

## CHEMICAL ENGINEERING DEPARTMENT ELECTIVES

### - CHEMISTRY ELECTIVES

Chemistry electives are advanced chemistry courses selected from the following list:

- CH2212 – Quantitative Analysis
- CH2252 – Measurement Science
- CH2420 – Organic Chemistry II
- CH2421 – Organic Chemistry Lab II
- CH3520 – Physical Chemistry II
- CH3531 – Physical Chemistry Lab II
- CH4212 – Instrumental Analysis
- CH4272 – Process Analytical Chemistry
- CH4310 – Inorganic Chemistry I
- CH4311 – Inorganic Chemistry Lab
- CH4320 – Inorganic Chemistry II
- CH4412 – Spectroscopy of Organic Chemicals
- CH4430 – Intermediate Organic Chemistry
- CH4510 – Intermediate Physical Chemistry
- CH4610 – Intro to Polymer Science
- CH4620 – Polymer Chemistry
- CH4631 – Polymer Chemistry Lab
- CH4641 – Polymer Chemistry Lab
- CH4710 – Chemical Principles in Biology
- BL2100 – Principles of Biochemistry
- BL4010 - Biochemistry I
- BL4020 - Biochemistry II

### CHEMICAL ENGINEERING ELECTIVES

Chemical engineering electives are any chemical engineering courses that are not required for a Bachelor of Science Degree in chemical engineering at Michigan Technological University.

### ENGINEERING ELECTIVES

Engineering electives are any engineering courses offered by any of the departments in the College of Engineering (Biomedical Engineering, Chemical Engineering, Civil and Environmental Engineering, Electrical Engineering, General Engineering, Geological Engineering, Mechanical Engineering-Engineering Mechanics, Metallurgical Engineering, and Mining Engineering.).

Science, business, communication, mathematics, orientation, seminar, and technology courses are excluded.

In particular, the following courses ARE NOT considered to be engineering electives:

### NON-ACCEPTABLE ENGINEERING ELECTIVE COURSES

Course Number	Title	Comment
BE4210	Exercise Physiology	Science Course
BE4550	Aerospace Physiology	Science Course
BE4920	Professional Development	Not engineering
ENG1000	Engineering Seminar	Seminar Course
ENG1002	Intro to Spatial Visualization	Not engineering
ENG2950	Orientation-Engg Enterprise	Orientation Course
ENG2962	Communication Contexts	Communication Course
ENG3401	Economic Decision Analysis I	Business Course
ENG3402	Economic Decision Analysis II	Business Course
ENG3403	Economic Decision Analysis III	Business Course
ENG3962	Communication Strategies	Communication Course
ENG3954	Enterprise Market Principles	Business Course
ENG4952	Complex Comm Practices	Communication Course
ENG4953	Writing Engg Societal Context	Communication Course
ENG4954	Global Competition	Business Course
GE2000	Understanding the Earth	Science Course
GE2050	Understanding Minerals	Science Course
GE2200	Earth Systems	Science Course
GE2300	Earth Mat I: Mineralogy	Science Course
GE2310	Earth Mat II: Rock & Min Res	Science Course
GE2640	Intro to Meteorology	Science Course
GE2900	Geology of Utah's Nat'l Parks	Science Course
GE3100	Depositional Systems	Science Course
GE3200	Geochemistry	Science Course
GE3300	Intro to Oceanography	Science Course
GE3320	Earth Hist & Paleoclimatology	Science Course
GE3600	Sampling and Data Analysis	Math Course
GE3900	Field Geophysics	Land Surveying
GE3920	Geological Field Excursion	Science Course
GE4000	Earth Science Teaching Experience	Communication Course
GE4170	Volcanic Clouds	Science Course
GE4500	Plate Tec & Global Geophysics	Science Course
GE4640	Meteorology	Science Course
GE4920	Geological Engineering Seminar	Seminar Course
GE4921	Geology Seminar	Seminar Course
GE4922	Geophysics Seminar	Seminar Course
GE4931	Special Topics in Geology	Science Course
GE4932	Special Topics in Mineralogy	Science Course
GE4933	Special Topics in Geophysics	Science Course
MEEM2200	Thermodynamics	Duplicates CM Course
MG2020	Intro Min Engg & Min Meth	Orientation Course
MG2400	Mining Geology	Science Course
MG3690	Management Science	Business Course
MG4610	Mineral Industry Economics	Business Course
MY4200	Scanning Electron Microscopy	Science Course
MY4210	Diffraction	Science Course
MY4250	Practical TEM	Science Course

## TECHNICAL ELECTIVES

Technical electives are higher-level engineering, math, science, or applied business courses.

Acceptable technical electives are offered by the following departments:

### College of Engineering

Biomedical Engineering (BE)  
Chemical Engineering (CM)  
Civil and Environmental Engineering (CE)  
Electrical Engineering (EE)  
General Engineering (ENG)  
Geological Engineering (GE)  
Mechanical Engrg-Engrg Mech (MEEM)  
Metallurgical Engineering (MY)  
Mining Engineering (MG)

### College of Sciences & Arts

Biology (BL)  
Chemistry (CH)  
Computer Science (CS)  
Mathematics (MA)  
Physics (PH)

### School of Business & Economics

Business (BA)  
Economics (EC)

### School of Forestry & Wood Prod (FW)

Communication, orientation, and seminar courses are excluded.

In particular, the following courses ARE NOT considered to be technical electives:

### NON-ACCEPTABLE TECHNICAL ELECTIVE COURSES

Course Number	Title	Comment
BA1700	Business Orientation	Orientation Course
BL1580	Intro to Biological Sciences	Orientation Course
BL1590	Intro to Pre-Medicine	Orientation Course
BL1600	Intro to CLS	Orientation Course
BL1710	Medical Terminology	Orientation Course
CH0011	Dev of Chemistry Skills	Not High Enough Level
CH1000	Preparatory Chemistry	Pre-College Material
CH1080	Topics in General Chemistry	Not High Enough Level
CH1100	General Chemistry	Only to Replace CH1110
CH1130	Orientation/Safety	Orientation Course
CH1140	Intro to Org, Inorg & Biochem	Not High Enough Level
CH4900	Senior Seminar in Chemistry I	Seminar Course
CH4910	Senior Seminar in Chemistry II	Seminar Course
CS1000	Computer Science Orientation	Orientation Course
EC2000	Principles of Economics	Not Applied Business
EC3000	Microeconomic Theory	Not Applied Business
EC3010	Macroeconomic Theory	Not Applied Business
EC3020	History of Economic Thought	Not Applied Business
ENG1000	Engineering Seminar	Seminar Course
ENG1002	Intro to Spatial Visualization	Not High Enough Level
ENG2950	Orientation-Engg Enterprise	Orientation Course
ENG2962	Communication Contexts	Communication Course
ENG3962	Communication Strategies	Communication Course
ENG4952	Complex Comm Practices	Communication Course
ENG4953	Writing Engg Societal Context	Communication Course
FW1050	Natural Resources Seminar	Seminar Course

### NON-ACCEPTABLE TECHNICAL ELECTIVE COURSES (Cont'd)

GE4000	Earth Science Teaching Experience	Communication Course
GE4920	Geological Engineering Seminar	Seminar Course
GE4921	Geology Seminar	Seminar Course
GE4922	Geophysics Seminar	Seminar Course
MA1032	Data, Functions, & Graphs Plus	Pre-College Material
MA1033	Data, Functions, & Graphs	Pre-College Material
MA1135	Calculus for Life Sciences	Not High Enough Level
MEEM2200	Thermodynamics	Duplicates CM Course
MG2020	Intro Min Engg & Min Meth	Orientation Course
PH0010	Development of Physics Skills	Not High Enough Level
PH0020	Team Approach to Learning Physics	Not High Enough Level
PH2010	Sophomore Seminar	Seminar Course

#### FREE ELECTIVES

Free electives are any courses with course numbers of 1000 or higher that are taught at Michigan Technological University.

No more than a total of three (3) semester credits of physical education and of fine arts performance courses (band, symphony, orchestra, choir, acting, etc.) may be used as free electives. (This restriction approved April 7, 2000)

Approved  
March 10, 2000

#### LINEAR ALGEBRA - DIFFERENTIAL EQUATIONS

Because Linear Algebra is a prerequisite for Differential Equations, it is recommended that the following courses be taken:

Linear Algebra	MA2321 – First Half of Semester
Differential Equations	MA3521 – Second Half of Semester

In the event that you can not schedule the above two courses, see the Mathematics Department (currently Beth Reed) for a waiver to take the following two courses concurrently:

Linear Algebra	MA2320
Differential Equations	MA3520