

**ESM 486 INNOVATION AND ENTREPRENEURSHIP IN ENGINEERING
(ELECTIVE)**

Credit: 3

Course Catalog description: Designed for upper division students, this course will explore the key elements and challenges involved in implementing innovation in complex engineering systems. This course will tackle this issue through historical analysis of engineering innovation through detailed case studies and examples. Framework for entrepreneurial developments will also be analyzed.

PRE- OR COREQUISITE(S): Available to advanced engineering students
B+ or higher in ESG 316 or ESE 380 or ESM 450 or MEC 310 or permission of instructor.

TEXT(S) OR OTHER REQUIRED MATERIAL:

Required: Cross the Chasm by Geoffrey Moore

Recommended: The innovators dilemma by Clayton Christensen

Library Access: They made America by Geoffrey Moore

Contemporary journal articles to be provided by instructor

COURSE LEARNING OUTCOMES	SOS	ASSESSMENT TOOLS
Understanding role of design and research skills in industry	a,b,c	Case Study
Effective teaming in industrial setting	d e f	Final report; employer assessment
Effective presentation and communication skills	G h i	Presentation & Final Report
Role of engineering ethics in industry	J k l m n	Final report

COURSE TOPICS

The course is comprised of three major parts:

- Definition and analysis of the innovation paradigm through historical and contemporary perspectives with relevant requirements for engineering systems. Contextual definitions of empowering, sustaining, and efficiency innovations including delineation of disruptive concepts.
- Case studies to illustrate the foundational elements and understanding the successes and failures.
- Synthesis of the required engineering elements that would foster innovation in complex engineering systems including interdisciplinary thinking, societal drivers and regulatory frame work

Part I will primarily be in the form of lectures and seminars while parts II and III will involve student teams and semester long project activity through case studies including multiple team presentations and discussions.

Detailed outline of the course through weekly breakdown of activities is attached.

- Include a week-by-week breakdown of the topics*

- Week 1. Introduction to the course. Definition of the Key Elements: Course plan presentation, Goals, Expectations and Outcome, Team developments and Case Study Identification
- Week 2. Exemplary studies of engineering innovation and entrepreneurship in the US: Part I Energy Systems
- Week 3. Exemplary studies of engineering innovation and entrepreneurship in the US: Part II Automotive Systems
- Week 4. Exemplary studies of engineering innovation and entrepreneurship in the US: Part III Aerospace Systems
- Week 5. Case Studies Development Sessions with Student Teams:
- Week 6. Case Studies Development Sessions with Student Teams:
- Week 7. Case Studies Development Sessions with Student Teams:
- Week 8. Entrepreneurships in Engineering: Opportunities and Challenges
- Week 9. External Seminars from Industry/Innovation Experts
- Week 10. Contemporary Examples of Innovation in Engineering (Energy, Aerospace and Automotive)
- Week 11. Exemplary case studies on recent entrepreneurial failures and lessons learned
(solar energy, energy storage)
- Week 12. Role of Partnerships in promoting innovation and entrepreneurship in engineering
- Week 13. Integrated Final Presentations on Case Studies by Student Teams

CLASS/ LABORATORY SCHEDULE:

Varies with Case Studies

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	2	3		2	3	2			3

3 – Strongly supported

2 – Supported

1-Minimally supported

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

Sanjay Sampath, 1/13/2013