September 2005

Under Graduate Course Description

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CHME 112. Introduction to Chemical Engineering (3 cr I) Lec 3. The chemical engineering profession, basic engineering calculations, chemical process measurements and calculations, underlying natural laws and relationships, properties of single compounds, properties of mixtures, design of equipment and unit operations, process flowsheets and systems analysis, material balances including those with chemical reaction, purge and recycle, sources of data.

CHME 202. Mass and Energy Balances (3 cr I) Lec 3. Prereq: CHEM 114, CHME 112 (CSCE 150 or ENGM 112 for transfer students). Parallel: MATH 107. Application of the principle of conservation of mass and energy in the analysis of steady-state chemical processes. Topics in physical, chemical, and thermal property estimation.

CHEM 203. Equilibrium Stage Operations (3 cr II) Lec 3. Prereq: MATH 107; CHME 202. Parallel: CSCE 155. Phase equilibria and mass and energy balances applied to staged mass transfer operations.

CHEM 312. Chemical Engineering Computation (3 cr I) Lec 3. Prereq: Junior standing; CSCE 155; MATH 221; or permission. Computational methods in orthogonal polynomials, numerical integration, matrix operations and ordinary differential equations as they apply to chemical engineering problems such as separations, reactor design, transport operations and control.

CHME 322. Chemical Engineering Thermodynamics I (3 cr I) Lec 3. Prereq: CHME 202; CSCE 155. Parallel: CHEM 481. Application of the three fundamental laws to chemical engineering problems.

CHME 323/823. Chemical Engineering Thermodynamics II (3 cr II) Lec 3. Prereq: CHME 322. Application to multicomponent systems: thermodynamics, phase equilibria, chemical reaction equilibria, and process analysis.

CHME 332/832. Transport Operations I (3 cr I) Lec 3. Prereq: MATH 208, CHME 202 or MECH 312. Mass, momentum, and energy transport phenomena and their applications in chemical engineering.

CHME 333/833. Transport Operations II (3 cr II) Lec 3. Prereq: CHME 332. Continuation of CHME 332.

[IS] CHME 430/830. Chemical Engineering Laboratory (4 cr I) Lec 1, lab 4. Prereq: CHME 203, 333. Prereq or parallel: CHME 442. Selected experiments in chemical engineering. Emphasis on experimental design, interpretation of results, and formal oral and written reports.

CHME 434/834. Diffusional Operations (3 cr II) Prereq: CHME 333 and 442, MATH 220 or 221. Application of diffusional theory to the design of processing equipment required for absorption, adsorption, leaching, drying, and chemical reactions.

CHME 442/842. Chemical Reactor Engineering and Design (3 cr I) Prereq: CHME 323 or permission. Basic principles of chemical kinetics are coupled with models descriptive of rates of energy and mass transfer for the analysis and design of reactor systems.

CHME 452/852. Chemical Engineering Process Economics and Optimization (3 cr I) Prereq: Senior standing in chemical engineering. Credit toward the degree may be earned in only one of: IMSE 206 or CHME 452/852. Criteria of chemical process economics: cost and asset accounting, time value of money, profitability, alternative investments, minimum attractive rate of return, sensitivity and risk analysis. Process optimization in: plant operations, unit operations, using successive calculations, linear programming and dynamic programming.

CHME 453/853. Chemical Engineering Process Design (3 cr II) Lec 1, lab 4. Prereq: CHME 203, 333, 442, 452. Design and evaluation of chemical engineering process applications.

CHME 454/854. Chemical Process Engineering (3 cr) Prereq: CHME 430 and 312 or permission. Practical and theoretical aspects of chemical process analysis, simulation, and synthesis. Case studies used to illustrate principles. Use of the digital computer as a tool of the process engineer is stressed.

CHME 460/860. Automatic Process Control Laboratory (1 cr II) Lec 3, lab 3. Prereq or parallel: CHME 462. Selected laboratory experiments to demonstrate the theory of the dynamics and control of chemical processes.

CHME462/862. Automatic Process Control (3 cr II) Lec 3. Prereq: MATH 220 or 221, CHME 333. Analysis and design of automatic control systems. Dynamic responses of measuring instruments, control elements, stability of control systems, and process equipment included in control loops.

CHME473/873. Biochemical Engineering (3 cr) Lec 3. Prereq: CHEM 262. Dynamics of microbial growth and death. Engineering processes for microbiological synthesis of cellular materials and industrial products, with emphasis on food and pharmaceutical production by bacteria and fungi.

CHME474/874. Advanced Biochemical Engineering (2-6 cr) Prereq: CHME 473/873 or permission. Recent theoretical and technical developments in biochemical engineering.

CHME482/882. Polymers (3 cr I) Lec 3. Prereq: CHEM 262 and 264. Introduction to polymer technology stressing polymerization kinetics, methods of resin manufacture and applications.

CHME486/886. Electrochemical Engineering (3 cr II) Prereq: CHME 333, and 442, or MECH 318 and METL 360, or permission. Thermodynamic and kinetic principles of electrochemistry are applied to the design and analysis of electrochemical processes, including chemical production, batteries, fuel cells, and corrosion prevention.

CHME492/892. Air Pollution, Assessment and Control (3 cr) Prereq: Senior standing or permission. Survey of the present status of the air pollution problem and the application of engineering and scientific principles to its practical and effective coordinated control.

CHME496/896. Advanced Topics in Chemical Engineering Computation (1-6 cr, max 6) Prereq: CHME 312 or CSCE 455/855 or ENGM 480/880, and permission. Intensive treatment of special topics of current research interest in such areas as steady-state and dynamic process simulation, design optimization, chemical process synthesis, computer-aided product research, stochastic optimization, and numerical methods applied to transport problems.

CHME 499. Senior Problems (1-6 cr) Conf and lab. Prereq: Senior standing in chemical engineering. Research and development problems which include literature surveys, equipment design and operation, and development of correlations.

CHME 499H. Honors Thesis (1-6 cr) Conf and lab. Prereq: Senior standing in chemical engineering, admission to the University Honors Program. Honors thesis research project meeting the requirements of the University Honors Program. Independent research project executed under the guidance of a member of the faculty of the Department of Chemical Engineering which contributes to the advancement of knowledge in the field. Culminates in the presentation of an honors thesis to the department and college.

CHME 805. Multiple Contact Separation Processes (3 cr I) Lec 3. Prereq: CHME 333 or permission.

CHME 815. Advanced Chemical Engineering Analysis (3 cr I) Prereq: CHME 333, MATH 220 or 221.

CHME 825. Theoretical and Applied Thermodynamics for Chemical Engineers (3 cr I) Lec 3. Prereq: CHME 823 or CHEM 982, MATH 820 or 821 or equivalent.

CHME 834. Diffusional Operations (3 cr II) Prereq: CHME 823 and 833, MATH 820 or 821.

CHME 835. Transport Phenomena (3 cr I) Prereq: MATH 221, CHME 332 and 333 or equivalent.

CHME 845. Advanced Chemical Engineering Kinetics (3 cr I) Prereq: CHME 815, 823, 835, 842.

CHME 874. Advanced Biochemical Engineering (2-6 cr) Prereq: CHME 873 or permission.

CHME 899. Masters Thesis (6-10 cr) Refer to the Graduate Bulletin for 900-level