



Fay Jones School of Architecture + Design

FABRICATION LABORATORIES
HANDBOOK
2021 - 2022

TABLE OF CONTENTS

General Information	3
General Policy and Procedures	
Overview	
Wood Lab	
Model Lab	
3D Print Lab	
Laser Lab	
CNC Lab	
Lab Extensions	
Build Lab	
Access	6
All Users	
Students, Faculty	
Common Course Assignments	
Coordinated Course Projects	
Personal Projects	
Professional Projects	
Funded Research	
Guests	
Staff	
Schedule	
Fall and Spring	
Summer	
Services and Fees	9
Fabrication Services	
Research	
Exhibition	
Workshops	
Material Purchases	
Schedule of Fees	
Equipment	
Materials and Labor	
Safety and Use	11
Safety Training and Orientations	
General Lab Safety	
Wood Lab Training	
Level 1, Level 2, Level 3	
Laser Lab Training	
Level 1, Level 2, Level 3	
3D Print Lab Training	
Level 1	
CNC Lab Training	
RhinoCAM	
3 Axis Routers	

GENERAL INFORMATION

GENERAL POLICIES AND PROCEDURES

The safety of students, faculty, staff and visitors is a principal consideration in every activity.

The goal of the Fabrication Laboratories Handbook is to develop positive attitudes regarding safety among all members. It is essential that Deans, Directors, Department Heads, faculty and staff supervisors take an active part in initiating preventive measures to control hazards associated with activities under their direction. Safety is an integral part of all programs in which there is a risk of injury or health in the academic, research and service areas.

The rules and guidelines in this document apply to all Fabrication Laboratories areas including the outdoor work areas, wet room with paint booth, and impromptu installation work locations.

OVERVIEW

Located in the lower levels of Vol Walker Hall and an annex location in Fayetteville, the Fabrication Laboratories are an open environment for all Fay Jones School of Architecture and Design students & faculty. Material experimentation, prototyping, and representing scale models is an essential part of the design culture at the FJSOA+D. The Fabrication Labs support this hands-on learning and research through offering the use of a variety of equipment in four facilities; Wood Lab, 3D Print Lab, Laser and CNC Lab, and the Build Lab. The Fabrication Labs are under the direction of the FJSOA+D Deans Office and Angela Carpenter, Fabrication Laboratories Manager.

The Wood Lab facility is staffed by one full-time specialist, Justin Tucker, and several student assistants. Full-time specialist, Randal Dickinson staffs the 3D Print, Laser and CNC Labs along with several student assistants. The Build Lab facility on S Lt Col Leroy Pond Ave is overseen by Angela Carpenter along with Fabrication Assistant, Corey Booth, and student assistants. Together, the students and staff are present to give advice and assistance, monitor safety and protocol, and maintain all equipment.

These facilities are available to FJSOA+D students and faculty for design, coursework, and research projects and may be subject to approval.

Wood Lab

The Wood Lab supports construction projects ranging from light fixtures and furniture to three-dimensional models.

- (2) Table Saws (with Sawstop™ safety feature)
- Band Saws
- Drill Presses
- Mortiser
- Jointer
- Thickness Planer
- Lathe
- Compound Miter Saw
- Scroll saws
- Belt/Disk Sander
- Spindle Sander
- Drum Sander
- Palm Sanders

GENERAL INFORMATION

- Screw Guns/Drills
- Panel Saw
- Routers and Router Table
- Steam Bending Setup
- Festool Domino
- Pneumatic Nail Guns (various)
- Chainsaw
- Hand Tools (various manual, powered, and fine woodworking tools)

Model Lab

- Small woodworking/model making tools
- Model measuring and assembly aids
- Cutting and assembly tables
- Belt/disk Sander
- Palm Sander
- Drill Press
- Scroll Saw
- Micro-pin Pneumatic Nail Gun
- Small Metals Tools
- 3-n-1 Metal Brake/Roll/Shear
- Brazing and Soldering tools
- Portable 12V power packs for model electronics
- Foam manipulation and cutting tools
- Hot wire foam cutters
- Heat Gun and thermoplastic manipulation
- Formech 300XQ Vacuum Former
- Dremel TM/rotary tool
- Wet saw (glass/tile/stone)
- Etching
- Airbrush (coming soon)
- Casting area
- Sink area
- Ventilated Spray Booth
- Flammables Cabinets

3D Print Lab

The 3D Print Lab houses several rapid prototyping machines and currently is located within the Laser Lab.

- (3)- Afinibot A31: *Print dimensions 11.5"x 11.5"x 15.5"*
- (4)- Prusa MK3: *Print dimensions 9.5"x 8.25"x 8.25"*
- (1)- Stratasys Uprint SE Plus: *Print dimensions 8"x 6"x 6"*

GENERAL INFORMATION

Laser Lab

The Laser Lab operates several small and large format CO₂ laser cutters for cutting material for prototypes and scale models.

- (2) VLS 3.50 Universal Laser Cutters: *Work area dimensions 12"x 24"*
- (2) VLS 6.60 Universal Laser Cutters: *Work area dimensions 18"x 32"*

CNC Lab

The CNC Lab houses 2 different sizes of 3-axis CNC routers

- XYZ 1000 CNC Router: *Work area dimensions 60"x 98"*
- SHOPBOT Desktop D2418: *Work area dimensions 18"x 24"*

Lab Extensions

The Lab Extensions include equipment located within other labs. Check with lab staff for location and use.

- Roland CAMM-1 GS 24 Vinyl Cutter: schedule Consultation at designreserve.uark.edu
- Heat tools: Checkout in Laser Lab
- Dremel tools: Checkout in Laser Lab

Build Lab

The Build Lab is a 7,000 SF space located on S Lt Col Leroy Pond Ave in South Fayetteville. It hosts multiple types of spaces within the lab that focuses on larger scale fabrication and construction. The space allows for wood working, metal working, casting, vacuum forming, and plastic molding. Within the Build Lab there is an office for staff workers and a class room space for studios and seminar courses.

- Onsrud M-Series CNC Router: *Work area dimensions 60"x 144"*
- Shaper Origin Handheld CNC Router
- 3D Potter Super 7 Ceramic Printer w/ small kiln: *Print dimensions 17"x 14"x 19"*
- Saw Stop Table Saw (with Sawstop TM safety feature)
- 12" Compound Miter Saw
- Band Saw
- Drill Presses
- 50" Drum Sander
- Hand Routers
- (2) Miller Mig Welders
- Miller Tig Welder
- Handheld Plasma Cutter
- Pipe Bender
- 4' x 10' Bag and Vacu-Press Pump
- Various Hand and Power Tools

ACCESS

GUIDELINES FOR ALL USERS

Currently enrolled FJSOA+D students, full-time faculty and staff may access the Fabrication Labs during open hours or by appointment to work on research or course related projects (see sections about student, faculty, and staff access for further details). Work on any equipment can only be performed while under the supervision of lab staff or other approved individuals such as faculty performing research. Labs are only available for use during posted hours. Access will not be permitted outside of standard operating hours.

Some equipment requires prior approval or reservation. Visit designreserve.uark.edu for reserving laser cutters and various other equipment and service reservations. Access to equipment may be limited during peak times.

STUDENT ACCESS

FJSOA+D students have access to facilities for course work and faculty assigned research. Students must attend Safety Training sessions for each lab, pass the safety tests, and perform and pass skills tests on selected tools to become certified. The following outlines the type of work with which students can participate and what work may require prior approval.

Common Course Assignments

Assignments that are self-directed by the students with minimal input from the Fabrication Lab staff. With proper orientation and training, the applicable equipment includes laser cutters, 3D printers, and most wood working tools.

If work is outside of general lab use, students will need to coordinate with their faculty and submit a **Service Request Form** to the Fabrication Lab staff to determine feasibility, timeframe, and fees for the following types of work:

Coordinated Course Projects

Course projects could require use of departmental funds. Course projects could include workshops, seminar demonstrations, and group models that require Fabrication Lab staff to coordinate materials.

Personal Projects

Use of equipment or space by a student for work not assigned as common course assignments, funded by department, research funds, or faculty's professional practice. These projects will be subject to fees and are by approved appointment only. Fees will be the same as non FJSOA+D U of A users (see fee schedule).

Professional Projects

Use by a student that has been hired to represent a practice or firm using the labs.

Funded Research

Use of equipment or space by a student working for a project funded by department, grant, or other research funds.

FACULTY ACCESS

FJSOA+D faculty and their students have access to facilities for various types of work. Faculty, staff, and students must attend Safety Training sessions for each lab, pass the safety tests, and perform and pass

ACCESS

skills tests on selected tools to become certified. Any faculty member that does not access the lab for a period of one year must re-take the Safety Training.

The following outlines the type of work with which faculty can participate and what work may require prior approval:

Common Course Assignments

Assignments that are self-directed by the students with minimal input from the Fabrication Laboratories staff. With proper orientation and training, the applicable equipment includes laser cutters, 3D printers, and most wood working tools. It is the responsibility of the faculty to ensure that proper training has been given the class as a whole before requiring use of specific equipment for assignments. For example, CNC router usage for class projects should be coordinated with the staff with enough advance time to allow for proper training in CAM software for file preparation.

A **Service Request Form** should be submitted to the Fabrication Laboratories staff to determine feasibility, time-frame, and fees for the following types of work:

Coordinated Course Projects

Course projects could require use of departmental funds. Course projects could include workshops, seminar demonstrations, and group models that require Fabrication Lab staff to coordinate materials or processes.

Personal

Use of equipment or space for work not funded by department, research funds, or faculty's professional practice.

Professional

Use of equipment or space by faculty or hired employee representing his/her private practice or firm.

Funded Research

Use of equipment or space funded by department, grant, or other research funds.

Adjunct faculty may use the lab upon written request and written approval of the Associate Dean.

Adjunct faculty use is limited to research and development of course related material only.

GUESTS

Guests may be permitted into most labs with a student or faculty that has undergone safety training.

Guests must check in with the supervising attendant. Guests are not permitted to operate any equipment or tools. Guests must follow all safety guidelines and wear proper safety gear as required by each lab.

STAFF

FJSOA+D staff may have access to labs after proper Safety Training. May be subject to fees.

ACCESS

SCHEDULE

The following describes the operating hours for each lab during the academic year. Times are subject to change due to unforeseen circumstances. All labs are closed during University holidays and any other time the University is closed, i.e. inclement weather. Additional hours will be added during peak times of the semester. Users will be notified of any change via email and equipment reservation system will be updated.

Fall and Spring

Wood Lab

Monday – Thursday 9:00 am – 12:00 pm | 1:00 pm – 5:00 pm | 6:00 pm – 8:00 pm

Friday 9:00 am – 12:00 pm | 1:00 pm – 5:00 pm

Saturday – Sunday 2:00 pm – 6:00 pm

Laser and CNC Lab

Monday – Thursday 9:00 am – 12:00 pm | 1:00 pm – 8:00 pm

Friday 9:00 am – 12:00 pm | 1:00 pm – 5:00 pm

Saturday 1:00 pm – 5:00 pm

Sunday 1:00 pm – 8:00 pm

Build Lab

Coursework access is scheduled by semester with Angela Carpenter. Lab access for faculty research can be requested by completing the **Service Request Form**. All other access is by appointment only. Contact Angela Carpenter agcarpe@uark.edu.

Summer

Summer lab hours will be posted via email and on the online calendar prior to Summer Session one. Student Summer access is limited to only students enrolled during the Summer session.

SERVICES AND FEES

FABRICATION SERVICES

Faculty, staff, and students are not charged fees for accessing fabrication labs. However, fees apply to some services and equipment and users must provide their own materials.

Research

Faculty requiring fabrication services (i.e. for exhibits or workshops) must complete a **Service Request Form** and submit to receive a formal quote. Equipment fees and general labor charges will apply. See schedule of fees.

Exhibition

Fabrication services needed for faculty exhibitions should be requested through the **Service Request Form**. Quotes for services will be determined from the schedule of fees.

Workshops

Faculty requiring fabrication services for workshops must complete a **Service Request Form** and submit 2 weeks in advance of production.

Outside Work

Fabrication services for work that falls outside of Fay Jones School students or faculty is subject to "Non UofA" fees and must be approved by Fabrication Specialists and Manager. Fees are reflected in the Schedule of Fees. Must complete a **Service Request Form**.

MATERIAL PURCHASES

Some materials are available for purchase from staff. Please check with lab staff for material availability. Lab staff can assist with large material purchases for departmental or course needs. Processing fees will be charged at 10% and will be invoiced to the appropriate cost center. Processing fees for stocked materials are reflected in the prices posted in the labs. These materials are available only for purchase with Razorbucks.

SERVICES AND FEES

SCHEDULE OF FEES

Equipment

General FDM Printers		FJS	UA Alumni	Non UA	
PLA		\$0.06 g	\$0.07 g	\$0.09 g	
Printing Time		\$1.00 hr	\$1.25 hr	\$1.50 hr	
Stratasys Uprint		FJS	UA Alumni	Non UA	
ABS		\$2.82 in3	\$3.68 in3	\$4.90 in3	
Supports		\$5.48 in3	\$7.14 in3	\$9.52 in3	
Wash		\$7.15	\$9.31	\$12.42	
Modeling Bases		\$6.00	\$7.81	\$10.42	
Laser Cutters		FJS Student	FJS Faculty	UA Alumni	Non UA
Universal Lasers time		\$0.00 hr	\$15.00 hr	\$22.50 hr	\$25.00 hr
CNC Router		FJS Student	FJS Faculty	UA Alumni	Non UA
3 Axis Router time		\$5.00 hr	\$18.00 hr	\$25.00 hr	\$35.00 hr
RhinoCAM setup		*\$5.00 hr	\$25.00 hr	\$35.00 hr	\$45.00 hr
Wood Lab		FJS Student	FJS Faculty	UA Alumni	Non UA
Lab Fee		\$0.00 hr	\$0.00	\$20.00 hr	\$25.00 hr
Design Consultation fee		\$0.00 hr	inquire	\$20.00 hr	\$30.00 hr

* First RhinoCAM setup is free for students. Students will receive instruction on RhinoCAM and then each setup executed by staff after the initial training will be \$5.00/hr

Staff Labor

Labor & Design Services

RhinoCAM setup	see CNC Router Equipment Fees
Workshop Staffing	\$15.00 hr
Lab Specialist Staffing	\$30.00 hr

SAFETY AND USE

SAFETY TRAINING AND ORIENTATIONS

Current Safety Training and lab orientations are required for the Wood Lab, Laser Lab and CNC Labs. Training is recommended during the first semester of freshman year. Transfer students or students that have failed to attend training must attend sessions before access to lab may be permitted. Students and faculty will be notified of sessions via email. Students and Faculty may also request sessions on a needed basis but must be minimum of 5 students. See Training Schedule.

Additional training for advanced processes may be held by lab staff as time allows throughout the semester. Faculty may request specific training for students by making a formal request prior to each semester. Please request training early so students have the proper amount of time needed to complete the project assigned.

GENERAL LAB SAFETY

1. The University of Arkansas, Fay Jones School of Architecture and Design's fabrication labs are open to all associated students, faculty, and staff who have completed proper training.
2. Guests are allowed into the fabrication lab after checking with lab staff. Guests may not use any equipment. Guests must wear proper PPE (Personal Protective Equipment) while visiting the labs.
3. Wear any safety equipment (PPE) that is required by the lab that you are working in.
4. ANSI approved eye protection must be worn around ANY operating machinery or tool that presents a hazard of flying objects/debris, and will be worn at all times in any space that presents this hazard
5. Closed toed shoes must be worn in equipment spaces. Open toed shoes are not permitted
6. Loose hair/jewelry/clothing that may pose an entanglement hazard are not permitted in equipment spaces. Gloves are not permitted with any machinery that poses an entanglement hazard.
7. Know the hazards associated with your work. Fully educate yourself on the safety procedures and precautions needed to properly use any tool before working. Do not use any equipment or tools you have not received training for and been approved to operate.
8. Pay attention to all signs posted. These signs will tell you important information about lab safety, hours of operation, and announcements.
9. Be considerate of tool zones and proximity. Do not surprise someone while they are using equipment. Keep any distractions to other students or faculty to a minimum.
10. Do not distract another student or faculty member while they are working; likewise, do not allow your own attention to be diverted while operating a tool or machine. Distractions can lead to serious mistakes and injuries.
11. If you have a question or need to use a "special setup" ask a supervisor for further assistance.
12. A "special setup" is a machine operation that is outside of normal use and/or could cause the operator and machine harm if not done properly. This includes oddly sized and shaped materials, as well as the use of shop-built jigs.
13. Be aware of the location of safety equipment such as emergency stop buttons and fire extinguishers. This also includes the location(s) of first aid equipment.
14. Maintain good housekeeping standards:
 - a. Clean up all of your work before leaving a fabrication lab

SAFETY AND USE

- b. Keep your work area free of any hazards to other students or faculty. This includes slipping and tripping hazards (cords, oil, glue, etc.)
 - c. Utilize any dust collection or exhaust fans that are available.
 - d. Do not store projects or materials in lab spaces without approval from lab staff.
15. No horseplay or other inappropriate behavior will be tolerated in any fabrication lab.
 16. Do not remove any safety guards on equipment.
 17. If you come into a fabrication lab while a class is receiving training or instruction in it, please ask the supervisor for permission before beginning to work.
 18. Report all breakage or damage of tools or machinery to the instructor/supervisor immediately.
 19. Do not operate any machine in any lab if you are under the influence of any drug or alcohol. Do not operate any machine in any lab if you feel your judgement and decision-making skills are hindered by lack of sleep.
 20. Do not use gloves on any machinery or equipment that pertains to wood working of any kind. If you need gloves for light metal work please ask lab staff before doing so.
 21. Do not use any lab space or equipment if lab staff are not presently working. Any attempts to enter labs after hours without staff presence and permission will be subject to disciplinary action, loss of lab privileges, and possibly legal action.
 22. Students, faculty, and staff are responsible for any damage done to lab equipment caused by misuse. This includes the cost of repair, parts, and overall replacement of equipment/tools. This does not include normal wear and tear or incidental breakage. All equipment issues or failures must be reported to lab staff.

SAFETY AND USE

TRAINING SCHEDULE

MANDATORY

1ST YEAR - All Majors

Fabrication Labs	Orientation	1 hour	Auditorium capacity
Wood Lab	Level 1 - Part A	1.5 hour	12 person max
Wood Lab	Level 1 - Part B	1 hour	10 person max
Laser Lab	Level 1	45 mins	8 person max
CNC/3D Print	Intro	15 mins	

2ND YEAR - All Majors

Wood Lab	Level 2	1.5 hours	5 person min - 10 person max
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OPTIONAL

Wood Lab	Level 3	2 hours	
CNC Lab	Level 1	4 hours	
CNC Lab	Level 2	4 hours	
Vacuum Former	Level 1	30 mins	
3D Print Lab	Level 1	1 hour	
3D Scanner	Level 1	1 hour	

FABRICATION LAB ORIENTATION

Presentation in auditorium about all lab safety and online resources

WOOD LAB TRAINING

Level 1 Part A

In-lab training and safety quiz

- Table Saw
- Drill Press
- Basic Sanding Equipment (belt/disc sander, palm sander)
- Scroll Saw
- Drill
- Basic Hand Tools (hammer, tape measure, screwdriver)

Level 1 Part B

In-lab practicum practicing skills on select equipment from Part A and demonstrating basic safety knowledge

Level 2

- Band Saw
- Planer
- More Handheld Power Tools (Nail gun, circular saw, jig saw, multi-tool)
- Intro to Advanced Hand Tools (Japanese saw, chisels)
- Drum Sander
- Spindle Sander

Intermediate Table Saw Cuts (including use of some jigs)
Miter Saw

Level 3 (Training as needed/requested after completion of Levels 1 and 2 and at the discretion of Lab manager)

Advanced Table Saw Cuts
Routing Table
Advanced Handheld Power Tools (router, belt sander)
Jointer
Lathe
Router Table
Fine woodworking handtools

LASER LAB TRAINING

Level 1

Illustrator file preparation
Vector cutting
Raster etching
Material post-processing

Level 2

Advanced image raster etching
Rotary attachment

3D PRINT LAB TRAINING

Level 1

Solid file preparation
Filling out project sheet and information

CNC LAB TRAINING

Level 1 - RhinoCAM for 3 Axis

2D toolpaths
3D toolpaths
File submission

Level 1 - CNC Operation

General students will not have permission to operate the 3-Axis routers. Training is specific to student lab staff and upper-level students with request from faculty advisor.