

EASTERN ARIZONA COLLEGE
Introduction to Fab Lab Technology
Course Design
2017-2018

Course Information

Division Industrial Technology Education
Course Number AMT 110
Title Introduction to Fab Lab Technology
Credits 2
Developed by Dee Lauritzen & Brian Coppola/Revised by Nathan McCray
Lecture/Lab Ratio 1 Lecture/2 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

None

Educational Value

Introduces high-demand skills in maintenance and safe operation of high-tech manufacturing equipment.

Description

Successful completers of this course will qualify to work in the Fab Lab with supervision. This course introduces participants to concepts and tools used in a Fab Lab environment; processes for collaborating with other Fab Labs throughout the world; and proper safety procedures, machine setup, and operation of key Fab Lab equipment. Participants will work collectively to keep the lab safe, organized, and clean. Participants will also be required to understand costs associated with items they would like to produce.

Supplies

There is a \$25.00 supply lab fee for this course. Note: students who tend to waste material or excessively use EAC supplies or use supplies for personal gain may have additional lab fees.

Competencies and Performance Standards

- 1. Demonstrate safe and competent setup and operation of Fab Lab 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:

- Demonstrate the ability to safely use the manufacturing equipment.
- Identify material cost, tooling cost and machine run cost for each project.
- Understand how to upload data to the controller.
- Acquaint self with proper machine setup, operation, and maintenance.
- Demonstrate ability to properly set-up and operate each Fab Lab machine to produce part(s) from activity sheet(s) provided.

Performance Standards

Competence will be demonstrated:

- in oral quiz and discussion
- in lab exercises and performance

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 EAC Fab Lab equipment
- learner attends required class and lab sessions and shows up on time
- learner provides 90% correct answers on written quiz and operation set-up of each Fab Lab equipment (redo is acceptable only after student relearns process)

- 2. Demonstrate an ability to recognize various types of materials which can be used in Fab Lab part fabrication and/or 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:

- Identify typical materials that can be safely used in EAC's Fab Lab.
- Identify material cost to produce a small two dimensional part using each Fab Lab.

Performance Standards

Competence will be demonstrated:

- in written quiz and tests
- in assignments

Your performance will be successful when:

- learner gives correct answers on written quiz/test
- learner provides acceptable cost analysis on selected parts provided

3. Demonstrate ability to web-cast ideas to another Fab Lab computer.

Learning objectives

What you will learn as you master the competency:

- a. Identify computer hardware and software used in to broadcast a web-based video and dialog with another Fab Lab computer.
- b. Demonstrate an ability to hook-up web cameras, microphones and manipulate conference software like Polycom's Real Presences to establish a short-term web dialog with another student in Fab Lab using the internet.

Performance Standards

Competence will be demonstrated:

- o in written quiz and test
- o by participating in set-up, implementation, and broadcast of Fab Lab ideas from Fab Lab computer to an instructional computer using the internet

Your performance will be successful when:

- o learner gives correct answers on written quiz/test
- o learner participates and documents involvement in lab activity sheets

Types of Instruction

Discussion/Demonstration/Collaboration

Grading Information

Grading Rationale

Students will be evaluated on their ability to locate and analyze job listing information and to provide written responses to job related criteria. Students will also 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 modules provided 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. Activity sheets and 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%