ECE 100 – Introduction to the Profession I

Credits: 3, **Contact Hours:** One 75 minute lecture session per week, one 160 minute laboratory session per week.

Coordinator: A. Flueck, Associate Professor of ECE

Textbook: Fred G. Martin, *Robotic Explorations: A Hands-On Introduction to Engineering*, Prentice-Hall, 2001.

2019 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. Lecture: 2 Lab: 3 Credits: 3 Satisfies: Communications (C)

Prerequisites or co-requisites by topic: Entering freshman status

Enrollment: Required course for CPE and EE majors

Specific outcomes of instruction:
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, Handy Board, 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.

Relationship of ECE 100 specific outcomes of instruction to student outcomes:

	Student Outcomes	**Course Goals**
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	1,2,3,4,5,6
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	4,6
3	An ability to communicate effectively with a range of audiences	7,8
4	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	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	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	5
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

Topics:

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

Laboratory topics:

- HandyBoard and Interactive C (1 week)
- LEGO construction and simple movement of robots (1 week)
- Obstacle avoidance for robots (1 week)
- Path following for robots (1 week)
- Competition preparation (3 weeks)
- Robot competitions (4 weeks)
- Team presentations (3 weeks)

Prepared by: A. Flueck **Date:** February 26, 2020