

## Listing of Approved Technical Electives

**Twelve total technical elective credits are required** for each student. This includes one math elective, two CBE 5000-level courses, and additional hours needed to meet the twelve total credits.

Math or Stat elective      2-4 credits  
 2- CBE 5000-level        6 credits  
 Other technical elective   2-4 credits

Most students will complete four- 3 credit courses to fulfill the requirements. If you choose a course such as Stat 3450 or FD SC TE 2410 (Brewing Science) which are two credits each, you will need to make up that missing credit.

**PLEASE NOTE: You must meet the pre-reqs in order to enroll in courses on this list. For example, many of the courses in Env Eng require that you are pursuing the minor in Env Eng so you will need permission from the instructor to enroll. All other courses where pre-reqs are not met will also need permission from the instructor.**

### Code    Definition of Codes used in Table

B      Biomolecular focus courses (these courses are also recommended for pre-health students)  
 C      counts towards the requirement for credit hours in CBE technical electives  
 E      Environmental focus  
 M      satisfies the requirement for credit hours in advanced math  
 N      new course (planned for near future, or may have already been offered)  
 P      Polymer focus  
 R      offered infrequently (most CBE technical electives are offered every 1 or 2 years)

Course	Credit	Subject	Codes
Biochem 4511	4	Introduction to Biological Chemistry	B
Biochem 5613	3	Biochemistry and Molecular Biology I	B
Biochem 5614	3	Biochemistry and Molecular Biology II	B
Biochem 5621	4	Biochemistry and Molecular Biology Lab	B
Biomed Eng 2000	3	Introduction to Biomedical Engineering	B
Biomed Eng 4110	3	Bioimaging	B
Biomed Eng 4210	3	Biotransport	B
Biomed Eng 4310	3	Biomaterials	B
Biomed Eng 4410	3	Biomechanics	B
Biomed Eng 4510	3	Cell, Molecular, and Tissue Engineering	B
Biomed Eng 4610	3	Biomedical Micro/Nanotechnology	B
Biomed Eng 5001	3	Cardiovascular Bioengineering	B
Biomed Eng 5110	3	Biomedical Microscopic Imaging	B
Biomed Eng 5120	3	Biomedical Optics	B

Biomed Eng 5186	3	Biomedical Ultrasound	B
Biomed Eng 5210	3	Advanced Biological Transport	B
Biomed Eng 5310	3	Advanced Biomaterials	B
Biomed Eng 5352	3	Soft Tissue Biomaterials	B
Biomed Eng 5353	3	Hard Tissue Biomaterials	B
Biomed Eng 5359	3	Biopolymer Structure and Function	B, P
Biomed Eng 5420	3	Mechanobiology	B
Biomed Eng 5421	3	Tissue Mechanics	B
Biomed Eng 5430	3	Finite Element Analysis Applications in BME	B
Biomed Eng 5510	3	Advanced Tissue Engineering	B
Biomed Eng 5520	3	Cell Engineering	B
Biomed Eng 5610	3	Biomedical Microdevices	B
Biomed Eng 5639	3	Medical Devices and Design	B
Biomed Eng 5186	3	Biomedical Ultrasound	B
Biomed Eng 5352	3	Soft-Tissue Biomaterials	B
Biomed Eng 5353	3	Hard-Tissue Biomaterials	B
Biomed Eng 5470	3	Cellular Mechanics	B
Biomed Eng 5475	3	Biofluid Dynamics of Physical Systems	B
Biomed Eng 5661	3	Biomedical Nanotechnology (cross-listed with CBE 5769; formerly BME 761)	B, C
Biomed Eng 5662	3	Advanced Biomedical Nanotechnology	B
Biomed Eng 5663	3	Micro and Nano Fluids	B
Biomed Eng 5665	3	Cellular Nanotechnology (cross-listed with CBE 5735)	B, C
Biomed Eng 5667	3	BioMEMS Microfabrication	B
Biomed Eng 5668	3	Biomedical Transducers	B
Biomed Eng 5669	3	Advanced Medical Devices and Design	B
Biomed Eng 5771	3	Biomedical Instrumentation	B
Chemistry 2210	5	Analytical Chemistry I: Quantitative Analysis (formerly Chem 221)	
Chemistry 2550	2	Organic Chemistry Laboratory II (formerly Chem 255)	B
Chemistry 4310	3	Physical Chemistry II	
Chemistry 4410	3	Physical Chemistry Laboratory	
Chemistry 4870	3	Analytical Chemistry II: Instrumental Analysis (formerly Chem 587)	
Chemistry 4880	3	Instrumental Analysis Laboratory (formerly Chem 588)	
Chem 4998/4998H	1-4	Undergraduate Research in Chemistry	
Chem 4999/4999H	1-4	Chemistry Research for Thesis	
CBE 4193	1-4	Individual Studies in Chemical and Biomolecular Engineering	
CBE 4998/ 4998H	1-4	Undergraduate Research in Chemical and Biomolecular Engineering	
CBE 4999/ 4999H	1-4	Chemical and Biomolecular Engineering Research for Thesis	
CBE 5550	3	Engineering Principles in Cancer (cross-listed with Biomed and MechEng 5550)	

CBE 5712	3	Catalysis and Catalytic Processes	C,E
CBE 5713	3	Fuel Cells and Catalysis (formerly 713)	C,E
CBE 5715	3	Particle Technology (formerly 715)	C
CBE 5717	3	Interfaces, Colloids, and Molecular Self-Assembly (formerly 717)	C
CBE 5733	3	Novel Separation Processes (formerly 733)	B,C
CBE 5734	3	Molecular Informatics (formerly 734)	B,C
CBE 5735	3	Cellular Nanotechnology (formerly 735)	B,C
CBE 5740	3	Quantitative Cell Biology	B,C
CBE 5755	3	Chemical Process Safety (formerly 755)	C
CBE 5761	3	Chemical and Biomolecular Engineering Processes (formerly 761)	C
CBE 5765	3	Principles of Biochemical Engineering	B,C
CBE 5766	3	Biotechnology and Bioprocess Engineering (formerly 766)	B,C
CBE 5769	3	Biomedical Nanotechnology (formerly 769)	B,C
CBE 5771	3	Air Pollution (formerly 771)	C,E
CBE 5772	3	Principles of Sustainable Engineering (formerly 772)	C,E
CBE 5773	3	Introduction to High Polymer Engineering (formerly 773)	C, P
CBE 5774	3	Polymer Membranes (formerly 774)	C,P
CBE 5775	3	Rheology of Fluids (formerly 775)	C,P
CBE 5777	3	(Introduction to Polymer Engineering at Macro, Micro, and Nano Scale (formerly 777)	C,P
CBE 5779	3	Design and Analysis of Experiments (formerly 779)	B,C,E,P
CBE 5790	3	Modeling and Simulation (formerly 790)	C
CSE 5361	3	Numerical Methods (formerly 541)	
CSE 5521	2	Survey of Artificial Intelligence I: Basic Techniques (formerly 630)	
CSE 5522	3	Survey of Artificial Intelligence II: Advanced Techniques (formerly 730)	
Earth Sci 5651	4	Hydrogeology (formerly 651)	E
Earth Sci 5751	3	Quantitative Reservoir Modeling	
Engr Study Abroad	1-4	Engr courses taught as a study abroad should be discussed with student's advisor	
Engr 4850	3	Translating Engineering Research to K-8 (TEK8)	
Engr 5050	3	Humanitarian Engineering	
Env Eng 2100	3	Environmental Engineering Analytical Methods (formerly Env Eng 610)	E
Env Eng 3200	3	Fundamentals of Environmental Engineering (former Env Eng 511)	E
Env Eng 3210	3	Environmental Engineering Unit Operations (formerly Env Eng 520)	E
Env Eng 5110	3	Environmental Engineering Bioprocesses	E
Env Eng 5310	4	Ecological Engineering and Science	E
Env Eng 5410	3	Hazardous Waste Management and Remediation	E
ENR 3000	3	Intro to Soil Science	E
FABE 5410	3	Advanced Food Engineering (formerly 784)	
FD SC & TE 2400	3	Introduction to Food Science (formerly 401)	

FD SC & TE 2410	2	Brewing Science (formerly 411)	B
FD SC & TE 5400	3	Unit Operations in Food Processing (formerly 630)	
FD SC & TE 5430	3	Food Fermentations (formerly 611)	
FD SC & TE 5600	3	Food Chemistry (formerly 605)	
FD SC & TE 5721	1	Applied Food Product Development (formerly 650)	
Ind Sys Engr 5540	3	Polymer Processing Fundamentals	P
MatsSci Eng 5611	3	Materials in Medicine (formerly 645 and 646)	P
MatsSci Eng 5641	3	Structure-Property Relationships of Polymers (formerly 642)	P
Math 2568	3	Linear Algebra (formerly 568 and 571)	M
Math 3350	3	Introduction to Mathematical Biology (formerly 350)	M
Math 4512	3	Partial Differential Equations for Science and Engineering (formerly 512)	M
Math 4551	3	Vector Analysis (formerly 513 and 551)	M
Math 4552	3	Complex Analysis (formerly 514 and 552)	M
Math 5000 to 5999	3-5	Note: Math 5194 is excluded as an option	M
Microbio 4000	4	Basic and Practical Microbiology (formerly 509)	B
Microbio 4100	5	General Microbiology (formerly 520)	B
Mol Gen 4500	3	General Genetics (formerly 500)	B
Mol Gen 5607	3	Cell Biology (formerly 607)	B
Nuc Eng 4505	3	Introduction to Nuclear Science and Engineering (formerly 505)	
Nuc Eng 5606	3	Radiation Protection and Shielding (formerly 606)	
Nuc Eng 5776	3	Nuclear Fuel Cycle and Radioactive Waste Management (formerly 771 and 776)	
Stat 3450	2	Basic Statistics for Engineers (NOT RECOMMENDED unless you have research credits to cover the missing credit)- PLEASE CHECK WITH CBE ADVISORS BEFORE ENROLLING	M
Stat 3460	3	Principles of Statistics for Engineers	M
Stat 3470	3	Introduction to Probability and Statistics for Engineers	M
Stat 4201	4	Introduction to Mathematical Statistics I (formerly 420)	M
Stat 4202	4	Introduction to Mathematical Statistics II (formerly 421)	M
Stat 5301	4	Intermediate Data Analysis I (formerly Stat 528 and 529)	M
Research courses	1-4	Science and engineering research credits not already on this list may be petitioned	