San Bernardino Valley College
Curriculum Approved: January 24, 2005

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

   B. Catalog Description: Beginning Computer Numerical Control (CNC) programming covering programming concepts, Cartesian coordinate systems, geometric principles, and hands on programming.

   C. Schedule Description: Beginning Computer Numerical Control (CNC) programming covering programming concepts, Cartesian coordinate systems, geometric principles, and HAAS Machining Centers.

II.   NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One
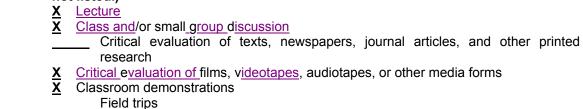
III.   EXPECTED OUTCOMES:
   Upon successful completion of the course, the student should be able to:
   A. Identify the basic concepts required in CNC programming.
   B. Describe CNC programming codes and their function to a CNC machine.
   C. Program a part print utilizing the Cartesian coordinate systems.
   D. Solve trigonometry problems relevant to CNC programming.

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. Types of CNC programs
           a) Mills
           b) Lathes
   C. Programming Basics
       1. Coordinate systems
       2. Geometric principles
       3. Trigonometry relevant to CNC programming
       4. Basic CNC programs for mills and lathes
   D. Locate Relevant, Current Research Materials
       1. Create a comprehensive course notebook

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
   X   Critical evaluation of films, videotapes, audiotapes, or other media forms
   X   Classroom demonstrations
   _____   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: After reading the chapter on Programming Basics, discuss in small groups the basic CNC programs for mills and lathes.

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 Question: Process a part utilizing an outline to describe the manufacturing process.

C. Critical Thinking Assignment. Critical thinking assignments are required and may include (but are not limited to) the following: In groups of two, program a given part and input it into a CNC mill or lathe showing the tool path graphically.

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)
_____ Work performance (internships or field work)
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. Clarke, William R., Math for Part Programmers, Instructor Notebook, 2003
B. Hoffman, Edward G., Student Shop Reference Book, 2nd Edition, Industrial Press, New York, 2002
C. Nanfara, F., The CNC Workshop, 2nd Edition, Schroff Development Corporation, Canada, 2002

IX.   OTHER SUPPLIES REQUIRED OF STUDENTS:

Texas Instruments T1-30X calculator