



MUHLENBERG COLLEGE MAKERSPACE

SAFETY AND ORIENTATION MANUAL

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Mission

Our mission is to provide a collaborative and inclusive environment where students, faculty, and staff can come together to explore, experiment, and create with a wide range of tools and technologies. We believe that making is a fundamental part of the liberal arts experience, and that it encourages critical thinking, creativity, and problem-solving skills that are essential for success in any field.

Our Makerspace is dedicated to promoting hands-on learning and exploration, and to fostering a sense of community and collaboration among our diverse student body. We strive to provide access to cutting-edge technology and equipment, as well as to support and encourage traditional crafts and skills.

We are committed to providing a safe and welcoming space for all, and to promoting social and environmental responsibility in all aspects of our work. We believe that our Makerspace has the power to inspire innovation and creativity, and to help our students develop the skills and confidence they need to make a positive impact in the world.

General Information

The Makerspace is located on the lower level of the Fahy Commons building, room 004. The Makerspace includes the main room (generally “Makerspace”) and the Fabrication Lab (FabLab). The spaces are available for use for all members of the Muhlenberg Community including students, faculty, and staff. The Makerspace may be used for individual exploration, coursework, prototyping, etc. We simply ask that you follow the rules and procedures outlined below to ensure that we can continue to make the space openly available and accessible to all into the future.

Emergency Contacts

If there is an emergency, use the wall “phone” located in the main area of the Makerspace. Press the red button to call Campus Safety.

484-664-3110 - Campus Safety Emergency Line

484-664-3112 - Campus Safety Non-Emergency Line

Use of Makerspace

The Makerspace is a collection of equipment, tools, materials, and supplies intended to allow for exploration, creativity, and innovation. To maintain the privilege of use for all members of the Muhlenberg community we ask that you respect the space, the items, and the other

community members in the space. All community members who use the space agree to comply with the requirements and restrictions set forth in this document.

Training & Orientation

In order to use the Makerspace all community members must attend an Orientation & Safety Training Session. Sign up details can be found on the Makerspace website. Once a community member receives training they will need to sign up for additional training sessions for specific equipment. **Members with just the basic Orientation & Safety Training can only use the Makerspace during open hours** (see specific times on website).

Guests

Guests are welcome to accompany Makerspace community members. **Guests must be a member of the broader Muhlenberg community** and are also required to sign-in and out of the Makerspace using the QR code system. Guests may NOT use any of the tools, equipment, or materials in the space.

Use of Equipment & Tools

All equipment and tools in the Makerspace are color coded. The color code indicates the level of training required prior to use. Below is a description of the requirements and coding for all Makerspace equipment and tools.

No color code

Items in the Makerspace that have no color coding can be used by anyone without any training or indication of prior knowledge. (during open hours)

Use Requirements-

- Safety Orientation must be completed
- No swipe access granted (unless for specific project)

Equipment without color coding:

- Non-power tools
- Items in bins in the middle of the Makerspace

- Paper slicer/ exacto knives
- Computers
- Ink Jet Printer
- Glue guns
- Laminating Machine
- Button Maker

Green

Items in the Makerspace marked as “green” can be used under supervision by anyone during open hours after completion of equipment specific training. Users with sufficient experience on a “green” piece of equipment can get swipe access for use outside open hours.

Use Requirements -

- Safety Orientation must be completed
- Swipe Access Granted
- Novice users must complete 4 hours of supervised training prior to unsupervised equipment access

Equipment coded “Green”:

- Sewing Machine
- Embroidery Machine
- Vinyl Cutter
- Large Format Printer
- BN-20 Printer/Cutter
- Heat Press
- Sublimation Printer

Yellow

Items in the Makerspace marked as “yellow” can be used under supervision by anyone during open hours after completion of equipment specific training. Users with sufficient experience on a “yellow” piece of equipment can get swipe access for use outside open hours.

Use Requirements -

- Safety Orientation must be completed
- Swipe Access Granted
- Novice users must complete 20 hours of supervised training prior to unsupervised equipment access

Equipment coded “Yellow”

- 3D Printer
- Laser Cutter (engraver)
- Power hand tools

Red

Items in the Makerspace marked “Red” can be used under direct supervision by anyone during open hours after completion of equipment specific training. Users with sufficient experience on a “red” piece of equipment can get swipe access for use outside open hours.

Use Requirements -

- Safety Orientation must be completed
- Swipe Access Granted
- Novice users must complete 40 hours of supervised training prior to equipment access

Equipment coded “Red”

- CNC Machine

Scheduling

The following pieces of equipment must be signed out using the Google Calendar prior to use (see website for detailed instructions):

- Vinyl Cutter
- Vinyl Printer & Cutter
- Sublimation Printer
- Heat Press
- Button Maker
- Large Format Printer
- CNC Machine
- 3D Printer
- Laser Engraver
- Sewing Machine
- Embroidery Machine

Other equipment/tools in the space can be used on a first-come/ first-served basis. Please be respectful of other users. Students using the space for coursework have priority on the use of all equipment/tools.

Sign-In and Sign-Out

All community members must sign-in and sign-out of the Makerspace and in and out of equipment, even during open hours. This process is managed using QR codes posted at the entrance to the Makerspace.

Individual pieces of equipment also have sign-in and sign-out forms that must be completed before and after use. QR codes can be found on equipment that requires sign-in and sign-out.

Failure to sign-in and sign-out of the space and on equipment may result in the loss of Makerspace privileges.

Material Usage & Project Storage

The Makerspace maintains stock materials that can be used for projects. We ask that community members not be wasteful with this material. Specific policies for use of materials apply to the materials and equipment listed below. If in doubt, contact the Makerspace via email (Makerspace@muhlenberg.edu). Our goal is to be an inclusive Makerspace and understand that the costs of materials may be prohibitive to some in our community. We will always attempt to provide materials free of charge for those using them for academic purposes.

Stand alone vinyl cutter (Graphtec CE 6000-60 Plus)

The Makerspace stocks small amounts of adhesive vinyl and iron-on vinyl for projects. Those who need to use larger quantities for their projects will need to purchase their own materials. Always check with the Makerspace staff for compatibility prior to purchasing materials. If you are creating something for an academic project please contact the Makerspace to see if we are able to provide you with the necessary materials.

Vinyl printer and cutter (Roland BN-20)

Because of the high cost and high demand for use of the Roland BN-20 vinyl printer and cutter, the following equipment specific usage policies apply. All use of the BN-20 must be checked with the Makerspace staff to ensure proper use of materials.

Individuals:

Individual community members may print a reasonable amount of stickers/ iron-ons a year. Reasonable use is determined by the Makerspace staff.

Printing for personal use should be limited. All personal use print jobs must be sent to the Makerspace staff via email in pdf format, ready for printing. The staff will contact you about when these can be printed. We group individual printing requests together to maximize materials and minimize waste.

Individuals using the BN-20 for coursework should contact the Makerspace before printing to inquire about material in stock and quantities that will be needed. Large jobs can be printed by individual students after approval.

Individuals may purchase their own vinyl materials for printing. These must be approved by the Makerspace staff and stored at home. Remember that the use of Makerspace equipment for commercial purposes is not permitted without prior approval.

Groups, organizations, departments, etc.:

Large quantities of vinyl for printing may be purchased by groups, organizations, and departments. This can be stored in the Makerspace for use. Materials must be approved by the Makerspace prior to purchasing to ensure compatibility.

Large Format Printer

We stock some materials for the Large Format Printer that community members may reasonably use. These materials vary greatly so it is best to check with the Makerspace to see what we have on hand at any given time.

Use of the large format printer requires that users note materials used during sign-out. Community members may bring in their own materials for printing with approval of Makerspace staff to ensure compatibility.

3-D Printer

The Makerspace stocks PLA and PETG filament in multiple colors for printing. Community members may request additional colors for stock. These requests will be granted as the budget allows.

Community members may use a reasonable amount of filament as determined by the Makerspace. Use of the 3-D Printer requires that community members submit filament usage during equipment checkout. Individuals with exceptionally high usage will be asked to purchase their own filament which must be stored at home. Make sure to get approval for all filament purchases to ensure compatibility.

Laser Engraver and CNC Machine

Stock materials for the Laser Engraver and CNC Machine include cardboard, plywood, and MDF. Material in the Makerspace may be used by any community member. We ask that you use these materials responsibly and respect the needs of other community members. For coursework the Makerspace may be able to purchase specific materials that are needed. Contact Makerspace staff for more detailed information. Individuals may bring in their own materials, but must check first with Makerspace staff to ensure compatibility.

General Rules for Makerspace and FabLab

Users of the Makerspace agree to:

- Be respectful to Makerspace staff, other users of the Makerspace, and towards the Makerspace and its equipment at all times.
- Notify Makerspace staff if there are any issues, concerns, or if you witness any violation of policies with regards to the Makerspace.
- Keep the Makerspace and everything within them clean and organized. If you take it out... put it back.
- Not use materials wastefully.
- Not use the Makerspace for commercial purposes without the prior approval of the Program Director. This includes fundraising for clubs, organizations, etc.
- Comply with intellectual property laws at all times, including, but not limited to, trademarks, logos, and copyrighted designs.
- As per Muhlenberg policy, weapons, weapon accessories, and other dangerous, prohibited, or inappropriate items are banned from being produced in the Makerspace. This includes fake/prop weapons unless prior approval is obtained from the Makerspace staff.
- Enter and exit the space from the main entrance. Do not admit individuals from the side and back doors.

Cleaning

- Makerspace community members are responsible for keeping the space clean and organized.
- Please return all equipment, materials, and supplies to their respective locations after use.
- Cleaning supplies are located in labeled cabinets in both the general area of the Makerspace and in the FabLab
- Use the ShopVac in the FabLab to clean after use of the CNC Machine

General Safety Requirements for the Makerspace and FabLab

- Food and drink are not allowed in the Makerspace with the exception of closed water bottles. Keep all water away from equipment. No water is allowed in the Fabrication Lab.
- Long hair must be tied back. Do not wear loose clothes. Dangling jewelry and loose accessories must be put away or secured.

- Wear appropriate eye protection and safety equipment when using Makerspace equipment.
- Closed toed shoes only in the Fabrication Lab.
- Use caution and act appropriately when dealing with equipment, tools, blades, potentially dangerous materials, flammable materials, etc.
- Do not use equipment or tools for anything other than for their intended purposes.
- Do not use any tools or equipment if you are using any medication or under the influence of drugs or alcohol.
- Follow all equipment specific safety instructions.

Personal Protective Equipment (PPE)

The Makerspace has the following PPE available for all students to use. Students should always use the necessary PPE for the equipment you are using.

- Safety goggles
- Noise reduction earmuffs
- Facemasks
- Work gloves

First Aid

A first aid kit is located in the main area of the Makerspace near the entrance to the Fab Lab

Emergency Electric Shut Off

There is an emergency button to shut off the electrical in the entire Makerspace. Use only in emergency situations as the power cannot be restored without contacting Campus Electrical.

The buttons can be found on the wall to the right of the entry to the FabLab and just to the left after entering the FabLab.

Equipment Specific Safety and Hazards

3D Printer

Fumes

- The Makerspace stocks PLA and PETG plastics. Both are known to be non-toxic and generally odorless. Do not use other plastics in the 3D Printer.

Fire & Burns

- The 3D Printer can get very hot. Use caution when touching your print after it is done as the end may remain hot for an extended period of time.
- Note the location of the CO2 fire extinguisher located underneath the laser engraver.

Laser Engraver

Fumes

- Fumes are a major safety concern for the laser engraver. Use accepted materials only. Ensure that the ventilation system is operating properly before use.

Fire

- Fire risk with the Laser Engraver is high. Never operate unattended. Ensure that you have the water spray and CO2 fire extinguisher nearby at all times.
- Keep the cover closed to reduce fire risk.

Special Safety Instructions for Laser Engraver:

- DO NOT operate the system unattended.
- DO NOT operate without the ventilation system operational.
- ALWAYS check that the air and water pumps are operating properly.
- ALWAYS ensure that you know the location of the water spray and CO2 extinguisher prior to use.
- DO NOT look directly at the laser beam.
- ALWAYS use the UV protecting safety goggles.

CNC Machine

Injury

- The CNC Machine presents a high risk of injury to the user. Keep clear of moving parts at all times. Protect eyes and ears from risk by wearing proper PPE.

Special Safety Instructions for the CNC Machine:

- ALWAYS make sure the CNC Machine is off when changing parts.
- ALWAYS use eye and ear protection.
- DO NOT wear gloves when operating the machine.
- ONLY operate the machine when in view and you are physically in touch with either the space bar on the computer or the emergency stop button.
- DO NOT operate the machine without the safety guards in place.
- ALWAYS tie back hair and keep loose clothing away from the machine.
- NEVER reach into the machine when it is running.
- NEVER leave the machine unattended when it is not fully powered down.