

CHEE 401A – UNIT OPS Reactor lab

Credits and Contact Hours	1 Units Discussion Required, Laboratory Required, Lecture Required
Instructor's or course coordinator's name	Dominic Gervasio Research Professor of Chemical and Environmental Engineering
Textbook, title, author and year a. Other supplemental materials	<i>No text. Class notes.</i>
Catalog Description	Laboratory of environmental engineering operations. Specifically, students will perform 2 hands-on experiments and develop an Oral-Design-a-Lab. The hands-on experiments include: Reactor – CSTRs or UV/peroxide oxidation Reverse Osmosis
Prerequisites	ChEE 420 and prerequisite for CHEE 420
Co-Requisites	None
Required, elective or selected elective	Required
Instruction Outcomes	Foster and develop rational thought processes as they pertain to: proficient and safe operation of chemical engineering process units; the analysis of data obtained from chemical process units; the exposition of technical information, particularly elements of expository writing; and teamwork.
Student Outcomes	Following completion of this course, students will demonstrate the ability to: <ul style="list-style-type: none"> <li>○ Apply knowledge of mathematics, science and engineering</li> <li>○ Design and conduct experiments, as well as to analyze and interpret data</li> <li>○ Communicate effectively</li> <li>○ Understand the impact of engineering solutions in a global, economic, environmental, and societal context</li> <li>○ Use the techniques, skills, and modern engineering tools necessary for engineering practice</li> </ul>
Brief list of topics covered	<ul style="list-style-type: none"> <li>● Reactors <ul style="list-style-type: none"> <li>● CSTR, UV/peroxide oxidation, Reverse Osmosis</li> <li>● Design a lab</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Lab Protocol <ul style="list-style-type: none"> <li>• Protective personal equipments, long pants, closed toed shoes, and safety glasses</li> <li>• Documentation using laboratory data sheets.</li> </ul> </li> <li>• Preparation of Lab Reports <ul style="list-style-type: none"> <li>• Acquisition and documentation of data</li> <li>• Results</li> <li>• Error analyses <ul style="list-style-type: none"> <li>• Systematic error (differential analysis of tooling error)</li> <li>• Statistical error (standard deviation, discordant data rejection by student T-test, weighted linear regression).</li> </ul> </li> <li>• Safety (chemical hazards, MSDS sheets, lab layout).</li> <li>• Environmental impacts (chemical handling design and disposal)</li> <li>• Making conclusions based on observation</li> </ul> </li> <li>• Oral presentation of a “design a lab” <ul style="list-style-type: none"> <li>• students design an experiment, give literature data which is analyzed to give discussion and conclusions about the performance of a reactor the students designed, including error analysis, environmental impacts, cost analysis and safety and chemical handling and hazards.</li> </ul> </li> <li>• Team work</li> </ul>
Contribution to Criterion 5	<p>Math and basic science - 1.5 units  Engineering topics – 1.5-2.5 units  General education – 0  Other – 0</p> <p>Does this course include significant engineering design?  YES</p>