



**Sul Ross Industrial Technology**  
**Metalsmithing**  
21932-IT2316-001  
Spring 2019



THE UNIVERSITY  
OF THE BIG BEND

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**Instructor**

Larry Crawford  
Adjunct Professor  
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Office Hours: Tuesday, 5:00 to 6:00 P.M.  
Or by appointment

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**Time and Location**

T - TH 6:00 pm – 9:00pm – Lab Room 108, Industrial Tech Building

**Course Description**

Basic skill development in hand-forging skill, forge welding, scroll-forming, shaping joinery utilizing hammers, anvils and coal and gas forges. Emphasis on techniques and processes to demonstrate versatility and skill.

**Course Objectives**

1. To become familiar with forging hot iron using basic blacksmithing techniques with forge, hammer and anvil.
2. To demonstrate safety throughout all procedures in metal-working lab and the development of thoughtful work habits.
3. To identify and discuss design benefits of traditional blacksmithing techniques.

**End of Course Outcomes**

Students will demonstrate facility with forging hot iron, acquire appropriate metal-working safety procedures and understand traditional blacksmithing design techniques.

**Incomplete Grades**

Strive to complete work on time. A grade of incomplete is given only if you can substantiate why work was not completed due to insurmountable schedule conflicts that occurred after final date of withdrawing from course. The incomplete grade must be removed the deadline during the following semester or it will convert to a final grade of F. Consult calendar in current college catalogue for removal date during the following semester period. It is not your instructor's responsibility to remind you of this date.

**Grading Policy**

Your final grade will be based on progress throughout semester in the areas of applied skills (projects) and theory (examinations), waited as follows:

- |                 |     |
|-----------------|-----|
| 1. Projects     | 60% |
| 2. Examinations | 40% |

Your applied skills will develop as you progress through the Project List in this syllabus. The project list

contains important accumulative projects, so your final applied skills grade will be based on the percentage of projects you complete.

Design theory is also an important part of this course. While applied skills are invaluable for learning what to do, a metalsmith must know the theory behinds what happens. Your instructor will provide appropriate written exams to measure your understanding of metalsmithing theory.

When calculating the above percentages, the following grading system is used at Sul Ross University:

A – Excellent	90% - 100%	grade point 4
B – Good	80% to 89%	grade point 3
C – Average	70% - 70%	grade point 2
D – Minimum Pass	60% to 69%	grade point 1
F – Fail	59% to 00%	grade point 0

### **Safety Regulations**

Metal work is inherently dangerous and can become very dangerous, even fatal, if you are careless and neglect safety precautions. Most accidents occur when people get in a hurry, so learn to pace yourself and move cautiously and deliberately. The university endeavors to provide you with proper training and a safe environment, but you must also do your part by abiding by the following rules. *If you persistently violate these rules, you will be considered a safety risk and will be withdrawn from class:*

1. Be aware of the following: Equipment on/off switches, gas valves, fire extinguishers, lab exits, first aid kit. Campus police emergency number is 432-837-8011, 911 off campus. Follow all posted safety procedures.
2. Welding and metal work is inherently dangerous. Be alert; do not work if you are drowsy, intoxicated, hung-over or taking medication that affects judgment
3. Beware of the signs of dehydration, especially during warm months: disorientation, confusion, light-headedness, flushed appearance, headache, and exhaustion. Do not wait until these signs appear – drink fluids and take frequent breaks.
4. Be mindful of proper ventilation in your work area.
5. Wear eye protection at all times. Wear hearing protection, especially when using or near power tools.
6. Dress properly when working with or welding hot metal. Shorts or sandals are not permitted. Wear long sleeves or leathers, work boots, and gloves while welding. (see Supply List)
7. Be sure that you have the proper shade of filter lens in your welding glasses, helmet or face shield.
8. Do not wear loose clothing or dangling jewelry in the lab. Tie up long hair.
9. If you burn yourself, cool the burn with cool water. Know where the first aid kit is and what its contents are. Alert your instructor to evaluate any injury!
10. Report all accidents to your instructor immediately. If you suspect an unsafe condition, bring it to your instructor's attention IMMEDIATELY!
11. Respect your fellow student; avoid all operations such as haphazardly grinding, heating or hammering that creates an injurious environment. Respect all of the equipment: it is durable but not indestructible: avoid damaging the school equipment.
12. Do not use any tool or equipment on which you have not been properly trained.
13. Never allow tools to become overheated. If tools accidentally are heated, allow them to cool in air; never quench them.
14. Notify your instructor if hammers or struck tools have mushroomed and cracked, or if the head is loose or handle is damaged.
15. Preserve cutting edges on hand tools and anvil tools.
16. Be extremely careful with the torch, it will burn the skin instantly.
17. Do not weld or grind near oxy-fuel tanks, manifold connections, or other potential sources for gas leaks.
18. Do not handle oxy-fuel equipment with oil or grease on your hands or clothing.

19. Never use acetylene gas at working pressures above 15 psi.
20. Never move or unchain a cylinder without first removing the regulator and putting the appropriate cap over the valve.
21. Always clamp pieces at the drill press, unless otherwise instructed.
22. When using portable grinders, be sure that you direct sparks away from others. Only grind in areas designated by your instructor, and always be sure to sweep up your grinder dust. It poses a serious slip hazard.
23. When using stationary pedestal grinders, be sure that the tool rest is adjusted as close to the grinding wheel as possible without touching it. Always wear safety glasses and a face shield when grinding and wire brushing. Do not wear gloves when working at pedestal/ bench grinders.
24. Never carry hot work, long pieces or sharp ends projecting in front of you, possibly injuring someone. Always carry work at your side. Avoid placement of your work that could present a puncture or trip hazard.
25. To avoid burns to others, do not discard hot metal without first quenching it. Write "HOT" on objects too large to bring to quench tank. In addition, if there is any work on the ground assume that it hot. Tap it to test before grasping.
26. Allow absolute unobstructed room around a striker swinging a sledgehammer; never walk behind a person striking with a sledgehammer.
27. Do not remove someone else's tools from his or her workstation.
28. Do not quench any steels unless you know what you are working with or intentionally need to heat/treat.
29. Not all steel is the same unless it comes off the rack and do not assume it is weldable, forgeable or can be sheered in hydraulic sheers or saws.
30. Do not attach your ground lead to water pipes or electrical conduit.
31. When welding in open lab, shield your arc with welding curtains. Always consider the line of sight between your arc and the eyes of bystanders.

### **Laboratory Policy**

1. You must attend class at the time for which you are enrolled
2. When you complete a project, request approval from your professor. You will not be credited for unapproved projects.
3. Cleanup time is ten minutes before the end of class. Sweep your immediate work area and return equipment to tool room. Surrounding work areas must be cleaned with collaborative effort of all students
4. Do not waste metal. Do not remove metal from the shop.
5. If there is an equipment malfunction, inform instructor immediately for repair and return to service.
6. Smoking/vaping is not permitted

# Course Outline

## 16 Week Semester

Week 1 Introduction, syllabus, schedule, safety policies, lab familiarity, torch introduction, blacksmithing vocabulary, introduction to ergonomic system of forging

Week 2 Safety exam, design, present day relevance of craft, ergonomic, hammer control drawing steel, cutting with hardy, flat tapers, pointed tapers, round tapers

Week 3 Estimation of stock, bending, shouldering, spreading, fullering, punching, veining

Week 4 Forging to dimension, forging to finish, pre-figuring

Week 5 Upsetting, fly press work, grooving

Week 6 Grinding, sharpening, splitting, slitting and drifting

Week 7 Fire welding

Week 8 Fixtures, forms and jigs

Week 9 Line and shape adjustments

Week 10 Drills and drilling

Week 11 Hacksaws, files, hot rasping

Week 12 Fitting

Week 13 Tenons and wraps

Week 14 Riveting

Week 15 Swaging and collaring

Week 16 Finishes

**Safety Agreement  
Sul Ross University  
Metalsmithing 21932 -IT-2316-001  
Industrial Technology Dept**

By signing my name below, I am attesting that my instructor has made me aware that welding is dangerous if I ignore applicable safety regulations and laboratory policies. I understand that I will acquire the knowledge of these regulations and policies by (1) reading the course syllabus attached to this Safety Agreement, (2) reading the chapters on safety in my textbook (if applicable), (3) observing all safety and warning signs posted in the laboratories and classroom, and (4) attending in-class safety demonstrations on equipment and shop practices given by my instructor throughout the course. I understand that it is my responsibility to attend class regularly, be alert to my surroundings and remain constantly vigilant to the risks of working in an industrial environment. I understand that "safe practice" is the discretionary interpretation of my instructor, and that if I fail to adhere to these requirements – *including the attendance policy outlined in the syllabus, I will be considered a safety risk to myself and others and I may be withdrawn or possibly fail the course.*

Student (print name)\_\_\_\_\_ Student signature\_\_\_\_\_

Student phone\_\_\_\_\_ Student Email\_\_\_\_\_

Instructor \_\_\_\_\_ Year\_\_\_\_\_

Emergency  
Contract Person\_\_\_\_\_ Emergency Phone\_\_\_\_\_

