CHEMICAL ENGINEERING (CHE)

Courses primarily for undergraduates:

CHE 1040: Chemical Engineering Learning Community
Credits: Required. Contact Hours: Lecture 1.
Curriculum in career planning and academic course support for Freshmen learning team. (Typically Offered: Fall)

CHE 1600: Chemical Engineering Problems with Computer Applications Laboratory
Credits: 3. Contact Hours: Lecture 2, Laboratory 2.
*Prereq: (*MATH 1430 *or satisfactory scores on mathematics placement examinations) and (*MATH 1650 *or satisfactory scores on mathematics placement examinations)*
Formulation and solution of engineering problems. Significant figures. Use of SI units. Graphing and curve-fitting. Flowcharting. Introduction to material balances, engineering economics, and design. Use of spreadsheet programs to solve and present engineering problems. Solution of engineering problems using computer programming languages. Chemical Engineering examples. Satisfactory placement scores can be found at: https://math.iastate.edu/academics/undergraduate/aleks/placement/.Graduation Restriction: Only one of ENGR 1600, ABE 1600, AERE 1600, CHE 1600, CE 1600, CPRE 1850, EE 1850, IE 1480, ME 1600, and SE 1850 may count towards graduation. (Typically Offered: Fall, Spring)

CHE 2020: Chemical Engineering Seminar
Credits: Required. Contact Hours: Lecture 1.
Professionalism in the context of the engineering/technical workplace. Introduction to chemical engineering career opportunities. Process and workplace safety. Development and demonstration of key workplace competencies: teamwork, professionalism and ethical responsibility, ability to engage in life-long learning, and knowledge of contemporary issues. Resumes; professional portfolios; preparation for internship experiences. Restricted to CHE majors. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

CHE 2040: Chemical Engineering Continuing Learning Community
Credits: Required. Contact Hours: Lecture 1.
Curriculum and career planning, academic course support for learning community.

CHE 2050: Chemical Engineering Progress Assessment
Credits: Required. Contact Hours: Lecture 1.
Prereq: CHEM 1780*,* MATH 1660*,* CHE 1600
Assessment of proficiency in general chemistry, calculus (including infinite series and applications of derivatives and integrals), and material balances, and an ability to use the principles of science and mathematics to identify, formulate, and solve engineering problems. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

CHE 2100: Material and Energy Balances
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHEM 1780*,* MATH 1660*,* CHE 1600
Introduction to chemical processes. Physical behavior of gases, liquids, and solids. Application of material and energy balances to chemical engineering equipment and processes. (Typically Offered: Fall, Spring)

CHE 2200: Introduction to Biomedical Engineering
(Cross-listed with BME 2200).
Credits: 3. Contact Hours: Lecture 3.
Prereq: BIOL 2120*; (*CHEM 1670 *or* CHEM 1770*); (*ABE 1600 *or* AERE 1600 *or* BME 1600 *or CE 1600 or* CHE 1600 *or* CPRE 1850 *or EE 1850 or* ENGR 1600 *or IE 1600 or ME 1600 or SE 1850);* MATH 1660*;* PHYS 2320
Engineering analysis of basic biology and engineering problems associated with living systems and health care delivery. The course will illustrate biomedical engineering applications in such areas as: biotechnology, biomechanics, biomaterials and tissue engineering, and biosignal and image processing, and will introduce the basic life sciences and engineering concepts associated with these topics. (Typically Offered: Fall, Spring)

CHE 2900: Introduction to Undergraduate Research/Independent Study
Credits: 1. Repeatable, maximum of 2 credits.
Prereq: Instructor Permission for CHE Course
Introduction to independent study with emphasis on skills necessary to pursue further independent study of a topic of special interest to student and faculty. Topics may include introductions to laboratory safety, standard operating procedures, design of experiments, data analysis, computational methods, literature searches, and professional communications. Pre-enrollment contract between student and instructor required. Graduation Restriction: Not applicable to the B.S. in Chemical Engineering degree. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

CHE 3100: Computational Methods in Chemical Engineering
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 1600*,* CHE 2050*,* CHE 2100*,* MATH 2650
Numerical methods for solving systems of linear and nonlinear equations, ordinary differential equations, numerical differentiation and integration, and nonlinear regression using chemical engineering examples. (Typically Offered: Fall, Spring)

CHE 3250: Chemical Engineering Laboratory I
Credits: 2. Contact Hours: Laboratory 4.
Prereq: CHE 3570*;* CHE 3810*; (*STAT 3005 *or* STAT 3031*); (Credit or concurrent enrollment in* ENGL 3090 *or* ENGL 3120 *or* ENGL 3140 *or* JLMC 3470*)*
Experiments covering fundamental material and energy balances, momentum and energy transport operations, and thermodynamics. Computer applications. (Typically Offered: Fall, Spring)

CHE 3560: Transport Phenomena I
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 2050 *and* CHE 2100 *and (*PHYS 2310 *or* PHYS 2310H*) and* PHYS 2310L *and (credit or enrollment in* MATH 2670*)*
Momentum and mechanical energy balances. Incompressible and compressible fluid flow. Applications to fluid drag, piping system design, filtration, packed beds and settling. (Typically Offered: Fall, Spring)

CHE 3570: Transport Phenomena II
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3560
Conduction and diffusion, convective heat and mass transfer, boiling and condensation, radiation, and design of heat exchange equipment. Introduction to diffusion. Graduation Restriction: Credit for only FSHN 3510 or CHE 3570 may be applied toward graduation for the Food Science major or Food Science minor. (Typically Offered: Fall, Spring)

CHE 3580: Separations
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3100*,* CHE 3570*, and* CHE 3810
Diffusion and mass transfer in fluids. Analysis and design of continuous contacting and multistage separation processes. Binary and multicomponent distillation, absorption, extraction, evaporation, membrane processes, and simultaneous heat and mass transfer. (Typically Offered: Fall, Spring)

CHE 3810: Chemical Engineering Thermodynamics
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 2020*,* MATH 2670*,* PHYS 2320*,* CHEM 3250 *and Credit or concurrent enrollment in* CHE 3100 *and* PHYS 2320L
Application of thermodynamic principles to chemical engineering problems. Thermodynamic properties of fluids, phase equilibria, and chemical reaction equilibria. (Typically Offered: Fall, Spring)

CHE 3820: Chemical Reaction Engineering
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3100*,* CHE 3810*; credit or enrollment in* CHE 3570
Kinetics of chemical reactions. Design of homogeneous and heterogeneous chemical reactors. (Typically Offered: Fall, Spring)

CHE 3910: Foreign Study Orientation
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3570*,* CHE 3810*; credit or enrollment in* ENGL 3140 *or* ENGL 3090 *or* ENGL 3120 *or* JLMC 3470
Graduation Restriction: Credit for graduation allowable only upon completion of CHE 3920. Meets International Perspectives Requirement. (Typically Offered: Spring)

CHE 3920: Foreign Study Program
Credits: 4. Contact Hours: Lecture 4.
Prereq: CHE 3580*,* CHE 3820*, and* CHE 3910
Study of chemical engineering including laboratories and lectures at collaborating international universities. Comparative study of U.S. and international manufacturing facilities. Expenses required. Meets International Perspectives Requirement. (Typically Offered: Summer)

CHE 4060: Environmental Chemodynamics
(Dual-listed with CHE 5060).
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3570 *and* CHE 3810
Examines the mechanisms and rates of chemical transport across air, water, and soil interfaces. Applications of transport and thermodynamic fundamentals to movement of chemicals in the environment.

CHE 4080: Surface and Colloid Chemistry
(Dual-listed with CHE 5080).
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3810
Examines the factors underlying interfacial phenomena, with an emphasis on the thermodynamics of surfaces, structural aspects, and electrical phenomena. Application areas include emulsification, foaming, detergency, sedimentation, fluidization, nucleation, wetting, adhesion, flotation, and electrophoresis.

CHE 4100: Electrochemical Engineering
(Dual-listed with CHE 5100).
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3570*,* CHE 3810*, and* CHE 3820
Electrochemical engineering principles in thermodynamics, electrode kinetics, charge and mass transport; modeling and simulation; electrocatalysis; electrochemical reactions; applications of electrochemical engineering in fuel cells, batteries and electrolyzers. (Typically Offered: Fall)

CHE 4120: Core Concepts in Chemical Engineering
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHEM 3250*;* MATH 2670*;* PHYS 2310 *or* PHYS 2310H*;* PHYS 2310L
Survey of the engineering science fundamentals in chemical engineering. Topics include material balances, energy balances, thermodynamics, transport phenome, and reaction engineering. Graduation Restriction: Credit for CHE 4120 may not be applied to any undergraduate or graduate degree programs in chemical engineering. (Typically Offered: Spring, Summer)

CHE 4150: Biochemical Engineering
(Dual-listed with CHE 5150).
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3570*,* CHEM 3310*;* BBMB 3010 *or* BBMB 3030 *or* BBMB 4040
Application of basic chemical engineering principles in biochemical and biological process industries such as enzyme technology and fermentation.

CHE 4200: Chemical Process Safety
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3570 *and* CHE 3810
Application of transport phenomena, thermodynamics, and chemical kinetics to the study of safety, health, and loss prevention. Government regulations, industrial hygiene, relief sizing, runaway reactions, toxic release, and dispersion models will be used. Fires, explosions, risk assessment, hazard identification, case studies, accident investigations, and design considerations will be studied. (Typically Offered: Fall, Spring)

CHE 4210: Process Control
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3580*,* CHE 3820*, and* MATH 2670
Control of industrial chemical processes. Device applications and limitations. Dynamics of chemical process components and process control systems. (Typically Offered: Fall, Spring)

CHE 4260: Chemical Engineering Laboratory II
Credits: 2. Contact Hours: Laboratory 4.
Prereq: CHE 3250*,* CHE 3580*, and* CHE 3820
Experiments in heat and mass transfer, staged operations, chemical reactor performance, unit processes. Computer applications. Graduation Restriction: Only one of CHE 4260 or 4270 may count toward graduation. (Typically Offered: Fall, Spring)

CHE 4290: Chemical Engineering Product Design
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3580 *and* CHE 3820
Application of core chemical engineering concepts to product design. Market and economic analysis, and technical feasibility. Literature and intellectual property search. Environmental, regulatory, and safety considerations. (Typically Offered: Fall, Spring)

CHE 4300: Process and Plant Design
Credits: 4. Contact Hours: Lecture 2, Laboratory 6.
Prereq: CHE 3580 *and* CHE 3820
Synthesis of chemical engineering processes, equipment and plants. Cost estimation and feasibility analysis. (Typically Offered: Fall, Spring)

CHE 4400: Biomedical Applications of Chemical Engineering
(Dual-listed with CHE 5400). (Cross-listed with BME 4400).
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 2100 *or* CHE 2200*,* MATH 2660 *or* MATH 2670*,* PHYS 2320
Applications of material and energy balances, transport phenomena, chemical reaction engineering, and thermodynamics to problems in biomedical engineering and applied physiology; survey of biomedical engineering; biomaterials; biomedical imaging.

CHE 4470: Polymers and Polymer Engineering
(Dual-listed with CHE 5470).
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHEM 3310 *and* CHE 3810
Chemistry of polymers, addition and condensation polymerization. Physical and mechanical properties, polymer rheology, production methods. Applications of polymers in the chemical industry.

CHE 4900: Undergraduate Research/Independent Study
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Department Permission for CHE Course
Investigation of topics of special interest to student and faculty with a final written report or presentation. Election of course and topic must be approved in advance by Department with completion of Study Proposal. Graduation Restriction: No more than 6 credits of CHE 4900 may be counted towards technical electives.

CHE 4900H: Undergraduate Research/Independent Study: Honors
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Department Permission for Course and Membership in the University Honors Program
Investigation of topics of special interest to student and faculty with a final written report orpresentation. Election of course and topic must be approved in advance by Department with completion of Study Proposal. Graduation Restriction: No more than 6 credits of CHE 4900 may be countedtowards technical electives.

CHE 4990: Applied Industrial Research
Credits: 3. Repeatable, maximum of 6 credits.
Prereq: CHE 2050*;* CHE 2100*; Permission of Instructor*
Application of core chemical engineering concepts to solve industrially-sponsored process design problems in teams. Introduction to literature review and analysis, intellectual property, and project management. (Typically Offered: Fall, Spring)

Courses primarily for graduate students, open to qualified undergraduates:

CHE 5060: Environmental Chemodynamics
(Dual-listed with CHE 4060).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Examines the mechanisms and rates of chemical transport across air, water, and soil interfaces. Applications of transport and thermodynamic fundamentals to movement of chemicals in the environment. (Typically Offered: Fall, Spring, Summer)

CHE 5080: Surface and Colloid Chemistry
(Dual-listed with CHE 4080).
Credits: 3. Contact Hours: Lecture 3.
Prereq: CHE 3810 *or graduate standing*
Examines the factors underlying interfacial phenomena, with an emphasis on the thermodynamics of surfaces, structural aspects, and electrical phenomena. Application areas include emulsification, foaming, detergency, sedimentation, fluidization, nucleation, wetting, adhesion, flotation, and electrophoresis. Term project required for graduate credit.

CHE 5100: Electrochemical Engineering
(Dual-listed with CHE 4100).
Credits: 3. Contact Hours: Lecture 3.
*Prereq: (*CHE 3570*,* CHE 3810*, and* CHE 3820*) or graduate standing*
Electrochemical engineering principles in thermodynamics, electrode kinetics, charge and mass transport; modeling and simulation; electrocatalysis; electrochemical reactions; applications of electrochemical engineering in fuel cells, batteries and electrolyzers. (Typically Offered: Fall)

CHE 5150: Biochemical Engineering
(Dual-listed with CHE 4150).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Application of basic chemical engineering principles in biochemical and biological process industries such as enzyme technology and fermentation.

CHE 5400: Biomedical Applications of Chemical Engineering
(Dual-listed with BME 4400/ CHE 4400).
Credits: 3. Contact Hours: Lecture 3.
*Prereq: (*CHE 2100 *or* CHE 2200*,* MATH 2660 *or* MATH 2670*,* PHYS 2320*) or graduate standing*
Applications of material and energy balances, transport phenome, chemical reaction engineering, and thermodynamics to problems in biomedical engineering and applied physiology; survey of biomedical engineering; biomaterials; biomedical imaging.

CHE 5420: Polymeric Biomaterials
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Polymeric biomaterials, overview of biomaterial requirements, different classes of polymers used as biomaterials, specific bioapplications of polymers.

CHE 5450: Analytical and Numerical Methods
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Analysis of equipment and processes by analytic and/or numerical solution of descriptive differential equations. Operational and series techniques, boundary value problems, numerical interpolation and approximation, integration techniques. (Typically Offered: Fall)

CHE 5470: Polymers and Polymer Engineering
(Dual-listed with CHE 4470).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Chemistry of polymers, addition and condensation polymerization. Physical and mechanical properties, polymer rheology, production methods. Applications of polymers in the chemical industry.

CHE 5540: Integrated Transport Phenomena
Credits: 4. Contact Hours: Lecture 4.
Prereq: Graduate Standing or Permission of Instructor
Conservation equations governing diffusive and convective transport of momentum, thermal energy and chemical species. Transport during laminar flow in conduits, boundary layer flow, creeping flow. Heat and mass transport coupled with chemical reactions and phase change. Scaling and approximation methods for mathematical solution of transport models. Diffusive fluxes; conservation equations for heat and mass transfer; scaling and approximation techniques; fundamentals of fluid mechanics; unidirectional flow; creeping flow; laminar flow at high Reynolds number; forced-convection heat and mass transfer in confined and unconfined laminar flows. (Typically Offered: Fall)

CHE 5720: Turbulence
(Cross-listed with AERE 5720).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Qualitative features of turbulence. Statistical representation of turbulent velocity fields: averages, moments, correlations, length and time scales and the energy cascade. Averaged equations of motion, closure requirements, Reynolds averaged models. Homogeneous shear flows, free shear flows, boundary layers. Numerical simulation of turbulence: DNS, LES, DES.

CHE 5800X: Introduction of Project Management for Thesis Research
(Cross-listed with MSE 5800X/ IE 5800X/ GRST 5800X).
Credits: 1. Contact Hours: Lecture 1.
Prereq: Graduate Standing or Permission of Instructor
Tools and skills of Project Management (PM) adapted from industry to improve efficiency in thesis research. Project charter initiation for thesis, timeline and meeting scheduling tools, expectation management, and communication with advisors. Practice of the PM skills using student's own thesis. Presentation of a project charter. Demonstration of knowledge of related PM skills and the ability of utilizing these skills for thesis research. Sharing thesis ideas and learning experience in the Graduate for Advancing Professional Skills (GAPS) learning community. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

CHE 5830: Advanced Thermodynamics
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Application of thermodynamic principles to chemical engineering problems. Thermodynamic properties of non-ideal fluids and solutions; phase and chemical-reaction equilibria/stability. (Typically Offered: Spring)

CHE 5870: Advanced Chemical Reactor Design
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate Standing or Permission of Instructor
Analysis of complex reactions and kinetics. Fixed bed, fluidized bed, and other industrial reactors. Analysis and design of non-ideal flow mixing, and residence times. Heterogeneous reactors. (Typically Offered: Spring)

CHE 5900: Independent Study
Credits: 2-6. Repeatable.
Prereq: Instructor Permission for Course
Investigation of an approved topic on an individual basis.

CHE 5950A: Special Topics: Separations
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5950C: Special Topics: Crystallization
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5950D: Special Topics: Thermodynamics
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5950E: Special Topics: Protein Engineering/Bioseparations
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5950F: Special Topics: Biological Engineering
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5950G: Special Topics: Materials and Biomaterials
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5950H: Special Topics: Surfaces
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5950I: Special Topics: Combinatorial Design
Credits: 2-3. Contact Hours: Lecture 3.
Repeatable.
Prereq: Graduate Standing or Permission of Instructor

CHE 5990: Creative Component
Credits: 1-30. Repeatable.
Prereq: Instructor Permission for Course

Courses for graduate students:

CHE 6010: Seminar
Credits: Required. Contact Hours: Lecture 1.
Repeatable.
Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

CHE 6250: Metabolic Engineering
Credits: 3. Contact Hours: Lecture 3.
Principles of metabolic engineering. Emphasis on emerging examples in biorenewables and plant metabolic engineering. Overview of biochemical pathways, determination of flux distributions by stoichiometric and labeling techniques; kinetics and thermodynamics of metabolic networks; metabolic control analysis; genetic engineering for overexpression, deregulation, or inhibition of enzymes; directed evolution; application of bioinformatics, genomics, and proteomics.

CHE 6320: Multiphase Flow
(Cross-listed with ME 6320).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Graduate standing
Single particle, multiparticle and two-phase fluid flow phenome (gas-solid, liquid-solid and gas-liquid mixtures); particle interactions, transport phenome, wall effects; bubbles, equations of multiphase flow. Dense phase (fluidized and packed beds) and ducted flows; momentum, heat and mass transfer. Computer solutions. Offered even-numbered years. (Typically Offered: Spring)

CHE 6880: Catalysis and Catalytic Processes
Credits: 3. Contact Hours: Lecture 3.
Principles and applications of heterogeneous and homogeneous catalysis. Adsorption. Reaction kinetics and mass transfer effects. Catalyst characterization. Industrial catalytic processes.

CHE 6920: Independent Study
Credits: 2-6. Repeatable.
Prereq: Instructor Permission for Course
Investigation of an approved topic on an individual basis. Election of course and topic must be approved in advance by Program of Study Committee.

CHE 6950A: Advanced Topics: Separations
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950B: Advanced Topics: Advanced Statistical Modeling and Control
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950C: Advanced Topics: Crystallization
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950D: Advanced Topics: Thermodynamics
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950E: Advanced Topics: Protein Engineering/Bioseparations
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950F: Advanced Topics: Biological Engineering
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950G: Advanced Topics: Materials and Biomaterials
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950H: Advanced Topics: Surfaces
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950I: Advanced Topics: Combinatorial Design
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950J: Advanced Topics: Polymeric and Nanostructured Materials
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6950K: Advanced Topics: Biomaterials and Tissue Engineering
Credits: 1-30. Contact Hours: Lecture 30.
Repeatable.

CHE 6970: Engineering Internship
Credits: Required. Repeatable.
One semester and one summer maximum per academic year professional work period. (Typically Offered: Fall, Spring, Summer)

CHE 6980A: Chemical Engineering Teaching Practicum: Teaching Practicum
Credits: 1. Contact Hours: Lecture 1.
Discussions intended to foster the development of graduate students as teaching assistants and future chemical engineering instructors. Topics include classroom and laboratory instruction, grading, and developing a teaching philosophy. (Typically Offered: Fall)

CHE 6980B: Chemical Engineering Teaching Practicum: Teaching Experience
Credits: 1. Contact Hours: Lecture 1.
Repeatable.
Prereq: Instructor Permission for Course
Participation in the instruction of a CHE course under the mentorship of a CBE faculty member. Typical activities may include lecture preparation and delivery, laboratory instruction, design of assessments, problem-solving sessions, office hours, and grading. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

CHE 6990: Research
Credits: 1-30. Repeatable.
Prereq: Instructor Permission for Course
Advanced topic for thesis/dissertation.