

# **ECE4011 Course Syllabus**

## **ECE4011**

### **ECE Culminating Design Project I (2-0-0-2)**

#### **CMPE Degree**

This course is Required for the CMPE degree.

#### **EE Degree**

This course is Required for the EE degree.

#### **Lab Hours**

0 supervised lab hours and 0 unsupervised lab hours

#### **Prerequisites**

See topical outline

#### **Corequisites**

None

#### **Catalog Description**

First semester of ECE culminating design sequence. Design tools, financial principles, project management, probabilistic and statistical techniques, team forming. Requires formal reports and group presentations.

#### **Textbook(s)**

Hyman, *Fundamentals of Engineering Design* (2nd edition), Prentice-Hall, 2002. ISBN 013046712X, ISBN 978-0130467126 (required)

#### **Course Outcomes**

Upon successful completion of this course, students should be able to:

1. Describe factors and constraints associated with product development and life cycles
2. Apply statistics to analysis of engineering problems, including component and manufacturing variation, project scheduling, and product reliability
3. Solve basic problems in engineering economy, including use of time-value-of-money principles for decision making
4. Describe considerations in professional engineering practice, including licensure, ethics, standards, intellectual property, and liability
5. Perform a literature search on a specific technical subject and prepare a summary report
6. Form and effectively function as a team to define, plan, and develop a design project of appropriate scope, depth, and breadth
7. As part of a team, describe qualitative design goals and determine quantitative design specifications to meet the goals
8. As part of a team, prepare a project timeline in an appropriate format that includes tasks, critical paths, and milestones
9. As part of a team, prepare a project budget that includes, as appropriate, development costs, manufacturing costs, and profit
10. As part of a design team, prepare a design project proposal that effectively communicates information in written and graphical form

## Student Outcomes

In the parentheses for each Student Outcome:

"P" for primary indicates the outcome is a major focus of the entire course.

"M" for moderate indicates the outcome is the focus of at least one component of the course, but not majority of course material.

"LN" for "little to none" indicates that the course does not contribute significantly to this outcome.

1. ( P ) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. ( P ) 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
3. ( P ) An ability to communicate effectively with a range of audiences
4. ( P ) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. ( P ) 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
6. ( P ) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. ( P ) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## Topical Outline

1. Introduction to Engineering Design
  - a. Definition of engineering design
  - b. Description of the engineering design processes, formal models
  - c. Problem formulation tools ; needs, requirements, specification
2. Professional Practice Issues
  - a. Professionalism and its responsibilities, licensure
  - b. Engineering ethics, models and examples
  - c. Standards and codes
  - d. Legal issues, including intellectual property and liability
3. Probabilistic Elements in Design
  - a. Basic probability distribution models, functions of single and
  - b. Manufacturing variation and the effect on product design
  - c. Defects, yield, and reliability
  - d. Engineering measurement fundamentals
4. Engineering Economics and Decision Making
  - a. Basic financial principles, Time-value-of-money analysis
  - b. Applications in engineering design, life-cycle costs, benefit-
5. Project Management
  - a. Project scheduling and time estimation
  - b. Project budgeting and job costing
  - c. Project documentation
6. Project Definition, Development, and Team Forming
  - a. Team forming rules and project deliverables
  - b. Technical Review Paper instructions
  - c. Project Summary Form instructions
  - d. Project Proposal instructions and required technical content
  - e. Critical Review I: Project Proposal report

