ESM/BME/EST/MEC 400 RESEARCH IN NANOTECHNOLOGY (ELECTIVE)
Credit: 3

COURSE CATALOG DESCRIPTION:
This is the capstone course for the minor in Nanotechnology Studies (NTS). Students learn primary aspects of the professional research enterprise through writing a journal-quality manuscript and making professional presentations on their independent research (499) projects in a formal symposium setting. Students will also learn how to construct a grant proposal (a typical NSF graduate fellowship proposal), methods to search for research/fellowship funding, and key factors in being a research mentor.

PRE- OR COREQUISITE(S): ESM 213; at least one semester of independent research 499

TEXT(S) OR OTHER REQUIRED MATERIAL: None

<table>
<thead>
<tr>
<th>COURSE LEARNING OUTCOMES</th>
<th>SOS</th>
<th>ASSESSMENT TOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional development in research enterprise</td>
<td>b d g</td>
<td>Portfolio</td>
</tr>
<tr>
<td>Writing research articles</td>
<td>g</td>
<td>Report (manuscript)</td>
</tr>
<tr>
<td>Grant writing</td>
<td>g i j k</td>
<td>Report (proposal)</td>
</tr>
<tr>
<td>Presenting research at conferences</td>
<td>g</td>
<td>Presentation</td>
</tr>
<tr>
<td>Mentoring research</td>
<td>g d k</td>
<td>Portfolio, observation</td>
</tr>
</tbody>
</table>

COURSE TOPICS
Week 1. Introduction to the professional research enterprise
Week 2. Writing a journal-quality manuscript; begin manuscript project
Week 3. Review of progress on manuscripts; presentation of research abstracts; discussion of mentorship
Week 4. Initial meeting with ESM 213 students, assignment of roles as research mentors; ethics in the context of professional research
Week 5. Review of progress on manuscripts; discussion of funding mechanisms in research; workshop on grant writing techniques
Week 6. Workshop on professional presentation techniques; presentation project assigned; “request-for-proposals” handed out and grant proposal projects discussed and assigned
Week 7. Review of progress on manuscripts; follow-up on mentoring activities
Week 8. Rough draft of manuscripts due; review of outlines for presentations
Week 9. Review of progress on presentations; practice presentations in class and feedback on manuscripts provided.
Week 10. Discussion of progress on grant proposal and manuscripts
Week 11. Presentation at Nanotechnology Undergraduate Research Symposium
Week 12. Manuscripts due; class presentations on grant proposal outlines (feedback provided)
Week 13. Updated grant proposals discussed in class
Week 14. Update on mentorship activities; grant proposal due

CLASS/ LABORATORY SCHEDULE

<table>
<thead>
<tr>
<th>ESM</th>
<th>400</th>
<th>Nanotechnology</th>
<th>LEC</th>
<th>W</th>
<th>11:45 AM</th>
<th>2:45 PM</th>
</tr>
</thead>
</table>

Also separate meeting times set up for tutorial experiences.

CURRICULUM

This course contributes 3 credit hours toward meeting the required 48 hours of engineering topics.

STUDENT OUTCOMES (SCALE 1-3):

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td></td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3 – Strongly supported  2 – Supported  1- Minimally supported

LEAD COORDINATOR(S) WHO PREPARED THIS DESCRIPTION AND DATE OF PREPARATION:

Gary Halada, 7/13/2010