

UM Taubman College
Metals Lab Handbook

2.0

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UM Taubman College Metals Lab Handbook

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Metals Lab Mission

The Taubman College Metals Lab provides students and faculty with the facilities, equipment and training to design and construct projects using a wide range of ferrous and non-ferrous metals. The Metals Lab provides the opportunities to work with a full range of rolled structural shapes in mild steel, stainless steel and aluminum. We also provide resources for working with sheet metals of all sizes and alloys.

The Metals Lab fully integrates the resources of the Taubman College FabLab and serves as a further set of resources for assembly, fabrication and finishing for work developed in the FabLab, in design studio or in other A+A building shops.

The Metals Lab supports a wide range of welding technologies including MIG, TIG, stick welding as well as high and low temperature brazing. Additional equipment for cutting, bending, grinding and finishing of both structural shapes and sheet metal are available. In addition to Taubman College resources, the Metals Lab coordinates collaborative work in the UM A+D metals, sculpture and ceramic labs to provide additional material and fabrication opportunities for Taubman College students and faculty.

The primary function of the Metals Lab is to provide training and learning opportunities for the Taubman College in the design and fabrication with metals. Regular shop and tool introductions are scheduled at the beginning of each semester. Welding tutorials are provided at scheduled intervals throughout the semester. Faculty are encouraged to coordinate work in the lab with studio and seminar projects and arrange for training and design development support from the Metals Lab.

Lab Schedule and Access

The Metals Lab is available to all Taubman College students and faculty after completion of introductory training sessions. During scheduled lab hours the Metals Lab coordinator is available for design consultation, training and fabrication assistance. Due to the hazardous nature of the work and equipment the Metals Lab equipment is not available for use on a 24/7 basis. For reasons of safety and security the Metals Lab is not available for unsupervised use. The Metals Lab will make every reasonable effort to accommodate student and faculty project schedules. Early planning and scheduling of any work is very important.

Any announcements or changes in schedule will be posted on the door outside room 1224. For the 2016-17 academic year the lab will be open with the following schedule. Lab hours are subject to change.

| | |
|-----------|----------------------|
| M-F | 8:30 am – 7:00 pm |
| W | 8:30 am – 10:00 pm |
| Saturday: | Hours by appointment |
| Sunday: | Closed |

Lab Coordinator:

Mick Kennedy 1224 A+A
mickk@umich.edu

Access

It is highly recommended that you speak with the lab coordinator in the planning stage of projects involving the Metals Lab equipment or materials. This will allow for input on issues you may not have considered such as material limitations, procedures, jig-making and scheduling. Please inform the coordinator in advance of your planned work-session in order to best guarantee dedicated consultation and help. *For reasons of safety and security the Metals Lab is not available for unsupervised use.*

Welding Tutorials and Tool Introductions

A major goal of the Metals Lab is to empower and encourage all students and faculty to incorporate metalworking and fabrication into their basic repertoire of design exploration, model making, and construction activity. A key component of the coordinator's role is in teaching, assisting and facilitating the adoption of the necessary skills and confidence to work with these areas.

Introductory tutorials on Metals Lab equipment and MIG welding will be held according to the following schedule:

Tutorial Scheduling

By appointment during the following lab hours.

M W Th F 9:00 am and 12:00 pm

Please contact the Metals Lab Coordinator to schedule a tutorial session.

Tutorial Sessions

Tutorials are limited to four per session and will last 1-1/2 hours depending on the size of the training group. If you cannot make your scheduled tutorial session, please contact the coordinator with as much lead time as possible as there may be another person waiting for a session.

Introductory manuals for MIG and TIG welding are available on the Metals Lab webpage. **Please review these manuals prior to your training session(s).**

Faculty members are encouraged to make use of the lab for their courses. Those wishing to do so should meet with the coordinator at least two weeks in advance to discuss the project, relevant space requirements, work flows and general schedule constraints.

Metals Lab Policies

Your Opportunities in the Metals Lab

The Metals Lab supports project work at a range of scales, materials and levels of coordination with other A+A shops. You will be empowered to design and build metal fabrications at a range of scales from small studio models, frames and support brackets, to furniture, installations, and buildings.

You will learn essential metal fabrication skills such as welding, grinding and finishing, shearing and folding sheet metals, assembly large frames and structures, bending metals rods and tubes, brazing and soldering.

You will gain valuable experience and confidence in the full range of project development from concept to schematic design, material sourcing and costing, to detailing and adjustment for material tolerances, to production, fitting and assembly.

Your Responsibilities in the Metals Lab

The Metals Lab has workstations and work tables and areas for use on a collective and cooperative basis. Please be respectful of the work area, tools as well as the work of others. Personal safety in the lab area is a collective concern and effort. Be aware of others and look out for each other's safety.

The Metals Lab area is to be used for work on metal only. **For safety reasons no working with wood, plastics or paper / cardboard is allowed in the lab.**

Please do not bring any beverages into the Metals Lab area. A lot of voltage around and liquids are a bad idea. *A really bad idea.*

There is storage of student or faculty projects in the Metals Lab area. There are racks on which you can store lengths of steel or aluminum for scheduled use on your projects. Please see the lab coordinator if you plan to store project metal supplies in the lab.

Tools located in the welding cage are for use by students and faculty in the Metals Lab. **No tools may be removed from the Metals Lab area.**

Before completing your Metals Lab work session you are required to:

- _Make certain all welding equipment is turned off. Close all gas tanks.
- _Replace all welding helmets, jackets and gloves to their respective places in the cage area.
- _Replace all hand tools to their respective tool boxes, bins, etc.
- _Put all metal scraps in either the scrap bins or recycling as appropriate
- _Throw away all trash, papers, jig material etc. in the appropriate bins.
- _Sweep floor area around the worktables.

Everyone working in the High Bay should consider themselves individually and collectively responsible for keeping the area clean, uncluttered and safe. *Watch out for yourselves and each other. Clean up after yourselves and each other.*

Safety in the Metals Lab

Safety glasses must be worn during all cutting, grinding and drilling operations in the Metals Lab. Safety glasses and hearing protection are available on the shop wall near the entrance to the FabLab from the office hallway. Safety glasses, goggles and face shields are also available in the welding cage.

A fire extinguisher is located in the Metals Lab and on the north wall of the FabLab. You will be instructed in the use of the fire extinguisher during your Metals Lab introductory tutorial.

Lab Working Attire

The Metals Lab has a range welding helmets, goggles, jackets, hats and gloves for use in the welding area. It does not provide *work gloves* for general use in the High Bay and FabLab. **Do not use welding gloves for general work glove purposes.** The welding gloves are expensive and their misuse in other applications may compromise their effectiveness and safety for welding purposes.

While not inherently dangerous welding can be hot and dirty work. You are required to wear long pants and leather boots or shoe. Loose fitting, work clothing is highly recommended. ***No one wearing sneakers, open toed shoes or sandals will be allowed to work in the lab.*** This requirement will be strictly enforced out of real concerns for safety.

Material and Project Storage

Project materials can be stored in the overhead racks in Metals Lab area or sheet metal bin near the water-jet cutter in the FabLab. It should be clearly tagged with your name, the time period for storage and your username for contact information. The Metals Lab cannot be responsible for materials stored in the lab. All scrap materials from your work should be removed from the lab or placed in the scrap bins for use by others.

The collective and cooperative ambitions of the High Bay work area seeks to allow areas for larger scale student and faculty projects to take place. This goal will only be as successful as the level of responsibility and cooperation of the all working in the High Bay. Everyone working in the High Bay should consider themselves individually and collectively responsible for keeping the area clean, uncluttered and safe. *Watch out for yourselves and each other. Clean up after yourselves and each other.*

All work-in-progress left in the Metals Lab area must be cleared first with the coordinator. **All project work should be clearly labeled with the date, contact name and username.**

Be responsible about your work and communicate your intentions. **Work left untouched for more than one week will be relocated at the discretion of the coordinator. Work left untouched for more than two weeks will be recycled at the discretion of the coordinator.**

Lab Resources

2 Miller 110v MIG welding workstations
1 Miller 380v MIG welding mobile workstation
1 Miller 350 Synchronwave LX TIG welding mobile workstation
1 Miller LSMW mobile spot welder

3' Shear 16g capacity
3' Break 16g capacity
6' Break 12g capacity

Various and sundry grinding and finishing tools, saws and associated power tools for jig making, fabricating etc.

Drill Press

Horizontal and Vertical Metal Bandsaws

Additional metal working equipment is located in the A+A building Wood Shop. Access can be arranged for the wide range of metal working equipment in the College of A+D Metals Shop.

If you are interested in acquiring any personal welding equipment, tools or attire check with:

Lessors Welding Supply

4105 Jackson Rd.
Ann Arbor, MI 48103
734 761-9100

Ann Arbor Welding Supply

4811 Carpenter Rd.
Ypsilanti, MI 48197
734-572-0444

Friendly and helpful folks at both locations.

Material Resources

Alro Metals Plus

2466 S. Industrial Hwy
Ann Arbor, MI 48104
(734) 213-2727

Alro carries a wide assortment of structural shapes, rods and sheet metal at reasonable prices on a cash-and-carry basis. Larger orders, better prices and deliveries can be arranged through their home office in Jackson, MI.

Alro Steel

3100 E. High St.
Jackson, MI 49204-0927
(517) 787-5500

Factory Steel and Metal Supply

14020 Oakland Ave.
Detroit, Michigan 48203
313-883-6300

Factory steel carries a wide range of high strength tubing, bars and other precision metal stock. A particular wide range of non-ferrous metals. Worth the drive to Detroit.

McNichols

www.mcnichols.com/

McNichols carries a wide range of perforated, stamped and embossed sheet metals as well as an array of expanded metal lathe, gratings etc.

Scrap and Recycled Metals

No surprise that Detroit is well stocked with scrap metal yards. Most are willing to sell you metal on a per pound basis. Who knows what treasures you might find? Don't expect special service or attention.

Try:

Kimmel Scrap Iron and Metal

10571 Grand River, Detroit, MI 48204
313 934-2141

or check at www.detroitscrapmetal.com

More Material Resources

Fastenal Ann Arbor

1776 E Ellsworth Rd
Ann Arbor, MI 48108
734-665-9060

A great local source for a wide variety of nuts, bolts, fasteners, clips, etc. etc. in a huge array of sizes, finishes and metals. Very good prices and helpful staff.

McMaster-Carr

www.mcmaster.com/

McMaster-Carr is a huge distributor of industrial products large and small: from soup to nuts. Everything under the sun. Helpful staff, usually next day shipping at no extra cost. A great, great resource.

Grainger Industrial Supply

www.grainger.com

Similar range of products as McMaster Carr. They do have a supply house in Ann Arbor, though they can be prissy about selling directly.

2915 Boardwalk St.
Ann Arbor, MI 48104-6765
734-662-1060

Haefele

www.hafele.com/us/

The US branch of the great German architectural hardware company. All types of amazing hardware for furniture, cabinetry, kitchens, industrial uses, showcases etc.

Sugatsune

www.sugatsune.com/

If anyone makes nicer hardware than Haefele it is Sugatsune. Get one of their catalogs.

Fabrication Resources

Le Forges Pipe and Fabrication, Inc.

64 Ward Road
Ypsilanti, MI 48198-4233
734-482-2100

Tube and steel section bending and fabrication services. You should allow a minimum of one week for scheduling and work sent out.

Lasers Unlimited East Inc

46918 Liberty Dr
Wixom, MI 48393
(248) 624-4597
cad@luieast.com

Water-jet cutting of aluminum and steel. Owner offers UM friendly pricing.

Michigan Sandblasting

michigansandblasting.com
12980 Inkster Rd.
Redford, MI 48239
313-533-9890

Sandblasting, painting and powdercoating services

References and Links

Miller Welding: <http://www.millerwelds.com>

Lincoln Welding: <http://www.lincolnelectric.com/>

Welding Safety: <http://www.osha.gov/SLTC/weldingcuttingbrazing/>

Please see the Metals Lab page at the Taubman College website for downloadable MIG and TIG welding manuals and tutorials.

http://taubmancollege.umich.edu/architecture/resources/workshops_and_labs/metals_fablab/