Advanced Technical Electives

10-13-2017, 3-15-2020

Two advanced technical electives are required for CSE chemistry majors (B.S.), and one is required for CLA chemistry majors (B.A.).

In general, courses in technical fields (STEM - science, technology, engineering, math) that are at least 3 credits and have a technical prerequisite can be used to satisfy this requirement.

The list below and on the following pages includes some of the courses that count as advanced technical electives. ***This is not a complete list.***

If you are interested in a course that is not included on this list and are wondering whether it would count as an advanced technical elective, feel free to ask Stephanie Stathopoulos in the Chemistry Advising Office (Smith 135, stephs@umn.edu) or our Chemistry DUGS (Director of Undergraduate Studies), Prof. Lee Penn (Smith 225, rleepenn@umn.edu).

Courses that count as advanced technical electives include the following:

A chemistry *lecture* course can count as an advanced technical elective, if it is not one of the required "core" courses, and it is not also used by that student to fulfill the requirement for an advanced chemistry lecture elective (of which one is required for CSE majors, and none is required for CLA majors).

An advanced chemistry *lab* course can count as an advanced technical elective, if it is not also used by that student to fulfill the requirement for advanced chemistry labs (of which 3 are required for CSE majors, and 2 for CLA majors).

Chemical Engineering, Materials Science, Computer Science, Math or Physics courses at the 2xxx or higher level, and/or Statistics courses at the 3xxx or higher level, can also count as advanced technical electives, if that course is not also used by that student to fulfill the requirement for a Math/Phys elective (of which one is required for CSE majors, and none is required for CLA majors).

Some courses in GEOG (Geography), HMed (History of Medicine), HSci (History of Science and Technology) or PSY (Psychology) will be accepted if they have a technical component; ask Stephanie Stathopoulos or Lee Penn about specific courses.

The courses listed on the following pages also count as advanced technical electives. Checkmarks indicate that the course was offered in Fall 2016 and/or Spring 2017; future schedules may differ.

Quick class schedules and course descriptions are available here:
http://z.umn.edu/twostop

Recent syllabi for some of these courses are posted here (and more are gradually being added):
http://advise.chem.umn.edu/syllabi-0

Advanced Technical Electives *Also see p. 1; this is not a complete list.*

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	Courses offered in 2016-17	
	Fall 2016	**Spring 2017**
{AEM = Aerospace Engineering and Mechanics}		
AEM 2011 Statics	✓	✓
AEM 2012 Dynamics	✓	✓
AEM 2021 Statics and Dynamics	✓	✓
AEM 3031 Deformable Body Mechanics	✓	✓
{ANAT = Anatomy}		
Anat 3001 Human Anatomy	✓	
{ANSC = Animal Science}		
ANSC 3011 Statistics for Animal Science	✓	✓
ANSC 3301 Human & Animal Physiology	✓	✓
{BBE = Bioproducts & Biosystems Engineering}		
BBE 3013 Principles of Molecular & Cellular Processes	✓	
BBE 4301 Applied Surface and Colloid Science	✓	
BBE 4305 Pulp and Paper Technology (online)	✓ (Sp 2020)	
{BIOC = Biochemistry}		
BioC 3021 Biochemistry	✓	✓
BioC 4331, 4332 Biochemistry I and II (for majors)	✓	✓
BioC 4521 Intro to Physical Biochemistry	✓	✓
BioC 5527 Intro to Modern Structural Biology	✓	
BioC 5528 Biophysical Spectroscopy & Kinetics		✓
{BIOL = Biology}		
Biol 3211 Physiology	✓	✓
Biol 4003 Genetics	✓	✓
Biol 4004 Cell Biology	✓	✓
{BMEN = Biomedical Engineering}		
BMEN 2101 Biomedical Thermodynamics		✓
BMEN 2501 Cell and Molecular Biology	✓	
BMEN 3011 Biomechanics	✓	

	Fall 2016	Spring 2017
{CEGE = Civil, Environmental, and Geo-Engineering}		
CEGE 3101 Computer Applications in Civil Engineering I	✓	
CEGE 3501 Intro to Environmental Engineering	✓	✓
CEGE 4561 Solid & Hazardous Waste		✓
CEGE 5541 Environmental Water Chemistry	✓	
CEGE 5180 Membrane Science & Technology	✓	
CEGE 8542 Chemistry of Organic Pollutants	✓	
{EE = Electrical and Computer Engineering}		
EE 2001 Introduction to Circuits and Electronics	✓	✓
{ESCI = Earth Sciences}		
ESCI 2301 Mineralogy	✓	
{ESPM = Environmental Science, Policy and Management}		
ESPM 3012 Statistical Methods for Environmental Scientists and Managers		✓
ESPM 3131 Environmental Physics		✓
ESPM 3425 Atmospheric Composition: from Smog to Climate Change (F'15)		
ESPM 3612W Soil and Environmental Biology	✓	
{FSCN = Food Science and Nutrition}		
FSCN 3102 Introduction to Food Science	✓	
FSCN 4112 Food Chemistry & Functional Foods	✓	✓
FSCN 4121 Food Microbiology		✓
FSCN 4312W Food Analysis	✓	
{GCD = Genetics, Cell Biology, and Development}		
GCD 3022 Genetics	✓	✓
GCD 3485 Bioinformatic Analysis: Intro to Computational Characterization		✓
GCD 4034 Molecular Genetics & Genomics		✓
GCD 4143 Human Genetics		✓
GCD 4161 Developmental Biology	✓	
GCD 5036 Molecular Cell Biology	✓	
{MATS = Materials Science and Engineering}		
MATS 3011 Intro to Materials Science & Engineering	✓	✓
MATS 4312 Principles and Applications of Solar Cells	(Fall 2020)	
{MICB = Microbiology}		
MICB 3301 Biology of Microorganisms	✓	✓
MICB 4131 Immunology	✓	
{MOT = Management of Technology}		
MOT 4001 Leadership, Professionalism and Business Basics for Engineers (2 cr. but ok)	(F '15)	

	Fall 2016	Spring 2017
{NSCI = Neuroscience}		
NSCI 3101 Introduction to Neuroscience I	✓	
{PBIO = Plant Biology}		
PBIO 4601 Topics in Plant Biochemistry	✓	
{PHCL = Pharmacology}		
PHCL 4001 Mechanisms of Drug Action	✓	✓
{PHIL = Philosophy}		
PHIL 5606 Introduction to the Philosophy of Quantum Mechanics		✓
{PHSL = Physiology}		
PHSL 3051 Human Physiology	✓	✓
PHSL 3061 Principles of Physiology	✓	
{PHYS = Physics}		
PHYS 2201 Intro Thermodynamics & Statistical Physics	✓	
PHYS 2303 Physics III: Physics of Matter		✓
PHYS 2503 Foundations of Modern Physics	✓	
PHYS 2601 Quantum Physics		✓
PHYS 5701 Solid State Physics		✓
{PUBH = Public Health}		
PUBH 3104 Environmental Health Effects: Toxicology		✓
PUBH 6190 Environmental Chemistry	✓	
{SOIL = Soil, Water and Climate}		
SOIL 2125 Basic Soil Science	✓	✓
{SSM = Sustainable Systems Management }		
SSM 3301 Global Water Sustainability (online course)	✓	✓
{VBS = Veterinary and Biomedical Sciences}		
VBS 2032 General Microbiology with Laboratory (5 cr.)	✓	✓