ECE 100 – Introduction to the Profession I

2012 Catalog Data: ECE 100: Introduction to the Profession I. Credit 3.
Introduces the student to the scope of the engineering profession and its role in society and develops a sense of professionalism in the student. Provides an overview of electrical engineering through a series of hands-on projects and computer exercises. Develops professional communication and teamwork skills. (2-3-3) (C)

Enrollment: Required course for CPE and EE majors.


Coordinator: A. Flueck, Associate Professor of ECE

Course goals:
Given a complex electrical and computer engineering challenge (e.g., navigate a maze, follow a line, win “Mint Shuffle”), each student should be able to perform the following tasks by the end of the course.

1. Investigate typical solutions to a complex engineering problem via print and online resources.
2. Generate alternative solutions to a complex engineering problem.
3. Determine an optimal solution to a complex problem via quantitative comparison with respect to the given design criteria.
4. Construct an autonomous robot with LEGO pieces, DC motors, touch sensors, light sensors, HandyBoard, and Interactive C to solve an engineering challenge.
5. Test and analyze the performance of an autonomous robot with respect to the given design criteria.
6. Evaluate the adequacy of the implemented solution with respect to the given design criteria.
7. Prepare a persuasive technical report describing the methodologies employed and results obtained in objectives 1-6.
8. Deliver a persuasive oral presentation describing the methodologies employed and results obtained in objectives 1-6.

Prerequisites by topic: Entering freshman status

Lecture schedule: One 75-minute session per week.
Laboratory schedule: One 160-minute session per week.

Topics:
1. Introduction and current examples of robotics (1 week)
2. Robots—overview (2 weeks)
3. DC motors and gears (1 week)
4. Control systems and feedback (1 week)
5. Truth tables, flowcharts and state machines (1 week)
6. Advanced topics in robotics, e.g., introduction to algorithms (1 week)
7. Industry presentations—communications, computers, electronics, power, plus ethics (3 weeks)
8. Robot competitions (3 weeks)

Computer usage:
1. Interactive C is utilized by students to program their robots.
2. Word processing and presentation software tools are used for written and oral presentations.

Laboratory topics:
1. HandyBoard and Interactive C (1 week)
2. LEGO construction and simple movement of robots (1 week)
3. Obstacle avoidance for robots (1 week)
4. Path following for robots (1 week)
5. Competition preparation (3 weeks)
6. Robot competitions (4 weeks)
7. Team presentations (3 weeks)

**Relationship of ECE 100 Course Goals to Student Outcomes:**

<table>
<thead>
<tr>
<th>Student Outcomes</th>
<th>Course Goals</th>
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<tbody>
<tr>
<td>a. Apply knowledge of math, engineering, science</td>
<td>1,2,3,4,5,6</td>
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<tr>
<td>b. Design and conduct experiments / Analyze and interpret data</td>
<td>5</td>
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<td>c. Design system, component, or process to meet needs</td>
<td>4,6</td>
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<td>d. Function on multi-disciplinary teams</td>
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<td>e. Identify, formulate, and solve engineering problems</td>
<td>1,2,3</td>
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<td>f. Understand professional and ethical responsibility</td>
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<td>g. Communicate effectively (written / oral)</td>
<td>7,8</td>
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<td>h. Broad education</td>
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<td>i. Recognize need for life-long learning</td>
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<td>j. Knowledge of contemporary issues</td>
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<td>k. Use techniques, skills, and tools in engineering practice</td>
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**Prepared by:** A. Flueck          **Date:** October 21, 2013