

Technical Electives

2016-17 Catalog Year

B.S. in Chemical Engineering

Technical electives must total to 14 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

5-8 credits of Core Engineering Electives

CM 1000	Intro to Chemical Engineering	1	CM 5200	Advanced CM Thermodynamics	3
CM 2200	Intro Minerals and Materials	3	CM 5300	Advanced Transport Phenomena	3
CM 3450	Computer-Aided Problem Solving	3	CM 5400	Advanced Reactive Systems Analysis	3
CM 3825	Sampling, Stats, and Instrumentation	2	EE 3010	Circuits and Instrumentation	3
CM 3830	Mineral Processing and Extraction Lab	1	ENG 2120	Statics-Strength of Materials	4
CM/ENT 3974	Fuel Cell Fundamentals	1	GE 4610	Formation Eval and Petroleum Engg	3
CM/ENT 3979	Alternative Energy Tech & Processes	1	MEEM 2110	Statics	3
CM 4125	Bioprocess Engineering Laboratory	1			
CM 4505	Particle Technology	3	Undergraduate Research Courses (repeatable)		
CM 4650	Polymer Rheology	3	No more than 6 credits from the following:		
CM 4655	Polymer Rheology Laboratory	1	CM 4000	Chemical Engineering Research	1-3
CM 4710	Biochemical Processes	3	CM 4020	UG Research in Mineral Proc Engg	1-3
CM/MY 4740	Hydrometallurgy/Pyrometallurgy	4	CM 4040	UG Research in Biological Engg	1-3
CM 4770	Analytical Microdevice Technologies	3	CM 4060	UG Research in Polymer Engg	1-3
CM 4780	Biomanufacturing and Biosafety	3	CM 4080	UG Research in Biofuels Engg	1-3
CM 5100	Applied Mathematics for CM	3			

2-6 credits of additional Technical Electives

BE 2110	Statistical Methods for Biomed Eng	3	CH 3520	Physical Chemistry II – Mol Structure	3
BE 2400	Cellular and Molecular Biology	3	CH 3521	Physical Chemistry Lab II	2
BE 4300	Polymeric Biomaterials	3	CH 4110	Pharm Chem: Drug Action	3
BL 1010	General Biology I	4	CH 4120	Pharm Chem: Drug Design	3
or BL 1020	General Biology II	4	CH 4140	Intro to Pharmaceutical Analysis	3
or BL 1040	Principles of Biology	4	CH 4212	Instrumental Analysis	5
BL 2010	Anatomy & Physiology I	3	CH 4222	Bioanalytical Chemistry	5
BL 2011	Anatomy & Physiology I Lab	1	CH 4310	Inorganic Chemistry I	3
BL 2020	Anatomy & Physiology II	3	CH 4311	Inorganic Chemistry Lab	2
BL 2021	Anatomy & Physiology II Lab	1	CH 4320	Inorganic Chemistry II	3
BL 2100	Principles of Biochemistry	3	CH 4412	Spectroscopy of Organic Chem.	3
BL 2200	Genetics	3	CH 4430	Intermediate Organic Chemistry	3
BL 2210	Genetics Laboratory	1	CH 4510	Intermediate Physical Chemistry	3
BL 3210	General Microbiology	4	CH 4710	Biomolecular Chemistry I	3
BL 3310	Environmental Microbiology	3	CH 4720	Biomolecular Chemistry II	3
BL 3640	General Immunology	3	CM 1000	Intro to Chemical Engineering	1
BL 4010	Biochemistry I	3	CM 2200	Intro Minerals and Materials	3
BL 4020	Biochemistry II	3	CM 3450	Computer-Aided Problem Solving	3
BL 4030	Molecular Biology	3	CM 3825	Sampling, Stats, and Instrumentation	2
BL 4220	Applied and Industrial Microbiology	3	CM 3830	Mineral Processing and Extraction Lab	1
BL 4380	Cardiopulmonary Physiology	3	CM/ENT 3974	Fuel Cell Fundamentals	1
BL 4820	Biochem Lab Techniques I	2	CM/ENT 3979	Alternative Energy Tech & Processes	1
BL 4840	Molecular Biology Techniques	3	CM 4125	Bioprocess Engineering Laboratory	1
CH 2212	Quantitative Analysis	5	CM 4505	Particle Technology	3
CH 2420	Organic Chemistry II	3	CM/CH 4610	Introduction to Polymer Science	3
CH 2421	Organic Chemistry Lab II	2	CM/CH 4620	Polymer Chemistry	3

CM/CH 4631	Polymer Science Laboratory	2	MA 4525	Applied Vector and Tensor Math	3
CM 4650	Polymer Rheology	3	MA 4620	Numerical Methods for PDEs	3
CM 4655	Polymer Rheology Laboratory	1	MA 4760	Mathematical Statistics I	3
CM 4710	Biochemical Processes	3	MA 4770	Mathematical Statistics II	3
CM/MY 4740	Hydrometallurgy/Pyrometallurgy	4	MA 4908	Theory of Numbers with Technology	3
CM 4770	Analytical Microdevice Technologies	3	MEEM 2110	Statics	3
CM 4780	Biomanufacturing and Biosafety	3	MEEM 2150	Mechanics of Materials	3
CM 5100	Applied Mathematics for CM	3	MEEM 2700	Dynamics	3
CM 5200	Advanced CM Thermodynamics	3	MEEM 4170	Failure of Materials in Mechanics	3
CM 5300	Advanced Transport Phenomena	3	MEEM 4200	Principles of Energy Conversion	3
CM 5400	Advanced Reactive Systems Analysis	3	MEEM 4220	Internal Combustion Engines I	3
CMU 8950U	CM Technical Elective	var	MEEM 4240	Combustion and Air Pollution	3
CS 1111	Intro to Programming in C/C++	3	MEEM 4260	Fuel Cell Technology	3
CS 1121	Intro to Programming I	3	MEEM 4405	Intro to the Finite Element Method	3
CS 1131	Accelerated Intro to Programming	5	MEEM 4635	Design with Plastics	3
EE 2174	Digital Logic and Lab	4	MEEM 4650	Quality Engineering	3
EE 3010	Circuits and Instrumentation	3	MEEM 5170	Finite Elem and Var Meth in Engg	3
EE 3120	Electric Energy Systems	3	MEEM 5240	Comp Fluid Dynamics for Engg	3
EE 3140	Electromagnetics	3	MY 2100	Intro to Materials Sci and Eng	3
EET 3373	Intro to Programmable Controllers	3	MY 2110	Intro to Materials Sci and Eng II	3
ENG 2120	Statics-Strength of Materials	4	MY 3100	Materials Processing I	4
ENG 4510	Sustainable Futures I	3	MY 3200	Materials Characterization I	4
ENG 5520	Sustainable Futures II	3	MY 4130	Principles of Metal Casting	3
ENT 2950	Enterprise Project Work I	1	MY 4155	Composite Materials	3
ENT 2960	Enterprise Project Work II	1	MY 4600	Introduction to Polymer Eng	3
ENT 3950	Enterprise Project Work III	1	OSM 4650	Six Sigma Fundamentals	3
ENT 3960	Enterprise Project Work IV	1	PH 2230	Electronics for Scientists	4
ENT 3980	Pre-Capstone Enterprise Project Work	1	PH 2300	Univ Physics III – Fluids and Thermo	2
ENT 4950	Enterprise Project Work V Capstone	2	PH 2400	Univ Physics IV – Waves and Mod Phy	3
ENT 4960	Enterprise Project Work VI Capstone	2	UN 2600	Fund of Nanoscale Sci and Eng	2
ENT 4961	Enterprise Project Work VII	1	UN 3002	Undergrad Cooperative Ed I	1-2
ENVE 3502	Envir Monitoring and Meas Analysis	3	UN 3003	Undergrad Cooperative Ed II	1-2
ENVE 3503	Environmental Engineering	3	UN 3004	Undergrad Cooperative Ed III	1-2
ENVE 4501	Envir Eng Chemical Processes	4	UN 3005	Undergrad Cooperative Ed IV	1-2
FW 1035	Wood Anatomy and Properties	4			
FW 3098	Wood Processing and Manufacture	2			
GE 2020	Intro to Mining Eng and Mining Meth	4	Enterprise Module Courses		
GE 2300	Mineral Science	3	No more than 3 credits from the following:		
GE 2310	Introduction to Petrology	3	ENT 3953	Ignite: Ideate, Innovate, Create!	2
GE 2640	Atmos Observations and Meteorology	3	ENT 3954	Enterprise Market Principles	1
GE 3400	Drilling and Blasting	3	ENT 3958	Ethics in Eng Des and Impl	1
GE 4360	Material Handling	3	ENT 3959	Fundamentals of Six Sigma I	1
GE 4610	Formation Eval and Petroleum Engr	3	ENT 3961	Enterprise Strategic Leadership	1
MA 2600	Scientific Computing	3	ENT 3962	Communication Strategies	1
MA 2710	Introduction to Statistical Analysis	3	ENT 3963	Deliver: Explore, Develop, Exceute!	1
MA 2720	Statistical Methods	4	ENT 3964	Project Management	1
MA 3210	Introduction to Combinatorics	3	ENT 3966	Design for Manufacturing	1
MA 3310	Introduction to Abstract Algebra	3	ENT 3967	Six Sigma II	1
MA 3450	Introduction to Real Analysis	3	ENT 3971	Seven Habits of Highly Effective Peop	1
MA 3710	Engineering Statistics	3	ENT 3976	Personal Brand Management	1
MA 3740	Statistical Programming & Analysis	3	ENT 3982	Contin Improv Using Lean Principles	1
MA 3924	College Geometry with Technology	3	ENT 3983	Culture of Continuous Improvement	1
MA 4330	Linear Algebra	3	ENT 4951	Business Plans and Budging in the Ent	1
MA 4515	Intro to Partial Differential Eqns	3	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.