

MATERIALS FOR MANUFACTURING

The certificate program will have an interdisciplinary curriculum rich in addressing both fundamental and emerging areas of the field. The curriculum will rely solely on regularly offered courses of existing graduate programs of the CECS and other colleges. This will assure (i) depth and breadth of the curriculum, (ii) consistent opportunity of timely completion of the program, (iii) implementation of the program not requiring any additional investment. The program will have no require or core courses and present minimal barriers for credit transfer between the program and the existing engineering graduate degree programs.

The certificate can be completed entirely on campus, entirely online, or through a combination of on-campus and online courses.

Graduate certificate in Materials for Manufacturing. This certificate program provides fundamental principles of design, properties and characterization of materials, with emphasis on applications to manufacturing. It covers such topics as advanced engineering materials, composites, lightweight materials, digital manufacturing, materials considerations in manufacturing. Only courses completed with grade B or better will be counted toward the certificate. A minimum certificate grade point average of 3.0 is required to obtain the certificate. The program can be completed entirely on campus, entirely online in the remote-access mode, or by taking a combination of on-campus, hybrid, and online courses. The program requires 12 credit hours, which can be selected from the following courses:

Code	Title	Credit Hours
Select 12 credits from the following:		
MTSE 501	Materials Thermodynamics and Kinetics	3
MTSE 502	Introduction to Materials Characterization	3
ME 559	Battery Materials, Manufacturing and Recycling	3
ME 580	Advanced Engineering Materials	3
ME 582	Injection Molding	3
ME 583	Mechanical Behavior of Materials	3
ME 585	Cast Metals in Engineering Design	3
ME 586	Materials Consideration in Manufacturing	3
ME 589	Composite Materials	3
ME 591	Degradation of Materials	3
ME 593	Powder Materials & Processing	3
ME 595	Digital Manufacturing	3
ME 611	Modeling of Engineering Materials	3
AENG 587	Automotive Manuf Processes	3
AENG 687	Adv Auto Mfg Processes	3
IMSE 504	Metal Forming Processes	3
IMSE 533	Manufacturing Systems	3
IMSE 537	Metal Machining Processes	3
IMSE 538	Intelligent Manufacturing	3

Double-counting (application of the earned credits toward both the proposed certificate degree and MSE programs of the University of Michigan – Dearborn) will be allowed provided the following conditions are met.

- Any number of credits earned by a student in one of the MSE programs of the University of Michigan – Dearborn can also be applied toward the certificate program if
 - The course is in the approved curriculum of the certificate program
 - Grade B or better is earned in the course
 - Completion of the course occurred not more than 5 years before the date of application for double-counting
 - The student applying for double-counting has completed at least 6 credits in the graduate degree program
- Any number of credits earned by a student in the proposed certificate program can be applied toward any MSE program offered by the Department of Mechanical Engineering (currently, MSE in Mechanical Engineering, MSE in Automotive Engineering, MSE in Bioengineering) and future such programs if
 - The course is in the approved curriculum of the graduate program
 - Grade B or better is earned in the course
 - Completion of the course occurred not more than 5 years before the date of application for double-counting.