Michigan Technological University
Department of Chemical Engineering

Technical Elective Courses
B.S. in Chemical Engineering
2015-16 Academic Year

Technical electives must total to 13 credits. Additional credits may be used towards free electives.

Note that many of the courses listed below are not offered every semester or every year and most have prerequisites. It is best to plan out your technical electives ahead of time.

3-4 credits of Organic Chemistry II or substitute

CH 2420	Organic Chemistry II	3
BL 2100	Principles of Biochemistry	3
CM 4740	Hydrometallurgy/Pyrometallurgy	4

4-6 credits of Core Engineering Electives

CM 2200	Intro Minerals and Materials	3
CM 3450	Computer-Aided Problem Solving	3
CM 3820	Sampling Stats and Instrumentation	3
CM/ENT 3974	Fuel Cell Fundamentals	1
CM 4125	Bioprocess Engineering Laboratory	1
CM 4500	Particle Technology	4
CM 4550	Industrial Chemical Production	3
CM 4650	Polymer Rheology	3
CM 4655	Polymer Rheology Laboratory	1
CM 4710	Biochemical Processes	3
CM/MY 4740	Hydrometallurgy/Pyrometallurgy	4
CM 4770	Analytical Microdevice Technologies	3
CM 4780	Biomanufacturing and Biosafety	3
CM 5100	Applied Mathematics for CM	3
CM 5200	Advanced CM Thermodynamics	3
CM 5300	Advanced Transport Phenomena	3
CM 5400	Advanced Reactive Systems Analysis	3
EE 3010	Circuits and Instrumentation	3
ENG 2120	Statics-Strength of Materials	4
GE 4610	Formation Eval and Petroleum Engg	3
MEEM 2110	Statics	3

Undergraduate Research Courses (repeatable)
No more than 6 credits from the following:

CM 4000	Chemical Engineering Research	1-3
CM 4020	UG Research in Mineral Proc Engg	1-3
CM 4040	UG Research in Biological Engg	1-3
CM 4060	UG Research in Polymer Engg	1-3

3-6 credits of additional Technical Electives

BE 2110	Statistical Methods for Biomed Eng	3
BE 2400	Cellular and Molecular Biology	3
BE 4300	Polymeric Biomaterials	3
BL 1040	Principles of Biology	4
BL 2010	Anatomy & Physiology I	3
BL 2011	Anatomy & Physiology I Lab	1
BL 2020	Anatomy & Physiology II	3
BL 2021	Anatomy & Physiology II Lab	1
BL 2100	Principles of Biochemistry	3
BL 2200	Genetics	3
BL 2210	Genetics Laboratory	1
BL 3210	General Microbiology	4
BL 3310	Environmental Microbiology	3
BL 3640	General Immunology	3
BL 4010	Biochemistry I	3
BL 4020	Biochemistry II	3
BL 4030	Molecular Biology	3
BL 4220	Applied and Industrial Microbiology	3
BL 4380	Cardiopulmonary Physiology	3
BL 4820	Biochem Lab Techniques I	2
BL 4840	Molecular Biology Techniques	3
CH 2212	Quantitative Analysis	5
CH 2420	Organic Chemistry II	3
CH 2421	Organic Chemistry Lab II	2
CH 3520	Physical Chemistry II – Mol Structure	3
CH 3521	Physical Chemistry Lab II	2
CH 4110	Pharm Chem: Drug Action	3
CH 4120	Pharm Chem: Drug Design	3
CH 4212	Instrumental Analysis	5
CH 4222	Bioanalytical Chemistry	5
CH 4310	Inorganic Chemistry I	3
CH 4311	Inorganic Chemistry Lab	2
CH 4320	Inorganic Chemistry II	3
CH 4412	Spectroscopy of Organic Chem.	3
CH 4430	Intermediate Organic Chemistry	3
CH 4510	Intermediate Physical Chemistry	3
CH 4710	Biomolecular Chemistry I	3
CH 4720	Biomolecular Chemistry II	3
CM 2200	Intro Minerals and Materials	3
CM 3450	Computer-Aided Problem Solving	3
CM 3820	Sampling Stats and Instrumentation	3
CM/ENT 3974	Fuel Cell Fundamentals	1
CM 4125	Bioprocess Engineering Laboratory	1
CM 4500	Particle Technology	4
CM 4550	Industrial Chemical Production	3
CM/CH 4610	Introduction to Polymer Science	3
CM/CH 4620	Polymer Chemistry	3
CM/CH 4631	Polymer Science Laboratory	2
CM 4650	Polymer Rheology	3
CM 4655	Polymer Rheology Laboratory	1
CM 4710	Biochemical Processes	3
CM/MY 4740	Hydrometallurgy/Pyrometallurgy	4
CM 4770	Analytical Microdevice Technologies	3
CM 4780	Biomanufacturing and Biosafety	3

Updated 4/15/2015

CM 5100	Applied Mathematics for CM	3
CM 5200	Advanced CM Thermodynamics	3
CM 5300	Advanced Transport Phenomena	3
CM 5400	Advanced Reactive Systems Analysis	3
CMU 8950U	CM Technical Elective	var
CS 1111	Intro to Programming in C/C++	3
CS 1121	Intro to Programming I	3
CS 1131	Accelerated Intro to Programming	5
EE 3010	Circuits and Instrumentation	3
EE 3120	Electric Energy Systems	3
EE 3140	Electromagnetics	3
EET 3373	Intro to Programmable Controllers	3
ENG 2120	Statics-Strength of Materials	4
ENG 4510	Sustainable Futures I	3
ENG 5520	Sustainable Futures II	3
ENT 2950	Enterprise Project Work I	1
ENT 2960	Enterprise Project Work II	1
ENT 3950	Enterprise Project Work III	1
ENT 3960	Enterprise Project Work IV	1
ENT 3980	Pre-Capstone Enterprise Project Work	1
ENT 4950	Enterprise Project Work V Capstone	2
ENT 4960	Enterprise Project Work VI Capstone	2
ENT 4961	Enterprise Project Work VII	1
ENVE 3502	Envir Monitoring and Meas Analysis	3
ENVE 3503	Environmental Engineering	3
ENVE 4501	Envir Eng Chemical Processes	4
FW 1035	Wood Anatomy and Properties	4
FW 3098	Wood Processing and Manufacture	2
GE 2020	Intro to Mining Eng and Mining Meth	4
GE 2300	Mineral Science	3
GE 2310	Introduction to Petrology	3
GE 2640	Atmos Observations and Meteorology	3
GE 3400	Drilling and Blasting	3
GE 4360	Material Handling	3
GE 4610	Formation Eval and Petroleum Engr	3
MA 2600	Scientific Computing	3
MA 2710	Introduction to Statistical Analysis	3
MA 2720	Statistical Methods	4
MA 3210	Introduction to Combinatorics	3
MA 3310	Introduction to Abstract Algebra	3
MA 3450	Introduction to Real Analysis	3
MA 3710	Engineering Statistics	3
MA 3740	Statistical Programming & Analysis	3
MA 3924	College Geometry with Technology	3
MA 4330	Linear Algebra	3
MA 4515	Intro to Partial Differential Eqns	3
MA 4525	Applied Vector and Tensor Math	3
MA 4620	Numerical Methods for PDEs	3
MA 4760	Mathematical Statistics I	3
MA 4770	Mathematical Statistics II	3
MA 4908	Theory of Numbers with Technology	3
MEEM 2110	Statics	3
MEEM 2150	Mechanics of Materials	3
MEEM 2700	Dynamics	3
MEEM 4170	Failure of Materials in Mechanics	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
MEEM 4403	Computer-Aided Design Methods	4
MEEM 4405	Intro to the Finite Element Method	3
MEEM 4635	Design with Plastics	3
MEEM 4650	Quality Engineering	3
MEEM 5170	Finite Elem and Var Meth in Engg	3
MEEM 5240	Comp Fluid Dynamics for Engg	3
MY 2100	Intro to Materials Sci and Eng	3
MY 2110	Intro to Materials Sci and Eng II	3
MY 3100	Materials Processing I	4
MY 3200	Materials Characterization I	4
MY 4130	Principles of Metal Casting	3
MY 4155	Composite Materials	3
MY 4600	Introduction to Polymer Eng	3
OSM 4650	Six Sigma Fundamentals	3
PH 2230	Electronics for Scientists	4
PH 2300	Univ Physics III – Fluids and Thermo	2
PH 2400	Univ Physics IV – Waves and Mod Phy	3
UN 2600	Fund of Nanoscale Sci and Eng	2
UN 3002	Undergrad Cooperative Ed I	1-2

(repeatable, max of 4 credits may be used as a tech elect)

Enterprise Module Courses

No more than 3 credits from the following:

ENT 3954	Enterprise Market Principles	1
ENT 3958	Ethics in Eng Des and Impl	1
ENT 3959	Fundamentals of Six Sigma I	1
ENT 3961	Enterprise Strategic Leadership	1
ENT 3962	Communication Strategies	1
ENT 3963	Technology Commercialization	1
ENT 3964	Project Management	1
ENT 3966	Design for Manufacturing	1
ENT 3967	Six Sigma II	1
ENT 3971	Seven Habits of Highly Effective Peop	1
ENT 3976	Personal Brand Management	1
ENT 4951	Business Plans and Budging in the Ent	1
ENT 4954	Global Competition	1

Additional higher-level engineering, mathematics, science or applied business course may be approved on a case-by-case basis. Email your request to cmadvise@mtu.edu. Courses that are on the general education HASS lists are not approved for technical electives. Courses on the core engineering list are ABET engineering courses.