

**ECE 123: Introduction to Electrical and Computer Engineering:
Mobile Robotics
Elective Course**

2003-2005 Catalog Description:

This course provides an introduction to the practice of electrical and computer engineering. Students learn skills that will be required throughout their academic and professional skills, including the art and science of engineering design, teamwork, basic electronics construction skills and basic computer programming.

Prerequisites: Departmental approval.

Credits: 3 credits

Textbook and related materials:

[required]: Text: Stiquito for Beginners: An Introduction to Robotics by James M. Conrad and Jonathan W. Mills, IEEE Computer Society, ISBN 0-8186-7514-4, 1999.

[required]: ECE 123 Laboratory Manual by Frank L. Severance and Damon A. Miller, which includes supplementary notes and problems, as well as specifications for each of the laboratories for the entire course. This is available through the student section of the IEEE.

Course Coordinator:

Dr. Frank L. Severance, Professor, ECE

Instructor (Fall 2004):

Dr. Frank L. Severance, Professor, ECE

Prerequisites by Topic:

1. Trigonometry
2. High school physics

Course Objectives:

This course seeks to develop success and confidence in first semester freshmen students by fostering each of the following abilities:

1. an ability to analyze, design, simulate, and experimentally validate the operation of basic electrical components including resistors, capacitors, operational amplifiers, diodes, transistors. (a, b, c, e, k);
2. an ability to design, simulate and experimentally validate simple oscillator circuits by using monolithic chips such as the 555 timer (a, b, c, e, k);
3. an ability to use basic electrical instrumentation including power supplies, signal generators, digital multimeters and oscilloscopes (a, b, c, e, k);
4. an ability to use basic hand tools for mechanical construction (c, k);
5. an ability to utilize circuit simulation and layout tools for electronic design and analysis (a, b, c, d, e, k);
6. an ability to use appropriate statistical measures to characterize experimental error (a, b, k);
7. an understanding of basic software (word processing, spreadsheets, procedural controls and simulations) uses and engineering applications (b, k);
8. experience performing web-searches for technical information, data sheets and application notes (b, c, d, k);

9. an understanding of material characteristics of nitinol wire (a, b, e);
10. an ability to create a parallel port driver circuit (a, b, c, e, k);
11. an ability to write a simple BASIC control program for a walking robot (a, c, e);
12. an ability to work as a team on a common project (d, e);
13. an ability to thoroughly and accurately document laboratory work using a laboratory notebook (b, d, e, f);
and
14. an ability to communicate technical information effectively (d, e).

Topics:

1. electrical laboratory safety and practice
2. teamwork
3. basic electricity
4. basic electronics
5. nitinol wire
6. levers
7. electronics and mechanical construction skills
8. using instrumentation
9. basic computer programming and interfacing

Course/Laboratory Schedule: 2 hours lecture, 3 hours laboratory

Evaluation:

2 tests (10% each)	20%
assignments	10%
laboratory work	10%
lab notebook	20%
project	20%
final examination:	20%

Contribution to Professional Component:

ABET professional component content as estimated by faculty member who prepared this course description:
Engineering Design: 1 credit
Engineering Science 2 credits

Relation of Course to Program Outcomes:

This course provides significant support for:
EE program objectives: 2, 3
ECE expected learning outcomes: a, b, c, d, e, f, k.

Person who prepared this description and date of preparation:

Frank L. Severance Date: 22 March 2004