CME 410: Chemical Engineering Laboratory III: Instrumentation, Material Design and Characterization

Credits and Contact Hours: 2 credits; 2 hours and 40 minutes

Course Instructor: Miriam Rafailovich


Specific course information
a. Students research a research topic and, together with course instructor and UPD, select an advisor and a thesis committee. The student, with the advisor, draft a course of preliminary experiments, and the student presents a written thesis proposal, with an oral defense, to his/her committee.
b. Pre-requisite(s): CME 320
c. Required course in the program

Specific goals for the course:
a. To give students hands-on training in nanomaterial synthesis, modern instrumentation operation, and sample characterization.
b. Students will be able to synthesize nanosized materials, learn to operate modern spectroscopic instruments, characterize nanosized materials, collect, analyze and interpret data.

b. Criterion 3 a-k: Outcomes

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<tr>
<th>Outcome</th>
<th>Contribution</th>
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<tbody>
<tr>
<td>a. Ability to apply knowledge of math, engineering, and science</td>
<td>20%</td>
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<td>b1. Ability to design and conduct experiments</td>
<td>15%</td>
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<td>b2. Ability to analyze and interpret data</td>
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<td>c. Ability to design system, component or process to meet needs</td>
<td>10%</td>
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<td>d. Ability to function on multi-disciplinary teams</td>
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<td>e. Ability to identify, formulate, and solve engineering problems</td>
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<td>k. Ability to use techniques, skills, and tools in engineering practice</td>
<td>15%</td>
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<td>Any other outcomes and assessments?</td>
<td>100%</td>
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Brief list of topics to be covered (including exams/quizzes):
Week 1: Selection of research topics
Week 2: Review of online databases, data mining, statistical analysis and presentation techniques
Week 3: Oral presentations of selected topics, submission to instructor of research proposals and timetables.

Week 4: Presentation of proposals to UPC and defense of proposal

Week 5: Safety training: chemical waste disposal of biological tissue

Week 6: Weekly progress report submission and laboratory work with designated mentor

Week 7: Weekly progress report submission and laboratory work with designated mentor

Week 8: Weekly progress report submission and laboratory work with designated mentor

Week 9: Weekly progress report submission and laboratory work with designated mentor

Week 10: Weekly progress report submission and laboratory work with designated mentor

Week 11: Weekly progress report submission and laboratory work with designated mentor

Week 12: Submission of thesis pre-proposal with oral presentations

Week 13: Final approvals

Week 14: Final approvals

Week 15: -