

GSS 98.13 METALLURGY FOR GUNSMITHS

Course Objectives and Student Tool & Materials List

Welcome and Overview:

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Welcome to Metallurgy for Gunsmiths. This course is an introduction to metals, with class room lectures and hands-on shop techniques. Topics covered include the fundamentals of metals, heat treating, and the various forms of mild, alloy and stainless steels, as well as non-ferrous metals like aluminum and brass. See below for list of student-supplied tools and materials needed for class.

Course Objectives:

At the conclusion of this course, the student will have gained an understanding of

1. Extraction of ore, refining of steel, steel classifications, terminology, physical and chemical properties, and performance measurements (strength, hardness and ductility).
2. How carbon content and other alloying elements affect the performance characteristics of steel, and the use of phase diagrams.
3. How crystalline structure is affected by temperature; work hardening; annealing and normalizing.
4. The fundamentals of heat treatment, use of isothermal transformation diagrams and how tempering can be used for obtaining desired post-heat treat properties.
5. How welding affects various metals.
6. The types and characteristics of non-ferrous metals like aluminum, copper, and brass; and how precipitation hardening is used to gain desired properties in these materials

Student-supplied Tools, Equipment and Material List:

Notebook, pens, pencils

Personal Protective Clothing (for working in the shop area)

Long pants (blue jeans or other denim fabric)

Shirt that breaks the shoulder (ie no tank tops)

Close-toed shoes or boots (leather boots preferred, no sandals)

Leather gloves (light or heavy weight welding gloves are preferred)

Safety glasses with clear lenses and side shields (goggles OK but uncomfortable for long periods of wear)

Gas welding goggles with number 5 lens

Dust mask (optional for grinding)

Lockable Tool Box (for holding tools and personal items)

2 Padlocks (one each for tool box and gun locker)

Smooth Mill File with handle (6 to 10 inch or longer, does not need to be new)

Hammer

Propane torch and cylinder (either self-lighting or striker)

A few shop rags

Marking pen (Sharpie)

Hacksaw and blades (course and fine tooth blades)

Steel rule (6 or 12 inch) or tape measure

Pliers to handle hot metal (cheap, thrift store variety, condition not important)

Lockable jaw pliers (Vise Grips type, cheap thrift store variety preferred)

Needle nose pliers with side cutting pliers (to shape and cut tie wire)

If you would like to practice sharpening or shaping tools, please bring

Old chisel to practice sharpening, and sharpening stone.

Old screwdrivers to practice shaping

Materials

Steel wire (also known as tie wire) for holding parts while heating

Automatic Transmission Fluid (any inexpensive brand for heat treating)

Old brass bottleneck cartridge cases **WITH THE PRIMERS REMOVED**

Kerosene or honing oil for use with sharpening stone (if bringing chisels)

Painters tape

Optional Tools and Equipment

Any tools or materials the student would like to bring.

Sources of tools and materials:

NOTE: These sources are provided as a convenience to the student, and should be considered neither a recommendation nor an endorsement.

Brownells.com

MSCdirect.com

Amazon.com