

Materials Engineering Certificate Program Outline

This program is a 15-credit certificate available to Chemical Engineering and Mechanical & Industrial Engineering students in the College of Engineering (COE) at UMass, Amherst. Other COE students also may enroll in the certificate if they have the proper background, have taken prerequisite courses, or have instructors' permission.

The required courses for this certificate are:

- 1.) MIE 201 (3 credits) – *Introduction to Materials Science and Engineering*
- 2.) ChE/MIE 571 (3 credits) – *Physical & Chemical Processing of Materials*
- 3.) ChE/MIE 572 (1 credit) – *Physical & Chemical Processing of Materials Project*
- 4.) ChE 573 (1 credit) – *Materials Science & Engineering Project*
- 5.) MIE 609 or equivalent (3 credits) – *Mechanical Behavior of Materials*
- 6.) Polymer 501 (1 credit will be counted) – *Introduction to Polymer Science and Engineering*
- 7.) ChE/MIE 579 or equivalent (3 credits) – *Advanced Materials Engineering*

For equivalent courses and related topics, please refer to appended certificate program information.

For further information and advice, please contact Professor Maroudas at: maroudas@ecs.umass.edu

In order to enroll in the Certificate Program, Chemical Engineering majors should speak to Tami Paluca in 112E Goessmann Lab.

COE's Materials Engineering Certificate

- A UMass certificate has a 15-credit requirement
- Introductory course: **MIE 201**, *Introduction to Materials Science and Engineering* (3 credits)
 - Prerequisite to take the 500-level courses of the certificate. For ChE students, the requirement can be waived after they pass Physical Chemistry (ChE 475); no credit from ChE 475
- Recommended courses for **Spring Semester of Junior Year**:
 - **ChE/MIE 571** (3 credits): *Physical and Chemical Processing of Materials*
 - **ChE/MIE 572** (1 credit): *Physical and Chemical Processing of Materials Project*
 - **ChE 573** [previously ChE/MIE 590L] (1 credit): *Materials Science and Engineering Project*
 - Total credits toward certificate: 5
- Recommended courses for **Fall Semester of Senior Year**:
 - **MIE 609**, same as former **MIE/ChE 590C** (3 credits): *Mechanical Behavior of Materials*; OR one of various materials mechanics electives (MIE 597MB, *Biomechanics*; MIE 597MM, *Mechanical metamaterials*)
 - **MIE 609** has been offered recently in the spring semester
- Recommended courses for **Spring Semester of Senior Year**:
 - **ChE/MIE 579** (3 credits): *Advanced Materials Engineering topics*; not offered this/next spring
 - Alternatives: ChE 589 (*Nanostructured Biomaterials*); ChE 535 (formerly 590E, *Microfluidics*); MIE 597E (*Intro to Computational Materials Science*); *Solid State Physics*; *Nanoelectronics*; etc.
- Additional requirement (1 credit):
 - ChE students are asked to take **Polymer 501** (3 credits; 1 credit counted toward the Certificate), while MIE students fulfill the requirement through **MIE 302**.