San Bernardino Valley College
Curriculum Approved: January 24, 2005

I. COURSE INFORMATION:

A. Division: Technical
Department: Machine Trades
Course ID: MACH 074B
Course Title: Set-up and Operation of Various Machine Controls
Units: 3
Lecture: 2 hours
Laboratory: 3 hours
Prerequisite: MACH 070B
Corequisite: None
Dept. Advisory: None

B. Catalog and Schedule Description:
The study of 2-D tool path, machine control programming, part fixture, tool applications, and management of data required to operate various CNC machines and inspection equipment.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES:

Upon successful completion of the course, the student should be able to:
A. Identify data input and output from three different computer controls.
B. Define common offsets.
C. Download files from computer disk to machine control.
D. Set machine Part Reference Zero (PRZ) Machine Reference Zero (MRZ).
E. Set-up tools, speeds, feeds from a set-up sheet.
F. Set-up three various parts utilizing CNC lathes and mills.
G. Download a part using Rapid Proto-Type technology.

IV. COURSE CONTENT:

A. Safety overview
1. General safety
2. Identify shop hazards
3. OSHA (Occupational Safety Health Act)
B. Machine control system
C. Data management from and into machine control
D. CNC machining centers and programming
E. Pallets, part loading, and programming options
F. Tooling for NC and CNC machines
1. Tooling consideration
2. Tool holder
3. Fixturing
G. Advanced CNC applications and integration and the role it plays in manufacturing machine parts
H. Tooling for hole and milling operations
1. Locating points
2. Tool offsets
3. Part production process
I. CNC turning operations
1. Miscellaneous functions
2. Tool edge programming from controller
3. Turning cycles

V. METHODS OF INSTRUCTION: (Please check all that apply and add any additional not listed.)

X Lecture

X Class and/or small group discussion
_____ Critical evaluation of texts, newspapers, journal articles, and other printed research
_____ Critical evaluation of films, videotapes, audiotapes, or other media forms
X Classroom demonstrations
X Field trips
_____ Guest speakers
_____ Other:
_____ Other:
_____ Other:

VI. TYPICAL OUT-OF-CLASS ASSIGNMENTS:

A. Reading Assignment. Reading assignments are required and may include (but are not limited to) the following: Read the chapter on Tool Path Verification and program a tool path.
B. Writing Assignment. Writing assignments are required and may include (but are not limited to) the following: Written homework assigned each week from the questions and problems in each chapter
   Typical Assignment: Write a process plan for modeling a three-dimensional part for a rapid proto-type process.
C. Critical Thinking Assignment. Critical thinking assignments are required and may include (but are not limited to) the following:
   1. Input a two-dimensional part into a computer control system utilizing an input device, i.e., floppy disk or direct input on machine control system.
   2. Input information into machine control to implement various control functions to operate a machining center.
   3. Manufacture a two-dimensional part from wax utilizing program codes and tool path geometry.
   4. Manufacture a three-dimensional part utilizing a rapid proto-type machining process.

VII. EVALUATION:

A student's grade will be based on multiple measures of performance and will reflect the objectives explained above. A final grade of "C" or better should indicate that the student has the ability to successfully apply the principles and techniques taught in this course. These evaluation methods may include, but are not limited to, the following (Please check all that apply, and add additional ones not listed):

_____ Portfolios
X Projects
_____ Written papers or reports
_____ Presentations (oral and visual)
X Work performance (internships or field work)
_____ Lab work
X Comprehensive examinations (cumulative finals or certifications)
_____ Peer evaluation
_____ Self evaluation
X Classroom participation
_____ Homework
_____ Other:
_____ Other:
_____ Other:

VIII. TYPICAL TEXTS:

A. Educational Division, Mastercam Handbook, Volume 1, CNC Software, Inc., Gig Harbor, WA, 2002

B. Educational Division, Mastercam Handbook, Volume 2, CNC Software, Inc., Gig Harbor, WA, 2002
C. Tony Shieu, Mastercam, Version 9.1, Scholars International, Ann Arbor, Michigan, 2004

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:

A. 3.5-inch-computer diskette
B. Safety Glasses

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