

COURSES FOR CHEMICAL AND BIOLOGICAL ENGINEERING

Chemical and Biological Engineering Courses

CHE125 Introduction To Chemical Engineering

Hours 1

An introduction to the chemical engineering profession, its history and its career-enabling potential. The course contains selected topics, and alumni seminars covering the full range of career opportunities from emerging areas (nanotechnology, biochemical, multifunctional materials) to those found in the more traditional positions within the chemical, petrochemical and petroleum industries.

CHE225 Chemical & Biological Engineering Honors Forum

UH

Hours 1

Designed to expose students to the rich array of resources, ideas, and experiences of chemical engineering. Emphasis and content based on faculty member's area of expertise.

University Honors

CHE254 Chemical Engineering Calculations

Hours 4

Study of physical and chemical processes and chemical reactions; material and energy balance calculations for single-phase and multiphase systems; simultaneous energy and material balances. Offered fall and spring.

Prerequisite(s): CH 101 or CH 117; and MATH 125 or MATH 145; and CHE 125 or AEM 121 or AEM 131 or CE 121 or ECE 121 or ENGR 111 or ENGR 131 or ME 121 or MTE 121 or MTE 155 or EE 121 or CS 121

CHE255 Chemical Engineering Thermodynamics

C

Hours 4

Chemical calculations using the first and second laws of thermodynamics, including chemical and phase equilibria, multiphase reacting systems, steady-state and non-steady-state material and energy balances. Computer proficiency is required for a passing grade in this course. Offered fall and spring.

Prerequisite(s): ENGR 103, CHE 254 and MATH 126 or MATH 146

Computer Science

CHE304 Fluid Flow Operations

Hours 3

Equations of momentum and energy transport and their applications to the analysis of fluid process behavior, filtration, fluidization and metering of fluids.

Prerequisite(s): CHE 254 and MATH 126 or MATH 146

Prerequisite(s) with concurrency: CHE 254

CHE305 Separation Processes

C

Hours 3

Unified approach to the basic calculations and fundamental concepts involved in the design of equilibrium-stage separations processes and continuous contacting equipment. Computer proficiency is required for a passing grade in this course.

Prerequisite(s): CHE 255

Computer Science

CHE306 Heat Transfer Operations

Hours 3

Study of heat transfer and its application in the design of specific processes and process equipment.

Prerequisite(s): CHE 254, MATH 238, and CHE 304

Prerequisite(s) with concurrency: CHE 304

CHE321 Basic Chemical Engineering Laboratory

W

Hours 2

Basic chemical engineering measurements are made, including temperature, pressure, concentration, and fluid flow. Fundamental and empirical equations are used to analyze mass, energy, and momentum transport. Writing proficiency within this discipline is required for a passing grade in this course. Offered both fall and spring semesters.

Prerequisite(s): CHE 255, CHE 304

Writing

CHE322 Unit Operations Laboratory

W

Hours 2

Performance tests on chemical engineering unit operations, such as distillation and heat transfer, are designed, operated, and analyzed in a formal report. Writing proficiency within this discipline is required for a passing grade in this course. Offered fall and spring semesters. Successful completion of CHE 321 and CHE 322 satisfies the curriculum requirement of CHE 323.

Prerequisite(s): CHE 304, CHE 305, CHE 306, CHE 321

Writing

CHE323 Operations Laboratory

W

Hours 4

Performance tests on chemical engineering unit operations, such as distillation and heat transfer, are designed, operated, and analyzed in a formal report. Writing proficiency within this discipline is required for a passing grade in this course. Offered summer only. Can be replaced by successful completion of CHE 321 and CHE 322.

Prerequisite(s): CHE 304, CHE 305, CHE 306

Writing

2 Courses for Chemical and Biological Engineering

CHE324 Transport Phenomena

C

Hours 3

Development of the conservation equations for mass, momentum and energy with application to steady-state and transient chemical processes. Computer proficiency is required for a passing grade in this course.

Prerequisite(s): CHE 255 ChE Eng Thermodynamics MATH 238 Appld Diff Equations I

Prerequisite(s) with concurrency: MATH 238 and CHE 255

Computer Science

CHE325 ChE Honors Forum

UH

Hours 1

Designed to expose students to the rich array of resources, ideas and experiences of chemical engineering. Emphasis and content based on faculty member's area of expertise.

University Honors

CHE354 Chemical Reactor Design

Hours 3

Reaction rate equations and comparisons with experimental data; use of rate information for the design of chemical reactors. Offered primarily in the spring semester.

Prerequisite(s): CHE 255, MATH 238

CHE412 Polymer Materials Engineering

Hours 3

Introduction to the manufacture, processing and applications of organic polymeric materials. This course covers the chemistry of polymer manufacture, the molecular structures of polymers, and the structure-property relationships for thermoplastic and thermosetting polymers. Offered primarily in the spring semester.

Prerequisite(s): CH 102 or CH 118

CHE413 Honors Polymer Materials Engineering

UH

Hours 3

Introduction to the manufacture, processing and applications of organic polymeric materials. This course covers the chemistry of polymer manufacture, the molecular structures of polymers, and the structure-property relationships for thermoplastic and thermosetting polymers. Honors designation.

Prerequisite(s): CH 102 or CH 118

University Honors

CHE418 Tissue Engineering

Hours 3

Tissue Engineering is an emerging dynamic, experimental science in which engineering and biological science principles are used to develop techniques for improving or restoring the structure and function of tissue. Offered primarily in the fall semester.

Prerequisite(s): CH231 and (BSC 114 or 118)

CHE419 Honors Tissue Engineering

UH

Hours 3

Tissue Engineering is an emerging dynamic, experimental science in which engineering and biological science principles are applied to develop techniques for improving or restoring the structure and function of tissues and organs.

Prerequisite(s): CH 231 and BSC 114 or BSC 118

University Honors

CHE425 Chemical Engineering Honors Forum

UH

Hours 1

Designed to expose students to the rich array of resources, ideas, and experiences of chemical engineering. Emphasis and content based on faculty member's area of expertise.

University Honors

CHE440 Health & Safety In The Chemical Process Industry

Hours 3

Health and safety in the chemical process industry that will introduce chemical engineering students to health and safety, regulations and the designs and procedures to meet them in the chemical process. Advanced topics will also be introduced, including current relevant topics such as recent accidents and ways and means of preventing a re-occurrence, advanced models of spills and advanced safety analysis.

Prerequisite(s): CH 102 General Chemistry I or CH 118 Honors General Chemistry CHE 255 Chem Engr Thermodynamics

CHE441 Honors Health and Safety in the Chemical Process Industry

UH

Hours 3

Health and safety in the chemical process industry that will introduce chemical engineering students to health and safety, regulations and the designs and procedures to meet them in the chemical process. Advanced topics will also be introduced, including current relevant topics such as recent accidents and ways and means of preventing a reoccurrence, advanced models of spills and advanced safety analysis.

Prerequisite(s): CH 102 or CH 118, CH 255

University Honors

CHE445 Introduction to Biochemical Engineering

Hours 3

Study of biological processes; application of chemical engineering skills to areas including enzyme kinetics, fermentation, cell growth and metabolic processes. Offered primarily in the spring semester.

Prerequisite(s): CH 231

CHE446 Honors Intro to Biochemical Engineering*UH*

Hours 3

Study of biological processes; application of chemical engineering skills to areas including enzyme kinetics, fermentation, cell growth and metabolic processes. Offered primarily in the spring semester.

Prerequisite(s): CH 231

University Honors

CHE481 Chemical Process Design I

Hours 3

Technical and economic design of chemical processes and plants. It is recommended that students complete at least two 300-level ChE classes before enrolling in 481.

Prerequisite(s): CHE 255 CHE 305

CHE482 Chemical Process Design II*W*

Hours 3

Optimal design of chemical processes and plants. Writing proficiency within this discipline is required for a passing grade in this course.

Prerequisite(s): CHE 481

Writing

CHE491 Special Problems

Hours 1-3

Research combined with practical application and testing. Credit is based on the amount of work undertaken. Students undertaking research project must obtain clearance from the supervising professor before registering.

CHE492 Special Topics

Hours 3

Various topics relevant to Chemical & Biological Engineering majors.

CHE493 Process Dynamics & Control

Hours 3

Development of model equations that describe the unsteady-state behavior of chemical processes; automatic control design and analysis emphasizing time-domain methods; introduction to digital computer control.

Prerequisite(s): CHE 255 and MATH 238

CHE495 Undergraduate Honors Seminar*UH*

Hours 1

Presentation of research/practical study results before a group of peers (graduate students, other honors students, faculty and invited guests).

University Honors

CHE496 Undergrad Honors Seminar*UH*

Hours 1

Presentation of research/practical study results before a group of peers (graduate students, other honors students, faculty, and invited guests).

University Honors

CHE498 Honors Special Problems*UH*

Hours 1-3

Credit is based on the amount of work undertaken. Research or practical study in a chemical engineering area, the outcome of which is a definite result presented in a report, paper, or manuscript. Instructor permission required.

University Honors

CHE499 Honors Special Problems*UH*

Hours 1-3

Credit is based on the amount of work undertaken. Research, teaching assistantship, practical study, honors co-op or internship in a chemical engineering area, the outcome of which is a definite result presented in a report, paper, or manuscript. Instructor or Honors Chair permission required.

University Honors