San Bernardino Valley College
Curriculum Approved: January 27, 2003
Last Updated: December 2002

I. COURSE DESCRIPTION:

A. Department Information:

Division:	Technical
Department:	Machine Trades
Course ID:	MACH 095A
Course Title:	Piping Systems
Units:	1
Lecture	1 Hour
Laboratory:	None
Prerequisite:	None

B. Catalog and Schedule Description:
This course focuses on an introduction to piping and piping installation, tubing, hoses, and valves.

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

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of this course, students will be able to:

A. Identify metal pipe function by color code.
B. Give an example of a pipe specification for a given pipe section.
C. Formulate head loss for a given pipe size and flow rate.
D. Relate fitting types sizes to a given pipe sample.
E. Interpret a piping schematic for a given application.
F. Recognize plastic pipe by measurement.
G. Synthesize metal tubing by utilizing industry data charts.
H. Sketch a metal tubing specification to a given dimension.
I. Calculate metal bend locations and angles given a tubing layout.
J. Identify hose size and layout by measurement.
K. Demonstrate a manually operated two-way valve, which has threaded ports.
L. Examine, disassemble, repair, and test a check valve.

IV. COURSE CONTENT:

A. Metal Piping Systems
   1. Identify the color code used to determine various pipe functions
   2. Identify pipe size and type by measurement
   3. Write a pipe specification given its pipe dimension
   4. Calculate the head loss for a given pipe flow rate utilizing the designated pipe formulas
B. Plastic Piping Systems
   1. Identify plastic pipe by measuring outside and inside diameters
   2. Write a plastic pipe specification and its given dimensions
   3. Thread plastic pipe to a given pipe specification
   4. Weld plastic pipe utilizing various pipe solvents
   5. Calculate the head loss for a given plastic utilizing a head loss formula
C. Metal Tubing Systems
   1. Identify various metal tubing sizes utilizing various measurement tools
   2. Write a metal tubing specification given its dimension
   3. Cut tubing to a specified length using a tube cutter
   4. Determine bend locations and angles given a tubing layout drawing
D. Hoses
   1. Identify hose sizes by measuring O.D and I.D. measurements
   2. Determine low and high pressure hoses by application process
   3. Determine a hose length by a given layout drawing
   4. Calculate head loss for a given hose size and flow rate
E. Two–Way Valves

1. Discuss a manually operated two-way valve, which has thread ports
2. Connect a valve that has flanged connections
3. Identify a two-way valve given a sample

V. METHODS OF INSTRUCTION:

This course is designed for a combination of hands-on and lecture components, where skills can be tested and evaluated. The instructional methods to be used include:

A. Multimedia Curriculum, Student Experimentation
B. Hands-on Skill Exercises-Authentic Assessment

VI. TYPICAL ASSIGNMENTS:

A. Discussion
   1. Discuss how pipe sizes are determined and what process is used to measure inside and outside diameter of pipe.
   2. Given a pipe size for a 330 ft. section of pipe, discuss how head loss and flow rate is calculated.
B. Hands-on Skill Demonstration
   Demonstrate the head loss for a piece of schedule 40 pipe flowing at 35 gallons of water per minute. Demonstrate loss per 100 ft. = head loss (100 ft) x 100/pipe length.
C. Read Amatrol text and other sources; read section on plastic piping systems and answer the following questions:
   1. How are pipe sizes determined, and what process is used to measure inside and outside diameter of pipe?
   2. What processes are used to determine head loss and flow rate?

VII. EVALUATION(S):

A. Methods of Evaluation
   1. Objective and subjective examinations (for lecture and text assignments)
      Typical Questions:
      a) Write a pipe specification given its pipe dimension.
      b) Calculate the head loss for a given pipe flow rate utilizing the designated pipe formulas.
   2. Skills examination
      The student will find the head loss for a 6 ft. ½ inch hydraulic hose if the flow rate is 10 GPM.
B. Frequency of Evaluation
   1. Five computerized Learning Activity Packets
   2. Five hands-on application tests

VIII. TYPICAL TEXT(S):

Integrated Systems Technology, Learning Activity Packets 1-5, Amatrol Corporation, Jeffersonville, Indiana, 2000
Edward Hoffman, Student Shop Reference Handbook, 2nd Edition, Industrial Press, New York, 2000
Weingartner, Machinist Ready Reference, 10th Edition, Prakken Publication, Ann Harbor, Michigan, 2000

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:

Calculator