

METALS

KUMATA – Tues/Thurs DH B 303 – 1:30-4:30

This course is an introduction to light metalworking techniques, focusing on fabrication. This studio class involves learning basic forming, joining, and finishing techniques for metal, while developing personal imagery. Through class projects, students will develop conceptual as well as technical skills. During the course, students will become familiar with stretching, forging, texturing, brazing, and finishing of metal. While acquiring this vocabulary in metal, students will be exposed to a variety of imagery sources and critical discussions.

AREAS TO BE COVERED :

FABRICATION;

- Cutting - shearing, piercing, sawing, drilling
- Forming - dapping, sinking, bending, simple forging
- Joining - silver soldering, cold joining

SURFACE EMBELLISHMENT;

- Texturing
- Chasing
- Marriage of metal
- Embossing
- Hammering

FINISHING;

- Sanding
- Filing
- Buffing
- Patinas

COURSE EXPECTATIONS:

Pieces will be evaluated based on conceptual merit, esthetic quality and craftsmanship. **Grades** will be based on the projects, attendance and participation in the critiques. It is **VERY** important that you attend and be on

time. Demonstrations and slides will be at the beginning of the class and will not be repeated.

LEARNING OBJECTIVES:

- Students will demonstrate increased technical abilities in metalworking.
- Student will integrate these techniques with individually defined conceptual goals in projects.
- Students will discuss and evaluate contemporary practice in metals through visual presentations.

FALL 2015

SEPTEMBER:

TUES. 1 – First day of class- syllabi, course objectives and requirements,
safety sheet, key forms
First assignment –slides, safety talk 2:00 - Dalcosta

THURS. 3 - talk about ideas – choose your topic, sawing demonstration,
texturing, annealing, cold joining etching

TUES. 8 – three ideas due with drawings to scale, demos on filing, finishes,
patinas

CORNELIA PARKER - Tues. Sept 08 / 5pm, Kresge Theater

THURS 10 - Document due. soldering demo, technical exercise

TUES. 15 – Images due. soldering exercise due

*RANIA MATAR - Tues. Sept 15 / 7.30pm, Carnegie Lecture Hall, Carnegie
Museum of Art*

THURS 17 – work day. major piece assignment - slides

TUES. 22 – first project due, Crit

JILL MAGID - Tues. Sept 22 / 5pm, Kresge Theater

THUR. 24-. 3 drawings for major piece due , idea crit
Forming, sinking, masonite die, chasing, repousse

TUES. 29 –MODELS DUE etching, laser cutter demo

MARINA ROSENFELD - Tues. Sept 29 / 5pm, Kresge Theater

OCTOBER:

THURS. 1 – WORK DAY

JEANINE BARCHAS - Oct 01 / 4:30pm reception, Porter Hall 100

TUES. 6 -

ANGELA WASHKO - Tues. Oct 06 / 5pm, Kresge Theater

THURS. 8 - work day

TUES. 13- work day

DISCOTECA FLAMING STAR - Tues. Oct 13 / 5pm, Kresge Theater

THURS. 15 - How to photograph small objects

BOB MOSES - Oct 15 / 4:30pm, location tba

TUES. 20- work day

THURS 22 - crit on major piece **LAST DAY OF CLASS**

METAL TERMS

ANNEALING - To soften metal by heating evenly to a dull red. Metal should be annealed after work-hardening and before hardening.

SOLDERING - Hard or silver soldering using silver solder in 3 different temperature grades - easy, medium, and hard. Hard soldering is also referred to as brazing.

FLUX - Borax and other chemicals mixed into a paste solution to be applied before soldering a joint. Flux keeps the metal from oxidizing, keeping the joint clean so that the solder will flow. When the flux turns black, it has burned off, and the piece must be pickled and refluxed.

PICKLE - Pickle is a mild sulfuric acid bath used to clean metal after annealing or soldering. The shop pickle is SPAREX, a dry form of acid. Pickle is best used hot. The pickle bath should be replaced when the solution turns dark blue. This means that the pickle has been loaded up with copper residue and probably no longer cleans quickly. If steel or iron come in contact with the pickle (i.e. iron binding wire), steel tweezers) the pickle has been contaminated and everything, especially silver, will come out copper plated.

SAW FRAMES AND BLADES-

Jeweler's saw frames come in different throat depths. Your tool kit contains a saw frame 4, 5 or 6 inches in depth. The saw blade's sizes are referred to by numbers - (Large) 3 - 2 - 1 - 0 - 00 - 000 - 0000 (Small) . The numbers extend down to 00000000, or 8-0 saw blade.

TORCHES - There are three different types of torches in the studio.

Gas/Air - this is the type at the large soldering bench. The flame is cooler, but cleaner than acetylene. The gas is natural gas and the air is forced air available through the compressor in the building. You will use this torch mainly for annealing.

Air/Acetylene - This is the torch you will be using most of the time for soldering. The gas is compressed acetylene, the air is drawn from the atmosphere, through the torch handle.

Oxy/Acetylene - This is the hottest torch in the studio. Usually used for welding, you may also see people using it for brass brazing or casting. The gas is compressed acetylene, the air is compressed oxygen.

INSTRUCTIONS FOR USING THE METAL SHOP

In gaining a key to the metal; area, you have demonstrated competency in the use of the equipment, particularly the electric tools and the torches. This means when you are in the room, *YOU ARE RESPONSIBLE* for the tools and the general safety of the shop. The safety rules should be memorized, If you see anyone violating those rules, stop them and instruct them in the correct use of those tools.

The number for campus security is posted on the phones. – In case of an emergency call campus security.

If you are working alone at night, you may want to keep the door locked.

INSTRUCTIONS FOR CLOSING THE SHOP

1. Make sure all tools are put away.
2. Check and make sure that all torches are off at the base as well as the handles.
3. Make sure that all the torch gauges read ZERO.
 - If you are using the hotplate or the wax pot be sure it is off.
4. Check and make sure doors are locked.

SAFETY RULES

1. **Wear hair tied back** and Tie back or remove jewelry or loose clothing like scarves or ties when using power equipment or torches.
2. **Wear safety glasses** when using torches or power equipment.
3. **Wear respirator or mask** when necessary - i. e. grinding, buffing
4. **Wear ear protection** when necessary - i.e. forging
5. **Turn ventilation on** when using torches, furnaces, or buffing and sanding equipment.
6. **Do not go barefoot in the shop.** Wear covered shoes, not sandals, when working.
7. Do not put **HOT METAL** in the pickle bath, quench first.
8. If you do not know a piece of equipment, ask first.

NOW HOW TO TURN THE GAS TANKS AND TORCHES ON AND OFF.

There are two types of torches in the metals shop. One is air/acetylene, the other is gas/air. You must know how to turn both on and off and how to bleed the lines when done.

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AIR/ACETYLENE

TO TURN ON :

Turn key at the top of the tank to the left (counter clockwise) one half turn. If pressure is low, screw in the pressure gage clockwise, to the right. Turn on torch at the handle and light with a striker. Adjust flame by either changing the torch tip size, screwing in more pressure, or turning up the torch at the handle.

TO TURN OFF:

Turn key to the right (clockwise) till tight. **BLEED THE LINES** by turning on the torch at the handle and letting all the gas out. If the gas does not stop releasing after a few seconds, check to see if you have turned the torch off at the tank correctly. After there is no more gas in the lines the gauges should go down to **ZERO**. If they are not at zero, there is still gas in the torch lines. When you are sure everything is drained, turn off the torch at the handle.

GAS/AIR TORCH

TO TURN ON :

Turn on gas and air handles on the wall to the left (counter clockwise) two turns. Turn on torch at handle by first turning on gas slowly, by moving handle up or down (off of the horizontal) and lighting with striker. Then slowly add air by moving air handle up or down (off the horizontal).

TO TURN OFF:

Turn the handles on the wall all the way to right (clockwise) until tight. BLEED THE LINES by opening both lines at the torch handle. Let the air and gas drain out. If the air and gas do not drain in a few seconds, make sure that you have turned the air and gas off correctly. After the lines are bled, turn the torch off at the handle by returning both handles to the horizontal position.

SUPPLY LIST

REQUIRED: These items may be bought at the art store.

2 dozen #00 jewelers saw blades - if art store is out of 00, you may get 000 or 0

1 pack of small twist drills, or three of #55,56,57,58,59 or 60 twist drills

2 cheap brushes (for flux and patinas)

cross locking tweezers- art store

regular tweezers- art store

1 sketchbook for notes and designs

1 metal ruler 6 - 12 inches.

masking tape

safety glasses

center punch

scissors

locker lock

*access to digital camera

rental of tool box – available at the art store see below

SUGGESTED:

scribe

work gloves

respirator

"The Complete Metalsmith", Tim McCreight – at CMU Bookstore or on line

TOOL KIT :

The tool box and tools within are available at the art store. Students in the class are asked to put down a deposit of \$100 less a rental fee that will be returned at the end of class . At the end of class an inventory will be taken and any missing or damaged tools will be charged to you. TAKE CARE OF YOUR TOOLS !!

LAB FEES :

Lab fees will be charged through the art office. Metal (copper, brass, bronze, steel) will be supplied to you within reason, courtesy of your fees. Silver solder, sandpaper will be given out at the beginning. Any additional materials will have to be purchased. \$60.00

STUDIO EQUIPMENT must remain within the metals area, except for your tool kit.

Return them to their proper place, do not store them in your desk or locker. If we do not have a tool, you may check them out of the tool room in the woodshop.