

## Technical Electives, new rules effective Fall 2024

Technical electives are math, science, engineering, and applied business courses that you get to choose.

- You must take a minimum of 17 credits of technical electives.
- Courses must be regularly graded. Pass/fail courses are ineligible.
- Acceptable courses are 2000-level or higher undergraduate courses and selected 1000-level courses from the departments listed below.

### The Very Short List

We recommend these courses to everyone because they are universally useful.

CM 3450	Computer-Aided Problem Solving	3
MA 3710	Engineering Statistics	3

### The Short List

These courses are a good place to start.

BL 1200	Gen Bio II: Intro to Cellular Biology	3
BL 1210	Gen Bio II Lab: Intro to Cellular Bio	1
CH 2420	Organic Chemistry II	3
CM 1000	Intro to Chemical Engineering	1
CM 2200	Intro Minerals and Materials	3
CM 3025	Bioprocessing Lab	1
CM 3450	Computer-Aided Problem Solving	3
CM 3830	Mineral Processing Lab	1
CM/ENT 3979	Alternative Energy Tech	1
CM/MSE 4740	Hydro/Pyrometallurgy	4
CS 1121	Intro to Programming I	3
EE 2230	Printed Circuit Seminar Series	3
EE 2231	Printed Circuit Fabrication	1
EE 3010	Circuits and Instrumentation	3
ENG 2120	Statics-Strength of Materials	4
ENG 4515	Intro to Sustainability & Resilience	3
ENT 2950	Enterprise Project Work I	1
GE 2300	Mineral Science	3
MA 3710	Engineering Statistics	3
MEEM 2110	Statics	3
MIS 2100	Intro to Business Programming	3
MSE 2100	Intro to Materials Sci and Engg	3
UN 3002	Undergrad Cooperative Ed I	1-2
	Undergraduate Research	1-3

### The Long List

This is the full list of approved technical electives.

#### Biomedical Engineering

BE 2000-level or higher courses

#### Biological Sciences

BL 1100	Gen Bio I: Intro to Organismal Bio	3
BL 1110	Gen Bio I Lab: Intro to Org Bio	1
BL 1200	Gen Bio II: Intro to Cellular Biology	3
BL 1210	Gen Bio II Lab: Intro to Cellular Bio	1
BL 1400	Principles of Biology	3
BL 1410	Principles of Biology Lab	1
BL	2000-level or higher courses	

#### Civil and Environmental Engineering

CEE 2000-level or higher courses

### The Long List Continued

#### Chemistry

CH 2000-level or higher courses

#### Chemical Engineering

CM 1000	Intro to Chemical Engineering	1
CM	2000-level or higher courses	

#### Computer Science

CS 1111	Intro to Programming in C/C++	3
CS 1121	Intro to Programming I	3
CS 1122	Intro to Programming II	3
CS 1131	Accelerated Intro to Program	5
CS 1142	Programming at Hardware Interf	3
CS	2000-level or higher courses	

#### Electrical Engineering

EE 2000-level or higher courses

#### Electrical Engineering Technology

EET 1121	Circuits I	3
EET 1122	Circuits I Lab	1
EET 1411	Basic Electronics	4
EET	2000-level or higher courses	

#### Engineering Fundamentals

ENG 2000-level or higher courses

#### Enterprise

ENT 2000-level or higher courses

#### Forest Resources and Environmental Sciences

FW 1035	Wood Anatomy and Properties	3
FW	2000-level or higher courses	

#### Geological and Mining Engineering and Sciences

GE 2000-level or higher courses

#### Mathematical Sciences

MA 1600	Intro to Scientific Simulation	3
MA	2000-level or higher courses	

#### Mechanical Engineering-Engineering Mechanics

MEEM 2000-level or higher courses

#### Management Information Systems

MIS 2000-level or higher courses

#### Materials Science and Engineering

MSE 2000-level or higher courses

#### Operation and Supply Chain Management

OSM 2000-level or higher courses

#### Physics

PH 1090	The Physics Behind Music	3
PH 1091	The Physics Behind Music Lab	1
PH 1500	Extraordinary Concepts in Physics	2
PH 1600	Introductory Astronomy	2
PH 1610	Introductory Astronomy Lab	1
PH	2000-level or higher courses	

#### System Administration Technology

SAT 2000-level or higher courses

#### University Wide

UN 2000-level or higher courses

Where can you look up classes? Course description are in the Undergraduate Catalog.  
<https://www.mtu.edu/catalog/courses/>

## Focus Areas

Why so many choices? We are giving you lots of space to explore because chemical engineering is a very broad field. You can take classes in several different areas to experience a wide range of topics or you can take classes in a specific area for a deeper dive. Either approach is perfectly valid.

Here are some general topics areas that are currently popular and growing. Also, take a look at the minors listed below for more ideas. Need or want help? See your academic advisor!

### Bioengineering

BL 1200	Gen Bio II: Intro to Cellular Biology	3
BL 1210	Gen Bio II Lab: Intro to Cellular Bio	1
BL 3020	Biochemistry I	3
BL 3210	General Microbiology	4
BL 3310	Environmental Microbiology	3
CH 2420	Organic Chemistry II	3
CH 4110	Medicinal Chem: Drug Action	3
CH 4120	Medicinal Chem: Drug Design	3
CH 4140	Intro to Pharmaceutical Analysis	3
CH 4710	Biomolecular Chemistry I	3
CM 3025	Bioprocessing Lab	1
CM 4710	Biochemical Processes	3
CM 4780	Biomanufacturing and Biosafety	3
FW 2100	Intro to Biochemistry	3

*Minor in Biochemistry*

*Minor in Bioprocess Engineering*

*Minor in Medicinal Chemistry*

### Data Analytics

CS 1111	Intro to Programming in C/C++	3
CS 1121	Intro to Programming I	3
EET 3131	Sensors and Instrumentation	3
EET 3373	Intro to Programmable Controllers	3
MA 2600	Scientific Computing	3
MA 3710	Engineering Statistics	3
MA 3720	Probability	3
MA 3740	Statistical Programming & Analysis	3
MA 4720	Design & Analysis of Experiments	3
MIS 2100	Intro to Business Programming	3
SAT 4650	Intro Applied Computing w/Python	3

*Minor in Computer Science*

*Minor in Data Acquisition and Industrial Control*

*Minor in Statistics*

### Energy

CM/ENT 3979	Alternative Energy Tech	1
EE 3010	Circuits and Instrumentation	3
EE 3120	Electric Energy Systems	3
EE 3140	Electromagnetics	3
GE 4610	Formation Eval & Petroleum Engg	3
MEEM 4200	Principles of Energy Conversion	3
MEEM 4220	Internal Combustion Engines I	3
MEEM 4240	Combustion and Air Pollution	3
MEEM 4260	Fuel Cell Technology	3

*Minor in Alternative Energy Technology*

### Leadership

ENG/OSM 4300	Project Management	3
ENT 2950	Enterprise Project Work I	1
	Entrepreneurialism Continued	

ENT 3953	Ignite: Ideate, Innovate, Create!	1
ENT 3954	Enterprise Market Principles	1
ENT 3958	Ethics in Engg Design & Implem	1
ENT 3959	Fundamentals of Six Sigma I	1
ENT 3961	Building & Leading Teams	1
ENT 3964	Funds of Project Management	1
ENT 3971	Seven Habits of Highly Effective	1
ENT 3982	Contin Improv Using Lean	1
OSM 4650	Six Sigma Fundamentals	3
	<i>Minor in Business</i>	
	<i>Minor in Enterprise</i>	

### Materials

CM/CH 4610	Intro to Polymer Science	3
CM/CH 4620	Polymer Chemistry	3
ENG 2120	Statics-Strength of Materials	4
MEEM 2110	Statics	3
MEEM 2150	Mechanics of Materials	3
MSE 2100	Intro to Materials Sci and Engg	3
MSE 2110	Intro to Materials Sci and Engg II	3
MSE 3100	Materials Processing I	4
MSE 3120	Materials Characterization I	4
MSE 4110	Introduction to Polymer Engg	3
MSE 4430	Composite Materials	3
	<i>Minor in Polymer Science and Engineering</i>	

### Mineral Processing

CM 2200	Intro Minerals and Materials	3
CM 3830	Mineral Processing Lab	1
CM 4505	Particle Technology	3
CM 4510	Interfacial Engineering	3
CM/MSE 4740	Hydro/Pyrometallurgy	4
GE 2020	Intro to Mining Eng and Methods	2
GE 2300	Mineral Science	3
MSE 4320	Corrosion & Environmental Effects	3
MSE 4325	Fundamentals of Corrosion	1
	<i>Minor in Mineral Processing</i>	
	<i>Minor in Mining</i>	

### Sustainability

CEE 3502	Envir Monitoring and Meas Analysis	3
CEE 3503	Environmental Engineering	3
CEE 4501	Envir Eng Chemical Processes	4
ENG 4515	Intro to Sustainability & Resilience	3
ENG 4525	Systems Analysis for Sustain & Res	3
FW 1035	Wood Anatomy and Properties	3
FW 3097	Forest Biomaterials	3
FW 3098	Adding Value to Biomaterials	2
	<i>Minor in Sustainable Biomaterials</i>	