EASTERN ARIZONA COLLEGE
Fab Lab Workshop I
Course Design
2017-2018

Course Information

Division	Industrial Technology Education
Course Number	AMT 111
Title	Fab Lab Workshop I
Credits	1-3
Developed by	Brian Coppola
Lecture/Lab Ratio	1 Credit = 0 Lecture/3 Lab 2 Credits = 0 Lecture/6 Lab 3 Credits = 0 Lecture/9 Lab

Transfer Status

ASU	NAU	UA
Non Transferable	CTE Departmental Elective	Non Transferable

Activity Course	No
CIP Code	48.0503
Assessment Mode	Portfolio
Semester Taught	Fall and Spring
GE Category	None
Separate Lab	No
Awareness Course	No
Intensive Writing Course	No

Prerequisites

AMT 110 or instructor approval

Educational Value

Individuals will have an opportunity to cultivate concepts and use ideas to develop and produce parts and projects using Fab Lab equipment.

Description

This workshop allows participants an opportunity to turn an idea into a small usable product using Fab Lab machines and equipment. Students will investigate ideas to develop and bring ideas to reality. Students will be supervised and assisted to ensure proper safety procedures are followed, machine setup is correct and guided to ensure correct operation. Students will work collectively to keep the Fab Lab safe, organized, and the workstation cleaned up. Students will also be required to understand associated costs of supplies used in the fabrication process.

Supplies

There is a $25 lab fee for this course. Students are responsible for bringing their own materials for personal projects.

Competencies and Performance Standards

1. Demonstrate a solid understanding of the safety procedures in the Fab Lab environment while using equipment (3D printer, 3D scanner, laser cutter, material cutters, CNC machining center, various hand tooling, and machine software).

Learning objectives

What you will learn as you master the competency:

a. Acquaint self with the safety procedure rules for each machine used.

b. Demonstrate the ability to safely use the manufacturing equipment.

c. Demonstrate the safety procedures within the Fab Lab environment.

d. Identify the safety available equipment in the Fab Lab.

Performance Standards

Competence will be demonstrated:

- in oral quiz and discussion
- in written quiz (a redo is acceptable only after student relearns the process)
- in lab activities and demonstrations

Your performance will be successful when:

- learner is productive, works safely and in a professional manner while working on task requirements for each Fab Lab equipment and in the lab area
- learner properly sets-up Fab Lab equipment to make single dimension part or cut
- learner operates each Fab Lab equipment according to strict machine protocols
- learner cleans work area and performs routine maintenance and inspections on Fab Lab equipment
- learner attends required class and lab sessions and shows up on time

2. Demonstrate an ability to recognize various types of materials which can be used in each Fab Lab machine or during some type of production process (3D printer, 3D scanner, laser cutter, material cutters, CNC machining center, various hand tooling, and machine software).

Learning objectives

What you will learn as you master the competency:

a. Identify typical materials that can be safely used in EAC's Fab Lab equipment.

b. Identify material cost to produce a small, two-dimensional part using each Fab Lab machine.

Performance Standards

Competence will be demonstrated:

- in written quiz and assignments

Your performance will be successful when:

- learner completes written quiz/test with satisfactory grade
- learner provides acceptable cost analysis on selected parts provided

3. Demonstrate understanding of the limits and operational cautions while using all Fab Lab equipment.

Learning objectives

What you will learn as you master the competency:

a. Understand and acquaint self with each machine's operational manual.

b. View A/V instructional module related to all Fab Lab equipment.

c. Demonstrate an understanding of operational procedures outlined in Fab Lab's operation manuals and checklist.

Performance Standards

Competence will be demonstrated:

- in oral discussion describing equipment operation
- in Fab Lab demonstrations and activities

Criteria – Performance will be satisfactory when:

- learner can pass a test with 90% on operational procedures for Fab Lab equipment
- learner is successful in a dry run process for each Fab Lab equipment operation
- learner uses direct guidance from Fab Lab technician for any project first run process using the Fab Lab equipment
- learner demonstrates an understanding of basic machine operation per competency check list on each equipment in Fab Lab

4. Demonstrate and produce a useable product using various Fab Lab equipment.

Learning objectives

What you will learn as you master the competency:

a. Demonstrate ability to properly set-up and produce a multi-dimensional part using one or various Fab Lab equipment.

b. Perform proper clean-up, maintenance, and resets of operation so the equipment is ready for the next user.

Performance Standards

Competence will be demonstrated:

- in written assignments
- in lab activities

Criteria – Performance will be satisfactory when:

- learner produces a product or part with recognizable forms and function
- learner is successful using Fab Lab equipment
- learner uses direct guidance from Fab Lab technician to ensure Fab Lab equipment is being used properly during the production process
- learner produces a list of simple operations for producing a Fab Lab product, including a drawing
- learner properly and safely produces a small part or product

Types of Instruction

Lecture/Discussion

Grading Information

Grading Rationale

Students will be evaluated on their ability to follow proper industry safety procedures, machine tool setup and operation, provide a simple cost analysis of the materials and manufacturing processes used to produce a part, and to manufacture course projects using available lab equipment.

Student completion of course competencies will be assessed by the instructor. Students will need to demonstrate mastery of all prescribed competencies on a selected machine tool before moving on to the next available machine tool in lab. Check-off sheets will be used by the instructor for grading purposes and to record each competency as it is completed.

Grading Scale

A	90%-100%
B	80%-89%
C	70%-79%
D	60%-69%
F	Below 60%

- This tool was created in order to fulfill the requirements of the TAACCCT 4 grant. AZ Ramp Up products by Eastern Arizona College are licensed under a Creative Commons Attribution 4.0 International License. This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.