San Bernardino Valley College
Curriculum Approved: February 2, 2004
Last Updated: January 13, 2004

I. CATALOG DESCRIPTION:

A. Department Information:
Division: Technical
Department: Machine Trades
Course ID: MACH 123A
Course Title: Machine Shop III
Units: 4
Lecture:2 Hours
Laboratory: 6 Hours
Prerequisite: None
Departmental Advisory: MACH 022B

B. Catalog and Schedule Description:
Third semester intermediate machine shop practices for majors or non-majors, with a machining background. Emphasis on safety, applied mathematics for tool manufacturing, surface grinding, milling and turning operations and National Industry Metal Skill Standards (NIMS)

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

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon successful completion of the course, the student will be able to:
A. Grind a template to the blueprint specifications according to National Industry Metal Working Skills (NIMS) standards.
B. Set-up and operate a rapid indexing head.
C. Construct multiple flats on a cylindrical part.
D. Demonstrate the use of a dial indicator, by indicating a VISE within .001.
E. Prepare a work piece for layout to the NIMS blueprint specification.

IV. COURSE CONTENT:

A. Safety Overview
1. General safety
2. Identify shop hazards
3. OSHA (Occupational Safety Health Act)
B. Indexing Processes
1. Ratios of indexing, gear ratios and chuck types
2. Calculations, angular
C. Rotary Tables
1. Types of tables, calculations, types of geometry cuts and rotating works between centers
D. Layout and Measuring Tools
1. Dial indicators and test type indicators
2. Error factors in using measurement tools
E. Taper Turning Operation
1. Methods of cutting tapers and types of taper series
2. Machinery's Handbook Directory for taper calculations
3. Taper type attachments and telescopic taper attachment
F. Grinding
1. Identify major parts of the surface grinder
2. Grinding wheel selection
3. Grinding to certification standards

V. METHODS OF INSTRUCTION:

A. Lecture, individual consultation, and demonstration

B. Hands-on activities

VI. TYPICAL ASSIGNMENTS:

A. Practical Project:
Prepare a metal template for grinding to meet a designated NIMS blueprint specification according to job duty 2.7b.

B. Field Trip:
Select a tooling manufacturer from those observed at the Western Tool show visited. Prepare a two-page written report that describes the tool machining capability.

C. Class Discussion:
Divide up into small groups and discuss the similarities and differences of various grinding applications.

VII. EVALUATION(S):

A. Methods of Evaluation:
1. Graded parts to meet NIMS blueprint specifications
2. Utilization of CMM machine to evaluate part specification
3. Oral quizzes
4. Written tests
   Typical Questions:
   a) Identify major parts of the surface grinder.
   b) Describe methods of cutting tapers and types of taper series.

B. Frequency of Evaluation:
1. Two (2) lathe exercises
2. Two (2) mill exercises/exams
3. Three (3) oral quizzes
4. Three (3) written tests

VIII. TYPICAL TEXT(S):

Walker, John, Machining Fundamentals, 6th Edition, Tinley Park, IL, The Goodheart Wilcox Company, Inc., 2004

Walker, John, Machining Fundamentals Workbook, 6th Edition, Tinley Park, IL, The Goodheart Wilcox Company, Inc., 2004

Hoffman, Edward G., Student Shop Reference Book, 3rd Edition, Madison Avenue, NY, Industrial Press, 2003

IX. OTHER SUPPLIES REQUIRED OF STUDENT:

Safety glasses, trigonometric function calculator

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Content Review Form
DEPARTMENTAL ADVISORY COURSE

Target Course: MACH 123A Machine Shop III

Departmental Advisory Course: MACH 022B Machine Shop II

Instructions:

1. List exit competencies (skills) from the Departmental Advisory Course. These skills are listed in the "Student Outcomes" section of the Course Outline.
2. Indicate which of the listed exit competencies (skills) are necessary entry skills probably needed for success in the target course. Mark with an "X" each needed skill.
3. Indicate the degree of importance of each identified 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 advisory course (Mark with an X if needed and indicate advisory course if more than one).	Degree of Importance (Rate 1 – 3)
1. Demonstrate knurling a straight shaft between centers.	X	2
2. Set-up a lathe to cut an external 60 degrees V-thread.	X	2
3. Illustrate the technique for offhand grinding a threading tool and radius tool.	X	2
4. Demonstrate the use of an edge finder on a vertical-milling machine.	X	2
5. Prepare a vertical-boring head for machining a .750 hole.	X	2
6. Prepare a part for NIMS layout certification.	X	2