

CHEMICAL ENGINEERING (CHE)

CHE 110 Introduction to Chemical Engineering (1 credit)

Introduction to chemical engineering career opportunities and process principles including problem solving and documentation skills. Graded P/F.

CHE 123 Computations in Chemical Engineering (2 credits)

Methods of analyzing and solving problems in chemical engineering using personal computers; spreadsheet applications, data handling, data fitting, material balances, experimental measurements, separations, and equation solving. Coordinated lec-lab periods. 49 COMPASS Algebra or MATH 143 or MATH 170; or Permission.

Prereqs: Minimum 520 SAT Math or minimum 22 ACT Math or

Coreqs: MATH 143, MATH 170, or higher

CHE 204 (s) Special Topics (1-16 credits)

Credit arranged

CHE 210 Integrated Chemical Engineering Fundamentals (1 credit)

Recitation support for fundamental STEM courses and process principles including problem solving and documentation skills. Twice a week, 2 hour recitation sessions. Graded P/F.

Prereqs: CHE 110 and CHE 123

CHE 220 Programming for Chemical Engineers (3 credits)

Algorithm development, principles of structured programming techniques, coding of numerical and graphical techniques for solutions of engineering systems.

Prereqs: MATH 170, CHEM 111, and CHE 123; or Instructor Permission

CHE 223 Material and Energy Balances (3 credits)

Conservation of mass and energy calculations in chemical process systems.

Prereqs: CHEM 112, CHEM 112L, MATH 175

CHE 299 (s) Directed Study (1-16 credits)

Credit arranged

CHE 307 Group Mentoring (1 credit, max 3)

Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).

Prereqs: Permission

CHE 326 Chemical Engineering Thermodynamics (3 credits)

Behavior and property estimation for nonideal fluids; phase and reaction equilibria; applications to industrial chemical processes.

Prereqs: CHE 223, ENGR 320 and ENGR 335, MATH 310

Coreqs: CHEM 305

CHE 330 Separation Processes I (3 credits)

Equilibrium stagewise operations, including distillation, extraction, absorption.

Prereqs: CHE 326, CHEM 305

CHE 340 Transport and Rate Processes I (4 credits)

Cross-listed with MSE 340

Transport phenomena involving momentum, energy, and mass with applications to process equipment design. Coordinated lec-lab periods.

Prereqs: ENGR 335, MATH 310, and CHE 223 or MSE 201

CHE 341 Transport and Rate Processes II (4 credits)

Transport phenomena involving momentum, energy, and mass with applications to process equipment design. Coordinated lecture-lab periods.

Prereqs: CHE 340

CHE 393 Chemical Engineering Projects (1-3 credits, max 9)

Problems of a research or exploratory nature.

Prereqs: Permission of department

CHE 398 (s) Engineering Cooperative Internship (3 credits)

Supervised internship in professional engineering settings, integrating academic study with work experience; requires written report; positions are assigned according to student's ability and interest. Graded P/F.

Prereqs: Permission

CHE 400 (s) Seminar (1-16 credits)

Credit arranged

CHE 404 (s) Special Topics (1-16 credits)

Credit arranged

Prereqs: Permission

CHE 423 Reactor Kinetics and Design (3 credits)

Chemical reaction equilibria, rates, and kinetics; design of chemical and catalytic reactors.

Prereqs: CHE 223, MATH 310, CHEM 305

CHE 433 Chemical Engineering Lab I (1 credit)

Senior lab experiments in chemical engineering.

Prereqs: CHE 330, CHE 341, CHE 423

CHE 434 Chemical Engineering Lab II (1 credit)

Senior lab experiments in chemical engineering.

Prereqs: CHE 330, CHE 341, CHE 423

CHE 444 Process Analysis and Control (3 credits)

Process modeling, dynamics, and analysis. Coordinated lecture-lab periods. Recommended Preparation: CHE 223, MATH 310.

CHE 445 Digital Process Control (3 credits)

Cross-listed with ECE 477

Dynamic simulation of industrial processes and design of digital control systems. Coordinated lecture-lab periods. Recommended Preparation: CHE 444 (Recommended Preparation for EE majors: ECE 350).

CHE 451 Environmental Management and Design (1-16 credits, max arranged)

Credit arranged. Waste management application projects; projects require original design, working model, and report. May involve week-long trip to national competition. One lecture and 3 hours of lab per week; weekly team status report meetings plus weekly task reviews with advisor.

Prereqs: Permission (by invitation only)

CHE 452 Environmental Management and Design (1-16 credits, max arranged)

General Education: Senior Experience

Credit arranged. Waste management application projects; projects require original design, working model, and report. May involve week-long trip to national competition. One lecture and 3 hours of lab per week; weekly team status report meetings plus weekly task reviews with advisor.

Prereqs: Permission (by invitation only)

CHE 453 Process Analysis & Design I (3 credits)

Cross-listed with MSE 453

Estimation of equipment and total plant costs, annual costs, profitability decisions, optimization; design of equipment, alternate process systems and economics, case studies of selected processes. CHE 453 and CHE 454/MSE 453 and MSE 454 are to be taken in sequence. (Fall only)

Prereqs: CHE 330, CHE 341, and CHE 423; or MSE 201, MSE 308, MSE 313, MSE 340, and MSE 412

CHE 454 Process Analysis and Design II (3 credits)

General Education: Senior Experience

Cross-listed with MSE 454

Estimation of equipment and total plant costs, annual costs, profitability decisions, optimization; design of equipment, alternate process systems and economics, case studies of selected processes. CHE 453 and CHE 454 are to be taken in sequence. (Spring only)

Prereqs: CHE 453 or MSE 453

CHE 455 Surfaces and Colloids (3 credits)

Chemical and physical phenomena near material interfaces and behaviors of colloidal particles in dispersing media.

Prereqs: CHE 326 or CHEM 305 or permission

CHE 460 Biochemical Engineering (3 credits)

Joint-listed with CHE 560

Application of chemical engineering to biological systems including fermentation processes, biochemical reactor design, and biological separation processes. Additional projects/assignments required for graduate credit.

CHE 491 Senior Seminar (1 credit)

Professional aspects of the field, employment opportunities, and preparation of occupational inventories. Graded P/F.

Prereqs: Senior standing.

CHE 498 (s) Internship (1-16 credits)

Credit arranged

CHE 499 (s) Directed Study (1-16 credits)

Credit arranged

CHE 500 Master's Research and Thesis (1-16 credits)

Credit arranged

CHE 501 (s) Seminar (1 credit, max 2)

Cross-listed with BE 501

Graded P/F.

Prereqs: Permission

CHE 502 (s) Directed Study (1-16 credits)

Credit arranged

CHE 504 (s) Special Topics (1-16 credits)

Credit arranged

CHE 505 (s) Professional Development (1-16 credits)

Credit arranged

CHE 515 Transport Phenomena (3 credits)

Advanced treatment of momentum, energy, and mass transport processes; solution techniques. Cooperative: open to WSU degree-seeking students.

Prereqs: B. S. Ch. E. and Equivalent of CHE 340, CHE 341 or Permission

CHE 517 Chemicals and Materials Analysis (3 credits)

Theory and experiments in photon/particle interactions, including x-ray diffraction, electron spectroscopy and microscopy techniques for chemical and physical property analyses applied to chemical, materials and nuclear engineering.

Prereqs: Graduate Standing or Permission

CHE 527 Thermodynamics (3 credits)

Thermodynamic laws for design and optimization of thermodynamic systems, equations of state, properties of ideal and real fluids and fluid mixtures, stability, phase equilibrium, chemical equilibrium, applications of thermodynamic principles. Cooperative: open to WSU degree-seeking students.

Prereqs: B. S. Ch. E. and Equivalent of CHE 326 or Permission

CHE 529 Chemical Engineering Kinetics (3 credits)

Interpretation of kinetic data and design of reactors for heterogeneous chemical reaction systems; heterogeneous catalysis, gas-solid reactions, gas-liquid reactions; packed bed reactors, fluidized bed reactors.

Cooperative: open to WSU degree-seeking students.

Prereqs: B. S. Ch. E. and Equivalent of CHE 423 or Permission

CHE 536 Electrochemical Engineering (3 credits)

Cross-listed with NE 536

Application of chemical engineering principles to electrochemical systems; thermodynamics, kinetics, and mass transport in electrochemical systems; electrochemical process design.

Recommended preparation: graduate engineering standing.

CHE 541 Chemical Engineering Analysis I (3 credits)

Mathematical analysis of chemical engineering operations and processes; mathematical modeling and computer applications.

Cooperative: open to WSU degree-seeking students.

Prereqs: B. S. Ch. E. and Equivalent of CHE 444 or Permission

CHE 560 Biochemical Engineering (3 credits)

Joint-listed with CHE 460

Application of chemical engineering to biological systems including fermentation processes, biochemical reactor design, and biological separation processes. Additional projects/assignments required for graduate credit.

CHE 582 Spent Nuclear Fuel Management and Disposition (3 credits)

Cross-listed with NE 582

The management of nuclear fuel after removal from a nuclear reactor; storage options, recycle and recovery of uranium and other radionuclides, geological repositories and related topics.

Prereqs: Permission

CHE 599 (s) Non-thesis Master's Research (1-16 credits)

Credit arranged

CHE 600 Doctoral Research and Dissertation (1-45 credits)

Credit arranged