Semester Supplements to this Bulletin contain description when course is offered. May be repeated as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: Two courses in literature 3 credits

CLT 332-G Literary Genres: Drama
Analysis of dramatic form through readings of major works in tragedy and comedy. Works selected from different national literatures and literary movements. Semester Supplements to this Bulletin contain description when course is offered. May be repeated as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: Two courses in literature 3 credits

CLT 333-G Literary Genres: Novel
Historical and analytical study of the novel form. Works selected from different national literatures and literary movements. Semester Supplements to this Bulletin contain description when course is offered. May be repeated as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: Two courses in literature 3 credits

CLT 334-G Other Literary Genres
Historical and analytical study of such literary genres as satire, fable, romance, epistle, saga, allegory, etc. Semester Supplements to this Bulletin contain description when course is offered. May be repeated as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: Two courses in literature 3 credits

CLT 335-G Interdisciplinary Study of Film
An inquiry into the aesthetics, history, and theory of film as it relates principally to literature but also to disciplines such as art, music, psychology, and cultural history. Semester Supplements to this Bulletin contain description when course is offered. May be repeated as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: One course in literature; HUM 201 or 203 or THR 117 3 credits

CLT 361-G Literature and Society
An inquiry, interdisciplinary in nature, into the relationships between the events and materials of political and social history and their effect on the form and content of the literature of a period. Also subsumed under the rubric Literature and Society is the topic Literature and Pastology. Semester Supplements to this Bulletin contain specific description when course is offered. May be repeated for credit as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: Two courses in literature 3 credits

CLT 362-G Literature and Ideas
An inquiry into the primary writings and significant documents in the history of ideas and their effect on the form and content of the literature of a period. Semester Supplements to this Bulletin contain description when course is offered. May be repeated as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: Two courses in literature 3 credits

CLT 363-G Literature and the Arts
An inquiry into the aesthetic milieu (including the plastic arts, theatre, and music) and its relationship to the form and content of the literature of a period. Semester Supplements to this Bulletin contain description when course is offered. May be repeated as the topic changes.

Prerequisite: U3 or U4 standing
Advisory Prerequisites: Two courses in literature 3 credits

CLT 475 Undergraduate Teaching Practicum I
Work with a faculty member as an assistant in one of the faculty member’s regularly scheduled classes. The student is required to attend all the classes, do all the regularly assigned work, and meet with the faculty member at regularly scheduled times to discuss the intellectual and pedagogical matters relating to the course.

Prerequisites: U4 standing; permission of instructor and chairperson 3 credits, S/U grading

CLT 476 Undergraduate Teaching Practicum II
Work with a faculty member as an assistant in one of the faculty member’s regularly scheduled classes. Students assume greater responsibility in such areas as leading discussions and analyzing results of tests that have already been graded. Students may not serve as teaching assistants in the same course twice.

Prerequisites: CLT 475; permission of instructor and chairperson 3 credits, S/U grading

CLT 487 Independent Reading and Research
Intensive reading and research on a special topic undertaken with close faculty supervision. May be repeated.

Prerequisites: Permission of instructor and department 0-6 credits, S/U grading

CLT 495 Comparative Literature Honors Project
A one-semester project for comparative literature majors who are candidates for the degree with departmental honors. The project involves independent study under close supervision of an appropriate faculty member, and the written and oral presentation to the department faculty colloquium of an honors thesis.

Prerequisites: Permission of instructor and department 3 credits

CME 304 Chemical Engineering Thermodynamics I
First and second laws of thermodynamics, PVT behavior of pure substances, equations of state for gases and liquids, phase equilibria, mass and energy balances for closed and open systems, reversibility and equilibrium, application of thermodynamics to flow processes, heat effects during chemical reactions and combustion.

Prerequisites: PHY 132; CHE 132, CSE 130 or ENG 111 or MEC 112 or ESE 124 3 credits

CME 310 Chemical Engineering Laboratory I: Unit Operation and Fundamentals

Prerequisite: CME 304
Corequisite: CME 300 2 credits

CME 312 Material and Energy Balance
Introduces analysis of chemical processes using the laws of conservation and energy as they apply to non-reacting and reacting systems. Integration of the concepts of equilibrium in physicochemical systems, and utilization of basic principles of thermodynamics.

Prerequisites: EES 111 or MEC 132; CHE 132 and 134; AMS 261 or MAT 203; CME 304 3 credits

CME 314 Chemical Engineering Thermodynamics II
Equilibrium and the Phase Rule; VLE model and K-value correlations; chemical potential and phase equilibria for ideal and non-ideal solutions; heat effects and property changes on mixing; application of equilibria to chemical reactions; Gibbs-Duhem and chemical potential for reacting systems; liquid/liquid, liquid/solid, solid/vapor, and liquid/vapor equilibria; adsorption and osmotic equilibria, steady state flow and irreversible processes. Steam power plants, internal combustion and jet engines, refrigeration cycle and vapor compression, liquefaction processes.

Prerequisite: CME 304 3 credits

CME 315 Numerical Methods for Chemical Engineering Analysis
Mathematical modeling lies at the heart of chemical engineering. Understanding, predicting, designing, optimizing, and controlling chemical processes and phenomena all require the development of good mathematical models. This course provides students with the concepts, processes, and tools for an introduction to such chemical engineering calculations with a mathematical software package (MATLAB).

Corequisites: AMS 361 or MAT 303 3 credits

CME 318 Chemical Engineering Fluid Mechanics
Introduces fluid mechanics. Dynamics of fluids in motion; laminar and turbulent flow, Bernoulli’s equation, friction in conduits; flow through fixed and fluidized beds. Study of pump and compressor performance and fluid metering devices. Includes introduction to microfluidics.

Prerequisites: AMS 261 or MAT 203 or 205; PHY 131 or 125 (or 125 or 141) 3 credits

COURSE DESCRIPTIONS

As printed January 2007
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Prerequisites/Advisory Prerequisite</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CME 320 Chemical Engineering Lab II: Chemical and Molecular Engineering</td>
<td>Introduction and operation of a continuous unit, handling of air-sensitive/water-sensitive materials, solvolysis and thermal techniques for materials synthesis, preparation of polymer nano-composites and nano-sized materials. Prerequisite: CME 310</td>
<td>2 credits</td>
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<tr>
<td>CME 322 Chemical Engineering Heat and Mass Transfer</td>
<td>Heat transfer by conduction, principles of heat flow in fluids with and without phase change, heat transfer by radiation, heat exchange equipment. Principles and theory of diffusion, mass transfer between phases, distillation, leaching and extraction, fixed-bed membrane separation, crystallization. Prerequisite: CME 318</td>
<td>3 credits</td>
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<tr>
<td>CME 323 Reaction Engineering and Chemical Kinetics</td>
<td>Introduction to chemical reaction engineering and reactor design. Fundamentals of chemical kinetics for homogeneous and heterogeneous reactions, both catalyzed and uncatalyzed. Steady-state approximation. Methods of kinetic data collection, analysis and interpretation. Transport effects in solid and slurry-phase reactions. Batch and flow reactors including operations under non-ideal and non-isothermal conditions. Reactor design including bioreactors. Prerequisites: CME major; U3 standing; CME 312 and 314</td>
<td>3 credits</td>
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<tr>
<td>CME 327 Molecular Modeling for Chemical Engineers</td>
<td>Molecular modeling techniques and simulation of complex chemical processes. Use of Monte Carlo methods and Molecular Dynamics methods. Emphasis on the simulation and modeling of biopolymeric systems. Prerequisites: PHY 132; ESG 111 or MEC 112; AMS 261 or MAT 203; AMS 361 or MAT 303</td>
<td>3 credits</td>
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<tr>
<td>CME 371 Biomedical Polymers</td>
<td>This course focuses on the clinical performance of polymers and discusses the chemical, physical, mechanical and biological questions raised by the unique use of these materials within the human body. The chemistry and properties of key biomedical polymers will be studied and their biomedical applications will be discussed. The biomaterial’s response to the various components of its biological environment will be examined, followed by the response of the host to the presence of the implanted polymer. Special attention will be given to the interaction of the system with the presence polymer. Special attention will be given to the interaction of the system with the presence of bio-polymers to tissue engineering and the relevance of nanoscale phenomena are discussed. Pre- or Corequisite: CHE 321 or permission by the instructor.</td>
<td>3 credits</td>
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<tr>
<td>CME 401 Separation Technologies I</td>
<td>Fundamentals of separations. Introduction to standard classical and advanced separation methods and their relative merits and limitations. Distillation, crystallization, filtration, centrifugation, absorption and stripping methods. Includes fundamentals of chromatography. Prerequisites: CME major; U3 or U4 standing; CME 320</td>
<td>3 credits</td>
<td></td>
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<tr>
<td>CME 402 Separation Technologies II</td>
<td>Introduces separation technologies in a plant design. Principles of supercritical fluids extraction and membrane separation. Packaged tower design for separations. Batch versus continuous operation. Prerequisite: CME 401</td>
<td>2 credits</td>
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<tr>
<td>CME 410 Chemical Engineering Laboratory III: Instrumentation, Material Design and Characterization</td>
<td>Synthesis of unsupported nanosized metal and nano-sized metal in a polymer. Characterization of synthesized nano materials by modern spectroscopic techniques (TEM, XRD, FTIR, and XPS). Data analysis and interpretation. Prerequisite: CME 320</td>
<td>2 credits</td>
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<tr>
<td>CME 420 Chemical Engineering Laboratory IV: Directed Research</td>
<td>Directed laboratory research or internship in industry. Includes original research project selection and a formal report preparation. Prerequisite: CME 410</td>
<td>2 credits</td>
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<tr>
<td>CME 440 Process Engineering and Design I</td>
<td>Classical methods of chemical process engineering, advanced mathematical techniques and computer software for efficient and accurate process design and development. Mini-project design. Prerequisites:</td>
<td>3 credits</td>
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<tr>
<td>CME 441 Process Engineering and Design II</td>
<td>Major design project: a review of engineering design principles; engineering economics, economic evaluation, capital cost estimation; process optimization; profitability analysis for efficient and accurate process design. Prerequisites: CME 401 and 440</td>
<td>3 credits</td>
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<tr>
<td>CME 470 Polymer Synthesis: Theory and Practice, Fundamentals, Methods, Experiments</td>
<td>This course teaches general methods and processes for the synthesis, modification, and characterization of macromolecules. It includes general techniques for purification, preparation and storage of monomers; general synthetic methods such as bulk, solution, and heterogeneous polymerization; addition and condensation polymerization; methods of separation and analysis of polymers. Prerequisites: PHY 132, PHY 134, CHE 322</td>
<td>3 credits</td>
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<tr>
<td>CME 488 Industrial Internship in Chemical Engineering</td>
<td>Research project in an industrial setting under joint supervision of an industrial mentor and chemical engineering faculty. Project to cover some or all of the following chemical engineering principles of product synthesis: experiment design, data collection, data analysis, process simulations, and report writing related to an actual production facility. May be repeated up to a maximum of 12 credits. Prerequisites: B average in CME courses; permission of supervising faculty member.</td>
<td>0-12 credits</td>
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<tr>
<td>CME 499 Research in Chemical Engineering</td>
<td>Independent research project under the supervision of a chemical engineering or interdisciplinary faculty member. Project to cover some or all of the following chemical engineering principles: experiment design, data collection, data analysis, process simulations, and report writing. May be repeated but a maximum of 3 credits of research electives can be counted towards technical elective requirements. Prerequisites: B average in CME courses; permission of supervising faculty member.</td>
<td>0-3 credits</td>
<td></td>
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<tr>
<td>CSE 101 Introduction to Computers and Information Technologies</td>
<td>An introduction to the basics of personal computing and information technologies intended primarily for students majoring in humanities, social and behavioral sciences, or business management. Topics include principles of personal (single-user) computer systems, office automation, and information in a modern, networked (multi-user) computing environment. Emphasis is on conceptual understanding of personal computing rather than use of specific hardware or software. Required participation in computer laboratories. May not be taken for credit in addition to EST 100 or after any CSE or ISE course. Prerequisite: Satisfaction of entry skill in mathematics requirement (Skill 1) or satisfactory completion of D.E.C. C</td>
<td>3 credits</td>
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<tr>
<td>CSE 102 Introduction to Web Design and Programming</td>
<td>An introduction to the design of Web pages, specifically the development of browser and device independent HTML, with an emphasis on the XHTML standards. Includes the use of style sheets (CSS) and tools for page layout and verification. HTML is presented as a mark-up language, exploring the rules of HTML elements and attributes. Students learn the separation of page viewing information from the HTML through CSS style sheets as well as the use of block layout without using HTML tables. Addresses HTML display properties including text, color, image, and graphic elements as well as approaches to HTML validation and techniques. Advisory Prerequisite: CSE 101 or basic computer skills</td>
<td>3 credits</td>
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<tr>
<td>CSE 110 Introduction to Computer Science</td>
<td>An introduction to fundamentals of computer science. Topics covered include algorithmic design, problem-solving techniques for computer programming, fundamental ideas of algorithms and computer organization, the role of the operating system, introductory programming methodology including variables, assignment statements, control statements and subroutines (methods), programming paradigms, the compilation process, theoretical limits of computation, social and ethical issues. Intended for students who have not taken any college-level computer science course containing programming assignments in a high-level programming language. Prerequisite: Level 3 or higher on the mathematics placement examination</td>
<td>2 credits</td>
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<tr>
<td>CSE 113-C Foundations of Computer Science I</td>
<td>A rigorous introduction to the conceptual and mathematical foundations of computer science with special emphasis on recursion and its applications in functional programming as well as reasoning techniques based on propositional logic and mathematical induction. Prerequisite: One MAT course that satisfies D.E.C. category C or score of level 4 on the mathematics placement examination</td>
<td>3 credits</td>
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</tbody>
</table>
| CSE 114 Computer Science I | An introduction to procedural and object-oriented programming methodology. Topics include program structure, conditional and iterative programming, procedures, arrays and records, object classes, encapsulation, information hiding, inheritance, polymorphism, file I/O, and exceptions. Software debugging and testing techniques are emphasized including an introduc-