A POLYTECHNIC INSTITUTION

Course Outline

School of Manufacturing, Electronics & Industrial Processes
Program: Robotics
Option: Taught to Robotics Term 4

ROBT 3416
Computer Integrated Manufacturing for Robotics

Start Date:	March 20, 2006				**End Date:**	May 26,2006			
Total Hours:	40	**Total Weeks:**	10		**Term/Level:**	4	**Course Credits:**	2.5	
Hours/Week:	4	**Lecture:**	2	**Lab:** 2	**Shop:**		**Seminar:**		**Other:**

Prerequisites

Course No.	Course Name
MECH 1210	Manufacturing Processes
MECH 1104	Computer Aided Design

ROBT 3416 is a Prerequisite for:

Course No.	Course Name
None	

Course Description

This course introduces students in the Robotics and Automation program to CNC machining. In the course, students will create programs manually and using CAM (Computer-Aided Manufacturing) software, set up a CNC milling machine, and operate the machine to produce a part.

Course Learning Outcomes/Competencies

Upon successful completion of this course, the student will be able to:

- recognize and describe the components of a CNC machine tool.
- setup and operate a CNC machining centre.
- create simple G-code programs for CNC machining.
- use graphics-based CAM software for producing programs for CNC machine tools.

Evaluation

Lab Assignments/Exercises	40%
Midterm Exam	30%
Final Exam	30%
TOTAL	100%

Comments:

- Copied assignments result in a mark of 0 for all parties and may result in a permanent record.

Assignment Details

Completed assignments should be neat and well organized.

Instructor(s)

Ben Berkmortel, P.Eng. Office Location: SW9-205 Office Hrs.: As Posted Office Phone: 604-432-8638 E-mail Address: ben_berkmortel@my.bcit.ca

Learning Resources

Required:
Text: None; instructor handouts
Equipment: Steel toe safety boots and eye protection
USB drive or other memory storage

References:
Computer Numerical Control – From Programming to Networking, S. C. Jonathan Lin, Delmar

Verification

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

Ben Berkmortel — Authoring Instructor
March 20, 2006 — Date

I verify that this course outline has been reviewed.

Dave Lewis — Program Head/Chief Instructor
March 20, 2006 — Date

I verify that this course outline complies with BCIT policy.

Dean/Associate Dean
2006/03/20 — Date

Information for Students

Note: Please refer to BCIT policy number 5002, Student Regulations Policy, for additional information. Policies are available at http://www.bcit.ca/about/administration/policies.shtml.

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.

Assignments: Assignments, lab reports or projects must be done on an individual basis unless otherwise specified by the instructor. Late assignments, lab reports or projects will be devalued 10% per day late to a maximum of 3 days late.

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**.

Attendance: The attendance policy as outlined in BCIT Policy 5002 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: If you miss an evaluation such as an assignment, quiz, exam, or project, or you miss 3 or more consecutive days of class, you must provide the department with a BCIT Student Medical Certificate (available at http://www.bcit.ca/admission/downloads.shtml). You may be asked to complete the work that you missed or the course evaluation may be adjusted to reflect the missed component(s).

Attempts: Students must successfully complete a course within a maximum of three attempts. Students with two attempts in a single course must get written permission from the Associate Dean to attempt the course for the third time. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the program.

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.

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.

Schedule

Topics	Reference/ Reading	Assignment	Due Date
Manual Programming Write programs incorporating the following elements: • point-to-point (rapid) moves • linear and circular interpolation • cutter compensation (manual and machine) • drilling canned cycles • subprograms • tool changes • work coordinate systems		TBD	TBD
Machine Operation Observe the setup and operation of a CNC milling machine. Describe how to set up the machine including fixturing the part, setting work coordinate system, setting tool offsets.			
CAM Programming Use MasterCAM to generate part programs. • Create part geometry in MasterCAM • Generate toolpaths for contours, pockets, facing • Create drill toolpaths • Use the built-in verification package to verify a program • Generate the code for a specific machine • Transfer 2-D geometry from CAD to CAM The lectures will cover the theoretical aspects of manual and CAM programming. In the lab sessions, you will write manual programs, verify programs, and use MasterCAM to generate programs.		TBD	TBD