Appendix B: Technical Electives Lists

As of June 2009 the Technical Electives (TE) have changed for all ChBE student regardless of the matriculation year. If a course was taken prior to June 2009 and was on a TE list, then it may be used. If you are unsure of what will be allowed please check at the SCS Academic Advising office in room 110A, 110B, or 110C Noyes Lab.

Technical Elective Requirements (Entering Fall 2011 and after):

Concentration in Chemical Engineering

At least 19 hours must be selected from the departmentally approved List of Approved Chemical Engineering Technical Electives, satisfying these distribution requirements.

- 6 hours must be 400-level ChBE courses, with not more than 3 hours being CHBE 497 or 499.
- 3 hours any 400-level course from List 1
- 4 hours any 400-level course from List 2
- 6 hours any courses from List 1

Concentration in Biomolecular Engineering

At least 19 hours must be selected from the departmentally approved List of Approved Biomolecular Engineering Technical Electives Categories A and B and List 2, satisfying these distribution requirements:

- 9 hours must be from Category A, with not more than 3 hours being undergraduate research.
- 4 credit hours must be from List 2
- 6 hours must be from Category B

A maximum of 9 total hours of undergraduate research may be counted toward technical elective credit.

Technical Elective Requirements (Entering Fall 2010 and prior):

Concentration in Chemical Engineering

At least 18 hours must be selected from the departmentally approved List of Approved Chemical Engineering Technical Electives, satisfying these distribution requirements.

- 6 hours must be 400-level ChBE courses, with not more than 3 hours being CHBE 497 or 499.
- 3 hours any 400-level course from List 1
- 6 hours any courses from List 1
- IE 300 (3 hours)

Concentration in Biomolecular Engineering

At least 18 hours must be selected from the departmentally approved List of Approved Biomolecular Engineering Technical Electives Categories A and B and List 2, satisfying these distribution requirements:

- 9 hours must be from Category A, with not more than 3 hours being undergraduate research.
- 6 hours must be from Category B
- IE 300 (3 hours)

A maximum of 9 total hours of undergraduate research may be counted toward technical elective credit.

Engineering Technical Electives (List 1)

Course	Credit Hours	Course Name
ABE	**Agricultural and Biological Engineering**	
ABE 436	3	Renewable Energy Systems
ABE 483	3	Engrg Properties of Food Matls
ABE 488	3	Bioprocessing Biomass for Fuel
AE	**Aerospace Engineering**	
AE 302	3	Aerospace Flight Mechanics II
AE 312	3	Compressible Flow
AE 321	3	Mechs of Aerospace Structures
AE 323	3	Applied Aerospace Structures
AE 352	3	Aerospace Dynamical Systems
AE 353	3	Aerospace Control Systems
AE 370	3	Aerospace Numerical Methods
AE 402	3	Orbital Mechanics
AE 403	3	Spacecraft Attitude Control
AE 410	3	Computational Aerodynamics
AE 412	4	Viscous Flow & Heat Transfer
AE 416	3	Applied Aerodynamics
AE 419	3	Aircraft Flight Mechanics
AE 420	3	Finite Element Analysis
AE 427	3	Mechanics of Polymers
AE 428	3	Mechanics of Composites
AE 433	3	Aerospace Propulsion
AE 434	3	Rocket Propulsion
AE 435	3	Electric Propulsion
AE 442	3	Aerospace Systems Design I
AE 443	3	Aerospace Systems Design II
AE 451	3	Aeroelasticity
AE 454	3	Systems Dynamics & Control
AE 460	2	Aerodynamics & Propulsion Lab
AE 461	2	Structures & Control Lab
AE 468	3	Optical Remote Sensing
AE 482	4	Introduction to Robotics
AE 483	3	Aerospace Decision Algorithms
ATMS	**Atmospheric Sciences**	
ATMS 420	3	Atmospheric Chemistry
ATMS 425	4	Air Quality Modeling
BIOE	**Bioengineering**	
BIOE 380	3	Biomedical Imaging
BIOE 414	3	Biomedical Instrumentation
BIOE 415	2	Biomedical Instrumentation Lab
BIOE 416	3	Biosensors
BIOE 461	4	Cellular Biomechanics
BIOE 467	3	Biophotonics
BIOE 473	3	Biomaterials Laboratory
BIOE 476	3	Tissue Engineering
BIOE 480	3	Magnetic Resonance Imaging
BIOE 481	3	Whole-Body Musculoskel Biomech
BIOE 482	3	Musculoskel Tissue Mechanics
CEE	**Civil and Environmental Engineering**	
CEE 300	4	Behavior of Materials
CEE 310	3	Transportation Engineering
CEE 320	3	Construction Engineering
CEE 330	3	Environmental Engineering
CEE 350	3	Water Resources Engineering
CEE 360	3	Structural Engineering
CEE 380	3	Geotechnical Engineering
CEE 401	4	Concrete Materials
CEE 405	3	Asphalt Materials I
CEE 406	3	Pavement Design I
CEE 420	3	Construction Productivity
CEE 421	3	Construction Planning
CEE 422	3	Construction Cost Analysis
CEE 430	2	Ecological Quality Engineering
CEE 431	3	Biomonitoring
CEE 432	3	Stream Ecology
CEE 434	3	Environmental Systems I
CEE 437	3	Water Quality Engineering
CEE 440	4	Fate Cleanup Environ Pollutant
CEE 442	3	Env Eng Principles, Physical
CEE 443	4	Env Eng Principles, Chemical
CEE 444	4	Env Eng Principles, Biological
CEE 445	4	Air Quality Modeling
CEE 446	3	Air Quality Engineering
CEE 447	3	Atmospheric Chemistry
CEE 449	3	Environmental Engineering Lab
CEE 450	3	Surface Hydrology
CEE 451	3	Environmental Fluid Mechanics
CEE 452	3	Hydraulic Analysis and Design
CEE 453	4	Urban Hydrology and Hydraulics
CEE 457	3	Groundwater
CEE 458	4	Water Resources Field Methods
CEE 460	3	Steel Structures I
CEE 461	3	Reinforced Concrete I
CEE 462	3	Steel Structures II
CEE 463	3	Reinforced Concrete II
CEE 465	3	Design of Structural Systems

Engineering Technical Electives (List 1)

Course	Credit Hours	Course Name
CEE 467	3	Masonry Structures
CEE 468	3	Prestressed Concrete
CEE 469	3	Wood Structures
CEE 470	4	Structural Analysis
CEE 471	3	Structural Mechanics
CEE 472	3	Structural Dynamics I
CEE 480	3	Foundation Engineering
CEE 483	4	Soil Mechanics and Behavior
CEE 484	4	Applied Soil Mechanics
CEE 491	3	Decision and Risk Analysis
CHBE	**Chemical and Biomolecular Engineering**	
CHBE 297	1-3	Individual Study for Sophomores
CHBE 397	1-3	Individual Study for Juniors
CHBE 451	3	Transport Phenomena
CHBE 452	3	Chemical Kinetics & Catalysis
CHBE 453	2-3	Electrochemical Engineering
CHBE 454	2	CHBE Projects
CHBE 455	3	Polymers Synthesis & Engineering
CHBE 456	3	Polymer Science & Engineering
CHBE 457	3	Microelectronics Processing
CHBE 471	3	Biochemical Engineering
CHBE 472	3	Techniques in Biomolecular Eng
CHBE 473	3	Biomolecular Engineering
CHBE 474	3	Metabolic Engineering
CHBE 475	3	Tissue Engineering
CHBE 476	3	Biotransport
CHBE 478	3	Bioenergy Technology
CHBE 494	1-3	Special Topics
CHBE 497	1-3	Individual Study for Seniors
CHBE 499	1-6	Senior Thesis
CHEM	**Chemistry**	
CHEM 482	3	Polymer Physical Chemistry
CHEM 488	3	Surfaces and Colloids
CS	**Computer Science**	
CS 357	3	Numerical Methods I
CS 420	3	Parallel Progrmg: Sci & Engrg
CS 425	3	Distributed Systems
CS 436	3	Computer Networking Laboratory
CS 438	3	Communication Networks
CS 439	3	Wireless Networks
CS 440	3	Artificial Intelligence
CS 450	3	Numerical Analysis
CS 460	3	Security Laboratory

Course	Credit Hours	Course Name
CS 461	3	Computer Security I
CS 463	3	Computer Security II
CS 477	3	Formal Software Devel Methods
CS 482	0-4	Simulation
CS 483	4	Applied Parallel Programming
CSE	**Computational Science and Engineering**	
CSE 401	3	Numerical Analysis
CSE 402	3	Parallel Progrmg: Sci & Engrg
CSE 441	3	Introduction to Optimization
CSE 450	3	Computational Mechanics
CSE 451	3	Finite Element Analysis
CSE 485	3	Atomic Scale Simulations
ECE	**Electrical and Computer Engineering**	
ECE 304	3	Photonic Devices
ECE 307	3	Techniques for Engrg Decisions
ECE 310	3	Digital Signal Processing
ECE 311	1	Digital Signal Processing Lab
ECE 313	3	Probability with Engrg Applic
ECE 329	3	Fields and Waves I
ECE 330	3	Power Ckts & Electromechanics
ECE 333	3	Green Electric Energy
ECE 340	3	Semiconductor Electronics
ECE 342	3	Electronic Circuits
ECE 343	1	Electronic Circuits Laboratory
ECE 350	3	Fields and Waves II
ECE 361	3	Digital Communications
ECE 380	3	Biomedical Imaging
ECE 385	2	Digital Systems Laboratory
ECE 391	4	Computer Systems Engineering
ECE 395	2-3	Advanced Digital Projects Lab
ECE 403	3	Audio Engineering
ECE 408	4	Applied Parallel Programming
ECE 411	4	Computer Organization & Design
ECE 412	3	Microcomputer Laboratory
ECE 414	3	Biomedical Instrumentation
ECE 415	2	Biomedical Instrumentation Lab
ECE 416	3	Biosensors
ECE 417	4	Multimedia Signal Processing
ECE 418	4	Image & Video Processing
ECE 419	3	Security Laboratory
ECE 420	2	Embedded DSP Laboratory
ECE 422	3	Computer Security I
ECE 424	3	Computer Security II

Engineering Technical Electives (List 1)

Course	Credit Hours	Course Name
ECE 425	3	Intro to VLSI System Design
ECE 428	3	Distributed Systems
ECE 431	4	Electric Machinery
ECE 432	3	Advanced Electric Machinery
ECE 435	3	Computer Networking Laboratory
ECE 437	3	Sensors and Instrumentation
ECE 438	3	Communication Networks
ECE 439	3	Wireless Networks
ECE 441	3	Physcs & Modeling Semicond Dev
ECE 444	4	IC Device Theory & Fabrication
ECE 447	3	Active Microwave Ckt Design
ECE 448	3	Artificial Intelligence
ECE 451	3	Adv Microwave Measurements
ECE 452	3	Electromagnetic Fields
ECE 453	4	Wireless Communication Systems
ECE 454	3	Antennas
ECE 455	3	Optical Electronics
ECE 456	4	Global Nav Satellite Systems
ECE 457	3	Microwave Devices & Circuits
ECE 458	3	Applic of Radio Wave Propag
ECE 459	3	Communications Systems
ECE 460	4	Optical Imaging
ECE 462	3	Logic Design
ECE 463	2	Digital Communications Lab
ECE 464	3	Power Electronics
ECE 465	3	Optical Communications Systems
ECE 466	1	Optical Communications Lab
ECE 467	3	Biophotonics
ECE 468	3	Optical Remote Sensing
ECE 469	2	Power Electronics Laboratory
ECE 470	4	Introduction to Robotics
ECE 472	3	Biomedical Ultrasound Imaging
ECE 473	3	Fund of Engrg Acoustics
ECE 476	3	Power System Analysis
ECE 478	3	Formal Software Devel Methods
ECE 480	3	Magnetic Resonance Imaging
ECE 481	3	Nanotechnology
ECE 482	3	Digital IC Design
ECE 483	3	Analog IC Design
ECE 484	3	Prin Adv Microelec Processing
ECE 485	3	MEMS Devices & Systems
ECE 487	3	Intro Quantum Electr for EEs
ECE 488	3	Compound Semicond & Devices
ECE 490	3	Introduction to Optimization
ECE 491	3	Numerical Analysis
ECE 492	3	Parallel Progrmg: Sci & Engrg
ECE 495	3	Photonic Device Laboratory
ECE 496	2	Senior Research Project
GE	**General Engineering**	
GE 402	3	Comp-Aided Product Realization
GE 410	3	Component Design
GE 411	3	Reliability Engineering
GE 413	3	Engrg Design Optimization
GE 420	4	Digital Control Systems
GE 423	3	Mechatronics
GE 424	3	State Space Design for Control
IB	**Integrative Biology**	
IB 450	3	Stream Ecology
IE	**Industrial Engineering**	
IE 310	3	Operations Research
IE 330	3	Industrial Quality Control
IE 360	3	Facilities Planning and Design
IE 361	3	Production Planning & Control
IE 400	3	Design & Anlys of Experiments
IE 411	3	Optimization of Large Systems
IE 412	3	OR Models for Mfg Systems
IE 413	0-4	Simulation
IE 430	3	Economic Found of Quality Syst
IE 431	3	Quality Engineering
MATH	**Mathematics**	
MATH 450	3	Numerical Analysis
ME	**Mechanical Engineering**	
ME 310	4	Fundamentals of Fluid Dynamics
ME 330	4	Engineering Materials
ME 350	3	Design for Manufacturability
ME 360	3.5	Signal Processing
ME 370	3	Mechanical Design I
ME 371	3	Mechanical Design II
ME 400	3	Energy Conversion Systems
ME 401	3	Refrigeration and Cryogenics
ME 402	3	Design of Thermal Systems
ME 403	3	Internal Combustion Engines
ME 410	4	Intermediate Gas Dynamics
ME 411	4	Viscous Flow & Heat Transfer
ME 412	3	Numerical Thermo-Fluid Mechs
ME 420	4	Intermediate Heat Transfer

Engineering Technical Electives (List 1)

Course	Credit Hours	Course Name
ME 430	3	Failure of Engrg Materials
ME 431	3	Mechanical Component Failure
ME 440	3	Kinem & Dynamics of Mech Syst
ME 445	4	Introduction to Robotics
ME 450	3	Modeling Materials Processing
ME 451	3	Computer-Aided Mfg Systems
ME 452	3	Num Control of Mfg Processes
ME 460	4	Industrial Control Systems
ME 461	3	Computer Cntrl of Mech Systems
ME 471	3	Finite Element Analysis
ME 472	4	Introduction to Tribology
ME 481	3	Whole-Body Musculoskel Biomech
ME 482	3	Musculoskel Tissue Mechanics
ME 483	4	Mechanobiology
ME 485	3	MEMS Devices & Systems
ME 487	4	MEMS-NEMS Theory & Fabrication
MSE	**Materials Science and Engineering**	
MSE 304	3	Electronic Properties of Matls
MSE 307	3	Materials Laboratory I
MSE 308	3	Materials Laboratory II
MSE 395	2	Materials Design
MSE 402	3	Kinetic Processes in Materials
MSE 403	3	Synthesis of Materials
MSE 405	3	Microstructure Determination
MSE 406	3	Thermal-Mech Behavior of Matls
MSE 420	3	Ceramic Materials & Properties
MSE 421	3	Ceramic Processing
MSE 422	3	Electrical Ceramics
MSE 423	3	Ceramic Processing Laboratory
MSE 440	3	Mechanical Behavior of Metals
MSE 441	3	Metals Processing
MSE 442	3	Metals Laboratory
MSE 443	3	Design of Engineering Alloys
MSE 445	3	Corrosion of Metals
MSE 450	3	Polymer Science & Engineering
MSE 452	3	Polymer Laboratory
MSE 453	3	Plastics Engineering
MSE 454	3	Mechanics of Polymers
MSE 455	3	Polymer Physics
MSE 456	3	Mechanics of Composites
MSE 457	3	Polymer Chemistry
MSE 458	3	Polymer Physical Chemistry

Course	Credit Hours	Course Name
MSE 460	3	Electronic Materials I
MSE 461	3	Electronic Materials II
MSE 462	3	Electronic Materials Lab
MSE 470	3	Design and Use of Biomaterials
MSE 472	3	Biomaterials Laboratory
MSE 473	3	Biomolecular Materials Science
MSE 474	3	Biomaterials and Nanomedicine
MSE 480	3	Surfaces and Colloids
MSE 481	3	Electron Microscopy
MSE 484	3	Composite Materials
MSE 485	3	Atomic Scale Simulations
MSE 487	3	Materials for Nanotechnology
MSE 488	3	Optical Materials
MSE 489	3	Matl Select for Sustainability
NPRE	**Nuclear, Plasma, and Radiological Engrng**	
NPRE 201	0-3	Energy Systems
NPRE 402	3	Nuclear Power Engineering
NPRE 412	3	Nuclear Power Econ & Fuel Mgmt
NPRE 421	3	Plasma and Fusion Science
NPRE 423	2	Plasma Laboratory
NPRE 429	3	Plasma Engineering
NPRE 431	3	Materials in Nuclear Engrg
NPRE 432	2	Nuclear Engrg Materials Lab
NPRE 435	3	Imaging w/Ionizing Radiation
NPRE 441	4	Radiation Protection
NPRE 442	3	Radioactive Waste Management
NPRE 444	3	Nuclear Analytical Methods Lab
NPRE 446	3	Radiation Interact w/Matter I
NPRE 447	3	Radiation Interact w/Matter II
NPRE 448	4	Nuclear Syst Engrg & Design
NPRE 451	3	NPRE Laboratory
NPRE 455	4	Neutron Diffusion & Transport
NPRE 457	3	Safety Anlys Nucl Reactor Syst
NPRE 458	4	Design in NPRE
NPRE 470	3	Fuel Cells & Hydrogen Sources
NPRE 475	3	Wind Power Systems
NPRE 480	3	Energy and Security
PHYS	**Physics**	
PHYS 466	3	Atomic Scale Simulations
TAM	**Theoretical and Applied Mechanics**	
TAM 211	3	Statics
TAM 212	3	Introductory Dynamics
TAM 251	3	Introductory Solid Mechanics

Engineering Technical Electives (List 1)

Course	Credit Hours	Course Name
TAM 252	1	Solid Mechanics Design
TAM 324	4	Behavior of Materials
TAM 412	4	Intermediate Dynamics
TAM 413	3	Fund of Engrg Acoustics
TAM 424	3	Mechanics of Structural Metals
TAM 427	3	Mechanics of Polymers
TAM 428	3	Mechanics of Composites

Course	Credit Hours	Course Name
TAM 435	4	Intermediate Fluid Mechanics
TAM 445	4	Continuum Mechanics
TAM 451	4	Intermediate Solid Mechanics
TAM 456	3	Experimental Stress Analysis
TAM 461	4	Cellular Biomechanics
TAM 470	3	Computational Mechanics

Science and Mathematics Technical Electives (List 2)

Course	Credit Hours	Course Name
All 400 level courses within Engineering Technical Elective list (List 1) are included within the Science and Mathematics Technical Elective list (List 2)		
ABE	**Agricultural and Biological Engineering**	
ABE 425	4	Engrg Measurement Systems
ABE 430	2	Project Management
ABE 445	4	Statistical Methods
ABE 446	3	Biological Nanoengineering
ABE 455	2	Erosion and Sediment Control
ABE 456	3	Land & Water Resources Engrg
ABE 457	2	NPS Pollution Processes
ABE 458	2	NPS Pollution Modeling
ABE 459	3	Drainage and Water Management
ABE 463	3	Electrohydraulic Systems
ABE 466	3	Engineering Off-Road Vehicles
ABE 469	4	Industry-Linked Design Project
ABE 476	4	Indoor Air Quality Engineering
ABE 482	3	Package Engineering
ABE 489	3	Corn Milling Process Design
ABE 497	1-4	Independent Study
ABE 498	1-4	Special Topics
AE	**Aerospace Engineering**	
AE 497	1-4	Independent Study
ATMS	**Atmospheric Sciences**	
ATMS 405	4	Boundary Layer Processes
ATMS 406	4	Tropical Meteorology
ATMS 410	4	Radar Remote Sensing
ATMS 411	4	Satellite Remote Sensing
ATMS 421	4	Earth Systems Modeling
ATMS 444	4	Arctic Meteorology and Climate
ATMS 446	3	Climate & Social Vulnerability
ATMS 447	3	Climate Change Assessment
ATMS 449	4	Biogeochemical Cycles
ATMS 490	1-4	Individual Study
ATMS 491	2-4	Adv Topics in Atmospheric Sci
ATMS 492	4	Capstone Undergrad Research
BIOC	**Biochemistry**	
BIOC 406	3	Gene Expression
BIOC 445	3	Current Topics in Biochemistry
BIOC 446	3	Physical Biochemistry
BIOC 455	4	Technqs Biochem & Biotech
BIOC 460	3	Biochemistry Senior Seminar
BIOC 492	2-6	Senior Thesis

Course	Credit Hours	Course Name
BIOE	**Bioengineering**	
BIOE 435	2	Senior Design I
BIOE 436	2	Senior Design II
BIOE 497	1-4	Individual Study
BIOE 498	1-4	Special Topics
BIOE 499	2	Senior Thesis
BIOP	**Biophysics**	
BIOP 401	3	Introduction to Biophysics
BIOP 419	3	Brain, Behavior & Info Process
BIOP 432	3	Photosynthesis
BIOP 470	3	Computational Chemical Biology
CEE	**Civil and Environmental Engineering**	
CEE 407	3	Airport Design
CEE 408	3	Railroad Transportation Engrg
CEE 409	3	Railroad Track Engineering
CEE 410	3	Railway Signaling & Control
CEE 411	3	RR Project Design & Constr
CEE 415	4	Geometric Design of Roads
CEE 416	3	Traffic Capacity Analysis
CEE 417	4	Urban Transportation Planning
CEE 490	3	Computer Methods
CEE 495	0	Professional Practice
CEE 497	1-16	Independent Study
CEE 498	1-4	Special Topics
CHEM	**Chemistry**	
CHEM 436	3	Fundamental Organic Chem II
CHEM 437	3	Organic Chemistry Lab
CHEM 438	3	Advanced Organic Chemistry
CHEM 444	4	Physical Chemistry II
CHEM 445	2	Physical Principles Lab I
CHEM 447	2	Physical Principles Lab II
CHEM 450	4	Astrochemistry
CHEM 451	3	Astrochemistry Laboratory
CHEM 460	3	Green Chemistry
CHEM 470	3	Computational Chemical Biology
CHEM 472	3	Physical Biochemistry
CHEM 474	3	Drug Discovery & Development
CHEM 483	4	Solid State Structural Anlys
CHEM 492	1-3	Special Topics in Chemistry
CHEM 497	1-3	Individual Study Senior
CHEM 499	2-6	Senior Thesis
CPSC	**Crop Sciences**	
CPSC 407	3	Diseases of Field Crops

Science and Mathematics Technical Electives (List 2)

Course	Credit Hours	Course Name
CPSC 412	3	Principles of Crop Advising
CPSC 414	3	Forage Crops and Pasture Eco
CPSC 415	3	Bioenergy Crops
CPSC 418	3	Crop Growth and Management
CPSC 419	1	Midwest Agricultural Practices
CPSC 426	3	Weed Mgt in Agronomic Crops
CPSC 428	2	Weed Science Practicum
CPSC 431	3	Plants and Global Change
CPSC 433	3	Basic Toxicology
CPSC 436	4	Conservation Biology
CPSC 437	3	Principles of Agroecology
CPSC 438	3	Soil Nutrient Cycling
CPSC 439	3	Env and Sustainable Dev
CPSC 448	3	Biological Modeling
CPSC 452	3	Evol Genetics and Genomics
CPSC 453	4	Principles of Plant Breeding
CPSC 454	2	Plant Breeding Methods
CPSC 462	1	Plant Molecular Biology
CPSC 466	2	Genomics for Plant Improvement
CPSC 467	1	Plant Genomics
CPSC 468	2	Plant Proteomics-Metabolomics
CPSC 473	3	Mgmt of Field Crop Insects
CPSC 475	4	Insect Pathology
CPSC 479	3	Insect Pest Management
CPSC 482	4	Plant Tissue Culture
CPSC 483	3	Outreach Education Skills
CPSC 484	3	Plant Physiology
CPSC 488	3	Soil Fertility and Fertilizers
CPSC 489	3	Photosynthesis
CS	**Computer Science**	
CS 410	3	Text Information Systems
CS 411	3	Database Systems
CS 412	3	Introduction to Data Mining
CS 413	3	Intro to Combinatorics
CS 414	3	Multimedia Systems
CS 418	0-4	Interactive Computer Graphics
CS 419	3	Production Computer Graphics
CS 421	3	Progrmg Languages & Compilers
CS 422	3	Programming Language Design
CS 423	3	Operating Systems Design
CS 424	3	Real-Time Systems
CS 426	3	Compiler Construction
CS 427	3	Software Engineering I

Course	Credit Hours	Course Name
CS 428	3	Software Engineering II
CS 429	3	Software Engineering II, ACP
CS 431	0-4	Embedded Systems
CS 433	3	Computer System Organization
CS 446	3	Machine Learning
CS 457	3	Numerical Methods II
CS 465	3	User Interface Design
CS 466	3	Introduction to Bioinformatics
CS 467	3	Social Visualization
CS 473	3	Fundamental Algorithms
CS 475	3	Formal Models of Computation
CS 476	3	Program Verification
CS 481	3	Stochastic Processes & Applic
CS 492	3	Senior Project I
CS 493	3	Senior Project II, ACP
CS 494	3	Senior Project II
CS 498	0-4	Special Topics
CS 499	3	Senior Thesis
CSE	**Computational Science and Engineering**	
CSE 414	3	Fundamental Algorithms
CSE 422	3	Computer System Organization
CSE 423	3	Operating Systems Design
CSE 426	3	Software Engineering I
CSE 427	0-4	Interactive Computer Graphics
CSE 429	3	Software Engineering II
CSE 461	3	Computational Aerodynamics
CSE 491	3	Computer Methods
ECE	**Electrical and Computer Engineering**	
ECE 402	3	Electronic Music Synthesis
ECE 445	4	Senior Design Project Lab
ECE 493	3	Advanced Engineering Math
ECE 498	0-4	Special Topics in ECE
ECE 499	2	Senior Thesis
ENVS	**Environmental Studies**	
ENVS 406	4	Urban Ecology
ENVS 420	4	Conservation Biology
ENVS 430	3	Comm in Env Social Movements
ENVS 431	3	Environ Toxicology & Health
ENVS 433	3	Pesticide Toxicology
ENVS 447	3	Environmental Sociology
ENVS 469	3	Environmental Health
ENVS 474	4	Principles of Epidemiology
ENVS 480	3	Basic Toxicology

Science and Mathematics Technical Electives (List 2)

Course	Credit Hours	Course Name
FSHN	**Food Science and Human Nutrition**	
FSHN 414	3	Food Chemistry
FSHN 416	2	Food Chemistry Laboratory
FSHN 418	4	Food Analysis
FSHN 420	3	Nutritional Aspects of Disease
FSHN 421	3	Pediatric Clinical Nutrition
FSHN 423	2	Advances in Foods & Nutrition
FSHN 426	3	Biochemical Nutrition I
FSHN 427	3	Biochemical Nutrition II
FSHN 428	3	Community Nutrition
FSHN 429	3	Nutrition Assessment & Therapy
FSHN 442	3	HM Skills and Applications
FSHN 443	4	Management of Fine Dining
FSHN 450	1	Dietetics: Professional Issues
FSHN 460	3	Food Processing Engineering
FSHN 461	4	Food Processing I
FSHN 462	2	Food Processing II
FSHN 465	3	Principles of Food Technology
FSHN 466	3	Food Product Development
FSHN 469	3	Package Engineering
FSHN 471	3	Food & Industrial Microbiology
FSHN 480	3	Basic Toxicology
FSHN 499	1-3	Cur Topics in FS & Human Nutr
GE	**General Engineering**	
GE 400	3	Engineering Law
GE 462	3	Leading Sustainable Change
GE 494	3	Senior Engineering Project I
GE 495	2	Senior Engineering Project II
GE 497	1-4	Independent Study
GE 498	1-4	Special Topics
GEOL	**Geology**	
GEOL 401	4	Geomorphology
GEOL 406	4	Fluvial Geomorphology
GEOL 411	4	Structural Geol and Tectonics
GEOL 415	2-8	Field Geology
GEOL 417	6	Geol Field Methods, Western US
GEOL 432	4	Mineralogy and Mineral Optics
GEOL 436	4	Petrology and Petrography
GEOL 440	4	Sedimentology and Stratigraphy
GEOL 450	3	Probing the Earth's Interior
GEOL 451	4	Env and Exploration Geophysics
GEOL 452	4	Introduction to Geophysics
GEOL 454	3	Introduction to Seismology
GEOL 460	3	Geochemistry
GEOL 470	4	Introduction to Hydrogeology
GEOL 481	4	Earth Systems Modeling
GEOL 483	3	Challenges of Sustainability
GEOL 492	2-8	Senior Thesis
GEOL 493	2-8	Honors Senior Thesis
GEOL 497	1-4	Special Topics in Geology
IB	**Integrative Biology**	
IB 401	3-4	Introduction to Entomology
IB 402	3	Molecular Evolution
IB 403	3	Behavioral Inference & Fossils
IB 404	2	Comp Genomics of Eukaryotes
IB 405	3	Ecological Genetics
IB 406	3	Evolution of Adaptive Systems
IB 409	3	Evol of Infectious Disease
IB 410	3	Evolution and Development
IB 416	3	Population Genetics
IB 420	3	Plant Physiology
IB 421	3	Photosynthesis
IB 424	3	Plant Development
IB 426	3	Env and Evol Physl of Animals
IB 427	4	Insect Physiology
IB 428	3	Primate Form and Behavior
IB 431	3	Behavioral Ecology
IB 432	3	Genes and Behavior
IB 433	5	Comparative Vertebrate Anatomy
IB 437	3	Primate Behav Endocrinology
IB 439	3	Biogeography
IB 440	3	Plants and Global Change
IB 443	3	Evolutionary Ecology
IB 444	3-4	Insect Ecology
IB 445	3	Chemical Ecology
IB 447	1	Field Ecology
IB 449	3-4	Limnology
IB 451	4	Conservation Biology
IB 452	3	Ecosystem Ecology
IB 453	3	Community Ecology
IB 461	4	Ornithology
IB 462	4	Mammalogy
IB 463	4	Ichthyology
IB 464	4	Herpetology
IB 467	4	Principles of Systematics
IB 468	4	Insect Classification and Evol

Science and Mathematics Technical Electives (List 2)

Course	Credit Hours	Course Name
IB 471	4	General Mycology
IB 472	1	Plant Molecular Biology
IB 473	1	Plant Genomics
IB 474	2	Plant Proteomics- Metabolomics
IB 477	2	Genomics for Plant Improvement
IB 478	3	Evol Genetics and Genomics
IB 481	4	Biology of Disease Vectors
IB 482	3	Insect Pest Management
IB 483	4	Insect Pathology
IB 485	3	Environ Toxicology & Health
IB 486	3	Pesticide Toxicology
IB 487	3	Math Modeling in Life Sciences
IB 490	1-5	Independent Study
IB 491	3	Biological Modeling
IB 493	4	Statistical Ecology
IB 496	1-5	Special Courses
IE	**Industrial Engineering**	
IE 410	3	Stochastic Processes & Applic
IE 420	3	Financial Engineering
IE 446	4	Human-Computer Interaction Lab
IE 497	1-4	Independent Study
IE 498	1-4	Special Topics
MATH	**Mathematics**	
MATH 402	3-4	Non Euclidean Geometry
MATH 403	3-4	Euclidean Geometry
MATH 408	4	Actuarial Statistics I
MATH 409	4	Actuarial Statistics II
MATH 410	3-4	Lin Algebra & Financial Apps
MATH 412	3-4	Graph Theory
MATH 413	3	Intro to Combinatorics
MATH 414	3-4	Mathematical Logic
MATH 417	3-4	Intro to Abstract Algebra
MATH 418	3-4	Intro to Abstract Algebra II
MATH 423	3-4	Differential Geometry
MATH 424	3	Honors Real Analysis
MATH 425	3	Honors Advanced Analysis
MATH 427	3	Honors Abstract Algebra
MATH 428	3	Honors Topics in Mathematics
MATH 432	3-4	Set Theory and Topology
MATH 441	3-4	Differential Equations
MATH 442	3-4	Intro Partial Diff Equations
MATH 444	3-4	Elementary Real Analysis
MATH 446	3	Applied Complex Variables
MATH 447	3	Real Variables
MATH 448	3-4	Complex Variables
MATH 453	3-4	Elementary Theory of Numbers
MATH 461	3-4	Probability Theory
MATH 463	4	Statistics and Probability I
MATH 464	3	Statistics and Probability II
MATH 465	3	Analysis of Variance
MATH 468	3	Topics in Applied Statistics
MATH 469	3	Methods of Applied Statistics
MATH 471	4	Actuarial Theory I
MATH 472	3	Actuarial Theory II
MATH 473	3	Fundamental Algorithms
MATH 475	3	Formal Models of Computation
MATH 476	3	Actuarial Risk Theory
MATH 478	3	Actuarial Modeling
MATH 479	3-4	Casualty Actuarial Mathematics
MATH 481	3-4	Vector and Tensor Analysis
MATH 482	3-4	Linear Programming
MATH 484	3-4	Nonlinear Programming
MATH 487	3	Advanced Engineering Math
MATH 488	3-4	Math Methods In Engineering
MATH 489	3-4	Dynamics & Differential Eqns
MATH 490	1-4	Advanced Topics in Mathematics
MATH 493	3	Statistical Computing
MATH 494	3	Time Series Analysis
MATH 496	3	Honors Seminar
MATH 499	1	Introduction Graduate Research
MCB	**Molecular and Cell Biology**	
MCB 400	3	Cancer Cell Biology
MCB 401	3	Cell & Membrane Physiology
MCB 402	3	Sys & Integrative Physiology
MCB 403	2	Cell & Membrane Physiology Lab
MCB 404	2	Sys & Integrative Physiol Lab
MCB 406	3	Gene Expression
MCB 408	3	Immunology
MCB 410	4	Developmental Biology
MCB 413	3	Endocrinology
MCB 419	3	Brain, Behavior & Info Process
MCB 421	3	Microbial Genetics
MCB 424	3	Microbial Biochemistry
MCB 426	3	Bacterial Pathogenesis
MCB 428	2	Bacterial Pathogens Laboratory
MCB 429	3	Cellular Microbiology &Disease

Science and Mathematics Technical Electives (List 2)

Course	Credit Hours	Course Name
MCB 430	3	Molecular Microbiology
MCB 431	3	Microbial Physiology
MCB 432	3	Computing in Molecular Biology
MCB 433	3	Virology & Viral Pathogenesis
MCB 434	3	Food & Industrial Microbiology
MCB 435	3	Microbial Ecology & Evolution
MCB 436	1	Global Biosecurity
MCB 442	4	Comparative Immunobiology
MCB 446	3	Physical Biochemistry
MCB 450	3	Introductory Biochemistry
MCB 460	3	Regeneration and Medicine
MCB 461	3	Cell & Molecular Neuroscience
MCB 462	3	Integrative Neuroscience
MCB 480	3	Eukaryotic Cell Signaling
MCB 481	3	Developmental Neurobiology
MCB 492	3-5	Senior Thesis
MCB 493	1-4	Special Topics Mol Cell Biol
ME	**Mechanical Engineering**	
ME 470	3	Senior Design Project
ME 496	1-4	Honors Project
ME 497	1-4	Independent Study
ME 498	0-4	Special Topics
MSE	**Materials Science and Engineering**	
MSE 401	4	Thermodynamics of Materials
MSE 497	1-4	Independent Study
MSE 498	1-4	Special Topics
MSE 499	1-5	Senior Thesis
NPRE	**Nuclear, Plasma, and Radiological Engrng**	
NPRE 498	1-4	Special Topics
PATH	**Pathobiology**	
PATH 410	4	Comparative Immunobiology
PATH 433	3	Virology & Viral Pathogenesis
PATH 439	3	Health Applications of GIS
PATH 460	3	Biology of Emerging Infect Dis
PATH 474	4	Principles of Epidemiology
PATH 494	1-4	Pathobiology
PHYS	**Physics**	
PHYS 401	3	Classical Physics Lab
PHYS 402	4	Light
PHYS 403	5	Modern Experimental Physics
PHYS 404	5	Electronic Circuits
PHYS 406	4	Acoustical Physics of Music
PHYS 420	2	Space, Time, and Matter

Course	Credit Hours	Course Name
PHYS 435	3	Electromagnetic Fields I
PHYS 436	3	Electromagnetic Fields II
PHYS 460	4	Condensed Matter Physics
PHYS 470	4	Subatomic Physics
PHYS 475	3	Biological Physics
PHYS 486	4	Quantum Physics I
PHYS 487	4	Quantum Physics II
PHYS 496	3	Intro to Physics Research
PHYS 497	1-4	Individual Study
PHYS 498	1-4	Special Topics in Physics
PHYS 499	1-4	Senior Thesis
SE	**Systems Engineering and Design**	
SE 400	3	Engineering Law
SE 462	3	Leading Sustainable Change
SE 494	3	Senior Engineering Project I
SE 495	2	Senior Engineering Project II
SE 497	1-4	Independent Study
SE 498	1-4	Special Topics
STAT	**Statistics**	
STAT 400	4	Statistics and Probability I
STAT 408	4	Actuarial Statistics I
STAT 409	4	Actuarial Statistics II
STAT 410	3	Statistics and Probability II
STAT 420	3	Methods of Applied Statistics
STAT 424	3	Analysis of Variance
STAT 425	3	Applied Regression and Design
STAT 426	3	Sampling and Categorical Data
STAT 427	3	Statistical Consulting
STAT 428	3	Statistical Computing
STAT 429	3	Time Series Analysis
STAT 430	3	Topics in Applied Statistics
STAT 440	3	Statistical Data Management
STAT 448	4	Advanced Data Analysis
STAT 458	3	Math Modeling in Life Sciences
STAT 466	3	Image and Neuroimage Analysis
STAT 484	3	Ethical Practice of Statistics
TAM	**Theoretical and Applied Mechanics**	
TAM 497	1-4	Independent Study
TAM 498	1-4	Special Topics
TAM 499	3	Senior Thesis
TMGT	**Technology, Engineering and Management**	
TMGT 461	2	Final project

UIUC Chemical and Biomolecular Engineering

Chemical Engineering Biomolecular Concentration Technical Electives (Cat A)

Course	Credit Hours	Course Name
CHBE	**Chemical and Biomolecular Engineering**	
CHBE 471	3	Biochemical Engineering
CHBE 472	3	Techniques in Biomolecular Eng
CHBE 473	3	Biomolecular Engineering
CHBE 474	3	Metabolic Engineering
CHBE 475	3	Tissue Engineering
CHBE 476	3	Biotransport
CHBE 478	3	Bioenergy Technology
CHBE 497*	1-3	Individual Study for Seniors*
CHBE 499*	1-6	Senior Thesis*

*In order for CHBE 497, or 499 to be considered a Category A technical elective, the project must contain sufficient biomolecular content. Discuss this with your project advisor for permission for the course to count as a Cat A.

UIUC Chemical and Biomolecular Engineering

Other Engineering Biomolecular Concentration Technical Electives (Cat B)

Course	Credit Hours	Course Name
All courses within Biomolecular Concentration Technical Elective list (Cat A) are included within the Engineering Biomolecular Concentration Technical Elective list (Cat B)		
ABE	**Agricultural and Biological Engineering**	
ABE 436	3	Renewable Energy Systems
ABE 483	3	Engrg Properties of Food Matls
ABE 488	3	Bioprocessing Biomass for Fuel
BIOE	**Bioengineering**	
BIOE 414	3	Biomedical Instrumentation
BIOE 415	2	Biomedical Instrumentation Lab
BIOE 461	4	Cellular Biomechanics
BIOE 467	3	Biophotonics
BIOE 473	3	Biomaterials Laboratory
BIOE 476	3	Tissue Engineering

Course	Credit Hours	Course Name
BIOE 480	3	Magnetic Resonance Imaging
ECE	**Electrical and Computer Engineering**	
ECE 414	3	Biomedical Instrumentation
ECE 415	2	Biomedical Instrumentation Lab
ECE 467	3	Biophotonics
ECE 480	3	Magnetic Resonance Imaging
MSE	**Materials Science and Engineering**	
MSE 470	3	Design and Use of Biomaterials
MSE 472	3	Biomaterials Laboratory
MSE 473	3	Biomolecular Materials Science
MSE 474	3	Biomaterials and Nanomedicine
TAM	**Theoretical and Applied Mechanics**	
TAM 461	4	Cellular Biomechanics