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.  
Prereq: Min 520 SAT math or min 22 ACT math or 49 COMPASS Algebra or MATH 143 or MATH 170; or Permission  
Coreq: MATH 143, MATH 170, or higher.

CHE 204 (s) Special Topics  
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.  
Prereq: CHE 110 and CHE 123.

CHE 223 Material and Energy Balances  
3 credits  
Conservation of mass and energy calculations in chemical process systems.  
Prereq: CHEM 112, CHEM 112L, MATH 175.

CHE 299 (s) Directed Study  
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).  
Prereq: Permission.

CHE 326 Chemical Engineering Thermodynamics  
3 credits  
Behavior and property estimation for nonideal fluids; phase and reaction equilibria; applications to industrial chemical processes.  
Prereq: CHE 223, ENGR 320 and ENGR 335, MATH 310  
Coreq: CHEM 305.

CHE 330 Separation Processes I  
3 credits  
Equilibrium stagewise operations, including distillation, extraction, absorption.  
Prereq: 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.  
Prereq: 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 lec-lab periods.  
Prereq: CHE 340.

CHE 393 Chemical Engineering Projects  
1-3 credits, max 9  
Problems of a research or exploratory nature.  
Prereq: Permission.

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.  
Prereq: Permission.

CHE 400 (s) Seminar  
Credit arranged.

CHE 404 (s) Special Topics  
Credit arranged  
Prereq: Permission.

CHE 423 Reactor Kinetics and Design  
3 credits  
Chemical reaction equilibria, rates, and kinetics; design of chemical and catalytic reactors.  
Prereq: CHE 223, MATH 310, CHEM 305.

CHE 433 Chemical Engineering Lab I  
1 credit  
Senior lab experiments in chemical engineering.  
Prereq: CHE 330, CHE 341, CHE 423.

CHE 434 Chemical Engineering Lab II  
1 credit  
Senior lab experiments in chemical engineering.  
Prereq: CHE 330, CHE 341, CHE 423.

CHE 440 Applied Mathematics in Chemical Engineering  
3 credits  
Mathematical approaches to modeling chemical behavior in transport, separation, reactor, and process systems.  
Prereq: CHE 341 or permission.

CHE 444 Process Analysis and Control  
3 credits  

CHE 445 Digital Process Control  
3 credits  
Cross-listed with ECE 477  
CHE 451 Environmental Management and Design
Credit arranged
Waste management application projects; projects require original design, working model, and report. May involve week-long trip to national competition. One lec and 3 hrs of lab a wk; weekly team status report meetings plus weekly task reviews with advisor.
Prereq: Permission (by invitation only).

CHE 452 Environmental Management and Design
Credit arranged
Gen Ed: Senior Experience
Waste management application projects; projects require original design, working model, and report. May involve week-long trip to national competition. One lec and 3 hrs of lab a wk; weekly team status report meetings plus weekly task reviews with advisor.
Prereq: 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)
Prereq: 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
Gen Ed: 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)
Prereq: 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.
Prereq: 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 reqd for grad cr.

CHE 491 (s) Seminar
1 credit
Recent developments and topics. Graded P/F
Prereq: Senior standing.

CHE 498 (s) Internship
Credit arranged.

CHE 499 (s) Directed Study
Credit arranged.

CHE 500 Master's Research and Thesis
Credit arranged.

CHE 501 (s) Seminar
Credit arranged.

CHE 502 (s) Directed Study
Credit arranged.

CHE 504 (s) Special Topics
Credit arranged.

CHE 505 (s) Professional Development
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.
Prereq: B.S.Ch.E. and Equivalent of CHE 340, CHE 341 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.
Prereq: 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.
Prereq: 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.
Prereq: B.S.Ch.E. and Equivalent of CHE 444 or Permission.

CHE 545 Mass Transfer Operations I
3 credits
Diffusional and equilibrium operations.
Prereq: B.S.Ch.E. and equivalent of CHE 341 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 reqd for grad cr.

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.
Prereq: Permission.
CHE 599 (s) Non-thesis Master's Research
Credit arranged.

CHE 600 Doctoral Research and Dissertation
Credit arranged.