

COURSE #: ChE 487		COURSE TITLE: CHEMICAL PROCESS DESIGN	
TERMS OFFERED: Fall, Winter		PREREQUISITES: ChE 360, Chemical Engineering Laboratory I, ChE 344 Reaction Engineering and Design, and MSE 250 or 220, or graduate standing	
TEXTBOOKS/REQUIRED MATERIAL: RECOMMENDED: Douglas, James M., <i>Conceptual Design of Chemical Processes</i> , New York, McGraw-Hill, 1988, ISBN: 0-07-017762-7 Peters, Max S., Klaus D. Timmerhaus and Ronald West, <i>Plant Design and Economics for Chemical Engineers</i> , 5th ed., New York, McGraw-Hill, 2003 ISBN: 0-07-119872-5		COGNIZANT FACULTY: Burns, Schwank, Tadd, Wiesniewski	
INSTRUCTORS: Schwank, Barkel, Wiesniewski		FACULTY APPROVAL: 2013-12-19	
CoE BULLETIN DESCRIPTION: Process conceptualization and design using chemical process simulators. A major team design project with progress reports, oral presentation, and a technical report with process drawings and economics.		COURSE TOPICS: (number of hours in parentheses) 1. Team dynamics and interpersonal relationships (1) 2. Conceptual design (6) 3. Process drawings and analysis (4) 4. Energy integration (1) 5. Safety and environment (4) 6. Process simulation (1) 7. Equipment function and sizing (4) 8. Equipment design (2) 9. Materials of construction (1) 10. Process economics (10) 11. Intellectual property issues (1) 12. Ethics (3) 13. Team meetings with instructor (10) 14. Technical communication (13)	
COURSE STRUCTURE/SCHEDULE: Lecture: 3 per week @ 1 hour plus 1 per week @ 2 hours			
COURSE OBJECTIVES	Links shown in brackets are to course outcomes that satisfy these objectives. 1. To provide a basis for students to function effectively in teams on a major project [1-9]. 2. To equip students to conceptualize and develop a chemical engineering process [1, 4-8]. 3. To equip students to design the essential elements of a chemical engineering process (equipment sizes, material & energy balances, economics, environmental, safety) [1, 4-8]. 4. To provide experience using commercial process simulation software as a design tool [5]. 5. To develop students' skills in written and oral technical communication [2,3]. 6. To integrate and apply subject matter from previous courses to solve open ended problems [4-8] 7. To provide opportunities to apply design concepts to biological systems [1-9]		
COURSE OUTCOMES	Links shown in brackets are to student outcomes a-k 1. Research chemically related technical and business related information [i,k] 2. Write, edit, revise, and critique technical memos and formal written reports, including status reports submitted via e-mail [g] 3. Prepare and present effective oral reports [g] 4. Assemble a logical sequence of interconnected unit operations for an effective chemical engineering process [a-c,e,j,k] 5. Use, and interpret results from a commercial process simulation software package [a-c,e,k] 6. Determine sizes, materials, and capital and operating costs of equipment commonly used in the chemical processing industries [a,c,e,h,k] 7. Assess the profitability of a chemical engineering process [h,k] 8. Recognize professional situations requiring ethical decisions [f] 9. Incorporate environmental and safety concerns into a chemical engineering process design [h] 10. Work in an industrial-type based team environment [d]		

**ASSESSMENT
TOOLS**

1. Regular team meetings with the course and project instructors including environmental and safety reviews, and status memos, assess course outcomes 1-10
2. Oral reports assess outcomes 1 and 3-10
3. Written reports assess outcomes 1,2 and 4-10
4. Written critique of other teams' final design reports assesses outcomes 2 and 4-10
5. Periodic self and peer evaluations assess outcome 10
6. End-of-term course evaluation provides student self-assessment of outcomes 1-10
7. Ethics workshop participation and essay assesses outcome 8.