PURDUE UNIVERSITY

Chemical Engineering Optional Concentrations

9 credits for Concentration
3 credits must be from CHE courses
3 credits must be from ENGR courses

Biological Engineering (9 credits)

- (3) ABE 58000* Process Engineering of Renewable Resources *(CHE 34800)*
- (3) BCHM 56100 General Biochemistry I *(CHM 26200)*
- (3) BME 52100 Biosensors: Fundamentals and Applications *(BIO 23000 & MA 26600/30300/30400/36600)*
- (3) BME 49500 Biomolecular Engineering
- (3) BME 49500 Introductory Computational Biology
- (3) BME 55100 Tissue Engineering
- (3) CHE 41100 or 49800 Biological Engineering Related Research
- (3) CHE 52500* Biochemical Engineering *(CHE 34800)*
- (3) CHE 59700 Engineering Applications of Biological Molecules
- (3) CHE 59700 Principles of Tissue Engineering
- (3) CHM 33300 Principles of Biochemistry *(CHM 26200)*
- (3) CHM 53300 Introductory Biochemistry *(CHM 26200 & CHM 32100)*
- (3) ME 59700 Bio-energy and Biofuels

*Students cannot earn credit in both CHE 52500 and ABE 58000

Energy and Environment (9 credits)

- (3) CE 35000 or EEE 35000 Environmental Engineering *(MA 16200, PHYS 17200, CHM 11600)*
- (3) CE 35500 or EEE 35500 Engineering Environmental Sustainability
- (3) CE 45700 Air Pollution Control and Design *(CE 34000)*
- (3) CHE 41100 or 49800 Energy and Environment Related Research
- (3) CHE 55800 Rate Controlled Separation Processes *(CHE 30600 & CHE 37800)*
- (3) CHE 59700 Advanced Solar Energy Conversion
- (3) CHE 59700 System Analysis of Energy Production
- (3) CHE 59700 Battery Storage Systems Lab
- (3) CHE 59700 Energy Storage Systems
- (3) CHE 59700 Organic Electronic Materials & Devices
- (3) ME 41800 Engineering of Environmental Systems and Equipment *(ME 30000/30100 & ME 31500)*
- (3) ME 59700 Bio-Energy and Biofuels
- (3) NUCL 40200 Engineering of Nuclear Power Systems *(ME 35100 or NUCL 35100)*
- (3) NUCL 47000 Fuel Cell Engineering
- (3) NUCL 50300 Radioactive Waste Management *(CHM 10200 & NUCL 20000/21100)*
- (3) NUCL 56300 Direct Energy Conversion

Material and Polymers (9 credits)

- (3) CHE 41100 or 49800 Material and Polymer Related Research
- (3) CHE 44200 Chemistry and Engineering of High Polymers *(CHM 26200 & CHM 37000)*
- (3) CHE 51700 Micro/Nanoscale Physical Processes *(CHE 37700 & CHE 37800)*
- (3) CHE 53600 Particulate Systems *(CHE 37700)*
- (3) CHE 54300 Polymerization Reaction Engineering and Reactor Analysis *(CHE 34800)*
- (3) CHE 54400 Structure and Physical Behavior *(CHM 26200 & CHM 37000)*
- (3) CHE 59700 Organic Electronic Materials & Devices
- (3) MSE 37000 Electrical, Optical and Magnetic Properties if Materials *(PHYS 24100)*
- (3) MSE 51000 Microstructural Characterization Techniques *(Senior Classification)*
- (3) MSE 51200 Powder Processing (Senior Classification)
- (3) MSE 52500 Struct-Property Relations of Engineering Polymers *(Junior 75+credits & Senior Classification)*
- (3) MSE 55600 Fracture of Materials *(Senior Classification)*
- (3) MSE 56000 Production of Inorganic Materials *(Junior 75+credits & Senior Classification)*
- (3) MSE 59700 Manufacturing Advanced Composites
- (3) MSE 59700 Biomaterials
- (3) MSE 59700 Characterization of Advanced Composite Materials

Pharmaceutical Engineering (9 credits)

- (3) CHE 41100 or 49800 Pharmaceutical Engineering Related Research
- (3) CHE 53600 Particulate Systems *(CHE 37700)*
- (3) CHE 55100 Principles of Pharmaceutical Engineering *(CHE 34800 & 37800 concurrently)*
- (3) CHE 55300 Pharmaceutical Process Development and Design
- (3) CHE 55500 Computer Integrated Process Operations *(Senior Classification)*
- (3) CHE 55700 Intelligent Systems in Process Engineering *(Senior Classification)*
- (3) IPPH 56200 Introduction to Pharmaceutical Manufacturing Process *(CHM 37000)*
- (3) PHAD 50100 Food and Drug Law Administration

Prerequisites are listed in *italics*.

Chemical Engineering Optional Concentrations

Data Science (12 credits)

Foundational Programming Course – Choose One (3 credits):

- (3) CS 15900 Programming Applications for Engineers (*ENGR 13100*)
- (4) CS 17700 Programming with Multimedia Objects
- (4) CS 18000 Problem Solving and Object-Oriented Programming (*MA 16500*)

Data Science Selectives (3 credits must be CHE; 6 credits must be 400 level or higher):

- (3) AAE 55000 Multidisciplinary Design Optimization (*Junior or Senior Classification*)
- (3) BIOL 47800 Intro to Bioinformatics (*BIOL 23000 & CS 18000/CS 17700/CS 15900*)
- (3) CGT 27000 Intro to Data Visualization
- (3) CHE 41100 CHE Undergraduate Research
- (3) CHE 55500 Computer Integrated Process Operations (*Senior Classification*)
- (3) CHE 59700 Data Science in ChE
- (3) ECE 59500 or IE 49000 Machine Learning
- (1) ILS 29500 Statistical Learning
- (1) PHIL 29300 Ethics of Data Science
- (3) STAT 41600 Probability (*MA 26100*)
- (3) Additional Courses to be added

Distinguished Research (9 credits)

- (3) CHE 41100 CHE Undergraduate Research
- (3) CHE 49800 Undergraduate Thesis Research I
- (3) CHE 49900 Undergraduate Thesis Research II (*CHE49800*)

        OR

- (3) CHE 49800 Undergraduate Thesis Research I
- (3) CHE 49900 Undergraduate Thesis Research II (*CHE49800*)
- (3) CHE 50000 Level or Higher Elective

*Upon completion of this concentration, students will be awarded ChE Departmental Honors.

Prerequisites are listed in *italics*.