

STATE UNIVERSITY OF NEW YORK  
COLLEGE OF TECHNOLOGY  
CANTON, NEW YORK



## MASTER SYLLABUS

MECH 122 – INTRODUCTION TO 3D PRINTING

**CIP Code: 14.1901**

*For assistance determining CIP Code, please refer to this webpage  
<https://nces.ed.gov/ipeds/cipcode/browse.aspx?v=55>  
or reach out to Sarah Todd at [todds@canton.edu](mailto:todds@canton.edu)*

**Created by: Cullen Haskins**

**CANINO SCHOOL OF ENGINEERING TECHNOLOGY  
MECHANICAL ENGINEERING TECHNOLOGY  
Fall 2023**

- A. TITLE: INTRODUCTION TO 3D PRINTING
- B. COURSE NUMBER: MECH 122
- C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):

**# Credit Hours: 1**  
**# Lecture Hours 0 per Week**  
**# Lab Hours: 15 Weeks – 1, 2-hour lab per week**  
**Other     per Week**

**Course Length (# of Weeks): 15**

- D. WRITING INTENSIVE COURSE: No
- E. GER CATEGORY: None
- F. SEMESTER(S) OFFERED: Spring

G. COURSE DESCRIPTION:

This course introduces the fundamental concepts of 3D extrusion printer technology, operation, maintenance, and repair. The components and technology that make 3D printing possible are investigated before students learn the processes involved in moving from a parametric 3D model through the slicing software and then to printing. Fundamental skills like safety, maintenance, troubleshooting, and repair are introduced and practiced during the course.

**NOTE:** *In lieu of a textbook, students are required to purchase their own printer for this course. The recommended printer is a Creality Ender 3 which can be purchased through Amazon for \$189.00. We will unbox and assemble printers on day 1 of the course, so please purchase your printer prior to the start of the semester and bring it to Lab 1.*

- H. PRE-REQUISITES: None  
 CO-REQUISITES: None

I. STUDENT LEARNING OUTCOMES:

<u>Course Student Learning Outcome [SLO]</u>	<u>PSLO</u>	<u>GER</u>	<u>ISLO</u>
a. Describe the fundamental operation of 3D extrusion printers and their key components and safety risks.	ABET SO#1 Performance Indicator a – Overall knowledge, techniques, skills, and tools		5-Ind, Prof, Disc, Know Skills
b. Demonstrate proper (printer-specific) methods for installing and removing printer filament, cleaning, and maintenance.	ABET SO#1 Performance Indicator a – Overall knowledge, techniques, skills, and tools		5-Ind, Prof, Disc, Know Skills

c. Demonstrate competence in progressing from a 3D parametric model to a physical printed part.	ABET SO#1 Performance Indicator e – Select and apply knowledge of engineering and technology		5-Ind, Prof, Disc, Know Skills
d. Identify and implement proper procedures for troubleshooting and repair of 3D extrusion printers.	ABET SO#1 Performance Indicator f – Identify, analyze, and solve problems		5-Ind, Prof, Disc, Know Skills

KEY	<b><u>Institutional Student Learning Outcomes</u></b> <b><u>[ISLO 1 – 5]</u></b>
ISLO #	ISLO & Subsets
1	<b>Communication Skills</b> Oral [O], Written [W]
2	<b>Critical Thinking</b> <i>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</i>
3	<b>Foundational Skills</b> <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
4	<b>Social Responsibility</b> <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
5	<b>Industry, Professional, Discipline Specific Knowledge and Skills</b>

J. APPLIED LEARNING COMPONENT: Yes  No

If Yes, select one or more of the following categories:

Classroom/Lab   
 Internship   
 Clinical Practicum

Civic Engagement   
 Creative Works/Senior Project   
 Research

Practicum\_\_\_\_  
Service Learning\_\_\_\_  
Community Service\_\_\_\_

Entrepreneurship\_\_\_\_  
(program, class, project)

K. TEXTS: None

L. REFERENCES:

*The 3D Printing Handbook, Technologies, Design and Applications* by Ben Redwood, Filemon Schöffner, and Brian Garret, Amsterdam, The Netherlands, ISBN 978-90-87485-0-5  
*3D Printing Failures: How to Diagnose & Repair All Desktop 3D Printing Issues* by Sean Aranda, Self-Published

M. EQUIPMENT:

Computer Lab, 3D Printing Lab, Student Printers (Purchased with Lab Fees)

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Homework, Quizzes, Labs, & Exams

P. DETAILED COURSE OUTLINE:

See Lab Outline Below

Q. LABORATORY OUTLINE:

Lab 1. (Brief) History of 3D Printing + Printer Assembly  
Lab 2. Filament Install & Removal + Bed Leveling + Test Print  
Lab 3. Anatomy and Function of FDM Printers  
Lab 4. STL Creation and Slicing Defaults (CURA)  
Lab 5. Part Orientation  
Lab 6. Additional Topics in Slicing  
Lab 7. 3D Printing Safety  
Lab 8. Tips for Printing Success  
Lab 9. Diagnosing Failed Prints and Malfunctions  
Lab 10. Cleaning, Inspection, & Maintenance  
Lab 11. Basic Repairs  
Lab 12. Final Print Project  
Lab 13. Course Content Review and Wrap-up  
Lab 14. Final Exam