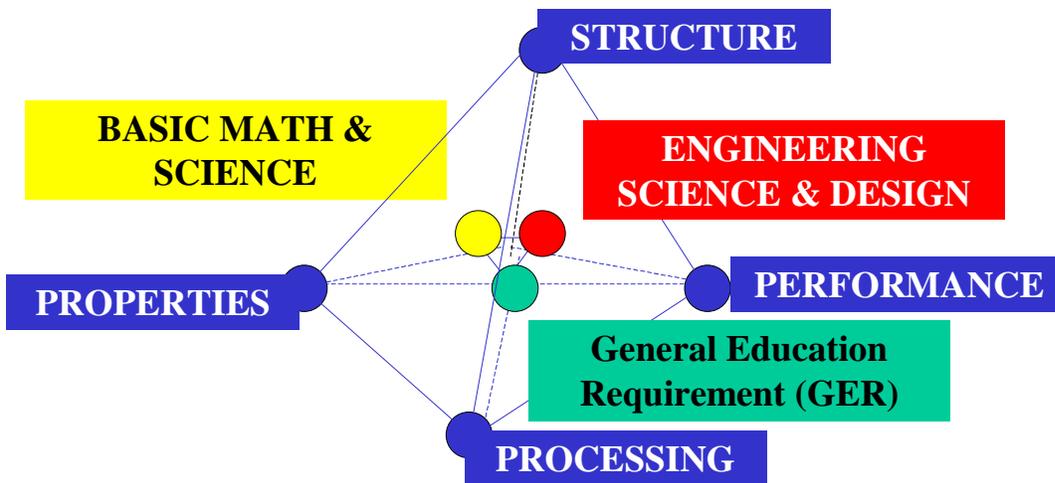


# Materials Science and Engineering

## Course Selection and Advising Guide



The Materials Science and Engineering faculty and staff welcome you as a major in the undergraduate field of study leading to the professional degree Bachelor of Science in Engineering (BSE) with a major in Materials Science and Engineering (MSE). You have selected a challenging and rewarding career path. The MSE curriculum is designed to prepare you to successfully enter the profession and to continue to advance through lifelong learning.

### **MSE Program Educational Objectives and Student Outcomes**

The educational objectives of the undergraduate curriculum are listed in Exhibit 1 and at

<http://www.mse.engr.uconn.edu/undergraduate-program/program-mission-and-objectives>

The educational outcomes of the BSE-MSE undergraduate curriculum are listed in Exhibit 2. The BSE-MSE curriculum is listed at

<http://www.mse.engr.uconn.edu/undergraduate-program/curriculum-and-course-guide>

and a flow chart illustrating the course sequence, prerequisites, and co-requisites is listed at

<http://www.mse.engr.uconn.edu/wp-content/uploads/2013/02/msecurriculumflowchart.pdf>

Each of the required and elective courses contributes to specific educational outcomes, which are listed in the course syllabi that are distributed at the beginning of each course and that can be viewed in the MSE Department Office (IMS 111). The course outcomes have been designed to provide you, over the four-year curriculum, with an education that will meet the overall objectives of the MSE Program, which are inclusive of the educational outcomes specified in the criteria of the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC-ABET). So that you follow a curriculum that will allow you to meet all educational objectives and student outcomes, substitution for required courses in the MSE curriculum must be considered for approval by your faculty advisor.

### **Advising**

When you declare Materials Science and Engineering as your academic major, you are assigned a faculty advisor. Your MSE faculty advisor will guide your progress through your period of study toward satisfying the requirements for a Bachelor of Science in Engineering degree. By School of Engineering policy you are expected to schedule an advising appointment with your faculty advisor at least once each semester. You are encouraged to consult with your MSE faculty advisor more frequently as you have questions and concerns involving your academic progress and your plans for a professional career in Materials Science and Engineering. Your advisor, and other MSE faculty members with whom you develop close working relations, will endeavor to provide thoughtful and responsibly considered guidance. Keep in mind each student is responsible for knowing and satisfying University requirements and policies. The University of Connecticut Undergraduate Bulletin contains the officially approved University requirements and policies ( <http://www.catalog.uconn.edu/> ).

Advising Appointment: During the enrollment period each semester, you should schedule an appointment with your faculty advisor. Generally, your faculty advisor will announce a day each semester that is set aside for advising appointments. The MSE faculty advisors' e-mail addresses and telephone extensions are listed in the campus telephone directory and on the MSE Program website:

<http://www.mse.engr.uconn.edu/faculty>.

It is recommended that you make a preliminary selection of courses for the next semester before meeting with your faculty advisor.

By School of Engineering policy, you must contact your faculty advisor each semester to request "your enrollment bar be lifted" before you can enroll with PeopleSoft in courses for the next semester. The purpose of the policy is to ensure each student takes advantage of the opportunity for one-on-one faculty advising. Beyond the two advisor appointments per year for enrollment, you are invited to schedule an appointment with your faculty advisor whenever you have an academic or personal concern. Again, it is recommended you schedule an appointment with your advisor by e-mail. Faculty members have duties that frequently take them out of their offices and off-campus. They may not be in their office or lab when you just walk by between classes. The MSE Program Administrative Coordinator, Ms. Cathy McCrackan, (6-4620, [CMcCrackan@ims.uconn.edu](mailto:CMcCrackan@ims.uconn.edu)) will know your faculty advisor's scheduled office hours and off campus travel schedule.

During your study in the MSE program, you will develop working relations with several departmental faculty members. You are encouraged to consult on academic, career, and personal matters with faculty members with whom you have a working relation. Your official faculty advisor must approve your plan of study and approve substitutions for required courses.

Plan of Study: Soon after you have completed about 64 credits but no later than three months prior to graduation, each student should complete an official plan of study (POS). The form for the POS can be found on the School of Engineering web site and at the link POS on the MSE Undergraduate Program website. The appropriate POS will be the one for the year of your first matriculation at UConn or, at your discretion, any subsequent year.

The POS will be reviewed for approval by your faculty advisor, the MSE Program Director, the Engineering Undergraduate Program Office, and the Registrar's Office. The Registrar will compare the student's transcript to the approved plan of study before clearing a student for graduation.

Individualized MSE Curriculum Template: As a guide to completing the POS and for planning course selection for each enrollment period, we have prepared an Excel spreadsheet as an individual curriculum template. A copy can be obtained electronically on the Departments web site from the link MSE Course Selection Template at

<http://www.mse.engr.uconn.edu/undergraduate-program/curriculum-and-course-guide>.

It is recommended that the Excel spreadsheet be updated every semester to indicate courses you have completed and courses that you plan to take. Both the student and the faculty advisor should save an electronic copy of your individual curriculum template.

### **Enrollment**

Enrollment in courses is guided by UConn's Peoplesoft software. Prior to each semester you will be assigned a Peoplesoft enrollment date. You can use Peoplesoft to enroll in courses starting with your enrollment date and after your advisor bar has been lifted. Your enrollment date will be earlier in the enrollment period as you progress from freshman to senior status. Thus, upper division students are provided a higher priority for enrolling in high demand course sections. To take full advantage of your enrollment priority, you should schedule an appointment with your faculty advisor to consider your course selection for the next semester and to have your advisor bar lifted before your Peoplesoft enrollment date. The link to Peoplesoft is

<https://student.studentadmin.uconn.edu>.

Before your enrollment date you can use PeopleSoft to add desired courses to a "shopping cart." You may continue to add or delete courses during the enrollment period and during the first few weeks of the semester. To avoid finding elective courses are closed to further enrollment, it is suggested you enroll in courses on or soon after your enrollment date.

Denied Enrollment: If enrollment in a course is denied because no seats are available, you may request a permission number from the course instructor. If enrollment in a course is denied because your transcript indicates prerequisite or corequisite requirements have not been satisfied, seek the advice of your faculty advisor. You may take some courses out of the normal sequence with the official permission of your faculty advisor and the course instructor.

If you cannot enroll in a required course in the MSE major for which you have satisfied the prerequisites, you should request a permission number from the course instructor or from Cathy McCrackan (CMcCrackan@uconn.edu). We will reserve seats in required MSE core courses for MSE majors through the end of the normal enrollment period. You may need a permission number to enroll in a course for which the seats have been reserved for majors. .

Credit Limits: The current undergraduate curriculum requires 128 course credits. Most students will elect to complete more than the minimum requirement. A typical engineering course load is 15 to 18 credits per semester. For a variety of reasons, many students choose to take 10 or more semesters to complete degree requirements. To be considered a full-time student, enrollment in a minimum of 12 credits per semester is required. Some financial aid packages are conditional on maintaining full-time student status. Alternatively, many students will choose to take a heavier load. Students may choose to complete multiple minors, double majors, or get an early start on graduate coursework. Consult your faculty advisor when you plan to enroll in 19 or more credits per semester.

Students often enroll in courses during the summer sessions or during the intersession between Fall and Spring semesters. Typically, basic mathematics and science, general education, and language courses are offered during the summer sessions. Few engineering courses are offered during the summer sessions. Students who plan to enroll

during the summer sessions or intersession in courses offered at another college or university should check with their faculty advisor to determine if the course credits will be eligible for transfer credit toward University of Connecticut graduation requirements.

### **Curriculum**

The current BSE curriculum for MSE majors is listed at

<http://www.mse.engr.uconn.edu/undergraduate-program/curriculum-and-course-guide>.

The curriculum flow chart at

<http://www.mse.engr.uconn.edu/wp-content/uploads/2013/02/msecurriculumflowchart.pdf>

highlights course prerequisites and corequisites and illustrates the order in which courses should be taken. The syllabi for MSE courses are available in the MSE Program office (113 IMS) and short course descriptions can be found on PeopleSoft and in the course catalog:

<http://www.catalog.uconn.edu/>

General Education Requirement (GER): The General Education Requirement (GER) applies to all University undergraduates. The current grouping of courses that satisfy the GER are listed at

<http://www.catalog.uconn.edu/acad.htm#1>

Two courses are to be selected from each of four content areas. The courses selected in each content area must be from different departments. The required basic science and math courses in the BSE-MSE curriculum more than satisfy the GER content area 3 requirements. There is no need to elect a course from content area 3 in order to satisfy GER requirements. Of course you may elect courses listed in content area 3 that meet your individual interest, just as you may select more than two courses in any of the other three content areas.

All Engineering undergraduates are required to take either ENGL 1010 or ENGL 1011. All Engineering undergraduates are required to take PHIL 1104, thus satisfying one of the GER requirements from content area 1. Several courses, designated by an asterisk in the GER course list, from content area 1 and content area 2 also satisfy the multicultural requirement in content area 4. Only one course may be used to satisfy the requirements for both content areas 1 or 2 and content area 4.

The GER courses also satisfy the EAC-ABET criterion for humanities and social science courses. A goal of professional engineering curricula is that engineers will be leaders and decision makers in our technological society. The engineering curriculum is designed to provide engineering graduates with the technical, ethical, and societal context to be effective decision makers in a global, technological economy. The University's writing competency (W) requirement is satisfied by enrolling in two required courses in the BSE-MSE curriculum: MSE 4901W and MSE 4902W MSE Capstone Design Project I and II. Faculty members mentor students on technical writing and technical presentation within the context of the discipline.

Electives and Concentrations: The MSE curriculum requires majors to select at least three courses (9 credits) of non-MSE engineering, science or math courses (2000 level or higher) at least one course to be basic science or mathematics in order to satisfy the Technical Elective requirement. MSE majors also select four MSE courses (12 credits) outside of the required MSE core courses to satisfy the Professional Elective requirement. MSE majors may select elective courses to satisfy a defined MSE Concentration. Current concentrations specify a minimum of four technical and/or professional elective courses as specified at website:

<http://www.mse.engr.uconn.edu/undergraduate-program/concentrations>

MSE majors are not required to satisfy the requirements of a concentration. Elective courses may be selected to satisfy a student's individual interests and career objectives. Students who decide to follow an MSE concentration should include the concentration in their plan of study. Because many elective courses are offered in alternate years, courses to satisfy the requirements may need to be selected starting with the first semester junior year or sooner.

MSE majors may decide to satisfy the requirements for a minor in another discipline. Minors typically require 15 course credits. Technical elective courses may be used to satisfy, in part, the requirements of a minor. Typically, students will enroll in more than the minimum 128 course credits required for a MSE-BSE to complete a minor in one or more non-MSE disciplines. Currently offered minor programs are listed at

<http://catalog.uconn.edu/minors.htm>

Capstone Design Project: The MSE curriculum culminates in a two-semester, four-credit capstone engineering design project. Regional materials industries will propose a design challenge for which the solution is of long-term interest. The sponsoring company also will make available an industry advisor, technical context, and specialized materials and equipment. The MSE Program will assign a faculty advisor who will work with the industry advisor and one or more MSE seniors and/or juniors as a project team to define the problem; identify criteria and constraints; develop and iteratively analyze alternative solutions; and recommend, document, and specify an optimum solution. The MSE Program will solicit just enough industry projects to match the size of the senior class, and students will select projects from the list provided at the beginning of the Fall Semester. In case of very special circumstances, students may start the project in the Spring or Summer Semesters. The two-semester capstone design project also serves as the writing (“W”) courses. Each student will submit in writing and orally present a project plan, progress reports, and a final report during the course of the project work.

### **Student Associations**

Undergraduate and graduate students are encouraged to become members and to actively participate in the Materials Advantage Society (<http://www.ims.uconn.edu/~asmtms/index.html>), which is affiliated with the international professional societies ASM, TMS, ACerS, and AIST. The Society officers will announce and invite you to attend organizational meetings. Alpha Sigma Mu is the international professional honor society for Materials Science and Engineering. Juniors, seniors, and graduate students who meet the scholarship and character requirements of Alpha Sigma Mu will be nominated for membership.

### **Standards and Regulations**

The standards and regulations relevant to undergraduate students are documented in the University’s Undergraduate Catalog (<http://www.catalog.uconn.edu/>). Students are responsible for their own decisions and actions and in adhering to standards and regulations of the University. Faculty advisors are expected to provide advisees with responsible and considered information on which to make decisions.

## **Exhibit 1: BSE-MSE Program Educational Objectives**

### *Program Educational Objective 1:*

Within three to five years after graduation, in their professional careers and/or graduate programs, our alumni/ae will have progressed in responsible professional positions and/or will have attained or will be successfully moving toward attaining post-graduate degrees.

### *Program Educational Objective 2:*

Within three to five years after graduation, in their professional careers and/or graduate programs, our alumni/ae will have earned recognition for applying and continually expanding special, in-depth competencies in materials design, selection, characterization, and/or processing.

### *Program Educational Objective 3:*

Within three to five years after graduation, in their professional careers and/or graduate programs, our alumni/ae will have earned recognition for applying and continually expanding professional skills of critical and cooperative thinking, communication, and leadership.

### *Program Educational Objective 4:*

Within three to five years after graduation, in their professional careers and/or graduate programs, our alumni/ae will have become engaged with and contributing to professional societies and collaborating with the MSE Program Faculty in providing opportunities for current and potential MSE majors.

## Exhibit 2: Program Educational Outcomes

- (a) The ability to apply knowledge of mathematics, science (including chemistry and physics) and engineering principles to *analyze* materials systems and processes;
- (b) The ability to utilize experimental, statistical and computational methods to design and conduct experiments, as well as to analyze and interpret data;
- (c) An ability to design a materials system, component, or process to meet desired needs and performance requirements within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- (d) An ability to contribute to and lead multifunctional and multidisciplinary teams;
- (e) An integrated understanding of the scientific and engineering principles underlying the four major elements of the materials science and engineering discipline: structure, properties, processing, and performance, and the ability to apply that knowledge to identify, formulate, and solve materials selection and design problems;
- (f) An understanding of professional and ethical responsibility;
- (g) An ability to communicate effectively;
- (h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- (i) A recognition of the need for, and an ability to engage in life-long learning;
- (j) A knowledge of contemporary issues; and
- (k) An ability to use the traditional and advanced techniques, skills, and tools necessary for modern materials science and engineering practice.