Duluth Campus

Materials Science and Engineering Minor

Chemical Engineering

Swenson College of Science and Engineering

- Program Type: Undergraduate free-standing minor
- Requirements for this program are current for Fall 2020
- Required credits in this minor: 45 to 46

Materials Science and Engineering (MSE) is a field that studies the structure, property, processing, and application of materials. The MSE minor provides students with the fundamentals of materials science and engineering and introduces them to a material focused approach to problem solving. Completion of the MSE minor requires a minimum of 45 credit hours, which include 36 hours of required courses and at least 9 hours of elective courses

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Minor Requirements

This program presupposes 1 year of high school chemistry and a Math ACT score of 27 or higher.

Materials Science and Engineering Core (36 - 37 cr)

Chemistry I with lab

CHEM 1153 - General Chemistry I [LE CAT, NAT SCI] (4.0 cr)
CHEM 1154 - General Chemistry Lab I [LE CAT, NAT SCI] (1.0 cr)
or CHEM 1173 - General Chemistry I for Majors [NAT SCI] (4.0 cr)
CHEM 1174 - General Chemistry I Lab for Majors [NAT SCI] (1.0 cr)

Chemistry II with lab

CHEM 1155 - General Chemistry II (4.0 cr)
CHEM 1156 - General Chemistry Lab II (1.0 cr)
or CHEM 1175 - General Chemistry II for Majors (4.0 cr)
CHEM 1176 - General Chemistry II Lab for Majors (1.0 cr)

Calculus I

MATH 1290 - Calculus for the Natural Sciences [LE CAT2, LOGIC & QR] (5.0 cr)
or MATH 1296 - Calculus I [LE CAT, LOGIC & QR] (5.0 cr)

Calculus II

MATH 1297 - Calculus II [LOGIC & QR] (5.0 cr)

Physics I Lecture

PHYS 2013 - General Physics I [LE CAT, NAT SCI] (4.0 cr)
or PHYS 2017 - Honors: General Physics I [NAT SCI] (4.0 cr)

Physics I Lab

PHYS 2014 - General Physics Lab I [NAT SCI] (1.0 cr)

Physics II Lecture

PHYS 2015 - General Physics II (4.0 cr)
or PHYS 2018 - Honors General Physics II (4.0 cr)

Physics II Lab

PHYS 2016 - General Physics Lab II (1.0 cr)

Engineering Materials

CHE 3231 - Properties of Engineering Materials (3.0 cr)
or ME 2105 - Introduction to Material Science for Engineers (3.0 cr)

Thermodynamics

CHE 2121 - Chemical Engineering Thermodynamics (3.0 cr)
or CHEM 4373 - Physical Biochemistry: Statistical Bio-Thermodynamics (3.0 cr)
or CHEM 4641 - Thermodynamics and Kinetics (3.0 cr)
or ME 2211 - Thermodynamics [SUSTAIN] (3.0 cr)
or PHYS 4031 - Thermal and Statistical Physics (4.0 cr)

Electives (9 cr)

A maximum of two courses with the same designator.

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Information current as of March 28, 2024

Take 3 or more course(s) totaling 9 or more credit(s) from the following:

- CE 2017 - Engineering Mechanics: Statics and Mechanics of Materials (5.0 cr)
- CE 3027 - Infrastructure Materials (4.0 cr)
- CE 5027 - Advanced Concrete Materials and Repair (3.0 cr)
- CE 5320 - Advanced Pavement Materials, Design and Construction (3.0 cr)
- CHE 4141 - Material and Minerals Processing (3.0 cr)
- CHE 5131 - Polymer Engineering (3.0 cr)
- CHE 5321 - Theory and Practice of Scanning Electron Microscopy & X-ray Microanalysis (3.0 cr)
- CHEM 5650 - Computational Chemistry (3.0 cr)
- CHEM 5714 - Applications of Spectroscopy (4.0 cr)
- EE 4611 - Introduction to Solid-State Semiconductors (3.0 cr)
- EE 5621 - Microelectronics Technology (3.0 cr)
- IE 3122 - Materials Engineering Laboratory (2.0 cr)
- IE 3130 - Materials Processing Engineering (3.0 cr)
- ME 5220 - Advanced Mechanics of Materials (3.0 cr)
- ME 5315 - Nondestructive Evaluation of Engineering Materials (3.0 cr)
- ME 5345 - Smart Materials and Structures (3.0 cr)
- PHYS 5041 - Optics (3.0 cr)
- PHYS 5531 - Introduction to Solid State Physics (3.0 cr)
- CHE 4711 - Biomedical Engineering (3.0 cr)
  or CHE 5711 - Biomedical Engineering (3.0 cr)
- CHEM 4510 - Polymer Chemistry (3.0 cr)
  or CHEM 5510 - Polymer Chemistry (3.0 cr)

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