

MAKE
101

Welcome to the Makerspace!



MAKE 101

Make 101 Quiz

- Quiz questions are embedded within this training video
- You must score a 90% or higher to pass the quiz and have access to the Makerspace
- Questions will usually allow you to re-answer them after reviewing the material

Training Topics

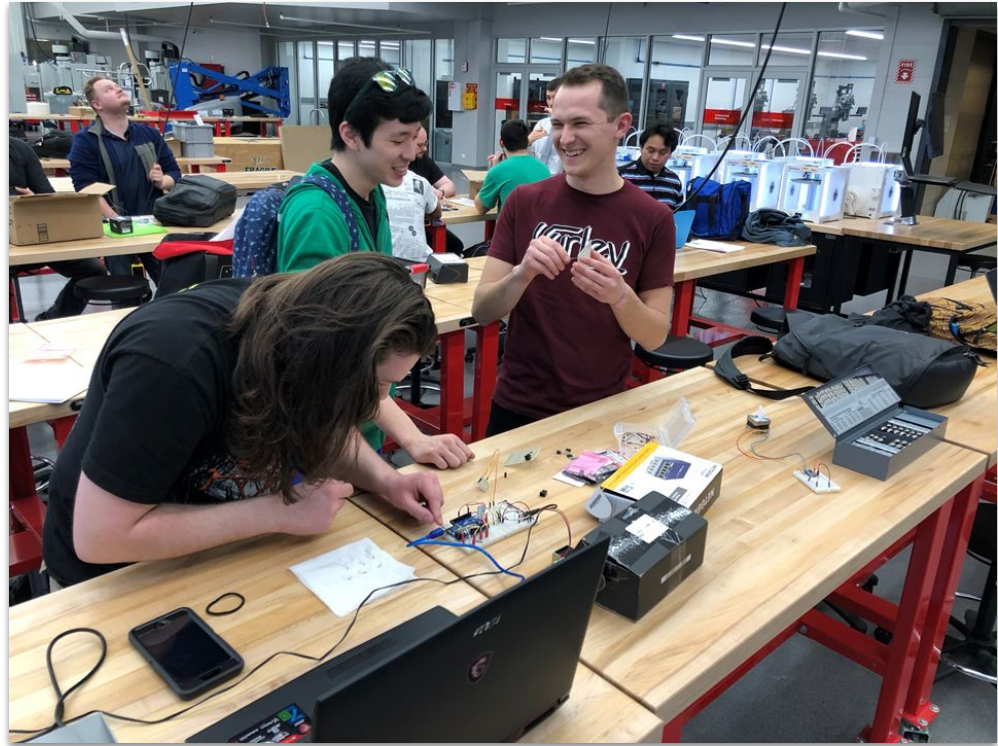
- What is a Makerspace and a Maker?
- What can the Makerspace and the staff do for you?
- What can you make in the Makerspace?
- Safety and how to behave in the makerspace
- What to do in an emergency
- Equipment usage, training, and information
- Accessing hand tools
- Storage lockers
- Purchasing materials and supplies

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What is a Makerspace?

A SPACE FOR LEARNING,
MAKING PROJECTS, AND
TEACHING OTHERS!

A
COMMUNITY
OF MAKERS!



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Who & What is a Maker?

Anyone who has an idea or goal and works to bring it to reality through a creative or physical medium is a **Maker!**



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Why use the Makerspace?

- Learn new skills that will help you become a better designer, engineer, employee, communicator, presenter, etc...
- Develop new hobbies, friends, and colleagues

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What does the makerspace **staff** do?

- The staff are here to help the users
- The staff can help users:
 - Learn to use equipment
 - Think through designs and options
 - Choose appropriate tools for a task
 - Point you in the right direction
- The staff's goal is to help upskill **you!**

We Encourage You To Work On:

- NJIT Course Work
- NJIT Team and Group Projects
- Research Projects
- Personal Projects, Hobbies, & Gifts
- Entrepreneurial Projects and Prototypes

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Please Do Not Make:

- 🚫 Weapons
- 🚫 Drug paraphernalia
- 🚫 Political items
- 🚫 Batches of commercial products

Some exceptions can be made for historical recreations, prototypes, or grassroots production. Ask the full time staff for approval on a case by case basis please.



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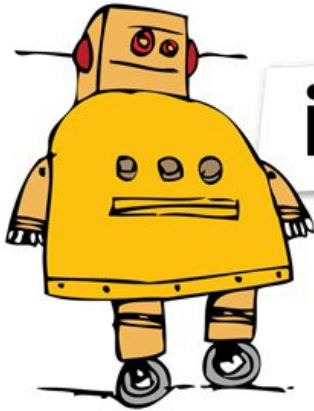
Where do I start?



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How Do I Get Started?



instructables



Make:

GRABCAD

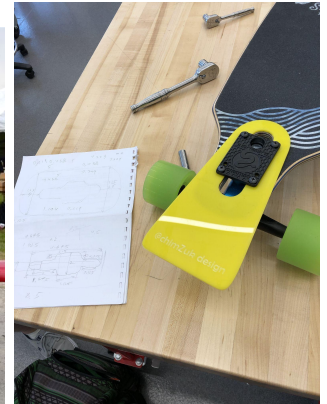
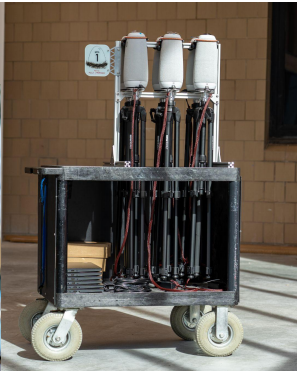
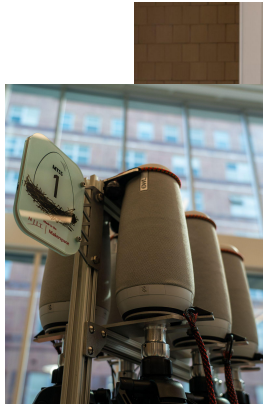
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...Even if it's not perfect, it's worth making

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Some Past Projects



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Behaviour, Guidelines, & Basic Safety

Behaviour, Attire, Cleanup, PPE

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General Guidelines

- Find operating hours and other information at:
 - <http://www.njitmakerspace.com>
- All njit **students, faculty, and staff** are eligible to use the makerspace
- Access to the space is granted once Make 101 (this course) and a safety waiver are completed
- Access may be revoked at any time at the discretion of makerspace personnel



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Attire

- No open toed footwear
- No loose fitting clothing or jewelry while operating machinery or power tools
- Long hair and beards must be secured prior to operating machinery or power tools
- Wear the proper PPE for the activity
 - Ex. safety glasses, gloves, hearing protection, apron, dust mask, etc...
 - Ask if you are unsure

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Basic Safety

- Ask for help if you are unsure about anything
- Avoid working alone and follow hazard class guidelines
- Keep your work area clean and organized
- Only use equipment you've been properly trained on
- Do not tamper with machine safety features or access control devices
- Clean up your work area when concluded
 - Ex. sweep, wipe, vacuum, scrub, dispose of, etc...
- Slow is smooth and Smooth is fast

Chemical and Hazard Safety

- All users of the makerspace have the right to know all physical and health hazards present in the space.
- All users of the makerspace have access to Standard Operating Procedures (SOP) and action plans pertaining to the makerspace.
- No eating or drinking in shop or equipment areas
 - You may eat in the social spaces near the front desk.

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Chemical and Hazard Safety

- Every chemical and material present in the space has a safety data sheet (SDS) that can be found in the SDS binders placed around the space.
 - If you bring a personal material into the space that the space does not already have in stock, you must tell the staff and they must add the SDS sheet to the binder.
- If expensive PPE you are using gets damaged, please give it to a staff member for disposal or repair. If low cost PPE is damaged, throw it out.
- Do not remove PPE from the makerspace
- Inform makerspace staff if you need to dispose of chemical/hazardous waste

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Injuries and First Aid

Minor Injuries, Major Injuries, Bleeding Control

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In Case of Small Injuries

- If you can handle the injury yourself
 - There are several first aid kits available
 - Alert staff when done and make sure the space is sanitized and cleaned
- If you are not comfortable handling the first-aid
 - Ask for help or Call 911
 - Make your injury known to others
 - Others and staff:
 - Assist if comfortable doing so
 - Use judgement - Call 911 if unsure at all

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In Case of Serious Injury

1. Serious Injuries and Emergencies - **Call 911**
 - Ex. Major bleeding, broken bones, dismemberment, head injuries, unconsciousness, etc...
 - If appropriate - consider helping with a bleeding control kit
2. Tell 911 operator **you are on the NJIT campus**
3. Alert makerspace staff

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Call 911



Bleeding Control Kits - **Serious Injury**

- In areas where equipment poses a risk of serious lacerations, amputation, or similar injuries, bleeding control kits are located in a “Stop the Bleed” station.
- Kits include:
 - Vented chest seals
 - 2 Pairs of gloves, large, latex-free
 - C-A-T tourniquet
 - Emergency bandage
 - Trauma shears (Scissors)
 - Rolls of primed, compressed gauze dressing
 - Instructions for use
- If comfortable, you can assist in an emergency or ask for help
 - **Call 911 immediately** and delegate someone to manage the 911 call and assist

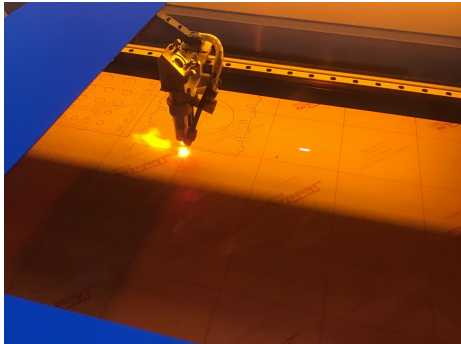
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Fire Response and Evacuation

Classification, Handling, Evacuation

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In Case of Fire

- Pull Fire Alarm - Call 911
 - Ex. The building, walls, full pieces of equipment, or major structures in the building are on fire, etc...
 - Exit the building carefully and remain in the vicinity a safe distance from the building in case you are needed.
- Tell 911 operator **you are on the NJIT campus**
- Alert Makerspace staff

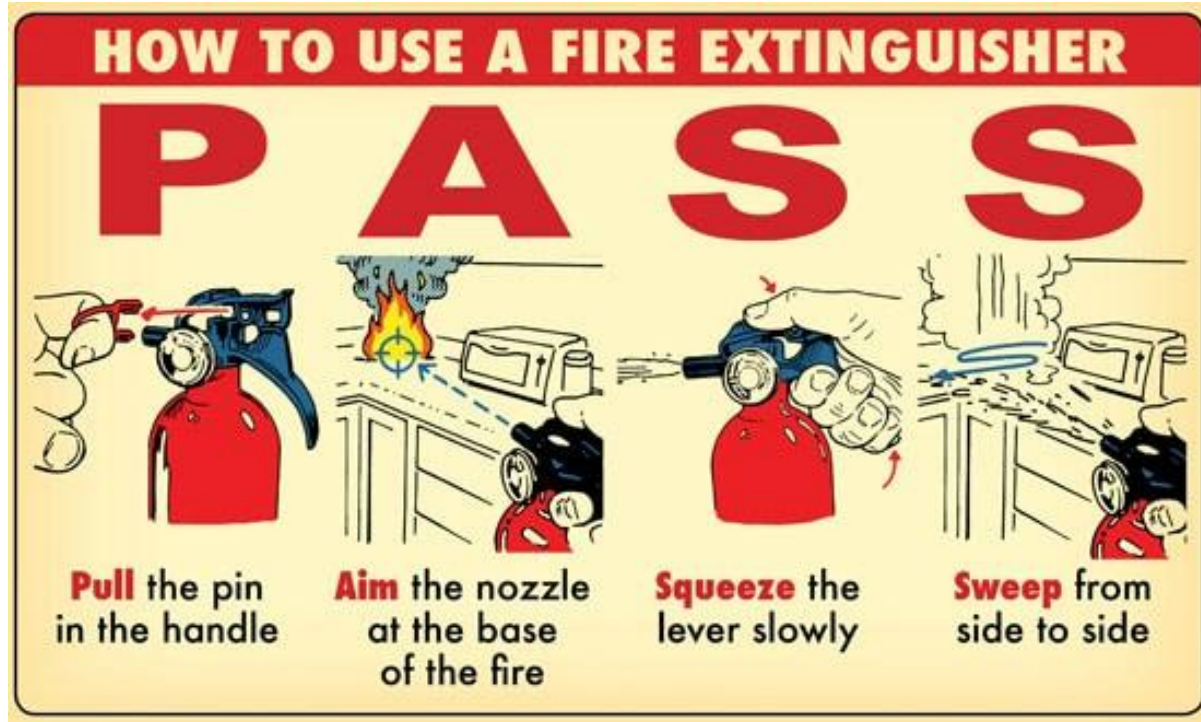
Small fires in laser cutters are normal and must be monitored. These can typically be extinguished with a small spray bottle if the fire grows. Do not walk away from operating laser cutters.

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Show Fire Extinguisher Video

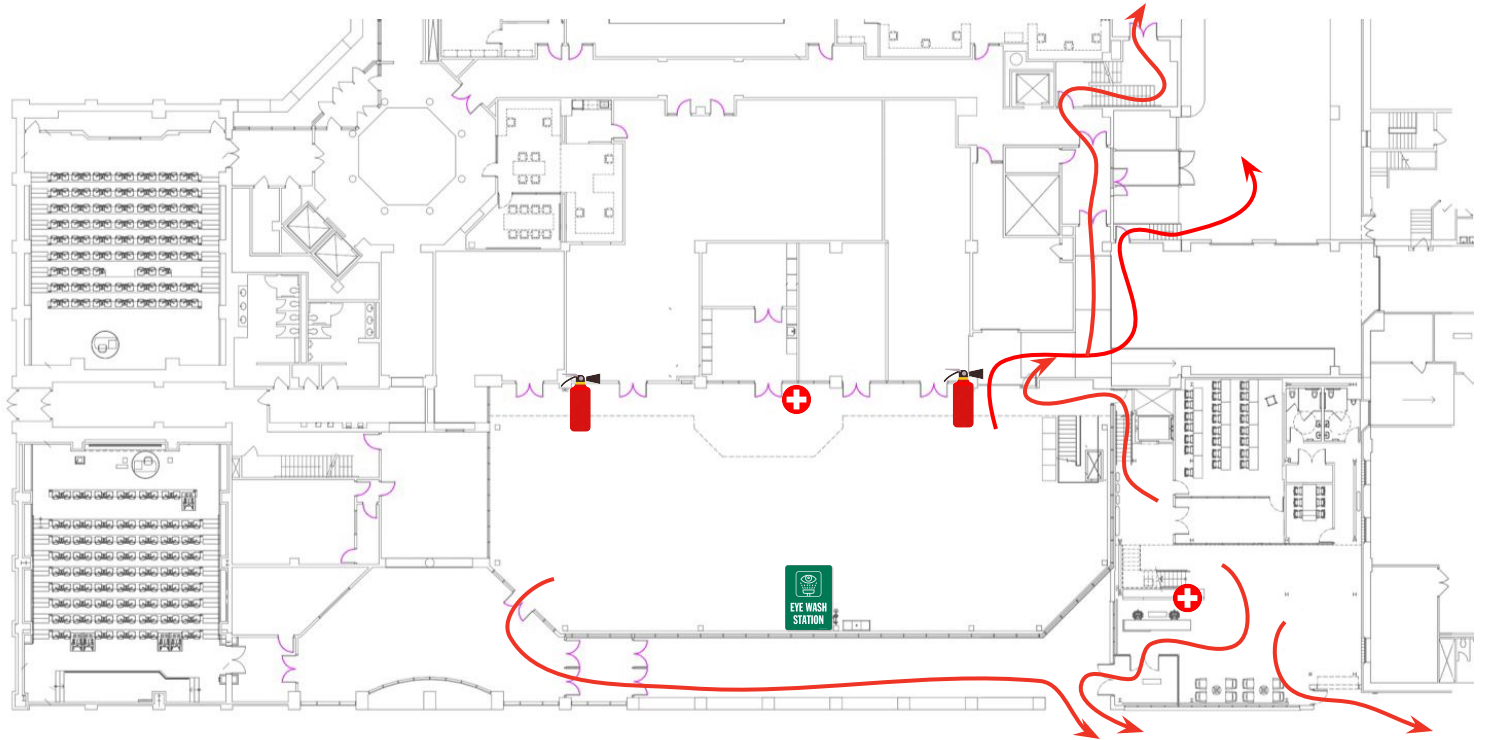
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FIRE SAFETY



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Ground Floor Exits



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Equipment Classification & Listing

Machine Status, Hazard Class, Access Class

Available Equipment

<https://www.njitmakerspace.com/equipment>

- 3D Printers
- CO₂ Laser
- Cutters/Engravers
- CNC Mills, Lathes, And Routers
- CNC Water Jet
- Wire EDM
- Vacuum Former
- Hand Tools
- Band Saw
- Polishing Units
- UV Printer
- Vinyl Printer / Cutter
- Metrology Equipment
- Soldering
- Test and Measurement
- Complete list available online.

Equipment Classifications



**2013-V3 Vertical
Contour Band Saw**

- Operational ← Machine Status
- Hazard Class 4 ← Hazard Class
- Assisted Use Only ← Access Class

Equipment as listed at
www.njitmakerspace.com

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**2013-V3 Vertical
Contour Band Saw**

Machine Status

Hazard Class

Access Class

Machine Status

- Operational
- Service Advisory
- Temporarily Unavailable

Machine status describes the **operational status** of the machinery

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**2013-V3 Vertical
Contour Band Saw**

- Machine Status
- Hazard Class
- Access Class

Access Class

- Standard Access
- Assisted Use
- Staff Use Only

Access class describes the **access rules** for each piece of equipment

For equipment listed as **“Standard Access”** the access protocols follow the equipment hazard class. (Discussed Next)

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**2013-V3 Vertical
Contour Band Saw**

- Machine Status
- Hazard Class
- Access Class

Hazard Class

- Class 1
- Class 2
- Class 3
- Class 4

Hazard classes describe the **potential for injury** that an operator is exposed to & the associated training and supervision requirements for operating the equipment.

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Hazard Class 1

- **Hazards**: minor injuries that can be resolved with first aid kit or ice pack.
- **Power**: less than 0.25 hp, 2-4 amps, 120 vac or up to 18v dc.
- **Access Requirements**: members must pass the proper equipment training.
- **Supervision Requirements**: a makerspace staff member must be present in the facility during open hours.

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Hazard Class 2



- **Hazards:** minor injuries (same as hazard class 1), but potentially requiring additional medical assistance
- **Power:** 0.25-0.5 hp, less than 10 amps, 120 vac, 18-24v dc
- **Access Requirements:** members must pass the proper equipment training.
- **Supervision Requirements:** the makerspace must be open and a makerspace staff member must be present in the facility.

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Hazard Class 3

- **Hazards**: potential for serious lacerations and minor amputations that require medical attention
- **Power**: greater than 0.5 hp, greater than 10-amp, 120 vac, greater than 24v dc
- **Access Requirements**: members must pass the proper equipment training. improper use may lead to loss of access to the space.
- **Supervision Requirements**: the makerspace must be open and a makerspace staff member must approve use of the equipment each time it is used. staff may deny access/place additional restrictions on the use of this equipment on a per-use/per-person basis.



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Hazard Class 4

- **Hazards**: same as class 3, but potential for serious amputations and life-threatening injuries
- **Power**: same as class 3, but self-standing and 3 phase power
- **Access Requirements**: members must pass the proper equipment training. improper use may lead to loss of access to the space.
- **Supervision Requirements**: the makerspace must be open and a dedicated staff member must supervise use of this equipment for the entirety of its operation. staff may deny access or place additional restrictions on use of this equipment on a per-use or per-person basis.



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Hand Tool Use and Access

Best Practices, Access, Maintenance

Basic Hand Tool Safety

- Use the right tool for the job (Ask if you are unsure)
- Examine the tool's condition before using it
 - Don't use or return damaged tools. Tell the staff!
- Use appropriate Personal Protective Equipment (PPE)
- If things feel wrong or dangerous, STOP, ask for help
- Return your tools to storage when finished

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Accessing Hand Tools

- Most hand tools are stored in automated tool control systems made by Snap On.
 - Put your tools back in your slots
 - The screen will show you where
 - Only one drawer can be open at a time
 - Lock the box when you are done with it
 - Return all tools before you leave



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Getting Tools



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Returning Tools



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Fastener, Hardware, and Supplies Storage

Storage, Use, Cost, Organization

Fastener and Supplies Storage

- Most supplies, fasteners, and consumable items in the Makerspace are stored in cabinets
- Items in unlocked cabinets are typically free for your use
 - Do not abuse this!
 - We are able to do this because users have been responsible.
 - Take only what you need
- If you need something specific that we do not have, ask the staff
- Keep things organized
- Put undamaged items back
 - (Only if you are certain you can put them back in the correct place)

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Fastener and Supplies Storage



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Accessing Storage Lockers

Policies and Workflows

Electronic Locker Usage

- A limited number of electronic storage lockers are available for rental (free)
- Maximum of one rented locker per user
- Several users can be assigned to a single locker for group projects (speak with the staff)
- Release your locker when you are done with it so others users can rent it... (we don't have a lot of lockers)
- Locker rentals are cleared at the start of each semester
- Rented lockers that are consistently empty or unaccessed may have the rental ended by the staff

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Rent a Locker



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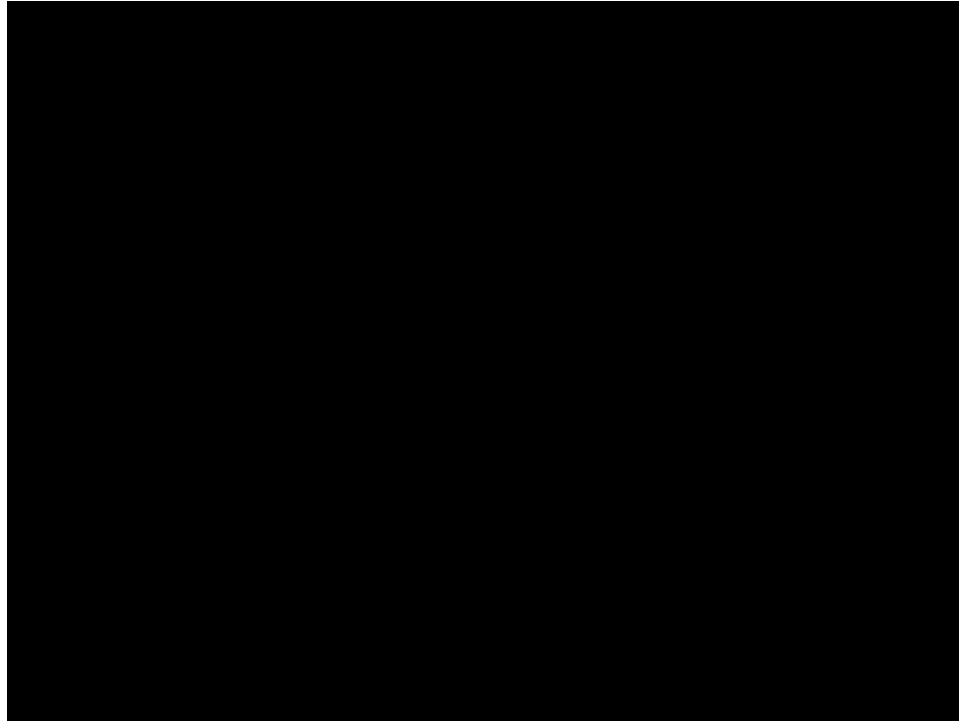
Access Your Rented Locker



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End Your Locker Rental



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General Tool Usage Guidelines

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Hand and Power Tool Guidelines



- Wear appropriate PPE and be aware of your surroundings
- Make sure nearby users are also protected
- Make sure nearby users are out of the danger zone
- Always secure parts with a clamp or vise
- Do not carry power tools by the cord
- Keep cords and cutting surfaces away from heat, oil, and sharp edges
- Disconnect tools from power when you walk away, change accessories, or clean the tool

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Hand and Power Tool Guidelines



- Friction + movement = heat
- Understand the movement of the tool before using
- Have enough space to complete the tool's motion
- Make sure nearby users are out of the danger zone
- For power tools, know if the tool could be in the “on” position when plugged in

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Getting More Training

Additional Trainings

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Available Training Sessions

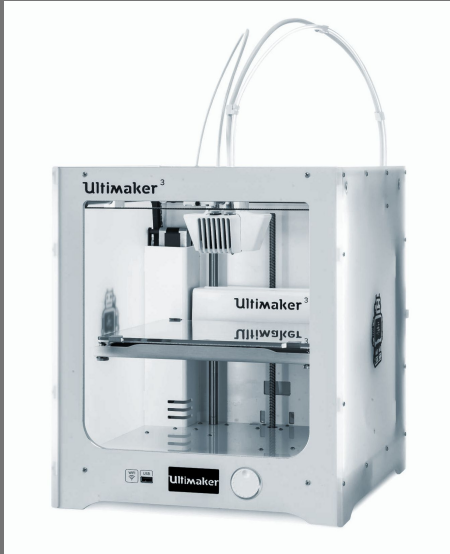


After this training, consider attending...

Make 102 - Intro to Laser Cutting

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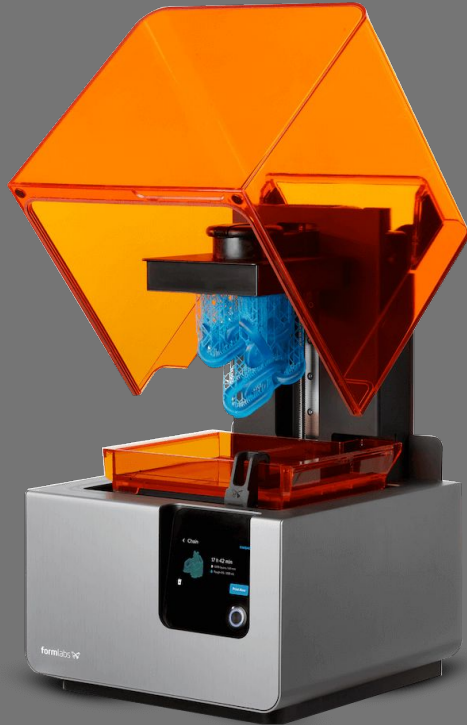
Available Training Sessions



After this training, consider attending...

Make 103 - Intro to 3D Printing

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Available Training Sessions

After this training, consider attending...

Make 203 - Intro to SLA Printing

After completing this quiz

- Complete the Makerspace Member Liability Release

Congratulations!

- You will now have access to the Makerspace during operating hours
 - You'll need your NJIT ID card to access the space
-

Congratulations!

- You can now use:
 - Hand tools and handheld power tools
 - Storage lockers
 - Soldering stations
 - Breakout rooms
 - Sign up for more trainings ASAP!
-