A POLYTECHNIC INSTITUTION

Course Outline

School of Manufacturing, Electronics & Industrial Processes
Program: Manufacturing Technology
Option: Taught to Manufacturing Term 3

MANU 3312
Computer Aided Manufacturing

Start Date:	September 2006					**End Date:**	December 2006		
Total Hours:	75	**Total Weeks:**	15			**Term/Level:**	3	**Course Credits:**	5
Hours/Week:	5	**Lecture:**	2	**Lab:**	3	**Shop:**		**Seminar:**	**Other:**

Prerequisites

Course No.	Course Name
MECH 1210	Manufacturing Processes
MECH 2201	Engineering Graphics 2

MANU 3312 is a Prerequisite for:

Course No.	Course Name
MANU 4412	Production Planning
MANU 4450	Automated Manufacturing

Course Description

Investigates programming and operating procedures of Computer Numerical Control (CNC) machine tools. Part and machine setup procedures will be examined and proved on BCIT's CNC equipment. Computer Aided Manufacturing (CAM) techniques for programming will be studied in depth.

Detailed Course Description

Evaluation

Lab Assignments and Quizzes	40%
Midterm Exam	30%
Final Exam	30%
TOTAL	100%

Comments:

- Cheating and plagiarism will be as per BCIT policy.

Course Learning Outcomes/Competencies

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

1. Set up and operate a Computer Numerical Control machining centre.
2. Prepare programs for Computer Numerical Control machine tools using manual methods.
3. Develop macros for use in CNC programming.
4. Prepare programs for machining centres using Computer Aided Manufacturing software.
5. Prepare multiaxis programs for machining centres using Computer Aided Manufacturing software.

Verification

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

Authoring Instructor — Date: Sept 6/06

I verify that this course outline has been reviewed.

Program Head/Chief Instructor — Date: Sep 6/06

I verify that this course outline complies with BCIT policy.

Dean/Associate Dean — Date: 2006/09/06

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

Instructor(s)

Dave Lewis

Office Location: SW9-201P
Office Hrs.: As posted

Office Phone: 604-432-8925
E-mail Address: dlewis@bcit.ca

Learning Resources

Recommended:

- *Computer Numerical Control: From Programming to Networking* — Jonathon Lin

Equipment Required

- USB memory stick, ZIP disk or RW CD
- Safety glasses
- Suitable close fitting clothing capable of protecting arms and legs MUST BE WORN AT ALL TIMES in the shop
- CSA-approved (green triangle) safety footwear — puncture-proof sole, steel toe and ankle support

Information for Students

Assignments: Late assignments, lab reports or projects may 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.

Assignment Details

Completed assignments should be neat and well organized. All assignments should include the Date, Course Number and the Student's Name, Technology and Set.

Details of topics to be covered
Manual Programming Write programs incorporating the following elements: • Point-to-point (rapid) moves • Linear and circular interpolation • Cutter compensation (manual and machine) • Canned cycles (hole) • Subprograms • Tool changes • Machine initialization • Work coordinate systems
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. • Develop a plan for machining • Select a method of workholding • Select cutters to be used • Select cutting speeds and feeds • Decide on a method of machining
CAM Programming Use MasterCAM to generate part programs. • Create part geometry in MasterCAM • Generate toolpaths for contours, pockets, facing • Create holes • Use the built-in verification package to verify a program • Generate the code for a specific machine Transfer geometry from CAD to CAM • Decide what geometry must be transferred • Decide what format to transfer data in • Transfer 2-D geometry from CAD to CAM • Transfer 3-D wireframe, surface and solid geometry from CAD to CAM • Create toolpaths from imported geometry