A POLYTECHNIC INSTITUTION

School of Manufacturing, Electronics & Industrial Processes
Program: Robotics & Automation Technology
Option:

Course Outline

ROBT 3356
Controller Systems

Start Date:	Sept 2006		**End Date:**	Dec 2006	
Total Hours:	**Total Weeks:**		**Term/Level:**	**Course Credits:**	
90	**15**		**3**	**6**	
Hours/Week:	**Lecture:**	**Lab:**	**Shop:**	**Seminar:**	**Other:**
6	3	3			

Prerequisites

Course No.	Course Name
ELEX 2220	Digital Tech. and Electronic Circuits
ROBT1270	"C" Programming

ROBT 3356 is a Prerequisite for:

Course No.	Course Name
ROBT 4451	Sensor Interfacing
ROBT4491	Robotics Project
ELEX 4336	Feedback Systems
ROBT 4455	PLC Applications for Robotics

- **Course Description**

Investigates the software and hardware involved in the real-time control of a microprocessor based system. Topics include microprocessor architecture, assembly language programming, input/output operations, handshaking protocols, timer system, interrupt handling, address decoding and interfacing techniques. Troubleshooting techniques used in fault analysis are also taught. Throughout the course, a single board microcontroller system is used to facilitate a detailed analysis of hardware and software involved. An automated controller system is designed, built and tested.

- **Evaluation**

Labs/Lab Quizzes/Project:	20%	Comments:
Quizzes	20%	
Assignments:	0%	
Midterm Exam:	20%	
Final Exam:	40%	
TOTAL	100%	

- **Course Learning Outcomes/Competencies**
  - Upon successful completion, the student will be able to:
  - Identify the various types of industrial controllers and their application to manufacturing automation.
  - Recognize the main functional blocks of an embedded controller.
  - Describe the programmer's model & memory map of an embedded controller.
  - Design, debug, and document software for control applications using development tools.
  - Interface input/output devices.
  - Use interrupts for interfacing.
  - Apply timer/counter operations to real time control applications.
  - Analyze bus signals to troubleshoot digital control systems.
  - Design and build address decoders for memory interfacing and port realization.

- **Verification**

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

Authoring Instructor — Date: Sept 8, 2006

I verify that this course outline has been reviewed.

Program Head/Chief Instructor — Date: Sept 8, 2006

I verify that this course outline complies with BCIT policy.

Dean/Associate Dean — Date: 2006/09/08

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: 604-432 8926
Office Hrs.: | E-mail Address: ppaleolo@bcit.ca

- **Learning Resources**

Required:

1. Text(s):
    - **MC 68HC11, An Introduction. Software and Hardware Interfacing. Han-Way Huang.**

2. Equipment/Supplies:
    - Microcontroller System (AxiomHC11EVBU)
    - Super Strip Bread Board
    - A set of IC chips
    - USB Memory Stick or RW CD

Recommended:

- Microcontroller Technology, Peter Spasov, Prentice Hall
- HC11 Technical Data. Motorola
- HC11 Reference Manual. Motorola
- TTL Data Book

- **Information for Students**

Lab reports: No late lab reports or projects will be accepted. Lab reports or projects must be done on an individual basis unless otherwise specified by the instructor. Lab attendance is mandatory.

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 , quizzes, tests, projects, or exams. At the discretion of the instructor, you may complete the work missed.

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.