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

Course Information

Division	Industrial Technology Education
Course Number	AMT 211
Title	Fab Lab Workshop II
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 111 and DRF 154 or instructor approval

Educational Value

Individuals will have an opportunity to continue to cultivate concepts and use ideas to develop and produce parts and projects from Fab Lab equipment and design software.

Description

This workshop allows students an opportunity to turn an idea into a small usable product using EAC Fab Lab equipment and CAD software. Students will investigate, develop, and bring ideas into reality. Students will be supervised and assisted to ensure proper safety procedures are followed and machine set-up is correct. Students will be guided to ensure equipment is used safely and correctly. Students will be required to link ideas using web-based video dialog with another MIT endorsed Fab Lab. Fab Lab students will work collectively to keep the Fab Lab safe, organized, and clean. 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

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 scores 90% on written safe operation quizzes and sets up of each FAB Lab equipment correctly (a redo is acceptable only after student relearns the process)

2. Demonstrate an ability to recognize various types of materials which can be used in Fab Lab machine or during the fabrication process (3D printer, 3D scanner, Laser cutter, material cutters, CNC machining center, various hand tooling & 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 machines equipment.

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

Performance Standards

Competence will be demonstrated:

- in written quiz and test

Your performance will be successful when:

- learner gives correct answers on written quiz/test
- learner provides acceptable cost analysis on selected parts provided
- learner identifies and lists characteristics related to selected material types

- o learner provides cost estimates on the two dimensional 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 operation manuals and follow operational checklists.

Performance Standards

Competence will be demonstrated:

- o in oral discussion
- o in lab activities demonstrating an understand of basic machine operation per competency check list on each equipment in Fab Lab

Criteria – Performance will be satisfactory when:

- o learner can pass with a 90% on an operational procedures quiz for Fab Lab equipment
- o learner is successful during a dry run process in each Fab Lab machine
- o learner utilizes guidance from Fab Lab technician for any project's first run on Fab Lab's equipment
- o learner demonstrates an understanding of basic machine operation per competency check list with equipment in Fab Lab

4. Demonstrate an ability to produce a useable product using varying 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 and maintenance on machines, and also resets equipment correctly so it is ready for the next user.

Performance Standards

Competence will be demonstrated:

- o in writing assignments
- o in lab activities

Criteria – Performance will be satisfactory when:

- o learner produces a product or part with recognizable form and function
- o learner is successful while using the Fab Lab equipment
- o learner utilizes guidance from Fab Lab technician to ensure Fab Lab equipment is being used properly during fabrication process
- o learner properly and safely produces a small part or product
- o learner successfully writes a step-by-step list of operational steps to produce Fab Lab drawing and functional product

5. Demonstrate an ability to collaborate ideas with another Fab Lab using web-based broadcast.

Learning objectives

What you will learn as you master the competency:

a. Identify computer hardware and software used in web-based video broadcast.

b. Demonstrate an ability to hook-up web cameras and microphones while utilizing PC software like Polycom's Real Presences to establish web dialog with another MIT endorsed Fab Lab.

Performance Standards

Competence will be demonstrated:

- in written quiz and test
- in lab activities

Your performance will be successful when:

- learner give correct answers on written quiz/test
- learner participates and documents involvement in lab activity sheets
- learner participates in setup, implementation, and broadcast of Fab Lab ideas from Fab Lab computer to a MIT endorsed Fab Lab computer using the internet

Types of Instruction

Demonstration/Discussion/Collaboration/Observation of A/V material

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 share ideas using web-based system.

Student completion of course competencies will be an ability to produce a product and utilize resources from other Fab Labs. A grading activity sheet will be used based on student productivity, professionalism, safety, work collaboration, and progress.

Project	25% of grade
Web-based dialog	25% of grade
Lab activity sheet	50% of grade

Grading Scale

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

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