

ARTD 255
Three-Dimensional Digital Fabrication
3 Credits

Community College of Baltimore County
Common Course Outline

Description

ARTD 255 – Three-Dimensional Digital Fabrication: builds on two-dimensional fabrication knowledge to create three-dimensional art and design works. Students will design and assemble physical forms using laser-cutters, 3D printers, and CNC routers utilizing industry-standard software and proprietary tools.

Pre-requisites: ARTD 155 and ARTD 240, or permission of the program coordinator

Overall Course Objectives

Upon completion of this course, students will be able to:

1. differentiate between digital fabrication machines and tools and associated usage;
2. operate a laser cutter, CNC router, FDM 3D printer, and SLA 3D printer;
3. generate toolpaths for the CNC router for press fit construction and carving;
4. use 3D printer slicer software to generate code to operate SLA and FDM 3D printers;
5. design original 3D files using vector and CAD software;
6. generate 3D forms from two-dimensional designs;
7. utilize additive and subtractive digital fabrication methods to produce 3D forms;
8. develop a concept from design to prototype to production using digital fabrication processes;
9. utilize problem solving and workflow strategies for digital fabrication;
10. assemble parts into a cohesive product;
11. critique designs and products; and
12. perform basic maintenance on digital fabrication machines.

Major Topics

- I. Digital fabrication processes
 - a. Additive 3D Printing
 - b. Additive and subtractive laser cutting
 - c. Additive and subtractive CNC routing
 - d. Multiple machine capabilities
- II. Software
 - a. Vector graphics
 - b. 3D modeling
 - c. Proprietary
- III. 3D Printing
 - a. FDM and SLA

The Common Course Outline (CCO) determines the essential nature of each course.
For more information, see your professor's syllabus.

- b. 3D file formats
 - c. Slicer software
 - d. Materials and filaments
 - e. Finishing
- IV. Laser-Cutting for precise dimensions
 - a. Joinery
 - b. Hinges
 - c. Stacking
 - d. Relief
 - e. File formats
 - f. Materials
- V. CNC Routing
 - a. File formats
 - b. Tools
 - c. Tool paths
 - d. Materials
 - e. Assemblage
- VI. Finishing and Assembly
 - a. Sanding
 - b. Painting, staining, and sealing
 - c. Glueing and clamping
 - d. Mechanical fasteners
- VII. Machine maintenance
 - a. 3D Printers (FDM, SLA)
 - b. Laser cutters
 - c. Filter systems
 - d. CNC Routers
 - e. Dust extraction systems
 - f. Troubleshooting
- VIII. Fabrication safety
 - a. Proper PPE
 - b. Chemical handling
 - c. Wood shop safety
 - d. Machine specific safety
 - e. Dust extraction and other fine particulate
- IX. Prototyping workflow
 - a. Optimizing paths
 - b. Print order efficiency
 - c. Maximizing material use
 - d. Software best practices
 - e. Minimizing post processing

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- One project utilizing each of the following processes:
 - Multi-part laser cutter/engraver with assembly

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- 3D printing
 - CNC routing
- A final project that utilizes multiple machines, processes, or techniques

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