

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

**Course Outline
ROP: Machinist Occupations**

Date: February 2005

Subject Area: Technology

Proposed Grade Level(s): 10-Adult

Course Length: 1 year

Grading: A-F

Number of Credits: 15/semester

Prerequisites: None

COURSE DESCRIPTION:

Students are introduced to manufacturing technology using a variety of materials, tools, and equipment. The primary purpose of this course is to provide students with a foundation of useful skills and qualify them for entry level jobs in a manufacturing facility. Training will include the concepts of planning, best use of materials, and project cost analysis. Safety is strongly emphasized in every aspect of the course. Proper use of hand tools, basic layout skills, precision measuring instruments, machine tools, and fabrication equipment will be strongly emphasized. All students can benefit from this course regardless of learning styles, learning rates, or gender. Upon successful completion of two semesters, students will receive a certificate of completion.

GENERAL GOALS/PURPOSES:

- Students will experience skill building activities in the machinist/fabrication trades
- Students will chose appropriate material and equipment required for project completion
- Students will acquire a skill base necessary for entry level work in an industrial setting
- Students will understand the importance of clear, accurate, communication skills, and the value of teamwork
- Students will gain a sound understanding of the importance of accurately following sequential steps in order to successfully complete an assigned task

STUDENT READING COMPONENT:

Students will locate, understand, and interpret written information in documents such as technical manuals, text books, and reference materials.

STUDENT WRITING COMPONENT:

Students will communicate ideas, thoughts, and technical information through drawings, written instructions, directions, and tests.

STUDENT ORAL COMPONENT:

Students will communicate orally to direct and instruct others for task completion.

STUDENT MATH COMPONENT:

Students will perform basic calculations in order to solve practical problems using a variety of mathematical concepts.

DETAILED UNITS OF INSTRUCTION:

1. Orientation
 - a. Career opportunities
 - b. Tools and methods used in machining/fabrication industry
 - c. Expectations in the classroom and shop environment
2. Safety
 - a. Use of hand and portable power tools
 - b. Overview of stationary equipment safety
 - c. Welding equipment and correct use of protective clothing
3. Precision measuring instruments
 - a. Micrometer
 - b. Dial and vernier calipers
 - c. Depth and height gauge
 - d. Surface plate
4. Gas Welding
 - a. Sequence for start up and shut down of equipment
 - b. Gas welding techniques
 - c. Brazing techniques
 - d. Cutting methods
5. Arc Welding
 - a. Setting up equipment for welding
 - b. Welding rod selection
 - c. Arc welding techniques
6. Mig Welding
 - a. Equipment set up
 - b. Selection of gasses and wire
 - c. Mig welding techniques
7. Tig Welding
 - a. Equipment set up
 - b. Use of various filler metal
 - c. Tig welding techniques

8. Design and Planning
 - a. Theory of calipers, rules, punches, scribes, and dye
 - b. Cost analysis
 - c. Use of reference materials for task
 - d. Calculations required for task completion
9. Layout
 - a. Use of calipers, rules, punches, scribes, reference plate, and dye
 - b. Use of Pythagorean theorem
10. Bench Work
 - a. Use of files, portable grinders, etc.
 - b. Various clamping techniques
 - c. Variety of hand tools and their use
11. Radial Drill Press
 - a. Cutting speeds and feeds (as it applies to all machine tools)
 - b. Introduction of all controls on machine and their adjustments
 - c. Safe clamping techniques
 - d. Intro to a variety of cutting tools
12. Engine Lathe
 - a. Introduction to all controls on machine
 - b. Introduction to lathe accessories (3 & 4 jaw chuck, live center, taper attachment, etc.)
 - c. Cutting tools used with lathe
13. Knee Mill
 - a. Introduction to all controls on machine
 - b. Introduction to Mill accessories (fly cutters, taps, rotary table, divider head, etc.)
 - c. Cutting tool used on mill
14. Horizontal and Vertical band saw
 - a. Introduction to all controls on machine
 - b. Introduction to clamping various shapes and sizes of materials
 - c. Blade selection and tension adjustment
15. Computer applications in manufacturing process
 - a. Importance of proper machine setup
 - b. Introduction to G code
 - c. Calculation of machining times
16. Introduction to CAD/CAM
 - a. Introduction to Bob CAD
 - b. Theory of transferring from CAD drawing to machine tool
17. Career Unit
 - a. Exploring career opportunities
 - b. Job interview skills
 - c. Expectations of business owner / foreman / supervisor
 - d. Preparing resume' and portfolio

THIS COURSE WILL PREPARE STUDENTS FOR THE CAHSEE AND /OR FCUSD EXIT EXAMS IN:

Reading, Math, and Writing

LAB FEE IF REQUIRED:

\$20.00 per year to pay for consumable materials

SUBJECT AREA CONTENT STANDARDS TO BE ADDRESSED:

Industrial and Technology Education Content and Performance Standards 1996:

- Standard 1 Planning and Layout Processes
- Standard 2 Materials Processing
- Standard 3 Assembling Processes
- Standard 4 Finishing Processes
- Standard 5 Quality Control
- Standard 6 Machinist Tool Processes

DISTRICT ESLR'S TO BE ADDRESSED:

When student completes this ROP Machinist Occupation course they will be:

Self-Directed Learners: who will be able to solve basic practical engineering problems

Effective Communicators: who can express technology concepts efficiently to others

Quality Producers: who can produce a variety of projects in a professional manner

Constructive Thinkers: who are able to solve complex technology problems in a logical, intelligent, and sequential manor

Collaborative Workers: who are able to effectively work in teams to complete assigned tasks

Responsible Citizens: who accept responsibility for their own actions