Lassen Community College Course Outline

GSS-98.13 Metallurgy For Gunsmiths 1.0 Unit

I. Catalog Description

This course introduces gunsmithing students to the theory of metallurgy. The student will learn to predict the behavior of metals, particularly common grades of steel, when exposed to heating and cooling cycles. This course requires an additional fee of $19 to cover the costs of various types of metal of specific composition for testing, heat treating, etc. Chemicals for altering metals, sandpaper (course, medium, fine, very fine, grits), emery cloth (course, medium, fine and very fine grits), sanding belts, polishing wheels and polishing compound.

Does Not Transfer to UC/CSU
12 Hours Lecture, 24 Hours Outside of Class, 36 Hours Lab, 72 Total Hours of Instruction
Scheduled:

II. Coding Information

Repeatability: Take 1 Time
Grading Option: Pass/No Pass Only
Credit Type: Credit - Degree Applicable
TOP Code: 099900

III. Course Objectives

A. Course Student Learning Outcomes

Upon completion of this course the student will be able to:

Use common shop tools to identify and predict the behavior of metals when exposed to heating and cooling cycles.

B. Course Objectives

Upon completion of this course the student will be able to:

Describe and perform quenching, tempering, and annealing heat treat procedure.

IV. Course Content

1. Structure of steel
   a. Iron and Carbon
   b. Steel Molecule
   c. Crystal Structure
   d. Steel alloys
   e. Identifying Steels
2. Phases of steel
   a. Melting and solidification
   b. Phase diagrams
   c. Cooling rate considerations
3. Hardness Consideration
   a. Hardness Measurement
      1) Brine
      2) Rockwell

3) Other Methods
b. Hardness Relation to Other Properties
a. Tensile Strength
b. Ductility
4. Heat Treatment Processes for steel
a. Annealing
b. Normalizing
c. Hardening
d. Tempering
e. Case Hardening
f. Heating Methods
a. Furnace
b. Flame
c. Other Methods
5. Aluminum
a. Aluminum Alloys
b. Heat Treatment of Aluminum
6. Experiments
a. Rochwell Hardness Testing
b. Furnace Processes
a. Annealing
b. Normalizing
c. Water Quench
d. Oil Quench
e. Tempering
c. Flame Processes
a. Selective Hardening
b. Tempering

V. Assignments

A. Appropriate Readings
Trade manuals, instructor handouts, and manufacturers instructions.

B. Writing Assignments
None

C. Expected Outside Assignments
None

D. Specific Assignments that Demonstrate Critical Thinking
None

VI. Methods of Evaluation

Evaluation will be based on student's progress and participation.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

☒ **Traditional Classroom Delivery** ☐ Correspondence Delivery

☐ Hybrid Delivery ☐ Online Delivery
Lecture, demonstration, and laboratory practice.

VIII. Representative Texts and Supplies
None

IX. Discipline/s Assignment
Gunsmithing

X. Course Status
Current Status: Active
Original Approval Date: 12/9/2002
Revised By: John Martin
Curriculum/Academic Standards Committee Revision Date: 11/15/2023