Chemical Engineering (CME) Courses

CME 1201. Introduction to Chemical Engineering. (1-0) 1 Credit Hour.
A broad survey of the practice of chemical engineering, intended to expose students to specialized areas of chemical engineering and potential career paths (e.g., bioengineering, environmental engineering, materials engineering, and petroleum/energy engineering) through discussions and guest lectures. Students will review ethics and safety, and practice Technical Communication through oral presentations and written assignments. Course Fees: LRE1 $20; STSE $10.

CME 2103. Chemical Process Principles. (3-0) 3 Credit Hours.
Prerequisites: A grade of "C-" or better in CHE 1113, CME 1201, and MAT 1214. Students will learn basic principles of chemical engineering, including materials and energy balances. Course Fees: LRE1 $20; STSE $30.

CME 2203. Computational Methods in Chemical Engineering. (3-1) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in EGR 2323. Introduction to numerical techniques and computational tools essential for chemical engineering, including the use of data acquisition and processing, engineering drawing, numerical modeling of linear and differential equations, and presentation tools. Students will learn to use computer software to aid in their analysis (e.g., Matlab, Mathematica). One hour of problem solving recitation per week. Course Fees: LRE1 $20; STSE $30.

CME 3003. Introduction to Materials Science and Engineering. (3-0) 3 Credit Hours.
Prerequisite: A grade of "C-" or better in CME 1201. Foundation for understanding the structure and properties of engineering materials such as ceramics, glass, polymers, composites, biomaterials, metals and alloys. An integrated introduction of materials’ microstructure, thermodynamic process, and corresponding mechanical, electrical, optical, and magnetic properties. (Same as BME 3003. Credit cannot be earned for both CME 3103 and BME 3003.) Course Fees: LRE1 $20; STSE $30.

CME 3103. Thermodynamics I. (3-1) 3 Credit Hours.
Prerequisites: A grade of "C-" or better in CHE 3804 and CME 2103. Heat, work, equations of state, thermodynamic systems, control volume, first and second laws of thermodynamics, applications of the laws of thermodynamics, reversible and irreversible processes, introduction to basic thermodynamic cycles, vapor-liquid equilibria, and non-ideal solutions. One hour of problem solving recitation per week. (Credit cannot be earned for both CME 3103 and ME 3293.) Course Fees: LRE1 $20; STSE $30.

CME 3303. Transport Phenomena. (3-0) 3 Credit Hours.
Prerequisite: A grade of "C-" or better in CME 2103. Fundamental principles of momentum and energy transport in various processes with exploration of laminar and turbulent flow, and heat exchange. Course Fees: LRE1 $20; STSE $30.

CME 3403. Unit Operations–Transport Processes. (3-1) 3 Credit Hours.
Prerequisite: A grade of "C-" or better in CME 3303. Fluid mechanics, flow of compressible and incompressible fluids, fluid transport and metering, fluid agitation and mixing; heat transfer by conduction and convection, phase changes of fluids, and heat exchangers; types of equipment used and practical chemical engineering applications. One hour of problem solving recitation per week. Course Fees: LRE1 $20; STSE $30.

CME 3433. Crystal Chemistry of Structure and Properties. (3-0) 3 Credit Hours.
Prerequisite: A grade of "C-" or better in CME 3003. Principles of crystal chemistry applied to the relationships of crystallographic structures, compositions, and engineering properties of materials. Course Fees: LRE1 $20; STSE $30.

CME 3503. Kinetics and Reactor Design. (3-1) 3 Credit Hours.
Prerequisites: A grade of "C-" or better in CME 3804 and CME 3303. Fundamental principles to the design and analysis of batch, continuously stirred tank, and fixed bed chemical reactors; steady and unsteady state operations; effects of pressure and temperature; heterogeneous catalysis; analysis of transport processes in catalysis; special topics may include enzyme catalysis; fluid bed reactors; membrane reactors; and microscale reactors. One hour of problem solving recitation per week. Course Fees: LRE1 $20; STSE $30.

CME 3601. Chemical Engineering Laboratory I. (0-4) 1 Credit Hour.
Prerequisite: Completion of or concurrent enrollment in CME 3501. Basic principles and statistical design of experiments using software tools; Experiments demonstrating key unit operations with emphasis on fluid flow and heat transfer. Written and oral reports required. Course Fees: LRE1 $20; STSE $10.

CME 3703. Transport Phenomena II. (3-0) 3 Credit Hours.
Prerequisite: CME 3303 or instructor approval. Fundamental principles of momentum and mass transport in various processes with exploration of laminar and turbulent flow, and mass diffusion. Course Fees: LRE1 $20; STSE $30.

CME 4001. Chemical Process Safety and Risk Management. (1-0) 1 Credit Hour.
Application of chemical process safety, risk assessment and management, including hazardous waste disposal and remediation. Course Fees: LRE1 $20; STSE $10.

CME 4103. Process Dynamics and Control. (3-1) 3 Credit Hours.
Prerequisite: A grade of "C-" or better in CME 3403. Modeling of dynamic processes; Response of uncontrolled systems; Transfer functions; Response and stability of controlled systems; frequency response; Design of feedback controllers; Cascade, feed forward and multivariable control systems; Process Instrumentation; Use of simulators to design feedback controllers. One hour of problem solving recitation per week. Course Fees: LRE1 $20; STSE $30.

CME 4163. Thermodynamics II. (3-2) 3 Credit Hours.
Prerequisites: A grade of "C-" or better in CME 3103 and CME 3403. Mass transfer applications with a focus on separations, including equilibrium staged operations, distillation, extraction, gas absorption, membrane and adsorption processes. (Formerly titled Chemical Engineering Design Fundamentals.) Course Fees: LRE1 $20; STSE $30.
CME 4201. Chemical Engineering Laboratory II. (0-4) 1 Credit Hour.
Prerequisite: Completion of or concurrent enrollment in CME 4103.
Experiments demonstrating key unit operations with emphasis on mass
transfer with and without reactions; hands on experience with process
control. Written and oral reports required. Course Fees: LRE1 $20; STSE $10.

CME 4264. Product and Process Design. (2-6) 4 Credit Hours.
Prerequisite: A grade of "C-" or better in CME 4163. Application of
design and economic principles to chemical engineering systems;
analysis of costs of equipment, feedstocks, utilities, and risk assessment;
optimization of equipment design using simulation tools. Strategic
application of technical and economic constraints in the design of a
chemical processing plant including most aspects of typical industrial
design; integration of process safety and environmental impact factors.
Students work in small groups and submit a plant design project report.
Course Fees: LRE1 $20; STSE $40.

CME 4423. Selected Topics in Petroleum/Energy Engineering I. (3-0)
3 Credit Hours.
Prerequisites vary with the topic (refer to the course syllabus on Bluebook
or contact the instructor). An organized course offering the opportunity for
specialized study not normally or not often available as part of the regular
course offerings. May be repeated for credit when topics vary, but not
more than 6 semester credit hours, regardless of concentration, will apply
to a bachelor's degree. Course Fees: LRE1 $20; STSE $30.

CME 4513. Selected Topics in Bioengineering. (3-0) 3 Credit Hours.
Prerequisites vary with the topic (refer to the course syllabus on Bluebook
or contact the instructor). An organized course offering the opportunity for
specialized study not normally or not often available as part of the regular
course offerings. May be repeated for credit when topics vary, but not
more than 6 semester credit hours, regardless of concentration, will apply
to a bachelor's degree. Course Fees: LRE1 $20; STSE $30.

CME 4523. Selected Topics in Petroleum/Energy Engineering II. (3-0)
3 Credit Hours.
Prerequisites vary with the topic (refer to the course syllabus on Bluebook
or contact the instructor). An organized course offering the opportunity for
specialized study not normally or not often available as part of the regular
course offerings. May be repeated for credit when topics vary, but not
more than 6 semester credit hours, regardless of concentration, will apply
to a bachelor's degree. Course Fees: LRE1 $20; STSE $30.

CME 4533. Selected Topics in Materials Science and Engineering.
(3-0) 3 Credit Hours.
Prerequisites vary with the topic (refer to the course syllabus on Bluebook
or contact the instructor). An organized course offering the opportunity for
specialized study not normally or not often available as part of the regular
course offerings. May be repeated for credit when topics vary, but not
more than 6 semester credit hours, regardless of concentration, will apply
to a bachelor's degree. Course Fees: LRE1 $20; STSE $30.

CME 4543. Selected Topics in Environmental Engineering. (3-0) 3
Credit Hours.
Prerequisites vary with the topic (refer to the course syllabus on Bluebook
or contact the instructor). An organized course offering the opportunity for
specialized study not normally or not often available as part of the regular
course offerings. May be repeated for credit when topics vary, but not
more than 6 semester credit hours, regardless of concentration, will apply
to a bachelor's degree. Course Fees: LRE1 $20; STSE $30.

CME 4553. Selected Topics in Business and Technology Management. (3-0) 3 Credit Hours.
Prerequisites vary with the topic (refer to the course syllabus on Bluebook
or contact the instructor). An organized course offering the opportunity for
specialized study not normally or not often available as part of the regular
course offerings. May be repeated for credit when topics vary, but not
more than 6 semester credit hours, regardless of concentration, will apply
to a bachelor's degree. Course Fees: LRE1 $20; STSE $30.

CME 4601. Independent Study. (0-0) 1 Credit Hour.
Prerequisites: Permission in writing (Independent Study Form available
online) from the instructor, the student’s advisor, and the Department.
Independent reading, research, discussion, and/or writing under the
direction of a faculty member. May be repeated for credit, but not more
than 6 semester credit hours of independent study, regardless of the
concentration, will apply to a bachelor’s degree. Course Fees: LRE1 $20;
STSE $10.

CME 4602. Independent Study. (0-0) 2 Credit Hours.
Prerequisites: Permission in writing (Independent Study Form available
online) from the instructor, the student's advisor, and the Department.
Independent reading, research, discussion, and/or writing under the
direction of a faculty member. May be repeated for credit, but not more
than 6 semester credit hours of independent study, regardless of the
concentration, will apply to a bachelor’s degree. Course Fees: LRE1 $20;
STSE $20.

CME 4603. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: Permission in writing (Independent Study Form available
online) from the instructor, the student's advisor, and the Department.
Independent reading, research, discussion, and/or writing under the
direction of a faculty member. May be repeated for credit, but not more
than 6 semester credit hours of independent study, regardless of the
concentration, will apply to a bachelor’s degree. Course Fees: LRE1 $20;
STSE $30.