Tuskegee University
College of Engineering
Department of Chemical Engineering

Spring 2024

Course: CENG 0470, Chemical Engineering Plant Design
Lecture Hours: Tuesday and Thursday 09:30 AM - 12:30 PM
Location: Luther H. Foster Hall, Room 528
Instructor: Shahryar Jafarinejad, PhD
Email: sjafarinejad@tuskegee.edu
Office: Luther H. Foster Hall, Room 522B
Phone: 334-724-4318
Office Hours: Tuesday 01:00 PM - 02:00 PM; Wednesday 11:00 AM - 01:00 PM; others by appointment
Credit Hours: 4.0
Prerequisites: CENG 0310, CENG 0360, and CENG 0380
Corequisite: CENG 0430
Textbook: M.S. Peters, K.D. Timmerhaus, R.E. West, Plant Design and Economics for Chemical Engineers, Fifth Edition, McGraw-Hill.

Course Objectives:
Students will
Objective1. Design a complete chemical process.
Objective2. Perform economic analysis of a process.
Objective3. Understand professional and ethical responsibilities of chemical engineers.
Objective4. Develop oral and written communication skills.

Course level student learning outcomes:

Outcomes	1	2	3	4	5	6	7
Objective1	X	X					X
Objective2		X					
Objective3				X			
Objective4			X				

of engineering, science, and mathematics

2.

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use

get extra time if you arrive late. Students who miss a quiz without an official excuse will receive a zero for that work.
No sharing of any materials (e.g., calculator) during exams.
No make-up assignments (tests, quizzes, and design problems) will be given. Exceptions:
University allowed excuses with WRITTEN PROOF.
Medical reasons with WRITTEN PROOF.
In the event of a medical emergency, proof must be provided within 24 hours of the student's return to campus or release from doctor's care.
In the event of an excused absence, make up assignments must be done by the next class meeting following the date of the excused absence (unless scheduled with the instructor). The student is responsible for his/her own missed assignments.
A student, who has a medical excuse (i.e. note from a physician or qualified health care facility) for missing an exam, waives that excuse when he/she shows up at the exam and begins to take the exam. A make-up exam will not be given.
It is likely that any makeup work will need to be scheduled during the interim period. Thus, a student with a valid excuse will receive a grade of I in the course until the work is made up. The exception is if the score on the missed work does not impact the final letter grade. In this case, no make-up assignment will be given. Regarding exams, the first excused absence for an exam will result in the substitution of the final exam score for that exam grade. General makeup policies apply for subsequent excused absences from exams.
Effective Spring 2012, the tuskegee.edu email system at Tuskegee University is required for all instructional administrators, faculty, staff and students.
Effective Spring 2012, all instructional administrators, faculty, staff and students are required to use CANVAS and Navigate (EAB).
Academic dishonesty policies outlined in the undergraduate handbook will be strictly enforced.

Grading Criteria:

Category	Percentage (%)
Exams	20
Design Project	50
Final Exam	20
Homework/Quizzes	10

Final Grading Scale:

Percentage (%)	Letter Grade
90-100	A

Tuesday and Thursday (11:00 AM - 12:30 PM): Each student should present a progress report on his/her project.
Design projects are due 20 days before the final examination. These should be written and typed independently; however, group discussion is encouraged.

Design Project (50%):

Category	Percentage (%)
Weekly progress reports	15
Oral presentation	10
Final report	25

Final Report (25%):

Category	Percentage (%)
Content	5
Summary	5
Introduction and theory	10
Hazard control and analysis	10
Results	10
Discussion	10
Conclusion	5
References	5
Design calculations	40

Course Content and Reading Assignment Schedule:

Topics	Session
Chapter 1: Introduction	1a
Chapter 11: Written and oral design reports	1b
Chapter 2: General design considerations	2a-4a
Chapter 12: Materials-handling equipment-design and costs	2b-4b
Chapter 3: Process design development	5a-6a
Chapter 13: Reactor equipment-design and costs	5b-6b
Test No. 1	7
Chapter 4: Flowsheet synthesis and development	8a-9a
Chapter 14: Heat transfer equipment-design and costs	8b-9b
Chapter 5: Software use in process design	10a-12a
Chapter 15: Separation equipment-design and costs	10b-12b
Chapter 6: Analysis of cost estimation	13a-14a
Design of process control systems	13b-14b
Chapter 7: Interest, time value of money, taxes, and fixed charges	15-16
Chapter 8: Profitability, alternative investments, and replacement	40

List of design books in the reference section of engineering library

Book Name	Author	Copyright	Publisher	City Published
Handbook of Chemical Processing Equipment	Nicholas P. Cheremisinoff	2000	Butterworth-Heinemann	Boston
Chemical Engineer's Condensed Encyclopedia of Process Equipment	Nicholas P. Cheremisinoff	1999	Gulf Publishing Company	Houston
Chemical Reaction Hazards, Second Edition	John Barton and Richard Rogers	1997	Gulf Publishing Company	Houston
Handbook of Chemical Compound Data for Process Safety	Carl L. Yaws	1997	Gulf Publishing Company	Houston
Applied Process Design for Chemical and Petrochemical Plants, Volume 1 Third Edition	Ernest E. Ludwig	1999	Butterworth-Heinemann	Boston
Applied Process Design for Chemical and Petrochemical Plants, Volume 2 Third Edition	Ernest E. Ludwig	1997	Gulf Publishing Company	Houston
Applied Process Design for Chemical and Petrochemical Plants, Volume 3 Third Edition	Ernest E. Ludwig	2001	Gulf Professional Publishing, an imprint of Butterworth-Heinemann	Boston

STATEMENTS OF COE EXPECTATIONS REGARDING STUDENTS'

Covid-Statement

Excuses related to covid infection as well as exposure have to be received from the Dean of Students office. Students should request the excuse for absence from the Dean of Students office as soon as they become aware of covid infection or exposure. Students may request a classes missed memo by contacting the Office of the Dean of Students and Student Conduct (334) 727-8421, via e-mail tharper@tuskegee.edu or by going into the office located in suite 203 Tompkins Hall.