BCIT®

A POLYTECHNIC INSTITUTION

School of Manufacturing & Industrial Mechanical
Program: Mechanical Engineering Technology
Option:

ROBT 4451
Sensor Interfacing

Start Date: Jan/2006			**End Date:** May/2006	
Total Hours: 120	**Total Weeks:** 20		**Term/Level: 4**	**Course Credits: 6**
Hours/Week: 6	**Lecture: 3**	**Lab: 3**	**Shop:**	**Seminar:**	**Other:**

Prerequisites

Course No.	Course Name
ELEX 3321	Electronic Circuits
ROBT 3356	Controller Systems

is a Prerequisite for:

Course No.	Course Name
ROBT 3351	Automation Equipment

- **Course Description**

  This course covers data acquisition and control systems for computer interfacing pertaining to the control of industrial manufacturing processes and robots. Topics include various types of sensory devices and their characteristics, analog and digital signal conditioning, A/D, D/A converters, sample and holds, isolation circuits, cabling, serial communications, V/F and F/V converters, transistor and thyristor based power interfaces. This course also provides and overview of machine vision.

- **Evaluation**

Lab Projects:	25%	Comments:
quizzes:	10%	
Midterm Exam(s):	25%	
Final Exam:	40%	
TOTAL	100%	

- **Course Learning Outcomes/Competencies**

Upon successful completion, the student will be able to:

1. Describe various A/D, D/A techniques.
2. Apply various types of A/D and D/A converters.
3. Design, build and test signal-conditioning circuits.
4. Describe a variety of robotic sensory devices such as potentiometers, synchros, resolvers, differential transformers and optical encoders.
5. Design, build and test the interfacing hardware/software needed for direction, position and velocity control using optical encoders.
6. Use the A/D system of the HC11 single chip microcontroller.
7. Define aliasing and aperture time and determine whether a sample and hold is needed in a signal conditioning application.
8. Describe the different conversion codes for A/D and D/A (unipolar, bipolar).
9. Design circuits using V/F and F/V converter.
10. Implement serial communications between system components using the HC11 single chip microcontroller and protocols such as RS-232.
11. Design and build transistor and thyristor based power interfaces.
12. Identify sources of noise and minimize their effects using isolation circuits and correct cabling techniques.
13. Describe machine vision system components.

- **Verification**

I verify that the content of this course outline is current.

_____   _____
Authoring Instructor   Date

I verify that this course outline has been reviewed.

_____   _____
Program Head/Chief Instructor   Date

I verify that this course outline complies with BCIT policy.

_____   _____
Dean/Associate Dean   Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

- **Instructor(s)**

  Pavlos Paleologou Office Location: sw3 2930 Office Phone: 604 4328926
  Office Hrs.: E-mail Address:

- **Learning Resources**
  - *Required*:
  - Text: Hand-out notes will be given as required.

  - Equipment/Supplies: 1 diskette - 2-2MB (1.44MB formatted) 3.5 inch.

Recommended:

1. Data Acquisition and Conversion Handbook, by DATEL.

- **Information for Students**

Assignments: Late assignments, lab reports or projects will be devalued 10% per day late. Assignments, lab reports or projects must be done on an individual basis unless otherwise specified by the instructor.

Makeup Tests, Exams or Quizzes: There will be **no** makeup tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for **documented** medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor **immediately**.

Ethics: BCIT assumes that all students attending the Institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam, or project for all parties involved and/or expulsion from the course.

Attendance: The attendance policy as outlined in the current BCIT Calendar will be enforced. Attendance will be taken at the beginning of each session. Students not present at that time will be recorded as absent.

Illness: A doctor's note is required for any illness causing you to miss assignments, quizzes, tests, projects, or exam. At the discretion of the instructor, you may complete the work missed or have the work prorated.

Attempts: Students must successfully complete a course within a maximum of three attempts at the course. Students with two attempts in a single course will be allowed to repeat the course only upon special written permission from the Associate Dean. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the appropriate program.

Course Outline Changes: The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

Advancement: Students who fail three or more courses in a term cannot advance to the next term and may be asked to discontinue from the program.

Completion of labs: Satisfactory completion of both the laboratory component and the theory component of this course is a requirement for a passing grade. The Lab portion of the course must be passed in order to pass the course.

- **Assignment Details**

Schedule

Week of/ Number	Outcome/Material Covered	Reference/ Reading	Assignment	Due Date