Franklin W. Olin College of Engineering
Certificate in Engineering Studies

Certificate in Engineering Studies: Olin College offers a Certificate in Engineering Studies for students at Brandeis University, Wellesley College, or Babson College. Certificate programs in a number of different disciplines are offered. The courses of study are designed to provide the student with a fundamental understanding of an engineering field, and typically consist of five courses ranging from first-year to upper-level.

Rationale for the Program: There are many paths to becoming an engineer. Not all of them begin with getting an undergraduate degree in engineering. For those students that want to explore the world of engineering studies—either out of curiosity, training to become professional engineers, or to prepare themselves for graduate study in engineering—Olin provides the Certificate in Engineering Studies. The Certificate provides a structured course of study in engineering that allows students to gain more exposure, more education, and more experience in the art and science of engineering. We believe that students completing the Certificate have the opportunity to expand their post-graduate options for careers or advanced study in technological fields by demonstrating a more significant degree of engineering expertise and a commitment to further engineering education.

Credit for Courses Taken at Home Institution: At most one course taken at a student's home institution covering equivalent material may substitute for an Olin course, whether or not it is used to also satisfy other requirements at the home institution. A list of already approved courses appears as a supplement to this document. Other courses will be considered upon request.

Prerequisites: The Certificate programs do not require any engineering prerequisites. However, most Olin engineering courses have general math and science prerequisites, such as calculus, physics, or biology. The Electrical and Computer Engineering program and Engineering Systems program may also require previous course experience in software design or discrete mathematics. These non-engineering prerequisite courses will normally not be taken at Olin. Courses taken at Olin must be chosen to avoid substantial overlap in subject matter with courses taken at the student's home institution. For each course in the Certificate program, generalized prerequisite information is provided as a supplement to this document.

Advising Structure: Managing challenging coursework from more than one institution is a complex task that should not go unsupervised. For students enrolling in the Program, the Certificate Program Coordinator will appoint an Olin faculty member to serve as their disciplinary advisor. The disciplinary advisor will coordinate the course of study with the student and the student's home institution academic advisor to ensure that the proposed program is coherent and appropriate. In addition to individual advising, the Certificate Program Coordinator will hold an information and orientation session each semester to help answer questions for interested students.

Enrolling in a Certificate Program: Students wishing to participate in the Program should be considering Olin courses as early as their sophomore year. In general, students will require strong backgrounds in math and science in order to meet prerequisite requirements. Prior to enrolling in the Olin Certificate in Engineering Studies courses, students are encouraged to discuss the program with their academic advisor (at the home institution) and to receive her or his approval. Prior to enrolling in their first course, students should contact the Certificate Program Coordinator at Olin College, who will direct them to their disciplinary advisor to craft a plan of study. Finally, students should contact their Olin course instructor(s) to discuss their preparation and receive her or his approval to enroll. The registration process is supported by the cross-registration procedures of the home institution. Information should be available through the student's Registrar's Office.

A note about Olin courses: Olin courses typically have significant project components and normally require considerable team-based work. Non-Olin students should be prepared to work closely with their Olin counterparts, both inside and outside class.

Programs of study: There are six programs of study proposed for the Certificate in Engineering Studies; details of the programs are appended. Note that not all courses are offered each semester, and the course offerings are updated frequently; students should discuss course selection with their Olin advisor. In general, students may take elective courses that are not specifically listed in the program description with the approval of their Olin advisor and the instructor. Full details regarding courses (hours, prerequisites, credits) can be found in the Olin Catalog.

Example Course Plans: A number of example course plans outlining a four-year experience that includes an Olin Certificate in Engineering Studies appear as a supplement to this document. Given the number of possible combinations of majors and certificate programs, these examples illustrate only a fraction of the options available to interested students.

For more information, please contact the Certificate Program Coordinator, Professor Mark L. Chang, mark.chang@olin.edu or 781 292-2559.

Engineering Design:

The Engineering Design Certificate prepares students to address important societal and environmental needs through design thinking. Students work individually and collaboratively to understand people and their needs, to manage creative processes to transform ideas into prototypes of new products and services for meeting those needs, and to shape those ideas to address perspectives such as usability, sustainability and manufacturability.

ENGR1200 Design Nature
ENGR2250 User-Oriented Collaborative Design

Three of the following courses:

AHSE1500 Foundations of Business and Entrepreneurship
ENGR3210 Sustainable Design
ENGR3220 Human Factors and Interface Design
ENGR3380 Design for Manufacturing
Other approved elective course

Materials Engineering:

Materials engineering is a field that integrates the physics and solid-state chemistry of solids with engineering considerations, such as mechanical and electrical properties. In addition, emphasis is placed on processing and applications of materials.

SCI1410 Materials Science and Solid State Chemistry

Four courses chosen from among the following:

ENGR3450 Semiconductor Devices
ENGR3810 Structural Biomaterials
ENGR3820 Failure Analysis and Prevention
ENGR3830 Phase Transformation in Ceramic and Metallic Systems
ENGR38xx Engineering Polymers
ENGR36xx Biomedical Materials
SCI3120 Solid State Physics
Other approved elective course

Bioengineering:

Bioengineering is a field that integrates engineering devices and systems with biological systems. The Olin program places a strong emphasis on the fundamentals of both biology and engineering.

ENGR3600 Topics in Bioengineering
SCI1410 Materials Science and Solid State Chemistry

Three courses chosen from among the following:

ENGR3810 Structural Biomaterials
ENGR36xx Biomedical Materials
ENGR3699 Special Topics in Bioengineering *(topics vary by year)*
SCI2110 Biological Physics
SCI2120 Biological Thermodynamics
SCI2210 Immunology
SCI3210 Human Molecular Genetics in the Age of Genomics
Other approved elective course

Electrical and Computer Engineering:

The Electrical and Computer Engineering (ECE) program introduces students to the fundamentals of electrical engineering, including the devices and structures of computing and communication systems.

ENGR1200 Design Nature
ENGR2210 Principles of Engineering

Two of the following courses:

ENGR2410 Signals and Systems
ENGR2420 Introduction to Microelectronic Circuits
ENGR2510 Software Design
ENGR3410 Computer Architecture
ENGR3420 Analog and Digital Communications

One additional course chosen from among the following:

An additional course from the list above
ENGR3390 Robotics
ENGR3425 Analog VLSI
ENGR3430 Digital VLSI
ENGR3440 Modern Sensors
ENGR3450 Semiconductor Devices
Other approved elective course

Mechanical Engineering:

The Mechanical Engineering (ME) program introduces students to the design of mechanical, thermal, and fluid systems.

ENGR1200 Design Nature

Two of the following courses:

ENGR3310 Transport Phenomena
ENGR3320 Mechanics of Solids and Structures
ENGR3330 Mechanical Design
ENGR3340 Dynamics
ENGR3350 Thermodynamics

Two additional courses chosen from among the following:

An additional course from the list above
ENGR3360 Topics in Fluid Dynamics
ENGR3370 Controls
ENGR3380 Design for Manufacturing
ENGR3390 Robotics
ENGR3820 Failure Analysis and Prevention
Other approved elective course

Engineering Systems:

The Engineering Systems program focuses on the design of products that integrate significant technology from multiple engineering disciplines, with a focus on products that merge mechanical and electrical systems.

ENGR1200 Design Nature
ENGR2210 Principles of Engineering

ECE requirement: one of the following courses:

ENGR2410 Signals and Systems
ENGR2420 Introduction to Microelectronic Circuits
ENGR3420 Analog and Digital Communications

ME requirement:

ENGR3320 Mechanics of Solids and Structures

Integrative course:

ENGR3710 Systems