ESG 213 STUDIES IN NANOTECHNOLOGY (ELECTIVE)

Credit: 3

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

TEXT(S) OR OTHER REQUIRED MATERIAL: G.L. Hornyak, J.J. Moore, H.F. Tibbals and J. Dutta, "Fundamentals of Nanotechnology", CRC Press, 2009

Website resources at: www.stonybrook.edu/nanotechnology

COURSE LEARNING OUTCOMES	SOS	ASSESSMENT TOOLS
Understanding tools used in design and analysis of nanotechnology	a b k	Laboratory report
Nanotechnology applications in electronics, energy, environmental engineering and medicine	a i j	Quizzes
Understanding the societal implications of nanotechnology, including the role of ethics and regulations	g f h	Presentations

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:

ESM Spring	201	Nanotechnology Studies	LEC	1	Tu	PM	PM

CURRICULUM

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

STUDENT OUTCOMES (SCALE 1-3):

A	B	C	D	E	F	G	H	I	J	K
3	2				2	2	2	3	2	2

3 – Strongly supported **2 – Supported** **1- Minimally supported**

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

Gary Halada, 5/19/ 2010