



CHEMICAL FOCUS AREA: Pharmaceuticals

Department of Chemical and Biochemical Engineering

General Education (19 sh)		sh
ALL	RHET:1030 Rhetoric	4
F/S	Diversity & Inclusion	3
ALL	Be Creative	3
ALL	Approved Gen Ed Course	3
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Math & Basic Science Core (24 sh)		sh
F/S	MATH:1550 Math I: Single Variable Calculus (P: ALEKS score \geq 75 or MPT Level 3 score \geq 9)	4
ALL	MATH 1560 Math II: Multivariable Calculus (P: MATH:1550)	4
ALL	MATH:2550 Math III: Matrix Algebra (P: MATH:1550)	2
ALL	MATH:2560 Math IV: Differential Equations (P: MATH:1560 & MATH:2550)	3
ALL	CBE:3020 Appl Stat Chem & Natural Resource Engr	3 OR
ALL	STAT:2020 Probability & Stats for Engr & Phys Sci (P: MATH:1560)	3 OR
ALL	STAT:3510 Biostatistics	3
ALL	CHEM:1110 Principles of Chemistry I (P: ALEKS score \geq 55 or MPT Level 3 score \geq 9)	4
ALL	PHYS:1611 Introductory Physics I / Lab (C: MATH:1550)	4

Engineering Core (7 sh)		sh
F	ENGR:1000 Engineering Success for First-Year Students (First semester standing)	1
F	ENGR:1100 Intro to Engineering Problem Solving	3
F/S	ENGR:1300 Intro to Engineering Computing (C: MATH:1550)	3

ChemE Requirements (53 sh)		sh
ALL	CHEM:1120 Principles of Chemistry II (P: CHEM:1110 with a minimum grade of C-)	4

ALL	CHEM:2210 Organic Chemistry I (P: CHEM:1120 with a minimum grade of C-)	3 OR
F	CHEM:2230 Organic Chemistry I for Majors (P: CHEM:1120 with a minimum grade of C-)	3

ALL	CHEM:2220 Organic Chemistry II (P: CHEM:2210 or CHEM:2230 with a minimum grade of C-)	3
S	CHEM:2240 Organic Chemistry II for Majors (P: CHEM:2210 or CHEM:2230 with a minimum grade of C-)	3 OR

ALL	CHEM:2410 Organic Chemistry Laboratory (P: CHEM:1120 & (CHEM:2210 or CHEM:2230), both with a minimum grade of C-; C: CHEM:2220 or CHEM:2240)	3
S	CHEM:2420 Organic Chemistry Lab for Majors (P: CHEM:1120 & (CHEM:2210 or CHEM:2230), both with a minimum grade of C-; C: CHEM:2220 or CHEM:2240)	3 OR

ALL	ENGR:2130 Thermodynamics (P: CHEM:1110 & PHYS:1611; C: MATH:1560)	3
ALL*	ENGR:2720 Materials Science (P: CHEM:1110; C: MATH:1550)	3
F	CBE:2110 Computational Tools for Chemical Engineers (P: MATH:1550; C: MATH:1560)	2
F/S	CBE:2105 Process Calculations (P: MATH:1550)	3
S	CBE:3105 ChE Thermodynamics (P: ENGR:2130; C: CBE:2105)	3
S	CBE:3109 Fluid Flow (C: CBE:2105)	2
F	CBE:3113 Heat & Mass Transfer (P: MATH:2560 & CBE:2105; R: CBE:3109)	3
F	CBE:3117 Separations (P: CBE:2105 & CBE:3105; C: CBE:3113)	3
F/S	CBE:3120 Chemical Reaction Engineering (P: MATH:2560; C: CBE:3105; R: CBE:3113)	3
F	CBE:3125 Chemical Process Safety (P: CBE:3105 & CBE:3109; C: CBE:3113)	3
S	CBE:3150 Thermodynamics / Transport Laboratory (P: CBE:3105 & CBE:3113)	3
F	CBE:3155 Chemical Reaction Engineering / Separation Lab (P: CBE:3117; C: CBE:3120; R: Statistics Elective)	3
S	CBE:3205 Introduction Biochemical Engineering (P: CBE:2105; C: CME:3109; R: CBE:3120)	3
F	CBE:4105 Process Dynamics & Control	3

ChemE Capstone Design Courses (5 sh)		sh
F	CBE:4109 Chemical Engineering Process Design I (P: CBE:3109, CBE:3113, & CBE:3117; C: CBE:3120 & CBE:3125)	2
S	CBE:4110 Chemical Engineering Process Design II (P: CBE:4109; R: CBE:4105 & CBE:3205)	3

ChemE Departmental Seminars (5 sh)		sh
S	CBE:1000 CBE Departmental Seminar	1
F/S	CBE:3000 CBE Professional Seminar (1 sh x4); (P: CBE:2105)	4
S	CBE:4195 Senior Enriching Activities Seminar (C: CBE:4110)	0

Electives: Advanced Chemistry / Science (6 sh)		sh
	Advanced Chemistry or Biochemistry Course	3
	Advanced Science Course	3

Required: Focus Area Electives		sh
Choose one		
S	PCOL:2220 Drug Use and Abuse	3
F	PCOL:3101 Pharmacology I: Drug's Fantastic Journey	3

Engineering Electives		
F/S	ENGR:2995 Intro to AI and Machine Learning in Engineering (P: ENGR:1300; C: MATH:2550)	3
ALL	CBE:3998 Individual Investigations (usually research)	1-3
S	CBE:5210 Bioseparations (spring semester, even years)	3
S	CBE:5300 Drug Delivery Devices (spring semester, odd years)	3
	CBE:5740 Engineering Principles of Drug Delivery (see MyUI for offerings)	3
S	BME:5421 Cell Material Interactions (P: BME:2400)	3
F	BME:5430 Biotransport (P: BME:2500)	3

Science Electives		
ALL	BIOC:3110 Biochemistry (P: one year each of college-level biology and chemistry; Recommended: on F/S	3
F/S	BIOC:3120 Biochemistry and Molecular Biology I (P: two semesters of general chemistry & one of organic chemistry; Recommendations: BIOL:1411, BIOL:1412, & additional organic chemistry course)	3
F/S	BIOC:3130 Biochemistry and Molecular Biology II (P: BIOC:3120 w/min C-)	3
S	BIOC:3140 Experimental Biochemistry (P: BIOC:3120 w/min C-)	2
ALL	BIOL:1411 Foundations of Biology (P: CHEM:1110 w/min C- or CHEM:1070 w/min A-)	4
	BME:4310 Computational Biochemistry (P: (MATH:1560 or MATH:1860) & CHEM:1120 (fall semester, even years)	3
F	CHEM:3110 Analytical Chemistry I (P: CHEM:1120 & (MATH:1460 or MATH:1850) & (PHYS:1511 or CHEM:3120 Analytical Chemistry II (P: CHEM:1120 w/min C- & (MATH:1460 or MATH:1850) & PHYS:1511 or PHYS:1611)	3
S	CHEM:3430 Analytical Measurements (P: CHEM:2021 & CHEM:3110 & CHEM:3120	3
ALL	HHP:1300 Fundamentals of Human Physiology (Recommended: high school chemistry and biology)	3
F	OEH:6450 Aerosol Technology	3
	CHEM:XXXX Upper-level chemistry course (3000 and above)	3

Pharmaceutics Electives		
S	PCOL:2220 Drug Use and Abuse	3
F	PCOL:3101 Pharmacology I: Drug's Fantastic Journey (P: (CBE:3205 or BIOL:1411) & CHEM:1110)	3
S	PCOL:3102 Pharmacology II: Mechanisms of Drug Action (P: PCOL:3101)	3
S	PHAR:4146 Drug Disposition and Pharmacokinetics (P: (MATH:1380 or MATH:1460 or MATH:1	2
	PHAR:4501 Basic Principles of Toxicology (P: BIOC:3110) (off-cycle) (see MyUI for offerings)	1
	PHAR:4502 Toxic Agents (P: BIOC:3110) (off-cycle) (see MyUI for offerings)	1
	PHAR:4503 Organ and Organism Toxicity (P: BIOC:3110) (off-cycle) (see MyUI for offerings)	1
S	PHAR:5521 High Throughput Screening in Drug Discovery (spring semester, even years)	1
S	PHAR:4537 Principles of Drug Metabolism (P: (CHEM:2220 or CHEM:2240) and (BIOC:3120 or B	3
F	PHAR:4736 Properties of Dosages Forms I (P: (CHEM:2220 or CHEM:2240) and (MATH:1460 or I	2
S	PHAR:4737 Properties of Dosages Forms II (P: PHAR:4736) (spring semester, odd years)	2
	PHAR:4740 Materials in Drug and Gene Delivery (see MyUI for offerings)	3
	PHAR:4741 Immunology and Immunotheraies (off-cycle) (see MyUI for offerings)	2
S	PHAR:4800 Chemical/Biophysical Properties of Drugs (P: ((CHEM:2220 or CHEM:2240) & BIOC	1
	PHAR:4XXX Upper level pharmacy courses available through the certificate programs	