

POLICIES FOR UNDERGRADUATE PROJECTS

The Sibley School of Mechanical and Aerospace Engineering

I. Below is a collective list of the educational goals for Undergraduate Projects. Not all will be addressed in all projects.

System Design

- Teamwork
- Enjoyment/Utility
- Meeting Objectives
- Practical Skills Development
- Systems Engineering
- Manufacturing
- Advanced Analysis
- Project Management
- Leadership
- Economics/Cost
- Communications - Oral, Written, Salesmanship
- Organization
- Motivation for other engineering courses
- Peer Evaluation experience

II. Safety and Professional Behavior Guidelines

All project students must agree to follow this non-inclusive list of safety and professional behavior guidelines. Each will sign a copy that will be kept by the department office.

1. **The first responsibility is personal safety.**
2. **The second responsibility is the safety of others** (includes members of your project, members of other projects, and people associated with groups outside of the department).
3. **The third responsibility is the protection of University property**, including material relating to your project, other projects, the School, and other University units.
4. **In all cases, the conservatively safe course shall be taken.** For example, in case of complaints, you should cease operations until such time as a TA or faculty member has reviewed the situation and determined there is no hazard or safety problems. **Initially assume all safety and health concerns are valid.** The pressure of a deadline is not sufficient grounds for continuing in the face of concerns expressed by others.
5. Failure to take action to protect the safety of others and University property will be treated the same as actively taking action which threatens others or directly damages University property.

6. By choosing to participate in a team based project, students agree to be individually responsible for the actions of all members of the team. Should there be a problem students are to report it to the team faculty advisor as soon as possible.

7. Unreported knowledge of deviation from professional behavior and these guidelines is to be considered the same as participation in deviation from professional behavior and these guidelines.

8. Deviation from professional behavior and these guidelines is considered an infraction of the academic code of conduct and carries all the penalties of violation of academic code of integrity.

9. Specific standards for safe professional behavior include (but are not limited to)

i. Never work alone with any powered mechanical or similar equipment in the laboratories, project rooms, etc. This is not allowable even for short periods while your safety companion runs an errand.

ii. Working when you have not had enough sleep is not acceptable because of safety concerns. If you find that your entire course load requires sometimes working with not enough sleep, budget your time so that other, non-safety-related course material is addressed when you have not had enough sleep

iii. Sleeping on University premises is not permitted. This is a violation of the University policies established by Risk Management and is considered misuse of University resources.

iv. Possession and/or use of alcohol or substances that may cause impairment of perception, ability to operate machinery, etc. by any student is prohibited in University facilities. This even applies to students over 21 years old.

v. Presence in laboratories while under the influence of alcohol or other substances that may cause impairment of perception, ability to operate machinery, etc. is not permitted. It is unacceptable to consume alcohol off campus and then begin project work for the evening.

By signing the Machine Shop Contract in MAE 225 (at the end of this document), I acknowledge I have read and understand these policies. I understand that violations of this policy are considered violations of the Academic Integrity Code.

EMERSON MANUFACTURING TEACHING LABORATORY
Product Realization Area
Operating Rules and Procedures

These rules apply to anyone wishing to use the machine tools located in the Emerson Lab. They are general in nature and do not necessarily cover the safe operating procedure for each piece of equipment. Please refer to the Emerson Lab Training Policy concerning this area for additional information.

1. Safety glasses are to be worn **at all times** when performing **any** work in the lab, during instruction and during cleanup. Approved safety glasses must have safety rated frames and side shields as well as safety lenses. Users are to provide their own glasses.
2. All lab users must check in with the area supervisor **before** starting **any** work. All lab users must also sign in on **each** piece of equipment **before** doing any work on it. All required information must be entered legibly. Users must obtain a replacement for full sign in sheets.
3. Sandals or shoes with open toes and/or tops are not to be worn in the lab.
4. No gloves may be worn while operating equipment, except in the welding area or by special arrangement.
5. Users are required to clean up **all** chips, dirt, oil, etc. produced by the use of **any** piece of equipment. Compressed air is not to be used to clean machines.
6. **All** tools and equipment are to be returned to their proper location before the user leaves the lab. This includes brooms and dustpans.
7. No vises, fixtures, etc. are to be altered, disassembled, or changed from their standard set up without prior approval. If approval is granted, it is the user's responsibility to return all such altered equipment to its original condition before leaving the lab.
8. No equipment is to be left running while physically or mentally unattended.
9. Hours of operation are 8:00 AM to 4:30 PM, Monday through Friday, or as posted. Changes in lab operating hours will be posted 24 hours in advance when ever possible. Cleanup starts **20 minutes** before the posted closing time and is announced by a bell. At that time **all work is to stop**.
10. Work may be left set up in a machine for a maximum of **two** hours without prior approval. After that time, work may be removed to make the equipment available for other users.
11. Any personal injuries are to be reported immediately. Those giving first aid to others should use the gloves provided to protect themselves from blood borne disease. **All** injuries must be reported **immediately**. Depleted first aid supplies should also be reported immediately.
12. Any damage to the machines, tools, fixtures, etc. must be reported immediately.
13. No food or drink is permitted in the lab. No audio equipment, either with or without headsets may be operated in the lab.
14. Users must receive proper instruction on each piece of equipment prior to using it for the first time. Typically, this will occur in during a regularly scheduled training program.

15. Users must not take any actions that may injure or distract other users and/or result in damage to equipment or the work of others.
16. Unauthorized removal of any tools or materials from the lab is theft.
17. Machining of materials other than aluminum and steel must have previous approval. **No woodworking is permitted in this facility.**

Violations:

First offense: **White card** - verbal warning.

Second offense or any serious infraction: **Yellow Card** - user is unable to use the facility for one full day of scheduled lab time immediately following the offense. (A yellow card may be issued for a first offense if the infraction is serious in nature.)

Third offense or any offense creating a dangerous situation: **Red Card** - user is unable to use the facility for a minimum of one full week of scheduled lab time immediately following the offense. (A red card may be issued for any offense that creates a dangerous situation.)

MACHINE USAGE RULES

1. NOTE:

Make sure you check the lab entrance for new rules each time you come into the shop. rules will be updated on a daily basis as need arises.

2. GENERAL RULES:

- a. When working at any lathe or mill, sign in on the clipboard hung at that machine before starting any work. this instruction also includes drill presses, saws and grinders.
- b. Put any tools used back where you found them immediately after use. Never leave tools laying out on the table tops.
- c. You must use the portable air filter if you are generating lots of smoke in your cutting process.
- d. Report any tool or machine that you damaged to a shop supervisor immediately.

3. CLEANING:

- a. Clean off ALL (note this says ALL, not some) chips and excess oil from any machine and the surrounding floor when you finish machining. This includes drill presses, sanders, band saws, table tops, vises, etc.
- b. Use rags and the small brushes stored in the "brushes" drawer of the tool box to facilitate the cleaning process.
- c. When finished cleaning, look back over the machine or area to see if there are any chips or oil left. **If there is any mess left on the machine, and your name is the last name on the clipboard, your name will be written on the yellow card board without consulting you. You will then be called back to clean the machine properly.** If you are not sure how clean is clean enough, ask a shop supervisor. Students will provide both phone numbers & e-mail listings.

4. SANDER RULES:

- a. Do not hold your work piece with pliers, gloves, or rags. Hold piece with your hand and use the bucket of water near the sander to cool the piece as it gets hot.
- b. Be careful when sanding sharp corners or thin stock. These materials may tear the sanding belt and/or get caught and result in injury.

- c. Be sure to clean up the sander table top, base, and surrounding floor immediately when finished with the machine.

5. BAND SAW RULES

- a. When using the vertical band saw, **do not use the wrong band saw blade or wrong speed for the material you are cutting.** See information sheets posted with each blade behind the band saw for proper blade choice and blade speed. Ask for help if you do not know how to change the blade.
- b. Do not place hands close the blade when cutting material. Always use a block of wood or scrap metal to push the work piece into the blade.
- c. Be sure to clean up the saw table top, base, and surrounding floor immediately when finished with the machine.

6. DRILL PRESS

- a. Be careful not to drill into the vises or drill press table.
- b. Do not use Silver and Deming drills in the drill press. Use the tapered drills for holes of diameter larger than 1/2" inch.
- c. Use vises clamped to the drill press table if there is the chance that your work piece might spin when drilling.
- d. Only change drill press speed while the drill press is running.
- e. Do not run the drill speed too fast. **If you hear any squeaking, the drill speed is too fast or you are not plunging fast enough.** Ask for help if you are not sure what speed to use.
- f. Be sure to clean up the drill press table top, base, and surrounding floor immediately when finished with the machine.

7. GRINDING:

- a. **Do not grind any red painted tool bits, PERIOD.** If you feel that a red painted tool needs regrinding, ask a lab supervisor to do it for you. If you need a specially ground tool, buy your own at TSF.
- b. The grinders are meant only for tool grinding. Do not grind anything else on the grinders.

- c. Do not grind carbide bits on the aluminum oxide grinder wheels. Ask if you do not understand this rule.

8. LATHE RULES:

- a. Sign in (name, tel.#, date) on the clipboard at the machine.
- b. **Never have the chuck key in chuck if your hand is not on the key.**
- c. When changing speed settings, make sure you turn the lathe spindle by hand to make sure the gears mesh before turning on the machine. Ask for assistance if you do not understand this rule.
- d. Do not put your hand on the chuck to slow it down.
- e. **If you hear any squeaking or if the tool is deflecting largely while cutting, something is wrong.** Ask for help if you are not sure what is wrong.
- f. Clean up:
 - The following pertains to the chuck, tool rack, tool holder, tools, tool post, all lathe surfaces, and the floor.
 - ~ **remove *all* chips**
 - ~ **wipe up *all* excess cutting fluid**
 - Use small brushes found in the tool box and rags to facilitate the cleaning process.
 - Organize the tool rack **exactly** the way it was when you got on the machine. If you cannot remember how the rack as set up, look at the picture on the back of tool holder.

9. MILL RULES:

- a. Make sure all table and spindle locks are released if you feel any resistance to table or spindle motion.
- b. Do not over tighten the draw bar. Tightening the draw bar 15 degrees after you feel resistance is enough.
- c. Be careful not to drill into the mill vise, table, or parallel bars. Make sure there is clearance for the drill or mill bit to pass through your work piece without running into these surfaces.
- d. If using a mill without dial speed changing you have to change the belts by hand. The belt must remain horizontal - do not cross the belt. Ask for assistance if you do not understand this rule.

- e. If using a mill with dial speed changing, change speeds only while the machine is running. Note that when going between low/high gear the machine must be stopped.
- f. When shifting from low to high speed settings, make sure you turn the spindle by hand to make sure the gears mesh before turning on the machine. Ask for assistance if you do not understand this rule.
- g. **If you hear any squeaking or if the tool/part is deflecting largely while cutting, something is wrong. Ask for help if you are not sure what is wrong.**
- h. Clean up:
 - The following pertains to the mill table, table slots, mill ways, vises, mill base, and the floor.
 - ~ **remove *all* chips**
 - ~ **wipe up *all* excess cutting fluid**
 - Use small brushes found in the tool box and rags to facilitate the cleaning process.

MACHINE SHOP CONTRACT

I AGREE TO FOLLOW ALL SHOP AND SAFETY RULES AS STATED IN THE “EMERSON OPERATING RULES AND PROCEDURES” AND POSTED IN THE EMERSON SHOP AND DESIGN STUDIO. I AM AWARE THAT FAILURE TO OBEY THESE RULES WILL LEAD TO SUSPENSION FROM THE SHOP OR STUDIO AND MAY ADVERSELY AFFECT MY FINAL GRADE IN MAE 225. I FURTHER CERTIFY THAT I HAVE READ THE RULES GOVERNING SAFETY IN PROJECTS CONDUCTED IN THE SIBLEY SCHOOL “POLICIES FOR UNDERGRADUATE PROJECTS”, AND THAT I WILL ABIDE BY THOSE RULES.

Name

Signature

Date

Telephone

email

Lab section: M-aft M-eve Tue Wed Thu Fri