

## Approved Technical Electives in Chemical Engineering

*grouped by emphasis track*

### Advanced Materials

cr hrs

CH E 462. Ceramic and Metallic Composites	3
CH E 464. Polymer Science	3
CH E 465. Process Technology of Solid-State Materials Devices	3
PHYS 489. Introduction to Modern Materials	3
PHYS 490. Nuclei and Elementary Particles	3

### Nuclear Engineering

CH E 470: Introduction to Nuclear Energy**	3
CH E 471: Health Physics**	3
CHEM 332: Nuclear and Radiochemistry**	3
CH E 473: Regulations and Compliance	3
CH E 474: Power Plant Design	3
CH E 475: Nuclear Reactor Theory	3
CH E 491: The Nuclear Fuel Cycle	3
EE 332: Introduction to Electric Power Engineering	3
ECON 455: Public Utilities Regulation	3

\*\*core courses for Nuclear Energy minor

### Traditional FE Prep

C E 233. Mechanics-Statics	3
E E 201. Networks I	3
M E 234. Mechanics-Dynamics	3
M E 236. Engineering Mechanics I	3

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<b>Biochemical/Pre-Med</b>	<b>cr hrs</b>
A EN 335. Engineering for Biological Systems	3
BCHE 341: Survey of Biochemistry*	3
BCHE 395. Biochemistry*	3
BCHE 396. Biochemistry and Biotechnology	3
BIOL 111G. Natural History of Life*	3
BIOL 111GL. Natural History of Life Laboratory*	1
BIOL 154. Introductory Anatomy and Physiology	3
BIOL 211G. Cellular and Organismal Biology*	3
BIOL 211GL. Cellular and Organismal Biology Laboratory*	1
BIOL 219. Public Health Microbiology	3
BIOL 253: Human Anatomy*	3
BIOL 254: Human Physiology*	3
BIOL 260. Human Genetics	3
BIOL 260 L. Human Genetics Laboratory	1
BIOL 305. Principles of Genetics*	3
BIOL 311. General Microbiology*	3
BIOL 311 L. General Microbiology Laboratory*	1
BIOL 354. Physiology of Humans	3
BIOL 377. Cell Biology	3
BIOL 381. Animal Physiology	3
BIOL 451. Physiology of Microorganisms	3
BIOL 454. Biology of Respiration	3
BIOL 471. Molecular and Cellular Mycology	3
BIOL 473. Ecology of Microorganisms	3
BIOL 474. Immunology	3
BIOL 475. Virology	3
BIOL 476. Soil Microbiology	3
BIOL 476 L. Soil Microbiology Laboratory	1
BIOL 477. Applied and Environmental Microbiology	4
BIOL 482. Microbial Systematics	3
C S 486. Bioinformatics	3
CH E 476. Biotechnology Processes	3
CH E 477. Introduction to Bioengineering	3
CHEM 372. Forensic Chemistry	3
CHEM 466. Advanced Organic Chemistry	3
MOLB 470. Bioinformatics and Genome Analysis	3

\*recommended for pre-med students

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<b>Fundamental Sciences</b>	<b>cr hrs</b>
MATH 377. Introduction to Numerical Methods	3
MATH 391. Vector Analysis	3
MATH 471. Complex Variables	3
MATH 472. Fourier Series and Boundary Value Problems	3
PHYS 217. Heat, Light, and Sound	3
PHYS 301G. Photonics	3
PHYS 315. Modern Physics	3
PHYS 451. Intermediate Mechanics I	3
PHYS 370. Geometrical Optics	3
PHYS 454. Intermediate Modern Physics I	3
PHYS 461. Intermediate Electricity and Magnetism I	3
PHYS 462. Intermediate Electricity and Magnetism II	3
PHYS 470. Physical Optics	3
PHYS 472. Non-Linear Optical and Laser Physics	3
PHYS 476. Computational Physics	3
PHYS 491. High Energy Physics I	3
PHYS 492. High Energy Physics II	3
CHEM 360. General Geochemistry	
CHEM 433. Physical Chemistry I	3
CHEM 434. Physical Chemistry II	3
CHEM 456. Inorganic Structure and Bonding	3
	3

<b>Industrial Ch E Prep</b>	<b>cr hrs</b>
CH E 425. Novel Commercial Separation Techniques	3
CH E 426. Solids Processing and Particle Technology	3
CH E 442. Chemical Kinetics and Reactor Engineering II	3
CH E 443. Industrial Catalysis	3
CH E 456. Advanced Chemical Process Simulation	3
CH E 466. Fuel Cell and Hydrogen Technology	3
CH E 468. Adsorption	3
CH E 482. Food Process Engineering I	3
CHEM 471. Instrumental Methods of Analysis	4
CHEM 371. Analytical Chemistry	4
I E 311. Engineering Data Analysis	3
I E 467. Discrete-Event Simulation Modeling	3
TOX 451. Occupational Toxicology	3

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<b>Environmental/Water</b>	<b>cr hrs</b>
C E 331. Hydraulic Engineering	3
C E 382. Hydraulic Systems Design	3
A EN 459. Design of Water Wells/Pumping Systems	3
A EN 475. Soil and Water Conservation	3
BIOL 301. Principles of Ecology	3
C E 256. Environmental Science	3
C E 256 L. Environmental Science Laboratory	1
C E 356. Fundamentals of Environmental Engineering	3
C E 357. Soil Mechanics	3
CH E 433. Air Pollution Modeling	3
CH E 435. Industrial Waste Treatment and Environmentally Benign Manufacturing	3
CH E 436. Environmental Processes Design I	3
CH E 437. Environmental Processes Design II	3
CHEM 422. Environmental Chemistry	3
CHEM 424. Soil Chemistry	1
CHEM 472. Analytical Methods for Toxic Organics and Metal Ions in the Environment	3
E S 256. Environmental Science	3
E S 256 L. Environmental Science Laboratory	3
E S 301. Principles of Ecology	3
E S 361. Basic Toxicology	3
E S 370. Environmental Soil Science	3
E S 458. Ecology of Inland Waters	3
E S 462. Sampling and Analysis of Environmental Contaminants	3
ENVE 487. Air Pollution Control Systems Design	3
G EN 270. Engineering Geology	3
G EN 357. Soil Mechanics	3
GEOL 295. Environmental Geology	3
GEOL 310. Mineralogy	3
GEOL 312. Optical Mineralogy	3
GEOL 360. General Geochemistry	3
GEOL 474. Ground Water Geology	3
TOX 361. Basic Toxicology	3
TOX 423. Environmental Toxicology	3
TOX 453. Regulatory Toxicology	3
TOX 461. Toxicology I	3