Master Course Description for EE-294 (ABET sheet)

Title: Innovation Readiness: Cultivating an Innovation Mindset

Credits: 5 (4 lecture; 1 quiz section)

UW Course Catalog Description

Coordinator: Payman Arabshahi, Associate Professor, Electrical and Computer Engineering

Goals: To teach innovation processes and models, the human side of technological innovation, trending technologies, engineering grand challenges, dealing with risk and ambiguity, and lessons from case studies of engineering high-tech companies.

Learning Objectives: At the end of this course, students will be able to:

1. Apply the five skills of disruptive science and engineering innovators, Associating, Questioning, Observing, Networking, and Experimenting.
2. Employ tools and techniques of psychology and sociology of innovation individually and in teams.
3. Perform assessments of and due diligence on current and trending technologies and high-tech companies.
4. Develop Design, Build, Test loops for technologies via Design Thinking methodologies.
5. Write and present innovative ideas as solutions to technological or societal problems.


Reference Texts:


**Prerequisites:**
Sophomore or junior standing.

**Topics:**
1. Innovations that Made the Modern World (How We Got to Now, Steven Johnson) [1.5 weeks]
2. Psychology & Sociology of Innovation (Ten Faces of Innovation) [1.5 weeks]
3. The Innovation Process (Ten Types of Innovation) [1 week]
4. Case Studies (Ten Types of Innovation & Gartner & Harvard Business Press) [1.5 weeks]
5. Companies that Failed (Why Most Things Fail) [1.5 weeks]
6. Innovation Ecosystems Around the World (The Rainforest) [1.5 weeks]
7. Emerging Technologies & Industries of the Future (VR/AR, autonomous vehicles, drones, AI, personalized medicine) (UW Libraries and gartner.com) [1.5 weeks]

**Course Structure:** The class meets for two lectures a week, each consisting of one hour and 50-minutes. Homework is assigned biweekly for a total of 5 assignments over the quarter. Quiz section work constitutes a significant focus of the class and is organized into smaller groups, which meet weekly for fifty minutes. Quiz section assignments are given weekly for a total of 9 assignments over the quarter.

**Grading:** Midterm Project (30%), Final Project (30%), Quiz Section Assignments (20%), Homework (20%).

**ABET Student Outcome Coverage:** This course addresses the following outcomes:

H = high relevance, M = medium relevance, L = low relevance to course.

(2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors (M) The midterm and final projects, as well the quiz section and homework problems are phrased in terms of societal impact and welfare, and design innovation within realistic constraints such as cost, usability, market acceptance, user experience, and manufacturability.

(3) An ability to communicate effectively with a range of audiences (H) Midterm and final projects are oral presentations in class, emphasizing clear descriptions of the problem, project goals, and methodologies used, together with user/customer discovery, testing, and validation.

(4) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals,
plan tasks, and meet objectives (H) The midterm and final projects are addressed by teams of 2-3 students who must organize themselves, perform task allocations, and develop a work breakdown structure. Quiz section exercises may be team efforts as well.

(5) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies (M) Part the course focuses on performing assessments and due diligence on new technologies which involves researching them, as well as coming up with innovative ideas as solutions to technological or societal problems. Students are responsible for learning this on their own.

Prepared By: Payman Arabshahi

Last Revised: 03/10/2019