Tuskegee University
College of Engineering
Department of Chemical Engineering

Spring 2024

Course: CENG 0440, Process Control and Instrument Lab
Lecture Hours: Monday 2:00 PM - 5:00 PM
Instructor: Iman Hassani, PhD
Email: ihassani@tuskegee.edu
Office: Luther H. Foster Hall Room 522A
Phone: 334-727-8845
Office Hours: Mondays, Wednesdays, and Fridays from 8:00 AM to 9:00 AM and 10:00 AM to 11:00 AM, and Mondays and Wednesdays from 12:00 PM to 2:00 PM.; Others by appointment
Credit Hours: 1.0
Prerequisites: CENG 0430
Textbook: James B. Riggs, Chemical and Bio-Process Control, 5th Edition, Ferret Publishing.
Dress Code: Business Casual

References:

- Stephanopoulos, G., Chemical Process Control, Prentice-Hall, 1984.
- Hendrix, C., Experiments That Get Results. AIChE, 2002.

General Policies:

- Students arriving late are considered absent and will not earn points for lab participation but can still share in preparing the report with lab partners.
- Students are not allowed to schedule any meetings, appointments, etc., anytime during class unless inevitable and discussed with the instructor beforehand.
- Lab reports will be due by 2:10 PM on the Friday after the experiment is completed.
- Assignments must be submitted as a single WORD document to turnitin.com. You will receive an access code by e-mail.
- **No late report is accepted.**
- Report guidelines are given in the lab manual. Technical aspects of the reports will be graded strictly. Refer to the guidelines and the report writing errors page before submitting the report for each lab. ALL lab partners should review the ENTIRE report before it is turned in.
- A group may be asked to revise a report for final grading. A revised report must be submitted within 7 days from the time the original is returned to the lab group. The original report and grading rubric must be returned with the revision.

- **Reports which appear to have been copied will result in a grade of zero for all students involved.**
- In addition to the written reports, each group will present one oral report that will count as a lab.
- The use of Cell phones and other electronic devices will not be allowed during exams or class. If your cell phone is seen during class, you will be asked to leave, and the class will be counted as an absence.
- Effective Spring 2012, the tuskegee.edu email system at Tuskegee University is required for all instructional administrators, faculty, staff, and students.
- Effective Fall 2023, all instructional administrators, faculty, staff, and students are required to use Canvas.
- Students are expected to write emails using responsible, courteous, and professional language.
- Academic dishonesty policies outlined in the undergraduate handbook will be strictly enforced.

TENTATIVE LIST OF ACTIVITIES

Please note that the schedule in the lab manual is tentative and subject to change!

A. **INTRODUCTION / LABORATORY SAFETY**
B. LIQUID LEVEL CONTROL
1) ON/OFF, Manual, and P-Only control of liquid level
2) PI and PID control of liquid level
8) Ziegler Nichols (ZN) Tuning
C. TEMPERATURE CONTROL
3) A Process Model for a resistance-heated element
4) Temperature Control Using a Heat Exchanger
D. DESIGN OF EXPERIMENTS/ OPTIMIZATION
5) Gloss Model for a Coating Operation
E. COMPOSITION CONTROL
6) Control of Dye Concentration with a Feedback Controller
F. PROCESS CONTROL SIMULATION
7) Naphtha Cracker Simulation
G. ORAL REPORT
H. FINAL EXAM

Grading Criteria:

Category	Percentage (%)
Lab Reports	60
Lab Participation	20
Final Exam	20

Final Grading Scale:

Percentage	Letter Grade
90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

COURSE OBJECTIVES:

1. Provide lab experience for concepts learned in the process control lecture.
2. Practice design of experiments (DOE).
3. Work in teams in a safe environment.
4. Communicate experimental findings through written and oral reports.

COURSE OUTCOMES:

	1	2	3	4	5	6	7
Objective 1	X						
Objective 2						X	
Objective 3					X		
Objective 4			X				

1. An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering solutions and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.