CHEMICAL ENGINEERING

Department of Chemical Engineering and Materials Science
College of Engineering

201 Material and Energy Balances
Fall, Spring. 3(4-0) P: (MTH 133 or MTH 153H or LB 119) and (CEM 142 or CEM 152 or LB 172) and (ICSE 131 or concurrently) or (CSE 231 or concurrently) or (EGR 102 or concurrently))


316 Laboratory Practice and Statistical Analysis
Spring. 4(2-6) P: (CHE 311 and (CHE 312 or concurrently)) and (CHE 321 or concurrently) and (CHE 431 and completion of Tier I writing requirement R: Open to juniors or seniors in the Chemical Engineering Major.

Practical experience with unit operations equipment, including separations processes, reactor systems, and chemical processes requiring analysis of heat, mass and momentum transport. Laboratory assignments requiring teamwork. Engineering statistics with focus on model building, experimental design, and statistical quality control.

321 Thermodynamics for Chemical Engineering
Spring. 4(5-0) P: CHE 201

431 Chemical Reaction Engineering
Fall. 4(5-0) P: CHE 210 or concurrently R: Open to juniors or seniors in the Chemical Engineering Major.


432 Process Analysis and Control
Fall. 3(3-0) P: CHE 431 R: Open to seniors or juniors in the Chemical Engineering Major.


433 Process Design and Optimization I
Fall. 4(5-0) P: (CHE 311 and CHE 312 and CHE 321 and CHE 431) and completion of Tier I writing requirement R: Open to seniors in the Chemical Engineering Major.

Applications of chemical engineering principles in design calculations. Selection of optimum design. Influence of design on capital investment, operating cost, product loss and quality. Mathematical programming methods for optimization.

434 Process Design and Optimization II
Spring. 2(0-4) P: CHE 433


468 Biomass Conversion Engineering
Fall. 3(3-0) Interdepartmental with Biosystems Engineering, Administered by Chemical Engineering. P: (BE 351 or CHE 321) and (BE 360 or CHE 431)

Physiochemical and biological pretreatment. Biomass conversion to alcohol, biodiesel, bio-oil, syngas, and other value-added products using advanced biological, chemical, and thermochemical treatments.

469 Sustainable Bioenergy Systems
Spring. 3(3-0) Interdepartmental with Biosystems Engineering, Administered by Bioenergy Systems Engineering. P: BE 230 or CHE 201 RB: CSS 467 and CHE 468 R: Open to juniors or seniors in the College of Engineering.

Biorefinery analysis and system design. Life cycle assessment to evaluate sustainability of bioenergy systems. Current policy regulating the bioeconomy and system economics. Product commercialization.

472 Composite Materials Processing
Fall. 3(2-3) P: CHE 311 or ME 332 or CE 321

Manufacturing processes for thermoset and thermoplastic matrix composites. Mechanical and thermal evaluation of composites. Rheology and molding of fiber-filled materials.

CHE—Chemical Engineering
Chemical Engineering—CHE

463  Brewing and Distilled Beverage Technology  
Spring. 3(2-3)  Fall: Uncle John’s Frithouse Winery and Brewing Company, East Lansing. Interdepartmental with Food Science and Technology. Administered by Chemical Engineering. P: CHE 311 or BE 350 or BE 429. R: Major in Chemical Engineering, Biosystems Engineering or Food Science. Must be at least 21 years of age. R: Approval of department.

490  Independent Study  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to students in the Chemical Engineering Major. Approval of department. Theoretical or experimental studies of current research topics in chemical engineering. Individual interaction with faculty advisor.

491  Selected Topics in Chemical Engineering  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to students in the College of Engineering. Approval of department. Study of newly developing or non-traditional chemical engineering topics in a classroom environment.

801  Advanced Chemical Engineering Calculations  
Fall. 3(3-0)  Formulation of differential equations modeling physical phenomena in chemical engineering. Application of analytical and numerical solution methods. Interpretation of solutions.

802  Research Methods  
Fall. 3(3-0)  Interdepartmental with Materials Science and Engineering. Administered by Chemical Engineering. Skills required for graduate research. Critically reviewing the literature; defining a fundamental research problem, effective oral and written technical presentations, ethics, and statistics.

804  Foundations in Chemical Engineering I  

805  Foundations in Chemical Engineering II  

821  Advanced Chemical Engineering Thermodynamics  
Fall. 3(3-0) R: Open only to Chemical Engineering majors. Laws of thermodynamics, unsteady state processes. Prediction and correlation of phase equilibria for nonelectrolytes. Relation of quantum theory and statistical mechanics to thermodynamic properties.