Mechanical Prototyping**

Credits: 4 ENGR
Hours: 5-3-4
Prerequisites: ENGR 1200
Usually offered: Spring
For information contact: Professor David Barrett

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.

ENGR 2340**Dynamics****Credits: 4 ENGR****Hours: 4-0-8****Prerequisites: ENGR 1121****Co-requisites: MTH 2140****Usually offered: Fall****For information contact: Professor Christopher Lee**

This course contains the analytical and conceptual tools for understanding how mechanical, electrical, and electromechanical systems undergo changes in state. To analyze such systems we will apply both momentum and variational principles to derive the equations of motion. Hands-on demonstrations will illustrate the concepts behind these fundamental tools, and students will work on real-world examples from robotics, vehicle systems, spacecraft, and intelligent-structures.

Building on the ability to derive the equations of motion for rigid bodies, we extend the analysis to lumped parameter and continuous systems. This course will deliver generic tools for characterizing linear and nonlinear system behavior in the time and frequency domains. The hands-on component of the course will explore the fundamental concepts of system dynamics: system modes (eigenvalues and vectors), spectrum analysis, and time response.

ENGR 2350**Thermodynamics****Credits: 4 ENGR****Hours: 4-0-8****Usually offered: Spring****For information contact: Professor Brian Storey**

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.

ENGR 2410**Signals and Systems****Credits: 4 ENGR****Hours: 4-0-8****Usually offered: Spring****For information contact: Professor José Oscar Mur-Miranda**

Signals (functions of one or more independent variables) and Systems (devices that perform operations on signals) presents fundamental concepts that arise in a variety of fields. The ideas and techniques associated with these concepts inform such diverse disciplines as biomedical engineering, acoustics, communications, aeronautics and astronautics, circuit design, and the arts, humanities, and social sciences. Topics include transforms (Z, Laplace, Fourier), frequency analysis, convolution, FIR and IIR systems, stability, generalized functions, modulation (AM and FM), sampling, and digital filtering.

ENGR 2420**Introduction to Microelectronic Circuits****Credits: 4 ENGR****Hours: 4-4-4****Prerequisites: ENGR 1121****Usually offered: Spring****For information contact: Professor Bradley Minch**

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, cascodes, 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.

ENGR 2510 Software Design

Credits: 4 ENGR

Hours: 5-0-7 (Fall); 6-0-6 (Spring)

Usually offered: Fall, Spring

For information contact: Professor Allen Downey

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.

ENGR 2620 Biomechanics

Credits: 4 ENGR

Hours: 4-0-8

Prerequisites: MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI1130, SCI1210, or

Permission of Instructor(s)

Usually offered: Spring (even years)

For information contact: Professor Yevgeniya V. Zastavker

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.

ENGR 3140 Error Control Codes

Credits: 2 ENGR

Hours: 4-0-8

Prerequisites: MTH 2120 (required) and MTH 2110 (or another proof based math class)

Co-requisite: MTH 3140

Usually offered: Spring

For information contact: Professor Sarah Spence Adams

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.

ENGR 3210 Sustainable Design

Credits: 4 ENGR

Hours: 4-0-8

Prerequisites: ENGR 2250

Usually offered: Fall

For information contact: Professor Benjamin Linder

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.

ENGR 3220**Human Factors and Interface Design****Credits: 4 ENGR****Hours: 4-4-4****Prerequisites: ENGR 2250 User-Oriented Collaborative Design (required); ENGR 2510 Software Design or other software development experience (recommended)****Usually offered: Fall or Spring****For information contact: Professor Lynn Stein**

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.

ENGR 3230**Usable Products: Analyzing the User Experience for Redesign****Credits: 4 ENGR****Hours: 4-4-4****Prerequisites: ENGR 2250****Usually offered: TBA****For information contact: Professor Ozgur Eris**

What makes products usable? How can products be designed for usability? Students develop an in-depth understanding of product-user interactions by redesigning product concepts they have developed prior to taking the course for better usability. They identify the user requirements that drove the development of their product concepts, treat those requirements as hypotheses for a series of user experiments, and redesign their product concepts based on experimental findings. Video interaction and protocol analyses are introduced as research methodologies. Fundamental usability theories are covered.

ENGR 3240**Distributed Engineering Design****Credits: 4 ENGR****Hours: 4-2-6****Prerequisites: ENGR1200; ENGR2250****Usually offered: TBA****For information contact: Professor Ozgur Eris**

As members of a geographically distributed design team, students learn to develop and manage design processes that allow them to innovate within a multi-cultural context. Given that industry practices are increasingly global in nature, this modality strongly resembles how a significant degree of product development is performed across the world today. Students are first exposed to distributed teamwork principles, and upon completion of a design project, revisit and evaluate their efficacy.

ENGR 3250**Product Design and Development****Credits: 4 ENGR****Hours: 4-0-8****Prerequisites: ENGR 2250****Usually offered: Spring****For information contact: Professor Benjamin Linder**

Interdisciplinary teams of students from Babson College, the Rhode Island School of Design (RISD) and Olin develop new products. A comprehensive design process is employed, which addresses opportunity recognition, user characterization, alternatives development and analysis, and prototyping. Particular attention is paid to developing products that meet users' needs and have a viable path to market. Class will be held at all three schools. Transportation to class will be provided. Teamwork might require travel to RISD.

ENGR 3260**Design for Manufacturing****Credits: 4 ENGR****Hours: 4-0-8****Prerequisites: ENGR 2250****Usually offered: Spring****For information contact: Professor David Barrett**

This course introduces the principles of design for manufacturability and assembly. A variety of manufacturing processes are covered with a special emphasis placed on injection molding and elec-

tronic circuit board fabrication. In the first project, students design, manufacture and assemble a product using these processes. In the second project, students redesign an electro-mechanical product for high-volume manufacture. Visiting designers present case studies of products that were recently or are currently in production.

ENGR 3310 **Transport Phenomena**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: MTH 1120
Usually offered: Fall
For information contact: Professor Brian Storey

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.

ENGR 3330 **Mechanical Design**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 2320
Usually offered: Fall
For information contact: Professor David Barrett

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. Students will learn how to apply these concepts for design optimization. The course includes a major design project.

ENGR 3340 **Dynamics of Mechanical and Aerospace Structures**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: MTH 2140, ENGR 2340 or Permission of Instructor(s)
Usually offered: Fall
For information contact: Professor Christopher Lee

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 aeroelasticity. 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.

ENGR 3345 **Mechanical and Aerospace Systems**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: ENGR 2210 or Permission of Instructor(s)
Usually offered: Spring
For information contact: Professor Christopher Lee

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.

ENGR 3355 **Renewable Energy**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: ENGR 2350
Usually offered: Fall
For information contact: Professor Jessica Townsend

Modern society relies on stable, readily available

energy supplies. Renewable energy is an increasingly important component of the new energy mix. The course covers energy conversion, utilization and storage for renewable technologies such as wind, solar, biomass, fuel cells and hybrid systems and for more conventional fossil fuel-based technologies. Thermodynamics concepts (including the first and second law) will form the basis for modeling the renewable energy systems. The course also touches upon the environmental consequences of energy conversion and how renewable energy can reduce air pollution and global climate change. Transport Phenomena is recommended as a co-requisite, but not required.

ENGR 3360 **Topics in Fluid Dynamics**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: ENGR 3310
Usually offered: Spring
For information contact: Professor Brian Storey

This course will build upon the fundamentals learned in ENGR 3310 (Transport Phenomena) and discuss modern applications of fluid dynamics. The theme for the course will be advertised during course registration and will vary from year to year.

ENGR 3370 **Controls**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: ENGR 2410 or ENGR 2340
Usually offered: Spring
For information contact: Professor Christopher Lee

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.

ENGR 3390 **Robotics**

Credits: 4 ENGR
Hours: 4-0-8
Usually offered: Fall
For information contact: Professor David Barrett

This course is taught much like a graduate seminar. Topics include 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 lectures both from various Olin faculty and from external leaders in the robotics community. The course will also include a project component to help solidify key concepts.

ENGR 3410 **Computer Architecture**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 1121
Usually offered: Fall
For information contact: Professor Mark Chang

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.

ENGR 3415 **Digital Signal Processing**

Credits: 4 ENGR
Hours: 4-0-8
Prerequisites: ENGR 2410
Usually offered: Spring
For information contact: Professor Diana Dabby

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.

ENGR 3420 **Introduction to Analog and Digital Communications**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 2410 or Permission of Instructor(s)
Usually offered: Fall
For information contact: Professor Siddharta Govindasamy

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.

ENGR 3426 **Mixed Analog-Digital VLSI I**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 2420
Usually offered: Fall
For information contact: Professor Bradley Minch

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.

ENGR 3427 **Mixed Analog-Digital VLSI II**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 3426
Usually offered: Spring
For information contact: Professor Mark Chang

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.

ENGR 3440 **Modern Sensors**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 1121, ENGR 2410
Usually offered: TBA
For information contact: Professor Mark Somerville

Modern topics in sensors, including sensor fabrication, physics, signal conditioning, and “smart” sensors. Students will conduct research on sensor technologies of their choosing, and implement a sensor system of their own design.

ENGR 3450 **Semiconductor Devices**

Credits: 4 ENGR
Hours: 4-4-4
Prerequisites: ENGR 1121; SCI 1410 or SCI 3110
Usually offered: TBA
For information contact: Professor Sherra Kerns

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.

ENGR 3520 **Foundations of Computer Science**

ENGR 3520A **Foundations of Computer Science Project**

Credits: 4 ENGR (ENGR 3520); 2 ENGR (ENGR 3520A)

Hours: 4-0-8 (ENGR 3520); 1-0-5 (ENGR 3520A)

Prerequisites: ENGR 2510

Co-requisites: MTH 2110

Usually offered: Every 3rd Semester (beginning Fall 04)

For information contact: Professor Lynn Stein

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. Students may optionally enroll only in ENGR 3520; these students will be excused from the programming/project component of the course. Students wishing to register for the full six credit course should register for both ENGR 3520 and ENGR 3520A.

ENGR 3525 **Software Systems**

Credits: 4 ENGR

Hours: 4-4-4

Usually offered: Every 3rd Semester (beginning Spring 05)

For information contact: Professor Allen Downey

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.

ENGR 3530 **Synchronization**

Credits: 2 ENGR

Hours: 2-2-2

Usually offered: Every 3rd Semester (beginning Spring 05)

For information contact: Professor Allen Downey

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.

ENGR 3540 **Computational Modeling**

Credits: 4 ENGR

Hours: 4-0-8

Prerequisites: ENGR 2510 or equivalent

Usually offered: Every 3 Years (beginning Fall 05)

For information contact: Professor Allen Downey

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.

ENGR 3550 **Computer Systems and Public Policy**

Credits: 2 AHS + 2 ENGR

Hours: 4-0-8

Usually offered: TBA

For information contact: Professor Lynn Stein

How do technical decisions influence human

lives? How can engineering solutions change the terms of public policy debate? Through a series of case studies, this course looks at these questions in specific fields where computer technology and public policy intersect. In questions of privacy, security, safety (including public health), pornography, intellectual property and free speech, developments in computer systems technology either raise or offer solutions to significant public policy questions. This course builds ethics and context competencies and breadth in AHS. It also covers topics normally found in classes such as Operating Systems, Databases, Distributed Systems, Cryptography, Web Computing, and other Computer Science offerings.

ENGR 3600

Topics in Bioengineering

Credits: 4 ENGR

Hours: 4-0-8

Usually offered: Fall

For information contact: Professor Alisha Sarang-Sieminski

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.

ENGR 3610

Biomedical Materials

Credits: 4 ENGR

Hours: 4-0-8

Prerequisites: SCI 1210 and SCI 1410, or Permission of Instructor(s)

Usually offered: Fall

For information contact: Professor Debbie Chachra

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.

ENGR 3620

Cellular Bioengineering

Credits 4 ENGR

Hours 4-0-8

Usually offered: Fall

Prerequisites: SCI 1210, or Permission of Instructor(s)

For information contact: Professor Alisha Sarang-Sieminski

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.

ENGR 3650**Biological Thermodynamics****Credits: 4 ENGR****Hours: 4-0-8****Prerequisites: MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI1130, SCI1210, or Permission of Instructor(s)****Usually offered: Alt Spring (odd years)****For information contact: Professors Yevgeniya V. Zastavker and Alisha Sarang-Sieminski**

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.

ENGR 3710
Systems**Credits: 4 ENGR****Hours: 4-0-8****Prerequisites: Completion of other E:SYS requirements or Permission of Instructor(s)****Usually offered: Fall****For information contact: Professor Andrew Bennett**

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

ENGR 3810
Structural Biomaterials**Credits: 4 ENGR****Hours: 4-4-4****Prerequisites: SCI 1410 and SCI 1210, or Permission of Instructor(s)****Usually offered: Spring****For information contact: Professor Debbie Chachra**

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.

ENGR 3812 **Solid State Physics**

Credits: 4 ENGR

Hours: 4-0-8

Prerequisite: SCI 2130

Usually offered: Alt Spring (odd years)

For information contact: Professor Rebecca Christianson

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.

ENGR 3820 **Failure Analysis and Prevention**

Credits: 4 ENGR

Hours: 4-4-4

Prerequisites: SCI 1410

Usually offered: Fall

For information contact: Professor Jonathan Stolk

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.

ENGR 3830 **Phase Transformations in Ceramic and Metallic Systems**

Credits: 4 ENGR

Hours: 4-4-4

Prerequisites: SCI 1410

Usually offered: TBA

For information contact: Professor Jonathan Stolk

How can two brittle ceramics combine to make a toughened structure? How does a machinable steel transform into a high strength cutting tool? What drives solid-state reactions in powdered materials? Since properties of alloys and ceramics are largely determined by intrinsic material properties and microstructure, an understanding of phase transformations is essential for materials design and performance optimization. This course focuses on the thermodynamics and kinetics of phase transformations in the bulk and at interfaces and surfaces of multi-component materials systems. Topics include binary and ternary phase equilibria, atomic mobility, transformation kinetics, nucleation and growth, heterogeneous reactions, surface and interfacial energy, diffusional and diffusionless transformations, phase stability, and microstructural development. Examples and laboratory activities highlight fundamental concepts and reinforce the practical importance of phase transformations in engineering ceramics and alloys.

ENGR 4190 **Senior Capstone Program in Engineering (SCOPE)**

NOTE: this course is typically taken in consecutive fall and spring semesters of a student's final full academic year.

Credits: 4 ENGR (Fall) and 4 ENGR (Spring)

Hours: 4-0-8 (Fall) and 4-0-8 (Spring)

Co-requisites: Must be a senior

Prerequisites: Enrollment in second semester SCOPE requires successful completion of first semester SCOPE.

Usually offered: Fall, Spring

For information contact: Professor Andrew Bennett

SCOPE is a two-course requirement for all Olin seniors. 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.

ENGR 4190A

Senior Capstone Program in Engineering (SCOPE)

Credits: variable 2 or 4

Hours: 2-0-4 (2 credits) or 4-0-8 (4 credits)

Prerequisites: Permission of Instructor(s)

Usually offered: Fall and Spring

For information contact: Professor Andrew Bennett

NOTE: This is a registration option for non-Olin students.

This course 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.

Mathematics

MTH 1111

Modeling and Simulation of the Physical World

Credits: 2 MTH

Hours: 3-0-3

Co-requisites: SCI 1111

Usually offered: Fall

For information contact: Professor John Geddes

See description in the Olin Introductory Experience (OIE) section

MTH 1120

Vector Calculus

Credits: 2 MTH

Hours: 2-0-4

Usually offered: Spring

For information contact: Professor John Geddes

An overview of differential and integral calculus in higher dimensions. Topics include surfaces, partial differentiation, gradients, multiple integrals, line integrals, Green's, Divergence, and Stokes' theorems, and their applications to science and engineering.

MTH 2110

Discrete Mathematics

Credits: 4 MTH

Hours: 4-0-8

Usually offered: Fall

For information contact: Professor Sarah Spence Adams

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.

MTH 2120

Linear Algebra

Credits: 2 MTH

Hours: 2-0-4

Usually offered: Fall, Spring

For information contact: Professor Sarah Spence Adams

An introduction to the fundamental mathematical techniques and concepts used in solving linear systems of equations. Topics include matrices and vectors, Gaussian elimination, matrix inverses, transposes and factorizations, column, row, and nullspace of a matrix, rank of a matrix, determinants, and eigenvalues and eigenvectors.

MTH 2130

Probability and Statistics

Credits: 2 MTH

Hours: 2-0-4

Usually offered: Fall, Spring

For information contact: Professor Sarah Spence Adams

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.

MTH 2140 **Differential Equations**

Credits: 2 MTH

Hours: 2-0-4

Prerequisites: MTH 1120

Usually offered: Fall, Spring

For information contact: Professor John Geddes

An introduction to the solution techniques of differential equations. Topics include mathematical modeling, solution techniques to linear and nonlinear first-order differential equations, characteristic solutions to linear constant coefficient second-order differential equations, solutions to homogeneous (unforced) and inhomogeneous (forced) second-order linear systems. Applications include modeling of physical systems.

MTH 2160 **Introduction to Mathematical Modeling**

Credits: 2 MTH

Hours: 2-0-4

Prerequisites or Co-requisites: MTH 1111, MTH 2120, MTH 2130, MTH 2140

Usually offered: Spring

For information contact: Professor John Geddes

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*).

MTH 3120 **Partial Differential Equations**

Credits: 4 MTH

Hours: 4-0-8

Prerequisites: MTH 2120 and MTH 2140

Usually offered: TBA

For information contact: Professor John Geddes

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.

MTH 3130 **Mathematical Analysis**

Credits: 2 MTH

Hours: 2-0-4

Prerequisites: MTH 1120

Usually offered: TBA

For information contact: Professor John Geddes

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.

MTH 3140 **Error Control Codes**

Credits: 2 MTH + 2 ENGR

Hours: 4-0-8

Prerequisites: MTH 2120 (required), MTH 2110 or another proof based math class

Usually offered: Spring

For information contact: Professor Sarah Spence Adams

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.

MTH 3150 **Numerical Methods and Scientific Computing**

Credits: 4 MTH

Hours: 4-0-8

Prerequisites: MTH 2120, MTH 2140

Usually offered: TBA

For information contact: Professor John Geddes

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.

MTH 3160 **Introduction to Complex Variables**

Credits: 4 MTH

Hours: 4-0-8

Prerequisites: MTH 1120, MTH 2140

Usually offered: TBA

For information contact: Professor John Geddes

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.

MTH 3170 **Nonlinear Dynamics and Chaos**

Credits: 4 MTH

Hours: 4-0-8

Prerequisite: MTH 2120, MTH 2140

Usually offered: Spring

For information contact: Professor John Geddes

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.

Science

SCI 1111 **Modeling and Simulation of the Physical World**

Credits: 2 SCI

Hours: 3-0-3

Co-requisites: MTH 1111

Usually offered: Fall

For information contact: Professor Mark Somerville

See description in the Olin Introductory Experience (OIE) section

SCI 1121 **Electricity and Magnetism**

Credits: 4 SCI

Hours: 4-0-8

Co-requisites: MTH 1120

Usually offered: Spring

For information contact: Professors Yevgeniya V. Zastavker, Rebecca Christianson and Mark Somerville

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.

SCI 1130 Mechanics

Credits: 4 SCI

Hours: 3-3-6

Usually offered: Fall, Spring

For information contact: Professors Yevgeniya V. Zastavker and Rebecca Christianson

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.

SCI 1210 Principles of Modern Biology (with laboratory)

Credits: 4 SCI

Hours: 4-3-5

Usually offered: Fall, Spring

For information contact: Professors Joanne Pratt and Jean Huang

This course introduces students to the fundamental aspects of biological science including biochemistry, molecular biology, human molecular genetics, and cellular communication. Students gain experience with contemporary research methods and scientific reasoning through laboratory experiments. The relevance of biology to the environment and health is emphasized.

SCI 1310 Introduction to Chemistry (with laboratory)

Credits: 4 SCI

Hours: 4-3-5

Usually offered: Spring

For information contact: Professor Chris Morse

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.

SCI 1410 Materials Science and Solid State Chemistry (with laboratory)

Credits: 4 SCI

Hours: 3-3-6

Usually offered: Fall, Spring

For information contact: Professors Jonathan Stolk and Debbie Chachra

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. Thermal and Mechanical Properties
- 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.

SCI 2130 Modern Physics

Credits: 4 SCI

Hours: 4-0-8

Prerequisites: SCI 1121, or SCI 1130, or Permission of Instructor(s)

Usually offered: Fall

For information contact: Professor Stephen Holt

Modern Physics is based upon a few fundamental ideas that allow the explanation of phenomena that seem to defy consistency with traditional (Newtonian) physics. The most important of these (in the context of engineering applications) are the principles of quantum mechanics and statistical mechanics. This course will introduce the basic concepts of Modern Physics, with particular application to atoms, molecules and the materials utilized in modern electronics.

SCI 2140 Relativity

Credits: 2 SCI

Hours: 2-0-4

Usually offered: Fall (odd years)

For information contact: Professor Stephen Holt

When it was first introduced, Einstein's Special Theory of Relativity rocked the foundations of classical physics with a plethora of "paradoxes" that included twins who could have different biological ages. Like swimming, special relativity can be completely understood 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.

SCI 2145 High Energy Astrophysics

Credits: 2 SCI

Hours: 2-0-4

Prerequisites: SCI 1111

Usually offered: Fall (even years)

For information contact: Professor Stephen Holt

The universe is full of hot stuff! The oldest radiation that we can measure directly corresponds to temperatures of only thousands of degrees, but there is indirect evidence for the early universe

requiring 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 virtually all the chemical elements on Earth more massive than the very lightest, 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.

SCI 2210 Immunology

Credits: 4 SCI

Hours: 4-0-8

Prerequisites: SCI 1210 or equivalent

Usually offered: Fall

For information contact: Professor Joanne Pratt

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.

SCI 2220 Biomechanics

Credits: 4 SCI

Hours: 4-0-8

Prerequisites: MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI1130, SCI1210, or Permission of Instructor(s)

Usually offered: Spring (even years)

For information contact: Professor Yevgeniya V. Zastavker

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.

SCI 2320 Organic Chemistry (with laboratory)

Credits: 4 SCI

Hours: 4-3-5

Usually offered: Fall

For information contact: Professor Chris Morse

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.

SCI 3120 Solid State Physics

Credits: 4 SCI

Hours: 4-0-8

Prerequisite: SCI 2130

Usually offered: Alt Spring (odd years)

For information contact: Professor Rebecca Christianson

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.

SCI 3130 Advanced Classical Mechanics

Credits: 4 SCI

Hours: 4-0-8

Prerequisite: SCI 1130, MTH 2120, MTH 2140

Usually offered: Alt Fall (even years)

For information contact: Professor Yevgeniya V. Zastavkero

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.

SCI 3210 Molecular Genetics in the Age of Genomics

Credits: 4 SCI

Hours: 4-0-8

Prerequisites: SCI 1210 (Olin); BISC 219 (Wellesley); or Permission of Instructor(s)

Usually offered: Fall

For information contact: Professor Helen Donis-Keller

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.

SCI 3220

Bacteriophage Genomics Research Project Laboratory

Credits: 4 SCI

Hours: 2-2-4

Usually offered: Fall or Spring

Prerequisites: SCI1210

For information contact: Professor Helen Donis-Keller

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.

SCI 3250

Biological Thermodynamics

Credits: 4 SCI

Hours: 4-0-8

Prerequisites: MTH 1111, MTH 1120, MTH 2120, MTH 2140, SCI1130, SCI1210, or Permission of

Instructor(s)

Usually offered: Spring (odd years)

For information contact: Professors Yevgeniya V. Zastavker and Alisha Sarang-Sieminski

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.

SCI 3320 **Organic Chemistry II (with laboratory)**

Credits: 4 SCI

Hours: 4-4-4

Prerequisites: SCI 2320

Usually offered: Spring

For information contact: Professor Chris Morse

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.

Academic Policies



Academic Policies

One of Olin's highest priorities is the well being of its students, and Olin recognizes that individual circumstances often call for individual approaches. Olin's faculty, staff, and administration will always attempt to do what is right, regardless of the formal rule. The following policies will help to ensure that students are treated fairly.

Attendance Policy

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 Life will grant exceptions for illness, religious observance, or other reasons deemed appropriate.

Olin Exposition

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 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. Faculty, staff, students and external visitors are asked to evaluate student presentations as a way of helping students improve and also as a way of evaluating our programs. Normally all registered students are required to participate in Expo, both as presenters and as evaluators. Students who cannot attend Expo for any reason should petition the Dean of Student Life as early as possible for an excused

absence. Failure to participate in Expo is noted by the faculty Expo Coordinator. Persistent failure to participate without an excused absence may be considered a violation of the Honor Code, particularly regarding Passion for the Welfare of the College.

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 Life for Advising.

Course Overload Policy

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 at the Student Accounts and Records Center (StAR) website (<http://star.olin.edu>) and must be signed by the student and his or her adviser.

Students declaring the Engineering major must also complete and submit a major course planning form at the same time. The instructions and form can also be found on the StAR website.

Change of majors can be submitted using a declaration of major form and a major course planning form (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 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 for 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 a minimum enrollment to be offered.*

Cross-Registration Policy

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 and business.

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. 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. Paper requests may also be processed at the StAR Center during these 10 days. Discussions between students and their advisers are strongly suggested. 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 StAR Center 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 at the Student Accounts and Records Center. 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.

3. 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 Life for Advising.

4. 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.

5. 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.

6. 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.

7. 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
D+		1.3
D	Poor	1.0
EG	Experimental Grading	n/a
F	Failing	0.0
I	Incomplete (temporary grade)	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
NG	No Grade Reported by Instructor (temporary grade)	n/a
NPP	No Passionate Pursuit Recognition	n/a
NR	No Record	n/a
P	Pass	n/a

Grade	Assessment Description	Point Value
PP	Passionate Pursuit Recognition	n/a
R	Course Repeated	n/a
TR	Transfer Credit	n/a
W	Withdrew from Course	n/a
EG	Experimental Grading	n/a

8. 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).

9. Repeated Courses: If a student retakes a course 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.

10. 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.

11. 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.

12. Passionate Pursuits (including Research as Passionate Pursuit): 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. In exceptional cases, the faculty supervisor may include an official letter of commendation in the student's file. This commendation letter will be available to external parties.

13. 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.

14. 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.

Honor Code

It is expected that students will behave with integrity and according to the Honor Code; see page 73.

Incomplete Policy

In extenuating circumstances, a student may request an Incomplete (I) grade by petitioning the Dean of Student Life. 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 Life. 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.

Extra Help

For all courses, faculty members provide extra help for students as appropriate. In addition, individual tutors are assigned by the Office of Student Life. Students who feel that individual tutoring would

be helpful to them should contact the Assistant Dean of Student Life for Advising as early in the semester as the need becomes apparent.

Grade Change Policy

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.

Final Exam Policy for Excused Absences

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 the Office of Student Life. In the event that advance authorization cannot be obtained due to extenuating circumstances, students should contact the Office of Student Life 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

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.

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 the retention and graduation rates. The retention rate, defined as the number of first year students who return in the following fall semester, is 100% for the 2009 cohort of new students.

The graduation rate is defined as the percentage of students who complete their degree program within 150 percent of the normal completion time for that degree. For Olin College, this means the percentage of entering students who complete their degree within six years. For the 2005 entering class, the graduation rate is 96%.

Additional information is available from the Office of the Registrar.

Academic Recommendation Board

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.

The Course Substitution and Transfer Board

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 the summer, during a leave from Olin, or before enrolling at Olin. For more information on transferring credit, see Transfer Credit section.

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; a list of these courses is posted on the StAR website (<http://star.olin.edu/forms>). 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

The Committee on Student Academic Performance (COSAP) is charged by the Dean of Student Life 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 Life 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 Life 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. The petition is then sent to the COSAP convener, Linda Canavan. Students should include their adviser on the email to the COSAP convener, as the adviser is always asked for feedback.

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 Policy

At times, the college may require a student to withdraw from Olin College for academic or other reasons. Students who are required to withdraw may not reenroll at Olin without approval from the Office of Student Life.

Students may wish to leave Olin College prior to completing their degree. Such a decision may be difficult to make. Therefore, we encourage stu-

dents to discuss the situation with their faculty adviser and the Assistant Dean of Student Life 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 Life 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 Life 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.

Leave of Absence Policy

Students in good academic standing may request a leave of absence for up to 180 days in any 12-month period. 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 Life 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 Life within two weeks of the date of the denial of leave. There are two kinds of leaves:

1. 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.*

2. A Leave of Absence Between Semesters:

This type of leave is requested when a semester is not in active session and there is a circumstance that impacts the student's ability to continue in the next semester. 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.*

Return from Leave or Withdrawal

Students wishing to return from a leave of absence, voluntary withdrawal or medical withdrawal from the college should contact the Office of Student Life.

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>.

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. Pre-approval forms can be found at: <http://star.olin.edu>.*

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. Although the grade does not 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, 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. Although, not listed on a transcript, the credits will also be included as attempted in the pace of progression calculation for financial aid satisfactory academic progress. 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.

Special 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. The Office of Student Life 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 Life 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 Life 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 ad-

■ vising. 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.

Student Life



Student Life

Overview

To an unusual extent, students at Olin have the ability to help create the campus culture. Each student has the chance to make a real impact on the direction of programs, available opportunities and the overall atmosphere of the college.

Olin offers the support, flexibility and services students need for a successful, well-rounded college career – from a wide range of clubs and activities to academic advising and health services.

The Office of Student Life also takes student development one step further with the Olin College Learning Continuum. While nearly every college in America offers academic courses and student organizations, seldom is much thought given to the unstructured zone between the curriculum and “extra-curriculum,” or the connections between them. At Olin, we have given this zone a lot of thought.

The Olin College Learning Continuum consists of courses, undergraduate research opportunities with faculty, non-degree credit Passionate Pursuits, transcript noted Co-Curricular offerings, community service, committee work or other service to the college, clubs and organizations and recreation. The Office of Student Life staff encourages student participation along the full range of opportunities in the Learning Continuum and works to foster connections among the elements on the continuum.



Honor Code

A fundamental element of Olin's culture is trust. As such, our Honor Code requires all members of the Olin community to conduct themselves with honor and integrity. The code, drawn from a few core values, consists of a small set of intentionally broad standards by which every action must be measured. While a small number of policies illuminate Olin's principles, students live by the core values embedded in the code. To read the full code, visit the student life page of the Olin website, http://www.olin.edu/student_life/.

Passionate Pursuits

A Passionate Pursuit is an activity in which students propose a semester-long project, solicit faculty participation, and establish objectives (i.e. learning goals, type of deliverable) that constitute satisfactory completion of the pursuit. In order to earn non-degree credit for a Passionate Pursuit, students must submit a credit proposal and give a faculty-assessed presentation or performance at the conclusion of the activity. Funding is available via the Office of Student Life.

Co-Curriculars

Co-Curricular offerings are non-credit activities combining fun and intellectual awareness. They are scheduled for a limited time (e.g. one semester), are led by a staff or faculty member or by a student working in concert with a faculty or staff member, and are funded by the Office of Student Life. 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. Examples of recent Co-Curricular offerings include: Beekeeping, Composting, Current Events, Environmental Sustainability, Fundamentals of Public Speaking, Gender and Engineering Education, Half Marathon Training, Olin Does the Boston Symphony Orchestra, Origami, Ornithology for Beginners, Pickles and Jams, Plan Your Own Documentary or Short Film, Play with

Clay, Puzzling and Trivial Phenomena, Reading and Seeing Theater, Spanish Conversation, When Swing Was King, and Writing Wikipedia.

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 individual advising, advising families and the Sibbs program.

Individual Advising

Every student has an Olin faculty member as an adviser. Every adviser's goal is to facilitate students' academic and personal development throughout their education at Olin. Although they help students with courses and other academic choices, their most vital responsibility is to help advisees manage the difficulties and stresses inherent in any academic setting. Prior to their first year at Olin, new students will be asked to submit a statement of interests to be pursued at Olin. These interests can then be used in advising meetings to assist the student in the development and revision of goal statements and resumes. Students meet with their advisers regularly all four years, at a rate determined by the student and the adviser.

Advisers are not around just to approve courses or discuss academics. They serve a variety of functions including mentoring, crisis awareness and support, providing institutional and career information, and helping students find a balance among curricular, Co-Curricular and extracurricular activities. Students should view advisers as helpful resources for whatever issues they are dealing with – academic, social or personal. When advisers do not have the needed information or expertise, they help find someone who does.

Students may remain with one adviser throughout or change advisers at the formal "adviser request period" at the end of each academic year. A stu-

dent wishing to switch advisers at other times may discuss this with the Assistant Dean of Student Life for Advising. Olin wants advising to be successful and will do whatever we can to make this relationship supportive, positive and effective.

Advising Families

Individual advising relationships are set within advising families consisting of all a faculty member's advisees. Students will often meet individually or in advising families with their primary adviser. Advising families provide a structure for incoming students to meet upper-class students, allow for cross-class meetings and discussions, and plan periodic social activities. Students are strongly encouraged to take part in initiating and organizing advising family activities; funds are available from the Office of Student Life.

Sibbs Program

The Sibbs program builds bridges (hence the double "b") between first-year, exchange and upper-class students. Volunteer upper-class Sibbs (often from the same advising family) "adopt" a first-year to help him or her adjust to the unique culture, quirks and inside information of Olin. They contact their incoming Sibb over the summer to answer questions before arrival. Early in the year, Sibb pairs get together for a meal at least weekly. Upper-class Sibbs also introduce their first-year Sibbs to people and places in the area by inviting them to do several activities during the fall. The most important role, however, is to talk with, answer questions from, give information to, and generally be available to the incoming student. If either member of the Sibb pair feels that the relationship is not working well, they should discuss this with each other or contact the Assistant Dean of Student Life for Advising.

Community Service

Mission

One of the guiding missions of Olin College is to instill a spirit and practice of "giving back" among students through significant and ongoing service to the community. Philanthropy was the central force in the F. W. Olin Foundation and Olin College is committed to supporting and continuing this tradition among its students, faculty and staff. Olin College encourages community service by providing financial support and reserving time dedicated to community service weekly in the schedule. To learn more about community service at Olin and how you can be involved, read on! For more information visit: <http://serv.olin.edu>.

Structure

The Organization to Support, Encourage, and Recognize Volunteerism (SERV) helps students, faculty, and staff get involved with a variety of community service activities at Olin. SERV consists largely of individual community service projects which involve groups of students, faculty and staff who meet regularly to do community service. Any member of the Olin community may start a project. Each project selects its own leader who is responsible for all aspects of the project including getting volunteers, determining budget needs, coordinating with the appropriate outside organizations and making necessary practical arrangements. SERV is available throughout to provide advice and support.

Project leaders attend periodic meetings of the Association of Project Leaders (APL). At APL meetings, project leaders report on individual projects and discuss common issues and concerns across projects. They consider ways to coordinate projects and generally support and improve the functioning of community service at Olin.

SERV is governed by five elected student officers and three faculty/staff advisers who foster community awareness, increase involvement in community service activities and generally work to support and coordinate community service activities at Olin. They coordinate with outside groups seeking volunteers, plan one-time and whole

community events, maintain the website (<http://serv.olin.edu>), charter projects, make budgeting decisions and generally deal with community service concerns that arise throughout the year. If you have any questions, feel free to contact the SERV officers for the 2010–11 academic year. For more detailed information about the policies and services discussed here and offered by the Office of Student Life, please refer to the Student Handbook.

Admission, Expenses and Need-Based Aid



Applying to Olin

Olin College will enroll approximately 85 top students from all over the world for the class of 2016.

By traditional measures (course rigor, test results and achievement) the quality of students we seek will be outstanding; however, we place equal importance on personal character, creativity, risk taking, unusual life experiences and an entrepreneurial spirit. Specifically, we are looking for:

- Exceptional academic ability and performance, especially in math and science;
- Strong written and oral communication skills;
- Excellence in and dedication to Co-Curricular and extracurricular activities;
- Evidence of leadership and collaboration;
- Understanding of Olin College's mission;
- Adventurous and entrepreneurial spirit;
- Energy, commitment to high standards, perseverance and a sense of humor.

Olin College strives for gender balance and a student body that is multidimensional, representing a broad range of cultural, economic and geographic backgrounds. Olin College is approved by the INS to issue I-20 forms (student visas) and seeks a multicultural presence on campus by enrolling international students and those with significant international experience. US Permanent Residents and Green Card holders are also eligible for admission. The application process and timeline are the same for all applicants, regardless of their residency status.

The Olin Application

Olin College is now a member of the Common Application. We require all applicants to complete their application online, through the Common Application. The Olin Supplement is required, along with the application fee, in order to submit your application. There is no Early Action or Early Decision.

Admission Process

The Application for Admission consists of six parts.

1. Standard Common Application
2. Olin Supplement to the Common Application, which includes two essays and a personal resume
3. Application fee (\$80 US/\$100 International)
4. Secondary school report (returned by your counselor with official transcripts, current senior grades and a high school profile)
5. Two teacher recommendations – one from a core math or science teacher and one from a teacher of your choice
6. Results of the SAT or ACT with Writing, plus two SAT Subject Tests (Math Level 1 or 2 and a science exam of your choice). Our SAT code is 2824; the ACT code is 1883.

After applications have been reviewed, approximately 250 top applicants will be selected to attend one of our three "Candidates' Weekends" in February and March. During these weekends Candidates will participate in group design exercises, interviews and informal discussions with Olin faculty and students. It is from this group of Candidates that we will select the incoming class.

Application Timetable 2011–12

December 2011

Complete all standardized testing

January 1, 2012

Deadline for submitting electronic Common Application, Olin Supplement, application fee and mailing supporting materials

Early February 2012

Applicants notified if they have achieved “Candidate” status

February 17–18, 2012

Candidates’ Weekend I

February 24–25, 2012

Candidates’ Weekend II

March 2–3, 2012

Candidates’ Weekend III

Late March 2012

Notification letters are mailed

May 1, 2012

Reply Date

Admission Visits and Tours

Tours and information sessions are available throughout the year. Please go to our website at http://www.olin.edu/admission/visits_tours.asp to schedule your visit.

Day and Overnight Visits

Day visits allow prospective students to attend a class, meet current students and faculty, and enjoy a meal in our Dining Hall. They are available Mondays through Thursdays in the fall (September to early December) and spring (mid-March to early May) semesters. Overnight visits for high school seniors may be scheduled on Sunday through Thursday nights during the fall semester.

Space is limited, so please schedule your day or overnight visit well in advance by emailing hosting@olin.edu.

Office of Admission Hours

Monday through Friday: 9:00 a.m.–5:00 p.m.

Saturdays in the fall: 9:30 a.m.–12:00 p.m.

Please see the *Directions/Visiting* page on our website for information about transportation, lodging and dining in the area.

Costs and Aid

Olin's generous scholarship policy stems from one of the founding principles of the college – to provide a world-class engineering education at significantly reduced cost to students and their families.

Estimated Cost: Academic Year 2011-12

Below are estimated costs for the upcoming academic year. We expect nominal increases in these figures for subsequent years.

Billed Expenses

Tuition	\$39,000
Room	\$8,800
Meal Plan	\$5,200
Health Insurance	\$916
*Laptop Purchase (incoming students)	\$2,500
Student Activity Fee	\$175
General Fee	\$275

Unbilled Expenses

Books and Supplies (estimate)	\$750
Travel and Incidentals (estimate)	\$1,500
Total Cost of Attendance	\$59,116
Olin Scholarship	-\$19,500
Net Cost	\$39,616

JR/SR laptop is paid in full

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 eligible for the merit scholarship program only.

Families interested in applying for additional assistance to meet costs in excess of the Olin Tuition Scholarship should complete a Free Application for Federal Student Aid (FAFSA) online at www.fafsa.ed.gov. Olin College's institutional code is **039463**.

The following deadlines apply:

- February 15th for incoming students
- April 15th for returning students

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 this verification process.** 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.

Eligibility for need-based aid at Olin College is evaluated based on the Free Application for Federal Student Aid (FAFSA) and the Expected Family Contribution (EFC). Financial need is evaluated by subtracting the EFC from the Cost of Attendance. The financial aid award letter will indicate all Institutional and Federal grant funding for which the student is eligible. The award letter will also advise the student of any Federal Direct Loan eligibility.

Aid is disbursed and posted to the individual student account at the beginning of the semester – usually after the add/drop period – 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 Jean Ricker, Financial Aid Manager at Olin College. She can be reached at jean.ricker@olin.edu or 781-292-2343.

Types of Assistance

Institutional Funding

Olin Tuition Scholarship (Non Need-Based)

The Olin College Tuition Scholarship is for a maximum of eight semesters of full-time study. Anyone permanently disqualified to attend or return to Olin College for academic or disciplinary reasons will forfeit the remaining portion of the scholarship. Study away (which requires pre-approval) or an internship for credit counts as one of the eight scholarship semesters (the student is maintained as full-time at Olin and is expected to pay Olin tuition after the merit scholarship and any additional costs associated with such activity at the host institution including any tuition exceeding Olin's, room, board, and fees if applicable). For mid-semester leaves of absence, the partial semester counts as one of the eight scholarship semesters; payment of tuition is required for any semester(s) beyond eight before graduation. For end-of-semester leaves of absence, the semester on leave does not count as one of the eight scholarship semesters (unless the student requests transfer credit for this semester). Payment of full tuition is required for any semester(s) beyond eight before graduation. Olin College provides accommodations for documented disabilities. In extenuating circumstances, exceptions may be granted by the Provost and Dean of Faculty.

Olin Need-Based Grant

Olin Need Based Grant may be awarded by the Financial Aid Office to eligible students who demonstrate financial need.

Named Need-Based Scholarships

These scholarships are designated with the name of the donor and/or are a particular fund established in honor of a person or organization. These funds are awarded annually on the basis of financial need and may be renewable.

Federal Grant and Loan Programs

Federal Pell Grant

Eligibility for the Federal Pell Grant program is based on a family's expected family contribution. If your EFC is less than an amount pre-determined

by federal regulation, you may be awarded a Federal Pell Grant. Approximately 9% of full time students at Olin College are eligible for a Federal Pell Grant.

Disbursement for books and supplies: Pell eligible students may receive a refund within the first 7 days of the semester if the Title IV financial aid overpays the student account balance. The student must meet applicable eligibility requirements at least 10 days prior to the start date. Additionally, eligible students may opt-out of this refund by notifying the StAR Center.

Federal Supplemental Educational Opportunity Grant (FSEOG)

This grant is provided by the federal government and is available to undergraduate students with exceptional financial need. Priority is given to Federal Pell Grant recipients.

Federal Direct Loan Programs

Direct Loan eligibility will be noted on your Financial Aid Award letter and will be denoted as either subsidized or unsubsidized. This is a loan program and funds must be paid back according to the terms of the loan. Terms and Conditions for the Federal Direct Loan program can be found in the Master Promissory Note (MPN). The average debt for the graduating class of 2011 was approximately \$11,900 and 21% of graduates utilized this program.

Direct Subsidized Loan

This loan program is available to students who demonstrate financial need. The interest on the Subsidized Direct Loan is paid (subsidized) by the federal government while the student is in school and during a six-month grace period after the student ceases to be enrolled at least half time. Based on current regulation, Subsidized Direct Loans first disbursed on or after July 1, 2011 have a fixed interest rate of 3.4%.

Direct Unsubsidized Loan

This loan program is available to students who do not demonstrate financial need, or whose financial need has been met by other resources (i.e. grants and scholarships). Borrowers are required to either pay the interest as it accrues, or have it capitalized

(added to the principal) into a repayment schedule that starts after graduation. The interest rate for the unsubsidized loan is fixed at 6.8%.

Direct PLUS Loan

This loan program is available to parents of dependent students. PLUS loans help pay for education expenses up to the cost of attendance minus all other financial assistance. Interest is charged during all periods. The interest rate for Direct PLUS Loans is a fixed rate of 7.9%. Beginning with the 2011-12 school year, families who wish to apply for a Direct PLUS are required to submit a FAFSA.

Other Loan Assistance

Students and families may be in need of additional assistance to pay their bill. Families should research the loan option that best suits their particular financial situation. Students or parents pursuing other alternative loan options will be required to submit a Self-Certification Form to the lender prior to obtaining loan approval.

Student Rights and Responsibilities

Verification Process

The U.S. Department of Education requires that certain financial aid applications be reviewed in a process called Federal Verification. Olin College verifies all applications selected by the U.S. Department of Education. This involves the submission of a Federal Verification Worksheet and supporting Federal Tax Returns. Your Student Aid Report will indicate if you are required to participate in this process. In addition, the Financial Aid Office is required to clarify any unclear or conflicting information in a financial aid application. If additional documentation is necessary, you will receive notification from the Financial Aid Office. Please respond to the request for documentation within the deadlines indicated in the letter.

NOTE: For incoming students, your Financial Aid Award is a tentative award until such time as verification documents are received and reviewed. Any adjustments to aid due to Verification will be indicated on a revised award letter.

Appeal Process/Change in Circumstance

Occasionally students may find that the financial circumstances reported on the FAFSA do not accurately reflect their current situation. In these cases students have an opportunity to submit an appeal letter for reconsideration of their financial aid eligibility. In most circumstances these requests will require supporting documentation.

Students are required by the federal government to update the Financial Aid Office regarding certain changes that occur during the academic year. The following changes **MUST** be reported:

- Number of family members in the household
- Number of siblings attending college
- Student's enrollment status
- Student's housing status

** A change to any of the above factors could result in an adjustment to the financial aid award.*

Outside Scholarship Policy

The federal government requires students to inform the Financial Aid Office of any grants, scholarships, or benefits received from sources outside of the college. The total amount of outside scholarship is divided equally between the Fall and Spring semesters. It is our policy to use Outside Scholarships to reduce self-help awards before reducing Olin Need Based Grant. If the scholarship is restricted to tuition only, it reduces the amount of the Olin Scholarship accordingly.

Student Academic Performance

Federal regulations require that students receiving financial assistance meet certain standards of Satisfactory Academic Progress. This means that the student is making progress toward completing their degree in a manner determined by the school. Financial Aid follows the same academic criteria as the Committee on Student Academic Performance (COSAP). In addition to this COSAP review, the Financial Aid Office will review pace of progression in cooperation with the Registrar. The quantitative calculation of pace of progression differs from the college quantitative measure in the treatment of transfer credits. Both standards must be met for continued financial aid eligibility.

ity. Specific criteria may also exist for particular awards.

Students who are not in Good Academic Standing will be placed on financial aid warning. During this warning period students continue to receive financial assistance. If at the end of the warning period the student is not meeting the required standard, they may be placed on financial aid suspension. Appeals to these decisions may be directed to the Financial Aid Manager and will be reviewed by the Appeals Committee. Refer to the Financial Aid website for policy statement and appeal guidelines.

Direct Loan Borrowers

The Department of Education has developed a comprehensive website at www.studentloans.gov to provide Consumer Information to student and parent borrowers.

Students who are borrowing through the Federal Direct Loan program are required to complete Entrance Counseling to advise of their Rights and Responsibilities with regard to borrowing a student loan. This is completed at www.studentloans.gov. Entrance Counseling must be completed prior to the first disbursement of your student loan.

Exit Counseling is completed upon graduation and/or less than half-time enrollment. Students can visit the National Student Loan Data System (NSLDS) for comprehensive information regarding their student loan history and servicing information. Exit Counseling is completed at the NSLDS website. Students who fail to complete this requirement will be subject to a hold on their student record.

Students and parents with an executed Master Promissory Note (MPN) should note that the loan will be submitted to the National Student Loan Data System (NSLDS), and will be accessible to guaranty agencies lenders, and institutions determined to be authorized users of the data system.

Refund of Title IV Funds for Financial Aid Recipients

Students who withdraw from Olin College must file a College Withdrawal Form with the Assistant Dean of Student Life for Advising. Students who withdraw from all classes before the 60% point in a semester may be required to repay all or a portion of the financial aid they received for that semester. This is known as the Return to Title IV calculation. The exact amount to be returned will vary depending on the amount of aid received and at what point during the semester the student withdraws from the college. In addition, the student is liable for the balance owed the college as a result of the repayment of financial aid based on the Return of Title IV calculation. Students owing a balance to the college will receive a revised statement of account.

Notice of Federal Student Financial Aid Penalties for Drug Law Violations

A conviction for any offense, during a period of enrollment for which a student received Title IV, HEA program funds, under any federal or state law involving the possession or sale of illegal drugs will result in the loss of eligibility for any Title IV, HEA grant, loan, or work study assistance (HEA Sec.484(r)(1);(20 U.S.C. 1091(r)(1)).

Study Away

Students who receive need-based assistance and are planning to study away should meet with the Financial Aid Manager to discuss options and eligibility prior to submitting their study away plan for approval. A Consortium Agreement is required of all need-based aid recipients who study away.

Statement of Ethical Principles and Code of Conduct for Institutional Financial Aid Professionals

Department of Education regulation requires a school that participates in an FSA loan program to establish and enforce a code of conduct that includes bans on:

- Revenue-sharing arrangements with any lender,

- Steering borrowers to particular lenders or delaying loan certifications, and
- Offers of funds for private loans to students in exchange for providing concessions or promises to the lender for a specific number of FSA loans, a specified loan volume, or a preferred lender arrangement.

This code of conduct applies to the officers, employees, and agents of the school and must also prohibit employees of the financial aid office from receiving gifts from a lender, guaranty agency or loan servicer.

This code also prohibits financial aid office staff (or other employees or agents with responsibilities with respect to education loans) from accepting compensations for:

- Any type of consulting arrangement or contract to provide services to or on behalf of a lender relating to education loans; and
- Service on an advisory board, commission, or group established by lenders or guarantors, except for reimbursement for reasonable expenses.

As an Institutional member of the National Association of Student Financial Aid Administrators (NASFAA), Olin College has adopted the Statement of Ethical Principles and Code of Conduct established by NASFAA in May 2007.

<http://www.nasfaa.org/subhomes/MediaCenter/NASFAACodeofConduct.pdf>

Faculty, Instructors and Consultants



Faculty Profiles

Sarah Spence Adams, Ph.D.

Professor of Mathematics and Electrical and Computer Engineering

Dr. Adams maintains an active research program partly focused on mathematical structures used to increase the reliability and efficiency of wireless communications and partly focused on graphs used to model communications and social networks. She earned her Ph.D. and M.S. in mathematics at Cornell University, where she was also a member of the Wireless Intelligent Systems Laboratory in the Department of Electrical and Computer Engineering. She holds a B.S. (summa cum laude) in mathematics from the University of Richmond. Dr. Adams has conducted research at the Institute for Defense Analyses, Center for Communications Research and the National Security Agency (NSA). Her short book on algebraic coding theory is used to introduce applications to abstract algebra classes. She is an ExxonMobil Fellow in the Mathematical Association of America's (MAA) Project NExT and serves on MAA national committees involving undergraduate programs/research. In recent years, she received an NSA Young Investigator's Award to support her research in space-time coding, a National Science Foundation (NSF) grant to develop a multi-faceted coding theory and cryptology course, and an NSF grant to support her Long-term Undergraduate Research Experience (LURE) model for engaging early undergraduates in meaningful research experiences.

Jonathan Adler, Ph.D.

Assistant Professor of Psychology

Jonathan Adler received his Ph.D. in Clinical and Personality Psychology from Northwestern University in 2009. He graduated with a B.A. in Psychology and a minor in Theater from Bates College. Professor Adler's research focuses on the interface between adult development and clinical psychology. Broadly conceived, his research interests revolve around the reciprocal relationships

between self and identity processes and psychological functioning. He is especially interested in the most productive ways people make sense of the difficult things that happen to them and how that personal meaning facilitates changes in identity. In other words, he studies the ways in which the process of making sense of negative experiences influences important life outcomes, including mental health, personality maturity, and the process and outcome of psychotherapy treatment. He is currently working on several research projects that all focus on related issues of identity development and mental health. In addition to his research, Professor Adler is a practicing psychotherapist, having worked as a Postdoctoral Fellow at the Stone Center Counseling Service at Wellesley College. Professor Adler completed his APA-Approved Pre-Doctoral Internship at the Jesse Brown Veterans Affairs Medical Center in Chicago from 2008-2009. Professor Adler is a major proponent of bridging the gap between psychological scientists and practitioners and his research and clinical work mutually inform each other. He also loves teaching and graduated from the Graduate Student Teaching Certificate Program at Northwestern University. At Olin he works to make the best of psychological science relevant and exciting for students, professionally and personally.

David Barrett, Ph.D.

Associate Professor of Mechanical Engineering and Design

With over 25 years of experience in the robotics industry, Dr. Barrett has built robotic systems for a wide variety of government, commercial and industrial customers. He teaches mechanical engineering and robotics at Olin. Prior to joining the Olin faculty, Dr. Barrett was vice president of engineering at the iRobot Corporation. Before iRobot, Dr. Barrett held positions as a director of the Walt Disney Imagineering Corporation, as a research engineer at MIT's Artificial Intelligence Laboratory and as a technical director at Draper Laboratory. Dr. Barrett received his Ph.D. and M.S. in ocean engineering and M.S. in mechanical engineering from MIT. He received his B.S. in

mechanical engineering from the University of Lowell. In addition to his many published articles, Dr. Barrett holds nine patents with previous colleagues on a variety of robotic systems. He is a member of numerous professional societies including IEEE Robotics and Automation, Vehicular Technology and Ocean Engineering Societies.

Andrew Bennett, Ph.D.

Director of SCOPE

Associate Professor of Mechanical Engineering

In addition to his role on the faculty at Olin College, Dr. Bennett is responsible for developing the SCOPE program, establishing the strategic corporate partnerships that support it and directing the student/faculty SCOPE teams. He has more than 20 years of R&D experience developing novel robot systems for land, water and air use. In 1985–86 he worked at the Stanford Department of Mechanical Engineering on a novel robotic all-terrain vehicle. From 1991 to 1997 Dr. Bennett worked on a variety of autonomous underwater vehicles at the MIT AUV lab, including the Sea Squirt, Odyssey I, Odyssey II and the WHOI Autonomous Benthic Explorer. From 1997 to 1998 he worked on control systems for underwater vehicles and SSTO rocket systems at the Charles Stark Draper Laboratory. From 1998 to 2000 he worked for Walt Disney Imagineering Research & Development where he helped create a full-sized walking quadruped robot technology demonstrator and several ride effects currently installed in Disney's Animal Kingdom. From 2000 to 2008 he was director of research and the division technology officer (DTO) for iRobot's Government and Industrial Robotics division where he oversaw all research and technology development and related activities. At iRobot he was also the program manager in charge of developing the PackBot mobile robot system under the DARPA Tactical Mobile Robotics (TMR) Program. From 2008 to 2010 he was the VP for research & development at Scientific Systems Company, Inc. of Waltham, MA, where he oversaw technical direction for a variety of cutting edge control and sensor development programs. Dr. Bennett served on numerous advisory boards, including

the medical advisory board to the Joint Improvised Explosive Device Defeat Organization (JIEDDO) and the American Institute of Aeronautics and Astronautics (AIAA). Two samples of Dr. Bennett's work, the PackBot and the MIT Daedalus 88, are displayed at the Smithsonian Museum. He is a member of numerous professional societies including the AIAA, IEEE Ocean Engineering Society, the Association of Computing Machines (ACM), the Society of Mechanical Engineers, and the Society of Naval Architects and Marine Engineers (SNAME).

Debbie Chachra, Ph.D.

Associate Professor of Materials Science

Dr. Chachra is passionate about working with undergraduate students and about improving engineering education. She is currently collaborating with Olin students to study biological materials, including the polymer nest cell linings of Colletes bees. She is concurrently involved in research on the undergraduate engineering experience. Her primary project is an investigation of self-efficacy in first-year, project-based design courses, with an eye towards improving these experiences for students at Olin and beyond. She has also studied and published on other aspects of the student experience including; studies of persistence and migration (why students stay in engineering or choose to leave), as well as differences in the engineering experience between male and female students. Prior to joining the faculty of Olin College, Dr. Chachra was a postdoctoral associate at MIT in the Department of Materials Science and Engineering. She joined MIT from the University of Toronto, where she received her master's degree and Ph.D. in materials science. Dr. Chachra has a bachelor's degree in engineering science, also from the University of Toronto. She was a recipient of a National Sciences and Engineering Research Council of Canada postdoctoral fellowship and a Medical Research Council of Canada graduate fellowship, as well as numerous other honors for her research and publications. In 2010, she received an NSF CAREER Award in support of her research on engineering education.

Mark L. Chang, Ph.D.***Associate Professor of Electrical and Computer Engineering***

Dr. Chang received his Ph.D. in electrical engineering from the University of Washington. He received his M.S. in electrical and computer engineering from Northwestern University and his B.S. from Johns Hopkins University. During his studies Dr. Chang earned an Intel Foundation Graduate Fellowship to study computer-aided design tools and methodologies for easier implementation of arithmetic hardware onto FPGA devices. His current research interests include mobile, social, and ubiquitous computing; engineering education, in particular design and student motivation; and reconfigurable computing. Dr. Chang's personal interests include travel, playing musical instruments, tinkering with electronics and anything and everything to do with cars.

Rebecca Christianson, Ph.D.***Assistant Professor of Applied Physics***

Originally from Minnesota, Dr. Christianson joined the Olin College faculty after completing a post-doctoral fellowship in colloid science at Harvard University. Prior to that, she received her Ph.D. from MIT on work in x-ray and neutron scattering from high temperature superconductors and low dimensional magnetic materials. Her undergraduate degrees in physics and music were granted by Stanford University. Her current research includes confocal microscopy studies of colloidal suspensions, bacteria as active particles, and thermal transport measurements of complex fluids. The bacterial work is performed in collaboration with Professor Jean Huang and the thermal transport work is performed in collaboration with Professor Jessica Townsend. Dr. Christianson is a committed teacher who received teaching awards at both Harvard and MIT before coming to Olin. At Olin, she has taught a diverse array of classes in physics and materials science. When not doing physics, playing her oboe or singing, she prefers to be outside hiking, canoeing, biking or playing with her kids.

Diana Dabby, Ph.D.***Associate Professor of Electrical Engineering and Music***

Diana Dabby has taught at MIT, Tufts and Juilliard, and holds degrees in music and electrical engineering from Vassar, Mills, C.C.N.Y., and MIT. In her doctoral research at MIT, she combined music and engineering by devising a chaotic mapping for musical variation, as heard on NPR member station WBUR-FM (2004), NPR's *Weekend Edition* (2007), and in *Science* (April 4, 2008). Awarded a U.S. Patent in 1997, this work has since been the topic of a number of invited concert/lectures sponsored by the National Association of Schools of Music, MIT, Princeton, Cornell, Dartmouth, IEEE, FIRST Place of New Hampshire, New Horizons in Science, the 2007 International Conference on Complex Systems, and Harvard. As a concert pianist, Dabby has performed in Weill (Carnegie) Recital Hall, Merkin Concert Hall, Jordan Hall, Symphony Hall Boston, Tanglewood and abroad. Her recent works include *A Fire's Tale* (2008), *Aerial Silk* (2006), and *September Quartet* (2005), a 5-movement work scored for voices, winds, brass, percussion, violin and piano, commissioned to commemorate the 150th anniversary of the founding of Tufts University. At Olin, she teaches orchestration, composition, and electrical engineering, as well as interdisciplinary courses combining art and science. She founded and continues to develop the music program at Olin.

Helen Donis-Keller, Ph.D.***Professor of Biology and Art***

An artist and scientist for her entire adult life, Dr. Helen Donis-Keller observes, investigates and interprets the natural world. She is intrigued by the opportunity to study the complexity, diversity and kinship of all organisms and to appreciate the unity of life and its processes throughout evolution. Most broadly defined Dr. Donis-Keller's scientific work, and to a considerable extent her art, investigates the relationship between genotype and phenotype, which is the relationship between the genetic potential carried by the DNA (genotype) and the observable self (phenotype), the product of the interaction of genes and environment. The world-view of a natural scientist permeates her

work and inspires a desire to facilitate access to genetic ideas through visual art. Dr. Donis-Keller is an artist and a scientist. She has held leadership positions in the biotechnology industry and in academic science. She was director of the Human Genetics Department at Collaborative Research, Inc. where she led the research group that developed the first genetic linkage map of the human genome. Later she was professor of Surgery, Genetics, Genetics in Psychiatry and director of the Division of Human Molecular Genetics at Washington University School of Medicine in St. Louis. While continuing to map the human genome, her research group identified a gene and mutations that cause several forms of thyroid cancer. Her group developed predictive diagnostic tests that served as preventative measures in the development of thyroid cancer. She continues research, teaching, and course development at Olin where she is currently chair of the Mathematics and Science Field Group and she serves on a number of faculty committees, particularly those with concern for intellectual vitality and scholarly research. Dr. Donis-Keller's scientific research at Olin is now focused on the molecular biology, genetics and evolution of viruses of mycobacteria and her art, which is often photo-based, is inspired by her life as a scientist. Her artwork is represented in private collections and in the collections of several museums. She received a B.Sc. in natural science and an Honours B.Sc. in biology from Lakehead University in Thunder Bay, Ontario, Canada, a Ph.D. in biochemistry and molecular biology from Harvard University, and an MFA in studio art from the School of the Museum of Fine Arts and Tufts University. She was also awarded a Doctor of Science Degree (Honoris Causa) from Lakehead University.

Allen Downey, Ph.D.

Professor of Computer Science

Before coming to Olin, Dr. Allen Downey taught at Colby College and Wellesley College, and held research positions at the San Diego Supercomputer Center and Boston University. He received his Ph.D. in computer science from the University of California/Berkeley in 1997, with a dissertation on operating system support for large-scale parallel

computation. His undergraduate and master's degrees are from MIT, in civil engineering. Dr. Downey is the author of several textbooks, including *"Think Stats," "Python for Software Design,"* and *"How to Think Like a Computer Scientist."* These books are available under free licenses that allow readers to copy and modify the text as well as contribute material. He has developed novel classes on physical modeling, statistics, operating systems and scientific computation. Dr. Downey believes that engineering and computer science are a valuable part of a liberal education, and that the thinking skills students develop at Olin are ideal preparation for the 21st century.

Ozgur Eris, Ph.D.

Associate Professor of Design and Mechanical Engineering

Dr. Eris joined Olin from Stanford University, where he was the associate research director of the Center for Design Research. His current research is in design cognition and informatics. He studies how designers think when they are engaged in design activity in teams, and is particularly interested in discovering metrics that are descriptive of the design process. He applies such understandings in developing new methods and tools in order to increase design performance. He has authored several award-winning NSF and NASA research proposals, and a recent book on the question asking processes of design teams, *"Effective Inquiry for Innovative Engineering Design."* Professionally, he has designed systems ranging from a pneumatic sample delivery machine to a national railroad system control center. He earned a B.S. (cum laude) from the University of Washington in mechanical engineering, and M.S. and Ph.D. degrees from Stanford University in mechanical engineering design.

John Geddes, Ph.D.

Associate Dean for Faculty Affairs and Research Professor of Mathematics

Dr. Geddes brings his passion for applied mathematics to the classroom and his work with research students. He has developed a number of interdisciplinary, co-taught courses at Olin which

emphasize dynamical systems theory, and he has supervised numerous research students in mathematical biology. He has received funding from the NSF and the NIH, and currently receives funds from the Davis Educational Foundation to support a faculty development project. Prior to joining Olin College, Dr. Geddes served on the faculty at the University of New Hampshire, where he worked on laser-based chaotic communication schemes and pulse dynamics in mode-locked lasers. Dr. Geddes also devoted considerable time to the development of an innovative mathematics course called "Linearity," which integrates the standard sophomore math courses into a year-long sequence. During his tenure at UNH he developed an interest in mathematical biology and received funding from the NIH for a project on the mathematics of micro-vascular blood flow. Between 1996 and 1998 Dr. Geddes served as assistant professor of mathematics at Ramapo College of New Jersey, where he focused on developing a course on chaos and fractals for freshmen. Dr. Geddes graduated in 1990 from Heriot-Watt University, Edinburgh, Scotland, with a B.Sc. in physics. He received his Ph.D. in applied mathematics in 1994 from the University of Arizona.

Siddharta Govindasamy, Ph.D.

Assistant Professor of Electrical and Computer Engineering

Dr. Govindasamy was born in Malaysia where he completed his high school education. He obtained B.S. and M.Eng degrees from MIT in 1999 and 2000 respectively. At MIT he participated in the VI-A internship program at Qualcomm Inc. in San Diego, CA, where he developed signal processing algorithms for mobile telephony. From 2000 to 2003, he was a DSP engineer and then senior DSP engineer at Aware Inc. in Bedford, MA, where he designed and developed broadband modem technology. He returned to MIT in 2003 and obtained a Ph.D. in wireless communications in 2008. His thesis research was on ad-hoc wireless communications using multi-antenna systems. In the course of his Ph.D. he visited the Indian Institute of Science in Bangalore, India, as part of the MIT-India program in the summer of 2006. His research

interests are in wireless communications and signal processing.

Aaron Hoffman, Ph.D.

Assistant Professor of Mathematics

Dr. Aaron Hoffman joins Olin from Boston University where he was an NSF postdoctoral fellow in the department of mathematics and statistics. He received his Ph.D. in applied mathematics from Brown University, and he graduated with high honors from Swarthmore College with a major in mathematics and a minor in biology. Dr. Hoffman has also spent time at the Mathematical Sciences Research Institute in Berkeley, CA, as a visiting postdoctoral scholar for the special semester on dynamical systems. Dr. Hoffman also maintains an active research program in infinite dimensional dynamics which focuses on the existence, stability and interaction of coherent structures in spatially discrete systems. These coherent structures arise in diverse applications such as fronts in population ecology, interfaces in materials science, waves in fluid mechanical models, mechanical pulses in granular media, as well as electro-chemical pulses in nerve fibers.

Stephen S. Holt, Ph.D.

Professor of Physics at Olin and Babson Colleges

Dr. Stephen Holt, an astrophysicist, was previously the director of Space Sciences at the NASA-Goddard Space Flight Center in Greenbelt, Maryland. Dr. Holt received a B.S. degree with honors in engineering physics and a Ph.D. in physics from New York University before joining the staff of the Goddard Space Flight Center. His primary research discipline is high-energy astrophysics, the study of the universe via the detection and interpretation of celestial x-rays and gamma rays. He has been selected to be principal investigator and/or project scientist on eight NASA scientific spacecraft, including joint missions with Germany, Japan, Russia, and the United Kingdom. He has more than 200 refereed publications in technical journals and scholarly books, and has received several significant awards, including the NASA Medal for Exceptional Scientific Achievement on two separate occa-

sions, the NASA Medal for Distinguished Service (NASA's highest award), and the John C. Lindsay Memorial Award for Outstanding Science. He is a fellow of both the American Physical Society and the American Association for the Advancement of Science. Since coming to Olin he has been elected to membership in the International Academy of Astronautics and is the first American scientist to be awarded the COSPAR Medal for International Scientific Cooperation. Dr. Holt has served on numerous national and international committees such as the National Academy of Sciences' Space Science Board Committee on Space Astronomy and Astrophysics, the National Academy of Sciences' Panel on Science Policy, and the Executive Committee of the American Physical Society. He has been elected Chair of a number of scientific society venues, including the High Energy Astrophysics Division of the American Astronomical Society, the Astrophysics Division of the American Physical Society, and the multi-national Joint Scientific Program Committee of the World Space Congress. An outstanding teacher and a lecturer, Dr. Holt has taught in both the physics and astronomy departments at the University of Maryland, and has been invited to make more than 100 major presentations at scientific society meetings and international symposia.

Aaron Hoover, Ph.D.
Assistant Professor of Mechanical Engineering

Dr. Hoover holds a Ph.D. and M.S. from the University of California-Berkeley and a B.S. from Stanford University, all in mechanical engineering. At Berkeley, his dissertation research was in the area of biologically-inspired design and manufacture of novel, small-scale, legged robots. In the quest to design and build ever-smaller and more capable robots, Dr. Hoover seeks to understand how the principles underlying the locomotion of biological systems can yield insights that improve everything from manufacturing to dynamic performance. His continuing research interests are in bio-inspired robotic locomotion, robotic design, and computer-aided design and manufacturing. In 2009, Dr. Hoover's research was featured on the Australian Broadcasting Corporation's science show, "*Catalyst*." Prior to joining Olin, Dr. Hoover

was a post-doctoral researcher in the Biomimetic Milli-Systems lab at Berkeley. During his time at Berkeley, he mentored a number of undergraduate students and was also a fellow of the Summer Institute for Preparing Future Faculty. Dr. Hoover is a strong proponent of experiential, hands-on learning and enjoys the challenge of continually improving his teaching.

Jean J. Huang, Ph.D.
Assistant Professor of Biology

Dr. Huang joins Olin from the University of Washington, Seattle, where she was a postdoctoral scholar in the Department of Microbiology. She received a Ph.D. in biology from the California Institute of Technology and a B.A. in biology from Wellesley College. Dr. Huang has also studied the microbial world at the Marine Biological laboratory in Woods Hole, MA., first as a student and then as a teaching assistant for the Microbial Diversity Summer Course. She is the recipient of a teaching award from Caltech, and she was a US EPA STAR pre-doctoral fellow. Dr. Huang is enthusiastic about studying bacteria from the environment and also about applying bacterial metabolic capabilities towards solving environmental challenges.

David V. Kerns, Jr., Ph.D., P.E.
Franklin and Mary Olin Distinguished Professor of Electrical and Computer Engineering
Founding Provost

Dr. David V. Kerns, Jr. is Olin's Founding Provost (1999-2007) and is currently the Franklin and Mary Olin Distinguished Professor of Electrical Engineering at the Franklin W. Olin College of Engineering. He is also Professor of Technology Entrepreneurship at Babson College. Responsible for recruiting and hiring Olin's faculty during the formative years of the college, he led development of Olin's innovative curriculum, student life, library and information services and helped set the college's faculty culture of student-centered, project-based education. Dr. Kerns is respected for his numerous contributions to US education, industry and commerce. A member of the technical staff at Bell Telephone Laboratories, he designed and developed bipolar and CMOS, analog

and digital integrated circuits. He co-founded and served as President of Insouth Microsystems, Inc., a microelectronics company that produced solid-state sensors, hybrid microcircuits, and silicon VLSI devices. He is a prolific inventor and holds many US and international patents for technical advances from novel electronics to better sunglasses. He is also a serial entrepreneur. One of his companies produced the first commercial single-chip silicon accelerometers based on his co-invention of one of the first silicon MEMS technologies, a micromachined accelerometer patented in 1985. Dr. Kerns is also co-inventor of a new diamond-based gas-sensing technology, and is inventor of revolutionary sunglass lens technologies for tennis, golf, fishing and other sports. David Kerns was named a Fellow of the IEEE in 1991 for “contributions to engineering education and research in microelectronics”; he continues consulting and research in MEMS devices, analog circuit design, silicon-based optoelectronics, radiation effects on microelectronics, and engineering education. He is one of the IEEE Millennium Medal winners and received the singular 2005 IEEE Award for Innovation in Engineering Education, and the 2007 IEEE Education Society Award for Meritorious Service. He has been a leader in strengthening engineering education throughout his life. He served as President of the IEEE Education Society for two terms, has co-authored successful textbooks, including *Introduction to Electrical Engineering and Essentials of Electrical and Computer Engineering* (Prentice-Hall), and has been honored as an undergraduate teacher. Dr. Kerns has published extensively and presented his work at numerous conferences worldwide. He is a member of the IEEE, Tau Beta Pi, Eta Kappa Nu, and ASEE; he served on a committee of The National Academy of Engineering on Engineering Education. Before coming to Olin, he was the Orrin Henry Ingram Distinguished Professor in the Department of Electrical and Computer Engineering at Vanderbilt University, where he served in the positions of Electrical Engineering Department Chair, Associate Dean, and Acting Dean of Engineering. He has also served on the faculties of Bucknell, Auburn, and Florida State Universities, and was instrumental in establishing microelectronics research programs and educational laboratories at each of

these institutions. He directed the Management of Technology program at Vanderbilt University and developed and has taught courses in entrepreneurship for engineering students throughout his career.

Sherra E. Kerns, Ph.D.

F.W. Olin Distinguished Professor of Electrical and Computer Engineering

Founding Vice President for Innovation and Research

Dr. Sherra E. Kerns joined Olin College as founding vice president for Innovation and Research on September 1, 1999, and pioneered a unique administrative position with responsibility for enhancing faculty intellectual vitality, improving assessment, and building a culture that rewards innovation, learning by discovery and the taking of appropriate risks. She also led the successful Olin efforts for regional and professional accreditation, completed in 2007. On September 1, 2007, she became a F. W. Olin distinguished professor of Electrical and Computer Engineering at the college. “Doc” was named fellow of the Institute of Electrical and Electronics Engineers (IEEE) in 1999 for her technical accomplishments in designing computers for use in space. These computers are immune to information disruption by the harsh cosmic ion and space weapons environments. She is recipient of the IEEE’s prestigious Millennium Medal, and has received institutional and national awards for outstanding undergraduate teaching. She has been very active internationally in engineering education, serving as president of the National Electrical Engineering Department Heads Association (now ECEDHA) and president of the American Society for Engineering Education (ASEE). She was named fellow of the ASEE for her contributions to progressive leadership in engineering education. Dr. Kerns also served as a member of the advisory committee of the National Academy of Engineering’s Center for the Advancement of Scholarship on Engineering Education and on its study committee for the Engineer of 2020 report. She has also served on the ABET Board of Directors – where her work focused on international educational issues and diversity – and on the Dartmouth College Thayer

School Board of Overseers and other non-profit boards. Dr. Kerns came to Olin from Vanderbilt University, where she held various posts, including chair of its flagship Department of Electrical Engineering and Computer Science, and director of the multi-disciplinary, multi-institutional University Consortium for Research on Electronics in Space – then one of the largest research programs in the nation. Dr. Kerns' present research involves developing resources to detect transport of nuclear materials utilizing innovative microelectronic sensors. She works nationally and internationally to aid reform in undergraduate engineering education. Dr. Kerns received her B.A. from Mount Holyoke College, M.A. from the University of Wisconsin, and Ph.D. from the University of North Carolina, all in physics. Her philanthropy is directed toward furthering opportunities for students during their college years.

Christopher Lee, Ph.D.

Associate Professor of Mechanical Engineering

Prior to joining the Olin College faculty, Dr. Lee was a lead engineer in the New Technologies Engineering Division at the Lawrence Livermore National Laboratory. He was responsible for supporting lab programs through computational analysis and vibration measurements. His projects ranged from buildings (vibration signature based system identification) to micro-devices (portable bio-pathogen and chemical detectors, accelerometers, adaptive optics arrays) to medical systems (catheter-based device for the treatment of cerebral aneurysms, retinal prosthesis, novel breast cancer imaging system). He has co-patented a carbon-nanotube based acoustic sensor. His primary research interests are in the area of structural dynamics. Current and past projects include energy harvesting devices, grasping landing gear for UAV's, structural health monitoring, and the mechanics of DNA. Dr. Lee has a B.S.E. degree in mechanical engineering from Cornell University. He has M.S.E. degrees in both mechanical and aerospace engineering and a Ph.D. degree in mechanical engineering from the University of Michigan.

Benjamin Linder, Ph.D.

Associate Professor of Design and Mechanical Engineering

Dr. Linder's teaching and research efforts are focused on sustainable design, international development, human centered design and creative design methods. These efforts are directed at developing techniques and approaches that further a more ecologically connected and socially informed design practice. As an experienced teacher and practitioner of product design, Linder regularly advises and delivers workshops for practitioners, educators and the Public. He is a co-organizer of the International Development Design Summit that brings people together from over 20 countries to build local, creative design capacity. Dr. Linder received a B.S.E. in Mechanical Engineering and a B.S.E. in Electrical Engineering from the University of Michigan where he studied engineering design with Professor Panos Papalambros. He received his M.S. and Ph.D. in Mechanical Engineering from the Massachusetts Institute of Technology where he studied product design and design education with Professor Woodie Flowers.

Caitrin Lynch, Ph.D.

Associate Professor of Anthropology

Dr. Lynch's professional experience includes an assistant professorship in anthropology at Drew University, as well as several fellowships, including a Mellon Postdoctoral Fellowship at Johns Hopkins University. She has taught at the University of Chicago and the University of Illinois at Chicago and is currently a Visiting Research Associate in the Department of Anthropology at Brandeis University. At Olin she teaches in the Arts, Humanities, and Social Sciences program. She is the secretary of the American Ethnological Society (of the American Anthropological Association) and past treasurer of the American Institute of Sri Lankan Studies. She is the author of the book *Juki Girls, Good Girls: Gender and Cultural Politics in Sri Lanka's Global Garment Industry*, as well as a forthcoming book about retirement, work, and aging. She is also producer of the documentary film, "My Name is Julius." Dr. Lynch received her Ph.D. and M.A. in cultural anthropology from the

University of Chicago and her B.A. in anthropology from Bates College. Dr. Lynch's research and teaching passions include examining the dynamics of work and cultural values (with a focus on aging and gender) as well as the cultural dimensions of offshore manufacturing, plus a commitment to understanding social behavior in global contexts and a devotion to encouraging students to use qualitative methods to think critically about the world around them.

Sanjoy Mahajan, Ph.D.

Associate Professor of Applied Science and Engineering

Dr. Mahajan obtained his Ph.D. in theoretical physics from the California Institute of Technology in 1998, and has undergraduate degrees in mathematics from Oxford University and in physics from Stanford University. Due to his wonderful teachers, he became interested in improving science teaching, an interest he followed as a postdoctoral researcher and faculty member in the Physics Department at the University of Cambridge and as a fellow of Corpus Christi College, Cambridge. While at Cambridge, he helped start the African Institute for Mathematical Sciences (AIMS) in Cape Town, South Africa, where he was the first Curriculum Director and taught the first courses in physics and computer science. There he wrote the (free) software to automate barcoding and cataloging the 5,000 donated books that started the Institute's library. In 2006 he became an associate director of MIT's Teaching and Learning Laboratory. At MIT he has taught courses in the mathematics, electrical engineering, and mechanical engineering departments. His favorite courses to teach are the "Art of Approximation in Science and Engineering" and "Street-Fighting Mathematics." The associated book – *Street-Fighting Mathematics: The Art of Educated Guessing and Opportunistic Problem Solving* – was published in March 2010 by MIT Press. It is available in print and online under a Creative Commons Noncommercial ShareAlike license.

Vincent P. Manno, Ph.D.

Provost, Dean of Faculty and Professor of Engineering

Dr. Manno received a B.S. from Columbia University and M.S., Engineer's and Doctor of Science degrees from MIT in nuclear engineering and science. His field of expertise is computational thermal-fluid dynamics including applications in power generation, electronics thermal energy management, and manufacturing processes. He has authored or co-authored more than 140 journal articles, conference proceeding papers and technical reports. Professor Manno has also worked in the private sector and served as a U.S. Navy Senior Summer Faculty Fellow. Prior to joining Olin in July 2011, Dr. Manno was Associate Provost and Professor of Mechanical Engineering at Tufts University in Medford, MA where he continues to hold an adjunct faculty appointment. At Tufts, he coordinated graduate education across the university and oversaw several cross-school initiatives such as the Tufts Institute of the Environment. He was Department Chair of Mechanical Engineering from 1993–2001, Associate Dean of Engineering from 2002–5, and Interim Dean of Engineering in 2003. Dr. Manno's research has been supported by government agencies and industry. He is a recipient of the SAE's Ralph R. Teeter Outstanding Engineering Educator Award, the Harvey Rosten Award for Excellence in the Thermal Analysis of Electronic Equipment, the ASME Curriculum Innovation Award, the Tufts University Fischer Award as Engineering Teacher of the Year and the Tufts Seymour O. Simches Award for distinguished teaching and advising. He is a Fellow of the ASME and serves on the Board of Directors of the ASME Engineering Research Council.

Robert Martello, Ph.D.

Associate Professor of the History of Science and Technology

Professor Robert Martello received his Ph.D. from MIT's Program in the History and Social Study of Science and Technology, and also received a Master of Science degree in civil and environmental engineering and a Bachelor of Science in earth,

atmospheric, and planetary science from MIT. Prior to joining the Olin College faculty, Dr. Martello lectured in MIT's history of technology program and served as Producer for the "Digital History" component of the American history textbook *Inventing America*. Dr. Martello's Ph.D. dissertation and ensuing research use the narrative of Paul Revere's technological and entrepreneurial endeavors to study America's transition from craft practices to industrial capitalism. He published his first book, *Midnight Ride, Industrial Dawn: Paul Revere and the Growth of American Enterprise*, in fall 2010. Dr. Martello's earlier research articles and presentations on this subject won three awards. At Olin, Dr. Martello chairs the Arts, Humanities, and Social Science committee and helps students to cross disciplinary lines and apply their communication and contextual analysis skills to global challenges. His current projects include new research about Benjamin Franklin's artisan activities; educational research as the co-principal investigator on two NSF grants studying the integration of humanities and technical pedagogies; workshop facilitation for fellow educators interested in student motivation, interdisciplinary education, and project-based teaching; and public history talks about Paul Revere's pivotal role in both the American Revolution and the rise of industrial America.

Richard K. Miller, Ph.D.

President

Professor of Mechanical Engineering

Richard K. Miller was appointed the President and first employee of the Franklin W. Olin College of Engineering in 1999, where he also holds an appointment as Professor of Mechanical Engineering. He served as Dean of the College of Engineering at the University of Iowa from 1992–1999, and spent the previous 17 years on the engineering faculties at the University of Southern California (where he held the position of Associate Dean for Academic Affairs) and the University of California, Santa Barbara. Dr. Miller's research interests are in structural dynamics and nonlinear mechanics with application to earthquake engineering and spacecraft structural design. He is the author or co-author of about 100 reviewed journal articles

and other technical publications. His research interests are in nonlinear dynamic phenomena such as vibroimpact of adjacent structures during earthquakes, elastic wave propagation in frictionally bonded solids, stability and deformation in wrinkling membranes, active control of large civil structures, and dynamic identification of hysteretic structures. His work in spacecraft structures includes the design of large precision deployable truss antenna structures, the design of large inflatable reflectors, and the accurate analysis of the large deformation of articulated trusses during deployment. He has been a consultant to several companies including The Aerospace Corporation, NASA's Jet Propulsion Laboratory, Hughes Aircraft Company (now Raytheon Company), and Astro Aerospace Corporation (now Northrop Grumman Corporation), where he made contributions to the Heliogyro, Solares, Mast Flight Experiment, Milstar, Mobile Transporter, and other projects. Dr. Miller has won five teaching awards at two universities, received the Legacy award from the College of Engineering at the University of Iowa, the 2011 Donald E. Marlowe Award from the ASEE, and was recognized in 2006 by the Mass High Tech journal as an All Star for his work in leading the establishment of Olin College. He is a member of the Board of Directors of Stanley Consultants, Inc., and serves on the Board of Trustees of Babson and Olin Colleges. He has also served as the chair of the National Science Foundation's Engineering Advisory Committee and on several advisory committees for the National Academy of Engineering, Harvard University, and other institutions. In addition, he has served as a short term consultant to the World Bank in the establishment of new academic institutions. He is a member of AIAA, ASME, ASCE, ASEE, Tau Beta Pi, Phi Kappa Phi, and Sigma Xi. A native Californian, Dr. Miller earned his B.S. degree in Aerospace Engineering in 1971 from the University of California, Davis, where he received the 2002 Distinguished Engineering Alumnus Award. In 1972, he earned his M.S. degree in Mechanical Engineering from the Massachusetts Institute of Technology. In 1976 he earned his Ph.D. in Applied Mechanics from the California Institute of Technology.

Bradley A. Minch, Ph.D.***Professor of Electrical and Computer Engineering***

Prior to joining the Olin College faculty, Dr. Minch was an assistant professor at Cornell University in the School of Electrical and Computer Engineering, where he was the recipient of three teaching awards and one freshman advising award. In 2000, he received an Early CAREER Award from the National Science Foundation. The award, which recognizes the early career development activities of teacher-scholars who are most likely to become the academic leaders of the 21st century, is the Foundation's most prestigious award for new faculty members. Dr. Minch's research interests are in the areas of analog and mixed-signal integrated circuit design. Translinear circuits, log-domain filters, floating-gate circuits, and neuromorphic circuits are among the topics covered in his published journal papers and conference presentations. Dr. Minch received his Ph.D. in 1997 from the Computation and Neural Systems program at the California Institute of Technology, where he worked under Prof. Carver Mead. In 1991, he received his B.S. in electrical engineering from Cornell University. His outside interests include origami, stained glass, and electronics.

Christopher Morse, Ph.D.***Lecturer in Chemistry***

Before coming to Olin College, Dr. Morse was a faculty member in the chemistry department at Tufts University where his courses covered both graduate and undergraduate curricula. At Tufts he served as the Graduate Training Coordinator, with the responsibility for the pedagogical training of the graduate students, especially those interested in careers in academia. He also successfully ran the Summer Institute on College Teaching for seven years, a program that trained graduate students in educational skills, and then paired them with veteran faculty members to co-teach courses. Before Tufts, Dr. Morse was at MIT where he received his doctoral degree in inorganic chemistry in the lab of Alan Davison as a National Science Foundation Predoctoral Fellow. The Davison lab focused on the creation of radiopharmaceuticals for use as imaging and therapeutic agents. Dr. Morse worked on the synthesis and reactivity of

a class of rhenium and technetium organometallic complexes. While at MIT, he also served as the chemistry liaison and taught chemistry courses through the Experimental Study Group. During his summers, Dr. Morse taught chemistry for Project Interphase, which prepared underrepresented minorities from rural and urban areas for the rigors of first-year courses. For this effort, he was awarded the Goodwin Medal for excellence in teaching by a graduate student. He also holds an A.B. from Dartmouth College. At Olin, Dr. Morse teaches courses in general and organic chemistry. He is currently working on a textbook for a course about art, art history and art preservation from a chemical perspective. Dr. Morse remains interested in pedagogy training and his current focus is on using cooperative education to teach critical thinking through chemistry and the role of math skills for success in the sciences. While at Olin he hopes to expose students to the wonders of the puzzle world through a Co-Curricular.

José Oscar Mur-Miranda, Ph.D.***Assistant Professor of Electrical and Computer Engineering***

Dr. Mur-Miranda received his Ph.D. in electrical engineering and computer science from MIT in 2004, with a dissertation on electrostatic vibration-to-electric energy conversion under Professor Jeffrey H. Lang. His electrostatic vibration energy harvester is the first published design of its kind in the literature. He also earned B.S.E. and M.S.E. degrees from MIT, both in electrical. At Olin, Dr. Mur-Miranda has taught several electrical engineering classes such as Signals and Systems, Microelectromechanical Systems and Nonlinear Circuit Analysis. He has also taught Design Nature and User-Oriented Collaborative Design, part of the design stream at Olin. Before coming to Olin, he was an associate professor of Electrical Engineering at the Inter American University of Puerto Rico, Bayamón Campus. Prior to that, Dr. Mur-Miranda was a research consultant in energy harvesting systems at the Centre Nacional de Microelectrónica in Barcelona, Spain. He has designed and implemented industrial process control and automation systems for various pharmaceutical companies.

Lawrence Neeley, Ph.D.
Assistant Professor of Design and Entrepreneurship

Dr. Neeley joined the Olin faculty as a visiting assistant professor of Design and Entrepreneurship in 2010. He brings to Olin his passion for design, prototyping, manufacturing and entrepreneurship and strives to share these passions with his students and the Olin community at large. Both his research and educational efforts center upon helping designers rapidly imagine, realize and offer compelling real-world products. Before coming to Olin full time, he spent three years as a postdoctoral associate in mechanical engineering at nearby MIT. During this time, he also had the pleasure of teaching User-Oriented Collaborative Design (the sophomore design class) at Olin every spring semester. In 2007, Dr. Neeley served as a global manufacturing research fellow for the Stanford Product Realization Network. In this role he conducted and documented site visits of manufacturing facilities associated with a multitude of industries in California and Shenzhen, China. Dr. Neeley holds a Ph.D. and an M.S. in mechanical engineering from the Center for Design Research at Stanford University where he received the Stanford University Legacy Achievement Award given by the Black Community Services Center, a silver medal in IDEA2003 for the design of a wine decanting cradle and the Stanford School of Engineering Dean's Doctoral Distinction Diversity Award. His dissertation research was in the area of adaptive design expertise. His thesis: *A Theory of Design Thinking and Innovation* examined the nature and nurture of design thinking. Dr. Neeley also holds a B.S. in mechanical engineering from the University of Maryland, Baltimore County where he was a Meyerhoff Scholar and graduated as a member of the Phi Beta Kappa and Tau Beta Pi academic honor societies. Outside of the classroom he enjoys imagining what might be and then making it so, cutting metal and anything related to custard.

Joanne C. Pratt, Ph.D.
Associate Professor of Biological Sciences

Dr. Pratt holds a Ph.D. in Immunology from the University of Pennsylvania and an A.B. in Biology

from Smith College. Prior to her position at Olin College, she held Instructor positions at National Jewish Medical Center in Denver and Dana-Farber Cancer Institute/Harvard Medical School in Boston. She also spent a year as a postdoctoral fellow in Paris. Dr. Pratt currently holds a research grant from the NIH, and she has previously received research grants from The Cancer League of Colorado and The Association for International Cancer Research. Dr. Pratt's research interests are focused on the factors that control the growth and function of white blood cells. She has mentored numerous Olin students in her laboratory-based research projects and incorporates a semester-long authentic research experience into her Principles of Modern Biology class. She also teaches an advanced biology elective in Immunology, which has been taught at Olin and Wellesley Colleges and an interdisciplinary course in Emerging Technologies in Cancer Research. In addition to her teaching responsibilities at Olin, Dr. Pratt has served on almost every committee at the college- from furniture selection to strategic planning. Dr. Pratt's professional memberships include the American Association of Immunologists, the American Society for Engineer Education, the American Association for the Advancement of Science and the American Society of Cell Biology. Dr. Pratt is a member of the Pilgrim John Howland Society and the Society of Mayflower Descendants.

Alisha Sarang-Sieminski, Ph.D.
Assistant Professor of Bioengineering

Dr. Alisha Sarang-Sieminski came to Olin from the Biological Engineering Division at MIT, where she was a Ruth L. Kirschstein National Research Service Award post-doctoral fellow. Prior to that, she received her Ph.D. in bioengineering from the University of Pennsylvania and a B.S. in chemical engineering from MIT. Dr. Sarang-Sieminski's research interests revolve around how cells interact with and perceive their immediate surroundings – with a focus on cell mechanics and cell-biomaterial interactions. Since coming to Olin, Dr. Sarang-Sieminski has enjoyed developing new bioengineering courses focused on transport in

biological systems, tissue engineering, cell mechanics and biological thermodynamics.

Stephen Schiffman, Ph.D.

Associate Professor of Entrepreneurship at Olin and Babson Colleges

Prior to joining the Olin faculty, Dr. Schiffman was the dean of the Undergraduate Program at Babson College and a senior partner at Olin College. In his two years as a senior Olin partner, Dr. Schiffman worked closely with the faculty to develop and improve the Olin curriculum. He has been a Babson faculty member in Entrepreneurship, Mathematics and MIS since 1986. He was the architect of Babson's revised undergraduate curriculum, which launched in the fall of 1996. In 1997, the Pew Charitable Trusts recognized this effort by selecting Babson for a Pew Leadership Award for renewal of undergraduate education. Dr. Schiffman holds a Ph.D. in mathematics from Dartmouth College as well as an M.S. in management from the Sloan School at MIT. He has taught at the University of Colorado and Colorado College. Prior to joining Babson, he worked at Digital Equipment Corporation.

Mark Somerville, Ph.D.

*Associate Dean for Academic Programs and Curricular Innovation
Professor of Electrical Engineering and Physics*

Dr. Mark Somerville joined Olin College from Vassar College, where he had been an Assistant Professor of Physics since 1998. He holds M.S. and Ph.D. degrees in electrical engineering from MIT, as well as an M.A. (first class honors) in physics from Oxford University. He did his undergraduate work at the University of Texas at Austin, where he earned a bachelor of science (highest honors) in electrical engineering as well as a bachelor of arts (special honors) in liberal arts (English concentration). His academic honors include the Joint Services Electronics Program Doctoral and Post Doctoral Fellowship, the Office of Naval Research Graduate Fellowship, and the Rhodes Scholarship. Dr. Somerville's technical research focuses on the physics of semiconductor devices, with particular emphasis on development of novel measurement

techniques to provide insight into failure mechanisms in devices ranging from III-V high electron mobility transistors to strained silicon-on-insulator transistors to germanium-based LED's. Dr. Somerville has also collaborated extensively with other institutions, including the University of Illinois at Urbana-Champaign, TU-Delft, and others, to spread change in engineering education, particularly through to application of collaborative design techniques to curriculum revision processes. He has also worked closely with other Olin faculty members to develop Olin's I2E2 Summer Institute, which draws engineering educators from around the world.

Lynn Andrea Stein, Ph.D.

*Professor of Computer and Cognitive Science
Director, Initiative for Innovation in Engineering Education*

Lynn Andrea Stein is a founding faculty member of the Franklin W. Olin College of Engineering. She joined Olin from MIT, where she was an associate professor of Computer Science and directed a research group on interactive intelligent computing systems. Her pioneering approach to the teaching of computer science is based on this interactive model rather than the traditional linear view of computation. Stein's research spans the fields of artificial intelligence, programming languages, and engineering and computer science education. She is a co-author of the foundational documents of the semantic web and the "mother" of a humanoid robot and an intelligent room. Stein is also active in the engineering and computer science education communities, a member of curricular advisory boards, and a frequent speaker at educational conferences on work including pioneering curricular applications of inexpensive robotics and an innovative curriculum for introductory computer science. In 2009, Stein was named the founding director of Olin's Initiative for Innovation in Engineering Education (I2E2). Stein is the recipient of the NSF Young Investigator Award and MIT's Spira Teaching Award, an IEEE Senior Member and a Fellow of the KISS Institute for Practical Robotics. She has a B.S. (cum laude) in computer science from Harvard and Radcliffe Colleges and

M.S. and Ph.D. degrees in computer science from Brown University.

Jonathan Stolk, Ph.D.

Associate Professor of Mechanical Engineering and Materials Science

Jonathan Stolk joined Olin College in 2001 from Bucknell University, where he served as a Visiting Assistant Professor in the Department of Chemical Engineering. Dr. Stolk holds M.S. and Ph.D. degrees in materials science and engineering from the University of Texas at Austin and a B.S. in mechanical engineering from the University of Texas at Arlington. Dr. Stolk is passionate about learning, and is excited to be a part of the Olin College environment, where there are always new paths to explore and new connections to make. He believes that each Olin student holds enormous potential for both personal growth and positive impact on our world, and he aspires to design learning experiences that foster students' creative capacities and that encourage students' development as unique, self-directing, and self-confident learners. Dr. Stolk's current research focuses on understanding the role of faculty in promoting lifelong learning, examining educational change processes in college settings, and investigating the effects of disciplinary integration and student autonomy on motivation and a broad range of learning outcomes. Stolk is currently involved in several NSF-supported collaborative research projects in STEM education, and he is actively engaged in helping faculty create innovative student experiences.

Brian D. Storey, Ph.D.

Associate Professor of Mechanical Engineering

Dr. Storey holds a Ph.D. from the University of California, Berkeley, a M.S. from the University of Illinois at Urbana-Champaign and a B.S. from the University of Texas at Austin, all in mechanical engineering. Dr. Storey's research interests and experiences are in the broad areas of fluid dynamics and computational science, including applications such as microfluidics, geophysical flows, and cavitation. Current research projects involve electrokinetic and electrochemical flows in microfluidic devices. Dr. Storey has received NSF funding to

support undergraduate research projects at Olin. These projects have led to publications authored by undergraduate students as well as student talks at professional conferences. Recently, Dr. Storey has been aiding in the development of a new two-week school which offers research training to scientists from developing countries.

Jessica Townsend, Ph.D.

Associate Professor of Mechanical Engineering

Dr. Townsend teaches several of the mechanical engineering core courses at Olin College and also advises student design teams in the SCOPE program. Dr. Townsend received her Ph.D. in aeronautics and astronautics from MIT, where she developed evaporatively cooled turbine blades for advanced aircraft engines. Prior to returning to school for her doctorate, Dr. Townsend spent three years in industry as an aerospace performance engineer at Hamilton Sundstrand Power Systems. She received her M.S. from the Mechanical and Aeronautical Engineering Department at the University of California at Davis. She earned her B.S. at the University of Massachusetts at Amherst in mechanical engineering and credits her mentors at UMass for their early influence in pointing her towards a career in engineering education. She was also the recipient of the AIAA Foundation Wilbur and Orville Wright Graduate Research Award, the AIAA Foundation Gordon C. Oates Air Breathing Propulsion Graduate Award and the American Association of University Women Engineering Dissertation Fellowship.

Yevgeniya V. Zastavker, Ph.D.

Associate Professor of Physics

Prior to joining Olin, Dr. Zastavker was a visiting assistant professor of Physics at Wellesley College where she taught physics and performed biophysics research. Born and raised in Kiev, Ukraine, she came to the United States in 1990 having received two years of education at the Kiev Pedagogical College and a degree from one of Kiev's Schools of Music. She graduated from Yale University with a B.S. in physics and holds a Ph.D. in biological physics from MIT. Her current research interests include (i) science/engineering education with

particular emphasis on innovative pedagogical and curricular practices at the intersection with the issues of gender and diversity; and (ii) investigation of physico-chemical properties of biological and synthetic self-assembling membranes with significant biomedical and industrial applications. Dr. Zastavker has served on the Committee on the Status of Women in Physics of the American Physical Society and represented the U.S. at the three International Conferences on Women in Physics (co-leading the U.S. delegation to the last event.) She has served as a Board of Trustees member of a local STEM charter school and helped to initiate Global Technology and Engineering Consortium that works with international students ranging from middle school through college. Dr. Zastavker continues to work on the issues of women and minorities in science/engineering through her research, active participation in professional societies, and her involvement in the community.

Academic Partners

Woodie Flowers, Ph.D. *Distinguished Olin Partner*

Dr. Flowers is the Pappalardo professor emeritus of Mechanical Engineering at MIT. He received a B.S. from Louisiana Tech University and S.M., M.E. and Ph.D. degrees from MIT. His interests include creative design processes, product development systems, and innovations in education. At MIT, he has received several honors for extraordinary contributions to undergraduate education including a MacVicar Faculty Fellowship. Currently, Dr. Flowers is a director of three companies and serves as National Advisor for FIRST.

Steven K. Gold, M.D. *Senior Partner for Entrepreneurship*

Dr. Gold is an entrepreneur who has founded and served as CEO of several life science and technol-

ogy ventures. His experience includes designing and launching new enterprises, and developing and commercializing innovative products and services. Dr. Gold is the inventor of several patented and patent-pending technologies, and the author of *Entrepreneur's Notebook: Practical Advice for Starting a New Business Venture*. After beginning his undergraduate years as a mechanical engineering student and studying oceanography aboard a research vessel in the North Atlantic, he earned a B.S.E. in Entrepreneurial Management from the Wharton School of the University of Pennsylvania. Dr. Gold also has a M.D. from Brown University Medical School, during which time he studied at the Karolinska Institute in Stockholm, Sweden. At Olin, Dr. Gold teaches the introductory entrepreneurship and intellectual property courses, and is an advisor to student businesses associated with the Olin Foundry.

Janey Pratt, M.D. *Senior Partner in Health Sciences*

Dr. Pratt is a General Surgeon specializing in bariatric surgery at the Massachusetts General Hospital (MGH). She is the Director of the MGH Weight Center and of the Nutrition Support Unit. She teaches medical students from Harvard and is currently an instructor in surgery at Harvard Medical School. She holds a B.A. degree from Wellesley College in chemistry and an M.D. from Tufts University School of Medicine. Dr. Pratt is married to former Olin Professor Gill Pratt. They enjoy working together on medical device engineering and have consulted as a team for Covidien and Boston Scientific. Dr. Pratt advises Olin students interested in pursuing careers in Medicine and other health sciences. Using her background in innovative medical technology and surgery, Dr. Pratt is a resource for students interested in medical technology. She periodically lectures in courses where medical technologies, of women in surgery are being discussed. She is an American Heart Association BLS instructor trainer which allows her to certify all incoming freshmen CPR and AED use. She also teaches a course in first aid for engineers. She assists in advising medically related SCOPE Projects.

Instructors, Academic Visitors and Technical Staff

David Anderson

Master Instructor of Mechanical Design and Fabrication

Prior to joining Olin, Mr. Anderson was an optomechanical engineer with Network Photonics, developing all-optical switches for Dense Wavelength Division Multiplexing (DWDM) Networks. He was a founding employee at Network Photonics and played an instrumental role in engineering the product from initial concept to production. Before Network Photonics, Mr. Anderson was employed by Ball Aerospace where his primary focus was space-borne optical instruments – two of which are presently on board the Hubble Space Telescope. While with Ball Aerospace, Mr. Anderson also designed mechanisms and optical structures for laser crosslink communication satellites. Mr. Anderson's areas of interest and expertise include design, analysis and manufacturing of precision mechanical systems found in optical instruments. Mr. Anderson holds two patents for MEMS micro mirrors and is a consulting engineer to companies developing optical sensing and imaging systems. He also consults to solar energy developers and has designed a novel solar panel mounting system and a solar powered engine for electricity generation. He received his bachelor's degree in mechanical engineering from the University of Colorado, Boulder.

Bruce Andruskiewicz

Instructor of Machining

Before joining Olin College, Mr. Andruskiewicz worked in industry at Packard Machinery, where he served as service manager and applications engineer. In this role he was responsible for providing technical support and customer training,

as well as servicing and installing machinery, including CNC machining centers, turning centers, manual mills, lathes and support equipment. Mr. Andruskiewicz is a Class A machinist who has held industry positions for over twenty five years with companies such as Laurel Brooke, Inc., Minuteman Labs, McPherson, Inc. and Tech-Ridge.

Sadie Aznavoorian-Cheshire, Ph.D.

Biology Laboratory Specialist

Dr. Aznavoorian-Cheshire's primary research interests are in the mechanisms of tumor cell invasion and metastasis, with an emphasis on extracellular matrix (ECM)-mediated regulation of tumor cell migration and protease production. Dr. Aznavoorian-Cheshire received her Ph.D. in microbiology from Boston University Graduate School of Medical and Dental Sciences, where she examined the interactions of carcinoma cells with basement membrane proteins. She pursued post-doctoral studies at the National Institutes of Health, Laboratory of Pathology, examining the stimulated migration of melanoma cells by host-derived factors and its possible role in promoting invasion of the basement membrane barrier separating epithelium from interstitial tissue. As a Staff Scientist at the University of Alabama at Birmingham, Dr. Aznavoorian-Cheshire studied the matrix metalloproteinase-mediated degradation of type I collagen by oral squamous carcinoma cells, and its regulation by the binding of b1 integrins to collagen. Current projects include collaborations with Olin biology faculty on aspects of tumor growth regulation and adhesion mechanisms, as well as development of student laboratory modules.

Aaron Boxer

Visiting Engineer

In addition to his appointment at Olin, Mr. Boxer is a consulting engineer at Millogic Corporation. He has been designing digital electronics for over 30 years at a number of companies including Digital Equipment Corporation, 3COM and AMCC. He has also been involved in five high-tech startup efforts. Mr. Boxer's engineering accomplishments include the first single-board floating point ar-

ray processor, one of the early cache-coherent distributed memory multiprocessors, one of the first Gigabit Ethernet switches and several digital design patents. His work has also been published in IEEE Spectrum and several engineering trade journals. Mr. Boxer's engineering interests include the problems of design and verification that confront large chip design projects. His educational interests include helping students learn how to be successful engineers in both large companies and small startups. He also hopes to help students see how much fun engineering can be. Mr. Boxer holds a B.S. and an M.E. in biomedical engineering from Rensselaer Polytechnic Institute.

Gillian Epstein, Ph.D.

Consultant in Writing

Prior to joining Olin College, Dr. Epstein was a senior consultant and instructor for FreshPond Education, a professional development company. While at FreshPond Education, she developed and led team-driven development programs that trained participants to create challenging curriculum projects in the humanities, implemented a vigorous peer review process and used online publishing tools to share curriculum research and lesson development. Prior to her position with FreshPond Education, Dr. Epstein was an instructor of composition and literature at the University of California, Berkeley where she won a teaching award in 1999 and a Mellon research fellowship in 1999-2000. Dr. Epstein earned her Ph.D. from the University of California, Berkeley and her B.A. from Wesleyan University, both in English. Her academic interests include nineteenth-century American literature, novel theory and feminist theory.

Shan-Yuan Ho, Ph.D.

Visiting Assistant Professor of Mathematics

Dr. Ho has taught and held research positions at the Massachusetts Institute of Technology (MIT), Stanford University, and the Ecole Polytechnique Federale de Lausanne. She holds a B.S. degree in mathematics, and the B.S., M.S., E.E., and Ph.D. degrees in electrical engineering and computer science from MIT. She worked in industry for several years prior to graduate studies. She

joined the Department of Mathematics at MIT in January 2006 and the Laboratoire de théorie de l'information in the Systemes de Communication of the Faculte Informatique et Communication at EPFL, Switzerland, in September 2007. Since then she has alternated between the two places. Dr. Ho has worked and lived in three different continents: North America, Asia, and Europe. Her research areas of interest are Probability, Stochastic Processes, and Information Theory. In particular, she has conducted research in decentralized detection and coding, sensor networks, algebraic coding, planar graph decomposition, and optimal stopping times of stochastic processes. In addition, she has several years of clinical experience in neurology and a keen interest in memory and learning, with particular emphasis on rehabilitation after traumatic brain injury. Dr. Ho is most interested in fundamental understanding of research problems, developing insight and intuition from simple models, and building novel frameworks to analyze complex systems.

Alexander Morrow

Distinguished Research Scientist in Residence

Alex Morrow retired from IBM Research in 2009 to join the Olin faculty. At Olin, Morrow has been pursuing his research into Internet control systems within SCOPE projects supported by IBM. Prior to joining Olin he was an IBM Fellow in IBM Research. There he led several research teams which were responsible for producing a Linux-based wristwatch (running Xclock!), Java Beans, and the Apache Xalan XSL processor, among others. He also led several research projects in Internet-based control systems. Before rejoining IBM, Morrow was a Fellow at Lotus Development in Cambridge, MA. There he produced software product architectures for application integration across Lotus product divisions and among software publishers. Prior that Morrow was Vice President of Strategic Relations at the Open Software Foundation (OSF) – a non-profit technology development organization for Unix systems. Before joining OSF, he led the team that produced ACIS 4.2, a version of 4.2 BSD Unix for IBM's first workstation, the IBM RT PC. ACIS 4.2 was used in many campus networking projects including

Athena at MIT and the Andrew at CMU. Prior to ACIS 4.2, he managed transaction monitor, operating system and computer language projects. He was chairman of the ANSI APL standard, and editor of the ISO APL standard, for which he received the ACM Iverson Award for Outstanding Contribution to APL. Morrow graduated from Trinity College in Hartford, CT in 1966. He lives in Wellesley with his wife and three sons.

Matthew Neal***Materials Science and Chemistry Laboratory Specialist***

Before joining Olin College in 2006, Mr. Neal was engaged in various aspects of research, development, and manufacturing of superconducting, magnetic, and micro-electromechanical systems (MEMS) devices. Mr. Neal received his S.M. in electronic materials from MIT, where his research was on the processing and characterization of superconducting thin films. He also graduated from Washington State University with a B.S. in physical metallurgy. Mr. Neal has been a member of three start-up companies, developing high temperature superconducting wire, thin film superconducting devices, and MEMS devices. He was also a materials scientist for the former Superconducting Supercollider Laboratory studying eddy current losses in superconducting magnets and magnetoresistance in steel beam tubes. He has also been a vacuum process engineer in a high volume manufacturing facility producing thin film recording heads.

Mihir Ravel, M.S.***Distinguished Research Scientist in Residence***

Mihir K. Ravel is a Visiting Professor at the Olin College of Engineering collaborating with academic colleagues to bring more active learning into the Olin educational process and to identify educational innovations that could be systematized for global value. He is a noted technology leader in the electronics design and automation industries with over 25 years experience in high performance technologies for a diversity of applications including GHz electronics, picosecond photonics, mixed-signal design and validation, RF/wireless

communications, multimedia systems, CCD imaging, environmental monitoring, and smart sensors. His R&D career spanned working with some of the world's leading academic/government/industrial R&D organizations. After a fortunate corporate career, his aim now is to apply that experience towards initiatives to improve global science/technology education and advising young entrepreneurs focusing on emerging markets. He spent much of 2004–2008 traveling internationally across the US, Europe, and developing parts of India and China to meet with public/private-sector experts about technology and educational challenges in globalizing economies. In addition to directly contributing to academia as an educator, he is the Chairman/Founder of The Learning Labs, a new social venture aimed at enabling teacher/student adoption of many of the global best practices observed in his travels. Mr. Ravel has been an invited speaker on global engineering and education issues at industry and academic forums as diverse as corporate boardrooms, the US State Department, U.S. Engineering Deans Institute, the National Learning Strategies Conference, the Indo-US Collaboration on Engineering Education, and the Indian government's National Research Development Corporation. He is active in contributing to the high tech community and has served on the advisory boards for EDN magazine, the Austin Technology Council, the MIT Enterprise Forum, The Indus Entrepreneurs (TiE), and is an advisor to various early stage private and non-profit ventures. He has degrees in Physics and Electrical Engineering/Computer Science from MIT, along with graduate studies in economics and computational finance from MIT's Sloan School of Management and the Oregon Graduate Institute.

Ursula Wolz, Ph.D.***Visiting Associate Professor of Computer Science***

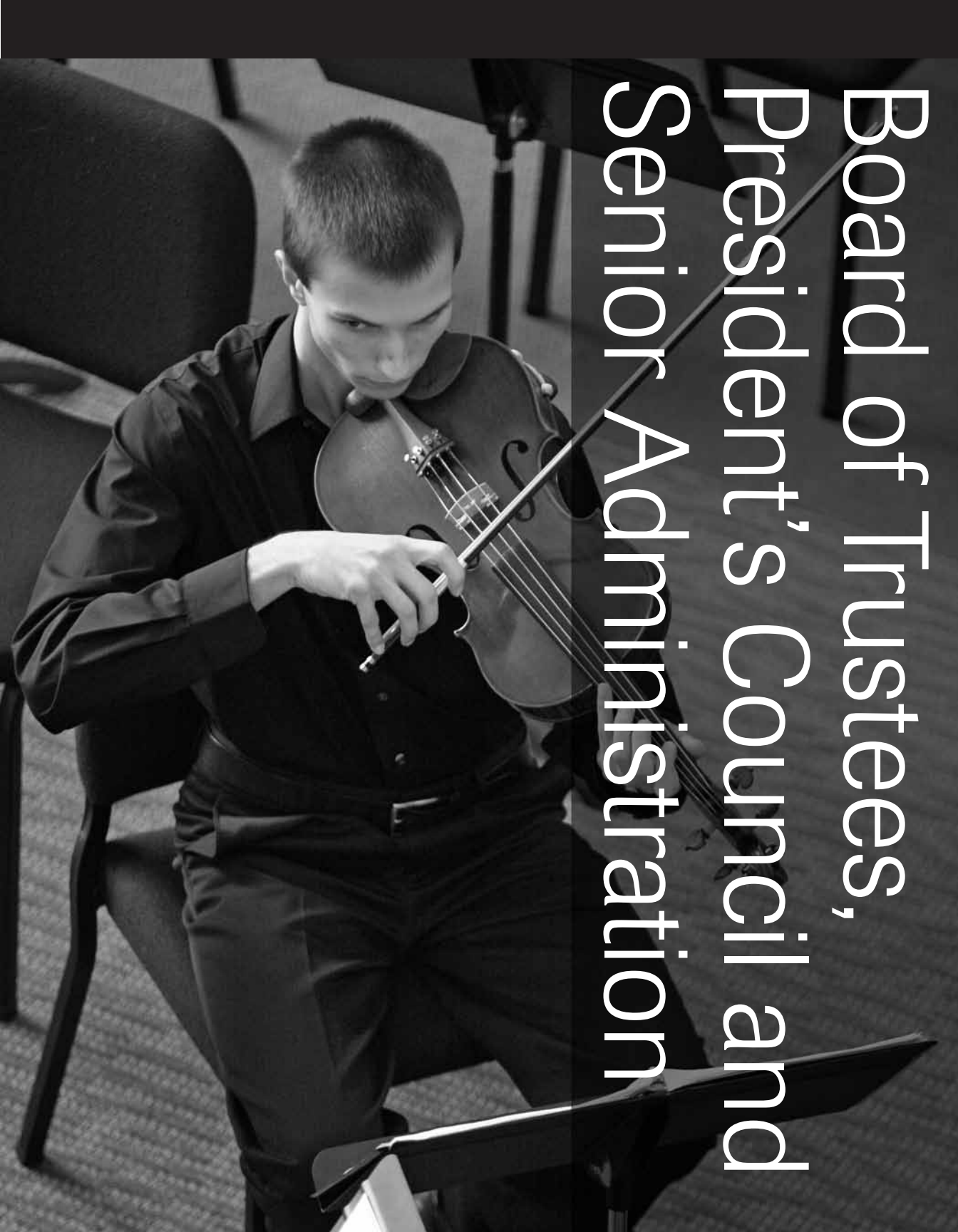
Dr. Wolz just completed her 21st year at The College of New Jersey (TCNJ) as an Associate Professor of Computer Science and Interactive Multimedia. Her scholarly interests are best described as “interactive storytelling.” She is interested in architectures for creating interactive stories and games, as well as using narrative form

as a vehicle for teaching programming. She was the Principal Investigator for the NSF “Broadening Participation in Computing via Community Journalism for Middle Schoolers” program, the Principal Investigator of a Microsoft Research project on Multidisciplinary Game Development, and most recently the co Principal Investigator of NSF EAGER Project “Toward a Climate for Interdisciplinary Computing.” She is a recognized computer science educator with a broad range of publications who has taught students including disabled children, urban teachers, and elite undergraduates for over 30 years. She is a co-founder of the Interactive Multimedia Program at TCNJ. She has a background in computational linguistics, with a Ph.D. in Computer Science from Columbia University, a Master Degree in Computing in Education from Columbia Teachers College, and a bachelor’s degree in Linguistics, Philosophy and Psychology from MIT, where she was part of Seymour Papert’s Logo group at the very beginning of research on constructivist computing environments.

Jennifer Zessin, Ph.D.

Visiting Assistant Professor of Mechanical Engineering

Dr. Zessin is a structural engineer with multidisciplinary research interests including analysis of historic monuments, the history of construction, and sustainable design. She received a Ph.D. in Building Technology from MIT, where her dissertation research was in the area of masonry mechanics, a M.S. in applied mechanics from Harvard University, and a B.S. in civil engineering from the University of Virginia. She was a Fulbright Fellow, studying at the Swiss Federal Technical Institute in Zurich. Dr. Zessin is an expert on the mechanics and behavior of masonry structures. She conducts research on the structural safety of historic monuments and the design of more sustainable infrastructure. During her time at MIT she mentored a number of undergraduate research projects affiliated with both MIT’s Undergraduate Research Opportunities Program (UROP) and the MIT Summer Research Program (MSRP).



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Board of Trustees

Elizabeth G. Armstrong, Ph.D., Dr. med. h.c.
Director of the Harvard-Macy Institute; Clinical Professor in Pediatrics, Harvard Medical School

Dr. Armstrong is the director of the Harvard-Macy Institute and Clinical Professor in Pediatrics at Harvard Medical School. She has held positions at Harvard Medical School since 1984, including director of Curriculum 1988-1992 and director of Medical Education 1992-2001. She has played a leadership role in designing, implementing and expanding Harvard's New Pathway curriculum. In 1994 with funding from the Josiah Macy Jr. Foundation, she created and continues to direct the Harvard-Macy Institute. The Institute offers professional development programs for physician-educators and leaders of reform in medical education worldwide. The global impact of the Harvard-Macy Institute's programs expanded in 2001 when Dr. Armstrong joined Harvard Medical International as director for Education Programs. Since then, she has customized the Harvard Macy programs through collaborative efforts with the Association for the Study of Medical Education in the United Kingdom, the Council of Deans in Australia, the Karolinska Institute in Sweden, the University of Queensland in Australia, and the National University of Singapore. She has served on and chaired many Harvard Medical School committees and was a member of Cornell University's Board of Trustees and Cornell's Medical School Board of Overseers assisting in the major curricular reforms undertaken at their Medical College and School of Veterinary Medicine. Dr. Armstrong is currently a member of the Editorial Board for Academic Medicine and is a co-director of the United States Europe Medical Education Exchange program. As a member of China Medical Board's Institute for International Education, she has been instrumental in developing global minimum essential requirements in medical education. Recognized worldwide as an expert in medical education, she has lectured and written on this subject and received an honorary doctor of medicine degree from the University of Lund Medical Faculty in recognition of her

international contributions to medical education. Dr. Armstrong received her Bachelor of Science degree from Cornell University; Master of Arts degree in Teaching from Harvard University; Ph.D. in Curriculum Design and Instruction from Boston College.

George R. Berbeco, M.S.
*President, The Devon Group
 Chairman, Bay Colony Development Corp.*

Mr. Berbeco is the president of The Devon Group, Inc., a commodity trading advisor, and director, Entrepreneur Shares. He has founded several technical companies, including Charleswater Products, Xytest, Syon, Adhesivesmart.com, and successfully exited by sale to Armstrong World Industries and ITW, as well as private funds. Mr. Berbeco is the author of over twenty publications in technical journals relating to electronics, ESD control, adhesives, and industrial applications of ionizing radiation. He has made over fifty presentations, and is the author of fifteen U.S. and foreign patents. Mr. Berbeco is chairman of Bay Colony Development Corporation, one the largest SBA 504 lenders in the country, and is on the Board of Directors of EntrepreneurShares (ENTRX), a mutual fund. He was an overseer of WGBH Public Television, and on the board of the New Rep Theatre. His past affiliations have included chairman of the NE Chapter of the MS Society, International Board of Governors-Technion, Haifa, Israel. Mr. Berbeco is a graduate of MIT, M.S. and B.S. Chemical Engineering, National Merit Scholar, Sigma Xi Honorary. He is registered as a commodity trading advisor, and commodity pool operator.

Tullio Cedraschi, M.B.A.
Former President and Chief Executive Officer of CN Investment Division

Mr. Cedraschi served as president and chief executive officer of the CN Investment Division for the last 30 years. He retired in January 2008. The CN Investment Division is responsible for investing the assets of the Canadian National Railways Pension Trust Fund, one of the largest pension funds in Canada. The Pension Trust Fund assets have a market value of US \$15 billion and include large bond and stock portfolios, real estate and

oil and gas holdings. The Division has achieved an annual rate of return of 11% over the last 35 years. Canadian National operates approximately 30,000 route-km of track spanning Canada and the US, with principal routes to every major metropolitan area in Canada and the major US rail hubs of Buffalo, Detroit, Chicago, Memphis and New Orleans. Mr. Cedraschi is a director of the Toronto Stock Exchange and Freehold Resources Ltd. He is a governor emeritus of McGill University, and governor and former president of the National Theatre School of Canada. He is also a former Director of S G Warburg plc, Cambridge Shopping Centres and Western Oil Sands. He holds a civil engineering degree from the College of Technology in Winterthur, Switzerland, and an M.B.A. from McGill University.

Sunlin Chou, Ph.D.

Former Senior Vice President and General Manager, Technology and Manufacturing Group, Intel

Dr. Chou has 37 years of experience in the integrated circuits industry, including 34 years at Intel Corporation. He retired in 2005 from his position as senior vice president and general manager of Intel's Technology and Manufacturing Group. He currently serves on corporate and non-profit boards and advisory committees. Dr. Chou made technical contributions in silicon device modeling, process and product development. He designed Intel's first CCD serial memory, and managed the development of several generations of Intel's dynamic random-access memories, including their pioneering transition from NMOS to CMOS technology. Later, he led the development of industry leading wafer fabrication processes for Intel's logic and memory products, and streamlined R&D methods and organizations to reduce the technology cycle time from three years to two years. He applied these methods to innovate in other technology areas including packaging and testing. Dr. Chou served as Intel's representative on the board of directors of the Semiconductor Research Corporation, an industry consortium that supports university research. He led the EUV LLC consortium to successfully demonstrate the potential of extreme ultra violet lithography, and to initiate its commercial development for future chip making.

Dr. Chou received his B.S., M.S., and E.E. degrees in electrical engineering from MIT, and his Ph.D. in electrical engineering from Stanford University. He was recognized by Scientific American magazine as one of the "Scientific American 50" in 2002, for leading the development of new materials that enabled Intel to achieve early production of processor chips on 130 nanometer technology. VLSI Research Inc. inducted him into its Hall of Fame, citing his ability to rapidly take chip-making technology from research to manufacturing. Dr. Chou is a member of the National Academy of Engineering.

Tamara P. Davis, M.A.

Managing Director, Corporate Governance Practice, Levin & Company, Inc.

Ms. Davis is the managing director and leads the Corporate Governance Practice at Levin & Company, Inc. in Boston, where she consults with CEOs of entrepreneurial life science companies relating to Board composition, governance best practices, Board performance, and building Boards as strategic assets. Previously, Ms. Davis served as president, chief executive officer, and director of UST Leasing Corporation, an investment banking/financial services company in Boston. She was also formerly an assistant dean of Humanities at Santa Ana College in California and an educator within the Los Angeles City Schools System. Ms. Davis is the retired chairman of the Massachusetts State College Building Authority, a former vice chairman of the Massachusetts Educational Financing Authority, and a former Board director of the Massachusetts Board of Higher Education. She also serves on several corporate, academic and nonprofit Boards. Ms. Davis earned an M.A., *summa cum laude*, from California State University and a B.A. from University of California, Los Angeles.

C. Scott Gibson, M.B.A.

CEO, Gibson Enterprises

Mr. Gibson is CEO of Gibson Enterprises and is a professional board member for public and non-profit entities. He has spent more than a decade as an investor and serving as chairman of Radisys Corporation and five other public companies, as

well as a director of several nonprofits. Prior to founding Gibson Enterprises, Mr. Gibson was the co-founder and president of Sequent Computer Systems, which went from startup to over \$800 million in annual sales before being sold to IBM. Previously, Mr. Gibson was employed for seven years by Intel Corporation, where he held various management positions, including general manager of the Memory Components Operation and marketing manager for the Development Systems Operation. Mr. Gibson received his M.B.A. in finance and his B.S. in electrical engineering from the University of Illinois. He was awarded the Lifetime Achievement Award from Oregon Entrepreneurs Forum in 2001 and was recognized as American Electronics Association's Oregon High Tech Executive of the Year in 1990. He and his wife Pam live in Jackson Hole, Wyoming.

Sherwin Greenblatt, M.S.

Director of Venture Mentoring Service, MIT

Mr. Greenblatt is director of the MIT Venture Mentoring Service (VMS). This program supports innovation and entrepreneurial activity throughout the MIT community by matching prospective entrepreneurs with experienced volunteer mentors who, through their advice, guidance and contacts, can boost the chances of a start-up's success. He also serves as an outside advisor and Board member to a number of start-up companies. From 2005 to 2007, Mr. Greenblatt served as the executive vice president and Treasurer of MIT and from 2008 to 2009 he also served as the interim executive vice president and CEO of the MIT Alumni Association. Mr. Greenblatt, retired from Bose Corporation where he was the first employee of Dr. Amar Bose, his former professor at MIT. As a project engineer, he worked on the early development of Bose high fidelity loudspeakers and related electronic systems. As the company grew, he held the positions of chief engineer, director of Engineering, executive vice president and, for 15 years, president. He is a community and professional leader having been a member of the Board of Directors of the Federal Reserve Bank of Boston, served as chair of the MetroWest Chamber of Commerce and as Chairman of the Board of Trustees at Framingham (Massachusetts) State

College. He currently is a member of the Board of Directors of the Draper Laboratory, the Board of Advisors to the Massachusetts Technology Transfer Council and the Graduate Advisory Board of Babson College. Mr. Greenblatt received his B.S. and M.S. degrees, both in electrical engineering, from MIT.

Carla L. Gude, M.A.

Vice Chair

Former Vice President of Technology, IBM

Ms. Gude was vice president of Technology, IBM Corporate Staff, Somers, NY. She is an experienced executive and information systems professional with 32 years of experience with IBM in a wide variety of management and executive positions for software product development, information technology and corporate technical strategy. In her many years with IBM she served in various positions including vice president of Systems Software, director of Enterprise Workgroup Networking Software, director of Process Support and Application Architecture, and manager of Information Systems. She is a member of several non-profit health care Boards. Ms. Gude received her B.A. from Vassar College and her M.A. from Cornell University.

Paul C. Jennings, Ph.D.

Professor of Civil Engineering and Applied Mechanics, Emeritus, California Institute of Technology

Professor Jennings received his B.S. degree in civil engineering from Colorado State University and his M.S. and Ph.D. degrees, also in civil engineering, from the California Institute of Technology. After serving in the United States Air Force as a member of the faculty of the Air Force Academy, he joined the faculty of Caltech in 1966. He served as chairman of the Division of Engineering and Applied Science from January 1985 to November 1989. He was Caltech's vice president and provost from November 1989 to February 1995. Following that he became acting vice president for Business and Finance until September of 1995; he held this post again in 1998-1999. From 2004 to 2007 he again became Caltech's provost. He is a member of the National Academy of Engineering, a past

president of the Earthquake Engineering Research Institute, a past president of the Seismological Society of America, and a fellow and past-chair of the California Council on Science and Technology. He now represents Caltech on the CCST Board of Directors. Professor Jennings is the author of numerous technical papers on earthquake engineering and dynamics of structures and has served as earthquake engineering consultant on the design of high-rise buildings, offshore drilling towers, nuclear power plants and other major projects. He was a member of the Board of Inquiry on the Loma Prieta earthquake appointed by California's Governor Deukmejian. He was the chair of Pasadena's City Hall Restoration Oversight Committee and he has served on several committees of the National Academy of Engineering and the National Research Council, including chairing the Draper Prize Committee, chairing the Committee on Natural Disasters, and chairing the Committee on Criteria for the Management of Los Alamos and Lawrence Livermore National Laboratories. He is currently chair of the Draper Prize committee. His awards include the Newmark Medal and the Huber Prize of the American Society of Civil Engineers and the Honor Alumnus and Achievement in Academia Awards from Colorado State University. He is a fellow of both the American Academy of Arts and Sciences and the Association for the Advancement of Science.

R. Douglas Kahn, M.B.A.

Chairman and CEO, Ahura Scientific, Inc.

Mr. Kahn is chairman and CEO of Ahura Scientific, Inc., the world's innovation leader in the design and manufacture of advanced ultra-compact spectroscopic instruments for safety, security, pharmaceutical and medical applications. Prior to joining Ahura Scientific, he was president and CEO of PanAmSat Corporation, an international provider of satellite-based communications services with a global fleet of 21 geostationary satellites. Mr. Kahn also served as chairman and CEO of Easel Corporation, a venture capital financed software company which he led through ten years of growth and a successful IPO. He currently serves as a director and chairman of Tetragenetics, Inc., a biotech company in Ithaca, NY, and as

a director of AeroSat Corporation, an avionics manufacturing company in Nashua, NH. Mr. Kahn has taught courses in Entrepreneurship and New Venture Creation at Northeastern University Graduate School of Business and has been a frequent guest lecturer on entrepreneurship at the Harvard Business School, Kauffman Foundation and Babson College. He was the recipient of the Entrepreneur of the Year award, the SBANE New Englander Award for Innovation and his companies have been selected among the INC 500 and the Software 100 for rapid growth and industry leadership. He has been an active member of the technology community in Massachusetts since 1980 and served as a Trustee of the Massachusetts Software Council for 10 years. He has also served previously as a director of ServiceSoft Corporation, Advanced Visual Systems, Inc., American Software Association and the Cornell University Entrepreneurship and Personal Enterprise Council. Mr. Kahn's career spans multiple technologies, from software and telecommunications to instrumentation and biotech. He's run start-ups and managed a global enterprise with annual revenues in excess of \$800 million. Mr. Kahn holds a B.S. in Operations Research and Industrial Engineering from Cornell University and an M.B.A. from Stanford University.

Robert N. McBurney, Ph.D.

CEO of the Accelerated Cure Project for Multiple Sclerosis

Robert McBurney is Chief Executive Officer of the Accelerated Cure Project for Multiple Sclerosis, a national non-profit organization dedicated to curing MS by facilitating research into its causes and mechanisms. He has more than 30 years experience in biomedical research and management. Prior to joining the Accelerated Cure Project, Robert co-founded Optimal Medicine Ltd., a UK company developing clinical decision support tools for optimizing the treatments of mental illness and neurological disorders. His former positions include: Executive Vice President of TheraGenetics Ltd.; Chief Scientific Officer at BG Medicine, Inc.; co-founder of Differential Proteomics, Inc.; and, Chief Scientific Officer and then Chief Executive Officer at Cambridge Neuroscience, Inc. Before joining the biotechnol-

ogy industry, Robert held a faculty position at the Medical School of the University of Newcastle upon Tyne (UK) and was Assistant Director of the Medical Research Council's Neuroendocrinology Unit. He held research positions at the National Institutes of Health in Bethesda (USA), the Physiological Laboratory of Cambridge University (UK) and the Medical School of the University of New South Wales (Australia). Robert has initiated and managed a wide variety of activities during his career, including the discovery and development of novel drugs for disorders of the nervous system and the discovery and development of diagnostics. He has extensive experience in the formation and business activities of biotech companies and serves as a Director of Optimal Medicine Ltd. and Chairman of Differential Proteomics, Inc. He is a former judge for the MIT \$100K Entrepreneurship Competition, the nation's premier business plan competition teaching students how to turn their ideas into companies. An author of many scientific papers, Dr. McBurney received his Ph.D. from the University of New South Wales in Physiology.

Lawrence W. Milas, L.L.B.

*Founding Chairman of the Board, Franklin W. Olin College of Engineering
President, F. W. Olin Foundation, Inc.*

Mr. Milas served on the F.W. Olin Foundation Board for 32 years and also was president for 26 of those years. During his tenure the Foundation made more than \$200 million in building grants to colleges and universities across the country. In 1993 Mr. Milas proposed the establishment of Franklin W. Olin College of Engineering to the Foundation Board. He led the development effort after the Board approved the concept in 1997 and served as Founding Chair of the college from 1999 through 2006. He was a partner in the former New York City law firm of Baer Marks & Upham, where he specialized in tax and trusts and estate law. Mr. Milas has received honorary degrees from Washington and Jefferson College, Whitman College, Roanoke College and the F. W. Olin Graduate School of Business at Babson College. He is a recipient of the Babson Medal from Babson College and served several terms on Babson's Board of Trustees. A 1958 graduate of

Babson College (with distinction), he received his LL.B. degree from Columbia University in 1963.

Richard K. Miller, Ph.D.

Ex-Officio

*President, Franklin W. Olin College of Engineering
Professor of Mechanical Engineering*

Richard K. Miller was appointed president and first employee of the Franklin W. Olin College of Engineering in 1999, where he also holds an appointment as professor of mechanical engineering. He served as dean of the College of Engineering at the University of Iowa from 1992–1999, and spent the previous 17 years on the engineering faculties at the University of Southern California (where he held the position of associate dean for Academic Affairs) and the University of California, Santa Barbara. Dr. Miller's research interests are in applied mechanics. He is the author or co-author of about 100 reviewed journal articles and other technical publications and has been a consultant to several aerospace companies. Dr. Miller has won five teaching awards at two universities and received the Legacy award from the College of Engineering at the University of Iowa. He is a member of the Board of Directors of Stanley Consultants, Inc., and serves on the Board of Trustees of Babson and Olin Colleges. He has also served as chair of the National Science Foundation's Engineering Advisory Committee and served on several advisory committees for the National Academy of Engineering, Harvard University, and other institutions. In addition, Dr. Miller has served as a consultant to the World Bank in establishment of new academic institutions. He is a member of AIAA, ASME, ASCE, ASEE, Tau Beta Pi, Phi Kappa Phi, and Sigma Xi. A native Californian, Dr. Miller earned his B.S. degree in aerospace engineering in 1971 from the University of California, Davis, where he received the 2002 Distinguished Engineering Alumnus Award. In 1972, he earned his M.S. degree in mechanical engineering from MIT. In 1976 he earned his Ph.D. in applied mechanics from the California Institute of Technology.

William B. Norden, J.D.
Chairman of the Board
Director, Secretary and Counsel, F. W. Olin
Foundation, Inc.
Partner, Seyfarth Shaw LLP

Mr. Norden became chairman of the board of the college in 2006. He is a partner in the law firm of Seyfarth Shaw LLP in the New York office and has extensive experience in legal matters related to trusts and estates and charitable organizations. He had been a director of the F.W. Olin Foundation, Inc. since 1988 and had served as secretary and counsel to the Foundation since 1983. Mr. Norden also serves on the Boards of the New York City Fire Museum and the Honor Emergency Fund of the Fire Department of the City of New York. He received his B.S. in economics from Brooklyn College in 1967 and his J.D. from the New York University Law School in 1969.

Douglas G. Rauch, M.B.A.
Clerk
Former President, Trader Joe's Company

Mr. Rauch is a former president of Trader Joe's Company. In his 31 years with Trader Joe's, the majority as president, Mr. Rauch played a pivotal role in the company's growth from a small, nine store chain in Southern California, to a nationally acclaimed retail success story with more than 350 stores in 29 states. He developed their buying philosophy, their unique private label food program, and championed their customer experience focus and unique personal leadership program called Trader Joe's University. Mr. Rauch moved to the Boston area 13 years ago to bring Trader Joe's to the east, and within a few years fell in love with New England. Several years after receiving his B.A. in history from California State University, Los Angeles and going to work for Trader Joe's, Mr. Rauch received his Executive M.B.A. from the Peter Drucker School of Management, Claremont University. At the Peter Drucker School of Management Mr. Rauch won several honorary awards from the faculty, graduating top in his class (undoubtedly due to the free samples he'd bring to class!). He retired from Trader Joe's

in June 2008, and currently is a Senior Fellow at Harvard in their Advanced Leadership Initiative, CEO of Conscious Capitalism, Inc., an executive partner at AptaCapital, Chair of the Board of Overseers of WBUR, and works with a number of entrepreneurial startups. He's married with three grown children, and currently lives in Newton.

Ken Stokes, M.B.A
Former Executive Vice President of The Americas
& Australia/New Zealand, Reckitt Benckiser plc

Ken Stokes is a former international business executive with 25+ years of experience leading consumer goods companies in the USA and abroad. He served most recently as Executive Vice President of The Americas & Australia/New Zealand for Reckitt Benckiser plc, a leading international household cleaning, personal care, OTC and food products company. Ken has overseen businesses in 24 countries across four continents, and served as CEO of companies in the USA, UK and Spain. Earlier in his career he spent four years with McKinsey & Company and held senior marketing roles with Wilson Sporting Goods and The Clorox Company. Switching his focus to board, business advisory, and not-for-profit leadership in 2004, Ken's community service experience includes having served on the Board of Education of one of the top-rated K-12 public school districts in New Jersey, the Board of Directors of the Morris County (NJ) School Boards Association, and as President of his local volunteer fire department, where he continues to serve as an active firefighter. He and his wife Dana are the parents of Lauren (Swarthmore, 2009) and Connor (Olin, 2012). Ken is the 2011-12 Chair of the Olin Parent Advisory Board (PAB) on which he has served since 2008. He holds a B.A. in Economics from Claremont McKenna College, and an M.B.A. from the University of Chicago/Booth School of Business.

President's Council

The President's Council is a group of distinguished advisors who volunteer their time to counsel the president on a full range of issues relating to curriculum, student life, administration and finance, governance, admission and other topics important to the college.

John E. Abele

Co-founder and Director, Boston Scientific Corporation

James E. Ashton, Ph.D.

President of Ashton Capital Partners

Mara G. Aspinall, M.B.A.

Former President and CEO of On-Q-ity

Joe Astroth, Ph.D.

Chief Education Officer, Autodesk

Atul Bhatnagar, M.S.E.E.

President and CEO, Ixia

H. Kim Bottomly, Ph.D.

President, Wellesley College

Marshall N. Carter, M.A.

Chairman of the New York Stock Exchange Exchange and Deputy Chairman of the parent company NYSE Euronext

James C. Curvey, M.A.

Vice Chairman, Fidelity Investments

James J. Duderstadt, Ph.D.

President Emeritus and University Professor of Science and Engineering, University of Michigan

Charles Fadel, M.B.A.

Global Education Lead, Cisco Systems

Domenico Grasso, Ph.D.

Vice President for Research and Dean of the Graduate College, University of Vermont

George N. Hatsopoulos, Ph.D.

Founder, Chairman and CEO, Pharos, LLC

Douglas A. Hunt

Vice President of SOA Advanced Technologies, IBM Corporation

Wayne C. Johnson, M.B.A.

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David S. Lintz, J.D.

General Counsel, Raytheon BBN Technologies

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Former Corporate Vice President, Chief Financial Officer and Treasurer, TechTeam Global Inc.

Cherry A. Murray, Ph.D.

Dean, Harvard School of Engineering and Applied Science

Sung Park, B.A.

President and Founder of Umagination Labs LLC

Naimish Patel, M.Eng.

CEO, Chromatic Systems Corporation

Stephen Pearse, M.S.E.E.

Principal, Yucatan Rock

John J. Piret, D.Sc.

Partner, Newbury Piret & Co., Inc.

John William Poduska, Sr., Sc.D.

Founder and Former Vice President of Research,
Prime Computer

Elizabeth P. Powell, M.A., M.B.A.

Co-founder, Chair, and Treasurer (Retired),
Diamond Machining Technology, Inc.

Melvin R. Ramey, Ph.D.

Professor Emeritus, University of California-Davis

Mark E. Russell, M.S.E.E.

Corporate Vice President, Engineering, Technology
& Mission Assurance, Raytheon Company

Leonard A. Schlesinger, D.B.A.

President, Babson College

Eileen Shapiro, M.B.A.

President, The Hillcrest Group

Ralph Sheridan, M.B.A.

Chief Executive Officer and a Director for Good
Harbor Partners Acquisition Corp.

Ralph Z. Sorenson, D.B.A.

General Partner of the Sorenson Limited
Partnership and President Emeritus, Babson
College

Nicole M. Stata

Founder and Managing Partner, Stata Techne
Ventures

Greggs G. Thomopoulos, M.S., P.E.

Chairman and CEO, Stanley Consultants, Inc.

Ronald G. Weiner, C.P.A.

Partner, Perelson Weiner LLP

Irving Wladawsky-Berger, Ph.D.

Chairman Emeritus, IBM Academy of Technology
and Visiting Professor, Engineering Systems, MIT

Lilian Wu, Ph.D.

Program Executive, University Relations and
Innovation, IBM Corporate Technology

William A. Wulf, Ph.D.

AT&T Professor of Computer Science, University of
Virginia

Senior Administration

Richard K. Miller, Ph.D.

*President and Professor of Mechanical
Engineering*

Dr. Miller was appointed the President and first employee of the Franklin W. Olin College of Engineering in 1999, where he also holds an appointment as Professor of Mechanical Engineering. He served as Dean of the College of Engineering at the University of Iowa from 1992-1999, and spent the previous 17 years on the engineering faculties at the University of Southern California (where he held the position of Associate Dean for Academic Affairs) and the University of California, Santa Barbara.

Dr. Miller's research interests are in structural dynamics and nonlinear mechanics with application to earthquake engineering and spacecraft structural design. He is the author or co-author of about 100 reviewed journal articles and other technical publications. His research interests are in nonlinear dynamic phenomena such as vibro-impact of adjacent structures during earthquakes, elastic wave propagation in frictionally bonded solids, stability and deformation in wrinkling membranes, active control of large civil structures, and dynamic identification of hysteretic structures. His work in spacecraft structures includes the design of large precision deployable truss antenna structures, the design of large inflatable reflectors, and the accurate analysis of the large deformation of articulated trusses during deployment. He has been a consultant to several companies including The Aerospace Corporation, NASA's Jet Propulsion Laboratory, Hughes Aircraft Company (now Raytheon Company), and Astro Aerospace Corporation (now Northrop Grumman Corporation), where he made contributions to the Heliogyro, Solares, Mast Flight Experiment, Milstar, Mobile Transporter, and other projects.

Dr. Miller has won five teaching awards at two universities, received the Legacy award from the College of Engineering at the University of Iowa,

the 2011 Donald E. Marlowe Award from ASEE and was recognized in 2006 by the Mass High Tech journal as an All Star for his work in leading the establishment of Olin College. He is a member of the Board of Directors of Stanley Consultants, Inc., and serves on the Board of Trustees of Babson and Olin Colleges. He has also served as the chair of the National Science Foundation's Engineering Advisory Committee and on several advisory committees for the National Academy of Engineering, Harvard University, and other institutions. In addition, he has served as a short term consultant to the World Bank in the establishment of new academic institutions.

He is a member of AIAA, ASME, ASCE, ASEE, Tau Beta Pi, Phi Kappa Phi, and Sigma Xi. A native Californian, Dr. Miller earned his B.S. degree in Aerospace Engineering in 1971 from the University of California, Davis, where he received the 2002 Distinguished Engineering Alumnus Award. In 1972, he earned his M.S. degree in Mechanical Engineering from MIT. In 1976 he earned his Ph.D. in Applied Mechanics from the California Institute of Technology.

Roger ("Rod") C. Crafts, Jr., Ed.D.
Dean of Student Life

Dr. Roger ("Rod") C. Crafts, Jr. joined Olin College from Brandeis University, where he was Dean of Student Affairs from 1984 to 2000. He has also held student affairs positions at the University of Rhode Island and Indiana University. Dr. Crafts is known nationally for his creative innovations in the delivery of student services and his dedicated and cohesive staff. At Brandeis, Dr. Crafts was instrumental in enhancing the sense of community for undergraduate and graduate students and increasing the undergraduate retention rate by more than ten percent. He also substantially improved coordination among the seven departments within the Division of Student Affairs. Under his leadership, Brandeis revamped its student disciplinary system, joined the prestigious University Athletic Association, and established an Intercultural Center. At Olin, he is responsible for helping to establish and preserve a rich and diverse campus life that enhances student academic experiences. Among the areas reporting to him are academic

advising, residence life, new student orientation, intramurals and recreation, student activities, the honor code and board, health services, psychotherapy and psychiatric services, community service, spiritual life, performing arts, registrar, student accounts, and financial aid. Dean Crafts holds a B.A. in biology from Earlham College and M.S.Ed. and Ed.D. degrees from Indiana University.

John B. Geddes, Ph.D.
*Associate Dean for Faculty Affairs and Research
Professor of Mathematics*

Dr. Geddes brings his passion for applied mathematics to research students and to the classroom. He has developed a number of interdisciplinary, co-taught courses at Olin which emphasize dynamical systems theory, and he has supervised numerous research students in mathematical biology. He has received funding from the NSF and the NIH, and currently receives funds from the Davis Educational Foundation to support a faculty development project.

Prior to joining Olin College, Dr. Geddes served on the faculty at the University of New Hampshire, where he worked on laser-based chaotic communication schemes and pulse dynamics in mode-locked lasers. Dr. Geddes also devoted considerable time to the development of an innovative mathematics course called "Linearity," which integrates the standard sophomore math courses into a year-long sequence. During his tenure at UNH he developed an interest in mathematical biology and received funding from the NIH for a project on the mathematics of micro-vascular blood flow. Between 1996 and 1998 Dr. Geddes served as assistant professor of mathematics at Ramapo College of New Jersey, where he focused on developing a course on chaos and fractals for freshmen.

Dr. Geddes graduated in 1990 from Heriot-Watt University, Edinburgh, Scotland with a B.Sc. in Physics. He received his Ph.D. in Applied Mathematics in 1994 from the University of Arizona.

Stephen P. Hannabury, M.B.A.
Executive Vice President and Treasurer

Mr. Hannabury serves as the Executive Vice President and Treasurer. In this role, he is responsible for the financial affairs of the college, including management of the college's investment and debt portfolios. In addition, he works closely with the President and Trustees on general administrative matters and long-range strategic and financial planning. He also oversees the institutional research, trustee affairs and risk management areas. Since joining the college in August 1999 as the founding Vice President for Administration and Finance, he has also been responsible for the design and construction of the new campus, the development of all administrative and financial processes and systems, and the establishment of all operational support functions. Prior to joining Olin, Mr. Hannabury spent fifteen years at Boston University in a variety of positions, including Assistant Dean of the School of Management. Other experience includes working as a civil engineer and as the director of a non-profit public sailing organization. He received his B.S. in Civil Engineering from Northeastern University and an M.B.A from Boston University. He serves on the Board and as Treasurer of the Boston Consortium of Higher Education, on the Board and as Treasurer of Collaborative Educational Ventures of New England LLC and on the Commonfund Capital Advisory Board.

Joanne Kossuth, M.S.
Vice President for Operations
Chief Information Officer

As Vice President for Operations and CIO, Ms. Kossuth has primary responsibility for the operational and technology areas of the college. These include: conference services, electronic security, dining services, facilities, human resources, information technology, planning and project management, public safety, and purchasing. In addition to her operations duties, she is responsible for fostering non-academic relationships with neighboring institutions, including Babson, Brandeis, and Wellesley Colleges. She was recently appointed as the Associate Director of the BOW collaboration. Ms. Kossuth founded and convened the External

Technology Advisory Board (EXTAB) upon her arrival at Olin College in November, 1999. The EXTAB continues to be an important part of IT governance at the college. More recently and in partnership with Thornton May, she founded the Olin Innovation Lab which brings together information technology innovators (CEOs, CIOs, CISOs, Sr VPs) on the Olin campus twice a year.

As Chief Information Officer, Ms. Kossuth has had a unique opportunity to design fully converged leading-edge technology facilities at Olin College from scratch, as well as to implement best IT practices from a 'clean slate.' Her IT leadership led to her being named one of Computerworld's Premiere 100 CIOs in 2005. Her previous experience includes Systems Manager at Fisher College, Director of Information Technology at Wheelock College and Director of Computer Support Services at the Boston University School of Management. Ms. Kossuth's professional background includes a B.A. from Holy Cross College and a M.S. from Lesley University with a concentration in developing and implementing information systems for small businesses. She also received technical certifications in areas such as network and security engineering from Novell, SANS, and Microsoft. She has been involved for a number of years in EDUCAUSE, a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology. Most recently she was appointed to the Nominations Committee, is the Editor for the Viewpoints Column of EDUCAUSE Review and serves as a member of the Frey Leadership Council. She also chaired the 2009 Annual Program Committee which was responsible for a 7000+ person conference. Her previous service includes: EDUCAUSE Board Member, Demand Aggregation Task Force, Management Institute Faculty Member; Chair of the 2020 committee focused on insuring the future relevance of EDUCAUSE to its members; EDUCAUSE Member Liaison Committee; Ryland Fellowship Advisory Group; Professional Development Committee and the Recognition Committee. Her publications include: "Looking at Clouds from All Sides Now" published in *EDUCAUSE Review*, "Attracting Women to Technical Professions," and "Building Relationships Means Better IT Contracts," both

published in *EDUCAUSE Quarterly* as well as “The Converged Workplace” published in the *ACUTA Journal of Technology in Higher Education* and Chapter 32 of *Olin College: Academic and Olin Centers* in the EDUCAUSE E-Book “Learning Spaces.”

Ms. Kossuth continues to provide service and leadership to NERCOMP as the co-founder of the EDUCAUSE NERCOMP IT Manager Workshop Series. She also serves as a member of the Town of Needham’s Technology Advisory Committee; as a Judge for the Computerworld Honors Program and the Connecticut Innovations Program; and was selected as a member of Pearson Education’s Strategic Advisory Board, Plantronics Unified Communications Advisory Board, E&I Technology Strategy Team and HP/Intel’s Higher Education Advisory Council.

J. Thomas Krimmel
Vice President for Development, Family and Alumni Relations

J. Thomas (Tom) Krimmel joined Olin in 2008 from the National Foundation for Teaching Entrepreneurship (NFTE) where he served as chief development officer from 2005–2008. From NFTE’s New York, NY, headquarters he led a team that partnered with the eleven regional offices to raise funds supporting in-school entrepreneurship programs in low income communities across the U.S. While at NFTE Mr. Krimmel was responsible for increasing total giving from \$7.7 million to \$14.3 million.

Prior to his appointment at NFTE, Mr. Krimmel served as the chief development officer at three other higher educational institutions over the past 28 years, including vice president of development and alumni relations at Babson College from 1990 to 2005. During the 1990s, he guided Babson’s \$122 million fund-raising campaign. Babson received three national fund-raising achievement awards from the Council for Advancement and Support of Education (CASE) while he was vice president. Mr. Krimmel also served as Babson’s representative in the college’s partnership with NFTE. He was a member of the executive committee at Babson when the decision was made in the mid-1990s to collaborate with the F. W. Olin

Foundation to create Olin College as an independent engineering college adjacent to the Babson campus. Mr. Krimmel has been an advocate of Olin College and its mission since the college was created in 1997.

Preceding his tenure with Babson, Mr. Krimmel served as senior vice president for Development at Antioch University and director of Development and Alumni Relations at his undergraduate alma mater the University of Wisconsin–Parkside. Mr. Krimmel also holds a Master of Science degree in Educational Administration from the University of Wisconsin–Milwaukee. At Olin he oversees all fund-raising, alumni relations and parent relations activities.

Vincent P. Manno, Ph.D.
Provost, Dean of Faculty and Professor of Engineering

Dr. Manno received a BS from Columbia University and MS, Engineer’s and Doctor of Science degrees from M.I.T in nuclear engineering and science. His field of expertise is computational thermal-fluid dynamics including applications in power generation, electronics thermal energy management, and manufacturing processes. He has authored or co-authored more than 140 journal articles, conference proceeding papers and technical reports. Prof. Manno has also worked in the private sector and served as a U.S. Navy Senior Summer Faculty Fellow.

Prior to joining Olin in July 2011, Dr. Manno was Associate Provost and Professor of Mechanical Engineering at Tufts University in Medford, MA where he continues to hold an adjunct faculty appointment. At Tufts, he coordinated graduate education across the university and oversaw several cross-school initiatives such as the Tufts Institute of the Environment. He was Department Chair of Mechanical Engineering from 1993–2001, Associate Dean of Engineering from 2002–5, and Interim Dean of Engineering in 2003.

Dr. Manno’s research has been supported by government agencies and industry. He is a recipient of the SAE’s Ralph R. Teetor Outstanding Engineering Educator Award, the Harvey Rosten Award for Excellence in the Thermal Analysis

of Electronic Equipment, the ASME Curriculum Innovation Award, the Tufts University Fischer Award as Engineering Teacher of the Year and the Tufts Seymour O. Simches Award for distinguished teaching and advising. He is a Fellow of the ASME and serves on the Board of Directors of the ASEE Engineering Research Council.

Most importantly, he has been happily married to Mariann M. Manno, MD for over 31 years and they are the proud parents of Elizabeth, Michael and Christopher.

Charles S. Nolan, Ph.D.

Vice President of External Relations and Dean of Admission

Dr. Charles Nolan became the vice president for External Relations and dean of Admission on June 1, 2006. He was the former vice provost for Enrollment Management at Santa Clara University in Santa Clara, California. For four years prior to that appointment, Dr. Nolan was the founding dean of Admission at Olin College. He has more than 30 years of experience in the field of admission and recruiting, serving as director of Admission at Bentley University, director of Undergraduate Admission at Boston College, assistant provost and Dean of Undergraduate Admission at Washington University in St. Louis and dean of Undergraduate Admission at Babson College, where he successfully led an enrollment program that substantially increased applications and the SAT scores of incoming freshmen. He is highly regarded nationally for his achievements in modern recruiting techniques. Dr. Nolan received a Ph.D. in higher education administration from Boston College and a B.A. in history from Curry College. He has served as a consultant for several colleges and universities, spoken at regional and national conferences on innovative ways to involve the whole campus in attracting and retaining high quality students and co-authored a chapter on admission published in *Global Cases in Benchmarking*.

Mark Somerville, Ph.D.

Associate Dean of Academic Programs and Curricular Innovation
Professor of Electrical Engineering and Physics

Dr. Mark Somerville joined Olin College from Vassar College, where he had been an Assistant Professor of Physics since 1998. He holds M.S. and Ph.D. degrees in electrical engineering from MIT, as well as an M.A. (first class honors) in physics from Oxford University. He did his undergraduate work at the University of Texas at Austin, where he earned a bachelor of science (highest honors) in electrical engineering as well as a bachelor of arts (special honors) in liberal arts (English concentration). His academic honors include the Joint Services Electronics Program Doctoral and Post Doctoral Fellowship, the Office of Naval Research Graduate Fellowship, and the Rhodes Scholarship.

Dr. Somerville's technical research focuses on the physics of semiconductor devices, with particular emphasis on development of novel measurement techniques to provide insight into failure mechanisms in devices ranging from III-V high electron mobility transistors to strained silicon-on-insulator transistors to germanium-based LED's. Dr. Somerville has also collaborated extensively with other institutions, including the University of Illinois at Urbana-Champaign, TU-Delft, and others, to spread change in engineering education, particularly through to application of collaborative design techniques to curriculum revision processes. He has also worked closely with other Olin faculty members to develop Olin's I2E2 Summer Institute, which draws engineering educators from around the world.

Appendices



Academic Partnerships

The purpose of Olin's academic partnerships is to enhance Olin students' opportunities for learning, growth, and career development.

Cross-Registration Agreements

Olin has cross-registration agreements with Babson College, Wellesley College, and Brandeis University to increase the academic offerings available to Olin students in the natural sciences, arts, humanities, and social sciences. These agreements also bring students from Wellesley, Brandeis and Babson to our campus, thereby enriching the academic environment at Olin and offering unique opportunities to these students through the Olin Certificate Program in Engineering Studies. Through international study opportunities – including a number of joint agreements, the Global E3 program and special arrangements coordinated by the Olin Study Away Program (www.olin.edu/academics/study_away.aspx) – the opportunities for learning and growth literally extend from the Olin campus to the whole world.

Babson College Partnership

Olin College has a special relationship with its closest neighbor, Babson College, that stretches back to Olin's founding. The Olin/Babson partnership builds on exciting synergies between business and engineering to enhance the resources and opportunities available to both institutions for innovative teaching, learning and research. Olin faculty work closely with the Babson faculty to develop curricula in entrepreneurship and business basics that are integrated into the Olin curriculum. Babson College has introduced a M.S. in Management in Technological Entrepreneurship

tailored for Olin students. The two institutions have also made several joint faculty appointments.

Wellesley College Partnership

Recently, Olin has expanded its partnership with Wellesley College, offering a targeted academic certificate program – the Certificate in Engineering Studies program – as well as inter-campus curricular and research initiatives, jointly offered academic courses, and open membership and participation in a variety of student activities and programs. Additionally, Olin faculty work closely with Wellesley faculty and in some cases go to Wellesley to teach courses such as anthropology, immunology, mathematical modeling, human genetics, and introductory engineering.

Expanded Collaboration with Wellesley and Babson

To capitalize on the physical proximity of the three institutions, Olin, Babson and Wellesley have reached agreement to further enhance their academic, social and business collaboration as part of an initiative that could serve as a new model of academic cooperation. Possible areas of cooperation include expansion of academic program collaborations; joint sponsorship of visitors, speakers, and conferences; expansion of business and service collaborations; and joint outreach programs.

Partnerships with Industry

As students move through the Olin program, the college's hands-on approach is designed to provide increasing opportunities for corporate experiences and real-world learning. Olin has reached out to the local high-tech community, home to some of the most innovative companies in the world, to provide these learning experiences, including summer internships and corporate sponsorship of research and design projects. Moreover, Olin is seeking to involve corporations and corporate leaders in the development of the college in such areas as curriculum, career planning, and student recruitment. Several of the most innovative companies have representatives on Olin's President's Council.

Accreditation Statement

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 through 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
(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, Inc., the recognized accreditor of college and university programs in applied science, computing, engineering, and technology. For further information, visit: www.abet.org or contact ABET at 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, tel: 410-347-7700.

Policy on Equal Opportunity

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 permit-

ted or mandated by law). This nondiscrimination policy encompasses the operation of the college's educational programs and activities including admission policies, scholarship program, sports 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, 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 the Office of Student Life at 781-292-2326 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 the Manager of Human Resources at 781-292-2429 to discuss investigation of the matter.

Academic Calendar for 2011–12

As of August 1, 2011. For the most current calendar visit: http://www.olin.edu/student_life/calendars/calendar2011-12.aspx

July–August	Summer reading: <i>Midnight Ride, Industrial Dawn</i> by Robert Martello
August 27(Sa)	Arrival Day for Class of 2015. West Hall opens at 9:00 a.m.; Welcoming luncheon, afternoon program and dinner for new students and parents; Farewell to parents; Orientation begins after dinner
August 28(Su)–31(W)	Orientation: Academic Advising, Team Building and Leadership Skills
August 30(Tu)	Upperclass students begin arriving after 3:00 p.m. Campus closed to returning students before 3 p.m.
September 1(Th)	First day of instruction, First Semester
September 5(M)	[Labor Day – no classes]
September 14(W)	Town Meeting (11:15 a.m.)
September 16(F)	Olin Monday – Monday class schedule in effect
September 17(Sa)	Constitution Day
September 23(F)–25(Su)	Reunion Weekend (5 yr. – Class of 2006)
October 5(W)	Career Fair (10:30 a.m.–2:00 p.m.) – classes in session
October 10(M)	[Columbus Day – no classes]
October 14(F)–16(Su)	Family Weekend
October 19(Th)	33rd instructional day
October 23(Su)	Admission Open House
November 10(Th)	Olin Monday – Monday class schedule in effect
November 21(M)–25(F)	[Thanksgiving Recess – no classes]
December 9(F)	Last day of instruction, First Semester
December 12(M)–13(Tu)	Study Days
December 14(W)–17(Sa)	Final Exams
December 19(M)	Olin Exposition (required for all students)
December 21(W)	Residence Halls close at 5:00 p.m. for intersession
December 21(W)–January 23(M)	[Intersession – no classes]
January 22(Su)	Residence Halls open at 5:00 p.m.
January 24(Tu)	First day of instruction, Second Semester
February 1(W)	Town Meeting (11:15 a.m.)
February 8(W)	Spring Career Fair (10:30 a.m.–2:00 p.m.) – classes in session
February 17(F)–18(Sa)	Candidate Weekend I for Class of '16
February 20(M)	[Presidents' Day – no classes]
February 21(Tu)	Olin Monday – Monday class schedule in effect
February 24(F)–25(Sa)	Candidate Weekend II for Class of '16
March 2(F)–3(Sa)	Candidate Weekend III for Class of '16
March 9(F)	33rd instructional day
March 19(M)–23(F)	[Spring Break – no classes]
April 16(M)	[Patriots Day – no classes]
April 18(W)	Olin Monday – Monday class schedule in effect
May 2(W)	Last day of instruction, Second Semester
May 3(Th)–4(F)	Study Days
May 7(M)–May 10(Th)	Final Exams
May 14(M)	Olin Exposition – Underclass projects and presentations (required for non-seniors)
May 15(Tu)	Olin Exposition – SCOPE presentations (required for seniors)
May 20(Su)	Commencement for Class of '12
May 21(M)	Residence Halls close at 5:00 p.m.

Student Absence for Religious Observances

Massachusetts state law regarding student absence due to religious beliefs has been adopted by Olin College as follows: "Any student who is unable to attend classes or participate in any examination, study, or work requirement on a particular day because of his or her religious beliefs is excused from any such activity. The student will be given the opportunity to make up the work that was missed, provided that the makeup work does not create an unreasonable burden upon the college. The college will not level fees or charges of any kind when allowing the student to make up missed work. In addition, no adverse or prejudicial effects will result because students have made use of these provisions." The following partial listing is provided for your information:

2011

August 31	Eid-al-Fitr (Ramadan ends, approximate)
September 28(sundown)-30	Rosh Hashanah
October 7(sundown)-8	Yom Kippur
October 12(sundown)-14	Sukkot
October 19(sundown)-20	Shmini Atzeret
December 8	Immaculate Conception
December 8	Bodhi Day
December 25	Christmas

2012

February 22	Ash Wednesday
March 7(sundown)-8	Purim
April 6(sundown)-14	Passover
April 12	Holy Thursday
April 13	Good Friday
April 15	Easter
May 6	Buddha Day
May 17	Ascension Thursday
May 26(sundown)-28	Shavuot

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.

Franklin W. Olin College of Engineering

Olin Way Needham, MA 02492-1200

Main Phone: 781-292-2300

