

ESM 212 INTRODUCTION TO ENVIRONMENTAL MATERIALS ENGINEERING (REQUIRED)

Credit: 3

COURSE CATALOG DESCRIPTION:

Multidisciplinary, materials-oriented approach to environmental and civil engineering, incorporating the concept of sustainable development: basic principles, including pollutant transport, water quality, waste and waste water treatment, energy systems and energy efficiency, use of sustainable building materials, 'green' manufacturing and pollution prevention, engineering materials issues unique to construction. Use of field and laboratory sensors and analytical tools will be discussed and demonstrated. Project and problem-based approach to design of structures and materials engineering, incorporating environmental considerations.

PRE- OR COREQUISITE(S): ESG 100 or ESG 201; ESG 198 or equivalent

TEXT(S) OR OTHER REQUIRED MATERIAL:

COURSE LEARNING OUTCOMES	SOS	ASSESSMENT TOOLS
Understand impact of toxic chemicals on the environment	a,h, j	Homeworks, exams
Use of basic principles of energy efficiency and the role of materials selection in designing energy efficient structures	a, b, c, e, f, h, j, k	Homeworks, exams, course project, project presentation.
Being able to describe several sustainable building materials	g,h	Course project, project presentations

COURSE TOPICS

- Week 1. Design needs of environmental engineering and sustainable design Policy and global issues
- Week 2. Basics of environmental materials chemistry
- Week 3. Pollutant transport Basics of biogeochemical principles
- Week 4. Water resource engineering Materials for water treatment technologies
- Week 5. Methods of environmental remediation Wastewater treatment
- Week 6. Materials in environmental remediation systems Filtration, barriers, bioremediation
- Week 7. Pollution prevention and energy conservation in manufacturing Midterm
- Week 8. Materials for energy generation and infrastructure development
- Week 9. Basic concepts of building design and construction
- Week 10. Materials for civil and construction engineers
- Week 11. Material and soil mechanics
- Week 12. Development and use of sustainable building materials Design of "green" buildings
- Week 13. Sustainable engineering and development Methods and case studies
- Week 14-15. Class presentations on semester projects Course final exam

CLASS/ LABORATORY SCHEDULE

ESM	212	Enviro Engineering	LEC	1	TU	3:50 PM	6:40 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
2	1	1		1	1	1	3		2	1

3 – Strongly supported

2 – Supported

1- Minimally supported

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

Alexander Orlov

5/21/10