COURSE CATALOG DESCRIPTION:
The emerging field of nanotechnology develops solutions to engineering problems by taking advantage of the unique physical and chemical properties of nanoscale materials. This interdisciplinary, co-taught course introduces materials and nano-fabrication methods with applications to electronics, biomedical, mechanical and environmental engineering. Guest speakers and a semester project involve ethics, toxicology, economic and business implications of nanotechnology. Basic concepts in research and design methodology and characterization techniques will be demonstrated. Course is cross-listed as BME 213, MEC 213, and EST 213 and is required for the Minor in Nanotechnology Studies (NTS).

PRE- OR COREQUISITE(S): Prerequisites: PHY 131 or PHY 125; CHE 131 or ESG 198


Website resources at: www.stonybrook.edu/nanotechnology

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<tr>
<th>COURSE LEARNING OUTCOMES</th>
<th>SOS</th>
<th>ASSESSMENT TOOLS</th>
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<tbody>
<tr>
<td>Understanding tools used in design and analysis of nanotechnology</td>
<td>a b k</td>
<td>Laboratory report</td>
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<td>Nanotechnology applications in electronics, energy, environmental engineering and medicine</td>
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<td>Quizzes</td>
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<td>Understanding the societal implications of nanotechnology, including the role of ethics and regulations</td>
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<td>Presentations</td>
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COURSE TOPICS
Week 1. What is nanotechnology?
Week 2. Nanobusiness
Week 3. Nanomanufacturing
Week 4. Nanotechnology in electronics and optics
Week 5. Lab: Formation of metallic nanoparticles
Week 6. Nanomechanics
Week 7. Nanostructures and nanocomposites
Week 8. Materials characterization techniques
Week 9. Safety issues in nanotechnology and research
Week 10. Lab: Making a dye-based solar cell
Week 11: Nanobiotechnology
Week 12: Medical applications of nanotechnology
Week 13: Environmental nanotechnology
Week 14: Societal implications of nanotechnology
Week 15: Final presentations
CLASS/ LABORATORY SCHEDULE:

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<tr>
<th>ESM Spring</th>
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<th>Nanotechnology Studies</th>
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CURRICULUM

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

STUDENT OUTCOMES (SCALE 1-3):

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3 – Strongly supported  
2 – Supported  
1- Minimally supported

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

Gary Halada, 5/19/ 2010