San Bernardino Valley College
Curriculum Approved: January 24, 2005

I.   COURSE INFORMATION:
   A. Division: Technical
       Department: Machine Trades
       Course ID: MACH 071B
       Course Title: Computer Numerical Control Machining II
       Units: 3
       Lecture: 2 hours
       Laboratory: 3 hours
       Prerequisite: MACH 070B
       Corequisite: None
       Dept. Advisory: None

   B. Catalog and Schedule Description: Intermediate Computer Numerical Control (CNC)
       programming covering programming concepts, hands on programming, computer
       assist programming, and down load programs to the mill and turning center.

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. Utilize G and M code commands in programming a part program.
   B. Write CNC programs using various sub-routines.
   C. Demonstrate the use of a computer to assist in writing a program.
   D. Down load a CNC program into the machining center displaying tool path graphics.

IV.   COURSE CONTENT:
   A. Safety Overview
       1. General safety
       2. Identify shop hazards
       3. OSHA (Occupational Safety Health Act)
   B. Programming Overview
       1. Principles of computerized numerical control
       2. Introduction to the use of a computer for CNC programming
       3. Use of interactive simulation software
   C. Programming Basics
       1. Identify concepts required in CNC programming
       2. Down load programs to various CNC machining center
   D. Locate Relevant, Current Research Materials
       1. Identify several sources of information available on a given subject

**V.   METHODS OF INSTRUCTION: (Please check all that apply and add any additional
        not listed.)**
   X   Lecture
   _____ Class and/or small group discussion
   _____ Critical evaluation of texts, newspapers, journal articles, and other printed
           research
   X   Critical evaluation of films, videos, and Interactive technology
   X   Classroom demonstrations
   X   Field trips
   _____ Guest speakers
   _____ Other:
   _____ Other:
   _____ Other:

VI.   TYPICAL OUT-OF-CLASS ASSIGNMENTS:
   A. <u>Reading Assignment.</u> Reading assignments are required and may include (but are not limited to) the following: After reading the chapter on Cartesian Coordinate Systems, plot points on the X and Y coordinates on the programming axis.
   B. <u>Writing Assignment.</u> 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 CNC programs using various sub-routines.
   C. <u>Critical Thinking Assignment.</u> Critical thinking assignments are required and may include (but are not limited to) the following: Prepare a CNC program from a given blueprint, identifying P. Points and codes to manufacture the part.

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
X	Presentations (oral and visual)
	Work performance (internships or fieldwork)
X	Lab work
X	Comprehensive examinations (cumulative finals or certifications)
	Peer evaluation
	Self evaluation
X	Classroom participation
	Homework
	Other:
	Other:
	Other:

VIII.   TYPICAL TEXTS:
   A. F. Nanfara, <u>The CNC Workshop</u>, 2nd Edition, Schroff Development Corporation, Canada, 2002
   B. M. Fitzpatrick, <u>Machining and CNC Technology</u>, Mcgraw Hill Company, New York, 2004

IX.   OTHER SUPPLIES REQUIRED OF STUDENTS:
3-1/2 inch computer diskette

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PREREQUISITE/COREQUISITE/ADVISORY
COURSE GRID FORM

Target Course: MACH 071B   Computer Numerical Control Machining II

Prerequisite Course: MACH 070B   Computer Numerical Control Machining I

Instructions:
1)   List exit competencies (skills) from Prerequisite Course. These skills are listed in the "Student Outcomes" section of the Course Outline ("upon completion of the course, the student should be able to…")
2)   Indicate which of the listed exit competencies (skills) are necessary entry skills needed for success in the target course. Mark with an "X" each needed skill.
3)   Indicate the degree of importance of each needed entry skill for course success, using the following rating scale:

1=Critical   2=Very Helpful   3=Desirable

Skills Analysis

Entry Skills in Target Course	Exit Skills Provided by Prerequisite Course (Mark with an X if needed and indicate Prerequisite Course if more than one).	Degree of Importance (Rate 1 – 3)
1. Identify the basic concepts required in CNC programming.	X	1
2. Describe CNC programming codes and their function to a CNC machine.	X	1
3. Program a part print utilizing the Cartesian coordinate systems.	X	1
4. Solve trigonometry problems relevant to CNC programming.	X	1