

## Technical Electives

Technical electives allow chemical engineering majors to tailor their degree. These classes, which include upper division science, applied science, and engineering subjects, cover a wide range of topics and give you a chance to follow your individual interests while completing your degree. In addition, you can often earn a minor by double counting some of the minor requirements with the technical electives.

To fulfill your departmental requirements, you must take 10 credits of approved technical electives. Technical electives are any course listed here as approved chemical engineering, engineering, or technical electives. With these 10 credits, you must take:

1. Three credits of chemical engineering elective,
2. Three credits of engineering elective, and
3. Four credits of technical elective.

Note that many of the courses listed below are not offered every semester and most have prerequisites. **A “\*” indicates courses that do not require additional prerequisites** other than classes CM majors must already take. It is best to plan out your technical electives ahead of time.

### Chemical Engineering Electives (3 credits required)

CM 2200	Intro Minerals and Materials*	3	CM/CH 4620	Polymer Chemistry*	3
CM 3450	Computer-Aided Problem Solving*	3	CM/CH 4631	Polymer Science Laboratory	2
CM 3820	Sampling Statistics and Instrumentation* <sup>3</sup>		CM 4650	Polymer Rheology*	3
CM/ENT 3974	Fuel Cell Fundamentals*	1	CM 4655	Polymer Rheology Laboratory	1
CM 4000	Chemical Engineering Research* <sup>1</sup>	va	CM 4710	Biochemical Processes*	3
CM 4125	Bioprocess Engineering Laboratory	1	CM/MY 4740	Hydrometallurgy/Pyrometallurgy*	4
CM 4450	Computational Methods in Chem Eng* <sup>2</sup>	2	CM 5100	Applied Mathematics for Chem Eng* <sup>2</sup>	3
CM 4500	Particle Technology*	4	CM 5200	Advanced CM Thermodynamics* <sup>2</sup>	3
CM 4550	Industrial Chemical Production*	3	CM 5300	Advanced Transport Phenomena* <sup>2</sup>	3
CM/CH 4610	Introduction to Polymer Science*	3	CM 5400	Advanced Reactive Systems Analysis* <sup>2</sup>	3

### Engineering Electives (3 credits required)

Approved engineering electives **include any course listed under chemical engineering electives, plus** the courses listed below.

BE 2600	Introduction to Biomed Eng*	3	ENT 4960	Enterprise Project Work VI <sup>2</sup>	2
BE 3500	Biomedical Materials	3	ENT 4961	Enterprise Project Work VII	1
BE 4100	Cell and Tissue Mechanics	3	FW 3098	Wood Processing and Manufacturing	2
BE 4300	Adv Polymeric Biomaterials	3	MEEM 2110	Statics*	3
CE 3502	Envir Monitoring and Meas Analysis*	3	MEEM 2150	Mechanics of Materials	3
CE 3503	Environmental Engineering*	3	MEEM 2700	Dynamics	3
CE 4501	Envir Eng Chemical Processes	4	MEEM 4170	Failure of Material in Mechanics	3
EE 2110	Electric Circuits	3	MEEM 4403	Computer-Aided Design Methods* <sup>2</sup>	4
EE 2150	Introduction to Signal Processing	3	MEEM 4405	Intro to the Finite Element Method	3
EE 2173	Digital Logic	3	MEEM 4635	Design with Plastics	3
EE 2190	Introduction to Photonics*	3	MEEM 4650	Quality Engineering	3
EE 3010	Circuits and Instrumentation*	3	MEEM 5170	Finite Elem and Var Meth in Eng* <sup>2</sup>	3
EE 3120	Electric Energy Systems	3	MEEM 5240	Comp Fluid Dynamics for Eng* <sup>2</sup>	3
EE 3130	Electronics	3	MY 2100	Intro to Materials Sci and Eng*	3
EE 3140	Electromagnetics	3	MY 3100	Materials Processing I	4
ENG 2120	Statics-Strength of Materials*	4	MY 3200	Materials Characterization I	4
ENT 2950	Enterprise Project Work I*	1	MY 3400	Mechanical Prop of Materials	3
ENT 2960	Enterprise Project Work II*	1	MY 4130	Principles of Metal Casting	3
ENT 3950	Enterprise Project Work III*	1	MY 4150	Composite Materials	2
ENT 3960	Enterprise Project Work IV*	1	MY 4600	Introduction to Polymer Eng	3
ENT 3966	Design for Manufacturing*	1	UN 3002	Undergrad Cooperative Ed Lab* <sup>3</sup>	2
ENT 3975	Intro to Vehicle Des and System Mod* <sup>2</sup>	1	UN 3003	Undergrad Cooperative Ed Lab* <sup>3</sup>	3
ENT 4950	Enterprise Project Work V <sup>2</sup>	2			

## Technical Electives (4 credits required)

Approved technical electives **include any course listed under chemical engineering electives and engineering electives, plus** the courses listed below.

BA 3600	Quality Management	3	CH 4710	Biomolecular Chemistry I	3
BA 4620	Supply Chain Management	3	CH 4720	Biomolecular Chemistry II	3
BE 2110	Statistical Methods for Biomed Eng*	3	CS 1121	Intro to Computer Science I*	3
BE/BL 2400	Biology for Engineers I*	3	CS 1131	Computer Science I* <sup>2</sup>	4
BL 1040	Principles of Biology*	4	ENG/SS 4510	Sustainable Futures I*	3
BL 2100	Principles of Biochemistry	3	ENT 3954	Enterprise Market Principles*	1
BL 4010	Biochemistry I	3	ENT 3958	Ethics in Eng Des and Impl*	1
BL 4020	Biochemistry II	3	ENT 3963	Technology Commercialization	1
BL 2010	Anatomy/Physiology I*	3	ENT 3964	Project Management*	1
BL 2011	Anatomy/Physiology I Lab	1	ENT 3967	Product/Process Development II*	1
BL 2020	Anatomy/Physiology II	3	ENT 3971	Seven Habits of Highly Effective Peop*	1
BL 2021	Anatomy/Physiology II Lab	1	ENT 4951	Business Plans and Budging in the Ent*	1
BL 2200	Genetics	3	FW 1035	Wood Anatomy and Properties*	4
BL 3210	General Microbiology	4	GE 2020	Intro to Mining Eng and Mining Meth*	4
BL 3640	General Immunology <sup>2</sup>	3	GE 2300	Earth Materials I: Mineralogy	3
BL 4030	Molecular Biology	3	GE 2310	Earth Materials II: Rocks and Min Res	3
BL 4220	Applied and Industrial Microbiology	3	GE 2350	Structural Geology I*	2
BL 4320	Histology	4	GE 2640	Atmos Observations and Meteorology*	3
BL 4380	Cardiopulmonary Physiology	3	MA 2710	Introduction to Statistical Analysis*	3
BL 4470	Analysis of Biological Data*	4	MA 2720	Statistical Methods*	4
BL 4820	Biochem Lab Techniques I	2	MA 3210	Introduction to Combinatorics*	3
BL 4830	Advanced Bichemical Techniques	2	MA 3310	Introduction to Abstract Algebra*	3
BL 4840	Molecular Biology Techniques	3	MA 3450	Introduction to Real Analysis*	3
CH 2212	Quantitative Analysis* <sup>4</sup>	5	MA 3710	Engineering Statistics*	3
CH 2421	Organic Chemistry Lab II	2	MA 3924	College Geometry with Tech*	3
CH 3520	Physical Chemistry II – Mol Structure*	3	MA 4330	Linear Algebra*	3
CH 3521	Physical Chemistry Lab II	2	MA 4515	Intro to Partial Differential Eqns*	3
CH 4110	Pharm Chem I - Drug Action	3	MA 4525	App Vector and Tensor Math*	3
CH 4120	Pharm Chem II - Drug Design	3	MA 4630	Numerical Methods	3
CH 4212	Instrumental Analysis	5	MA 4760	Mathematical Statistics I	3
CH 4310	Inorganic Chemistry I	3	MA 4908	Theory of Numbers with Tech	3
CH 4311	Inorganic Chemistry Lab	2	PH 2230	Electronics for Scientists*	4
CH 4320	Inorganic Chemistry II	3	PH 2300	Univ Physics III – Fluids and Thermo*	2
CH 4412	Spectroscopy of Organic Chem.	3	PH 2400	Univ Physics IV – Waves and Mod Phy* <sup>3</sup>	3
CH 4430	Intermediate Organic Chemistry	3	UN 2600	Fund of Nanoscale Sci and Eng*	2
CH 4510	Intermediate Physical Chemistry	3			

Additional higher-level engineering, mathematics, science or applied business course may be approved by the CM advisor or CM department chair on a case-by-case basis. Courses that are on the general education list are not approved for technical electives.

<sup>1</sup> A maximum of 6 credits may be counted as technical elective credit.

<sup>2</sup> Registration is restricted. Will need special permission to take. See Banweb for more information.

<sup>3</sup> A maximum of two semesters of full-time co-op may be counted as technical elective credit.

<sup>4</sup> Difficult to fit into the standard CM schedule at this time.