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

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MECH 312 – MECHANICAL ENGINEERING TECHNOLOGY DESIGN

Created by: Cullen Haskins

Updated by: Cullen Haskins

Canino School of Engineering Technology

Department: MECHANICAL ENGINEERING TECHNOLOGY

Semester/Year: SPRING 2023

A. **TITLE**: MECHANICAL ENGINEERING TECHNOLOGY DESIGN

B. **COURSE NUMBER:** MECH 312

C. **CREDIT HOURS: 3 credit hour(s) per week for 15 weeks**

☒ One hour (50 minutes) of lecture per week 3
☐ Two to three hours of lab or clinical per week 0
☐ Two hours of recitation per week
☐ 40 hours of internship

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☒ **Yes:** GER
***If course satisfies more than one*:** GER

F. **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☒ **Fall & Spring** ☐

G. **COURSE DESCRIPTION:**

This course focuses on learning and practicing an industry-accepted process to design mechanical objects; students start with product discovery and a goal of delivering a viable product by the end of the semester. Sketching, hand drawing, parametric modeling, and GD&T are utilized in concert with written communication to document this process. Mathematical models and other principles learned in statics, strengths, materials, and machine design among others are used alongside measurements, tests, and experiments to evaluate and advance the design state. Hand tools, 3D printing, woodworking, and/or machine tools are utilized throughout this iterative process to experimentally verify generated concepts and test prototypes as appropriate.

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

Geometric Dimensioning and Tolerancing (MECH 303) and Mechanics of Machine Elements (ENGS 350)

CO-REQUISITES: None ☒ **Yes** ☐ **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
A. Apply and document an industry-accepted design process to a mechanical engineering design problem.	ABET SO#2		1-Comm Skills 5-Ind, Prof, Disc, Know Skills ISLO	W Subsets Subsets Subsets
B. Create detailed hand sketches and 3D parametric models (with GD&T as appropriate) that clearly communicate design intent.	ABET SO #3		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
C. Iteratively utilize measurements, tests, experiments, and mathematical and/or other models to advance the design state.	ABET SO#4		2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets
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KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator

J. **APPLIED LEARNING COMPONENT:** Yes ☒ No ☐

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

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service

- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship

(program, class, project)

K. TEXTS:

"The Mechanical Design Process" by David G. Ullman
https://www.davidullman.com/mechanical-design-process-6ed

L. REFERENCES:

M. EQUIPMENT: None ☐ Needed: Computer Lab with AutoDesk Inventor and Matlab, 3D printers, and Machine Shop

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Projects, Homework, Quizzes, and Exams

P. DETAILED COURSE OUTLINE:

1. Why Study the Design Process?
2. Understanding Mechanical Design
3. Designers and Design Teams
4. The Design Process and Product Discovery
5. Planning for Design
6. Understanding the Problem and the Development of Engineering Specifications
7. Concept Generation
8. Concept Evalution and Selection
9. Product Generation
10. Product Evaluation for Performance and the Effects of Variation
11. Product Evaluation: Design for Cost, Manufacture, Assembly, and Other Measures
12. Wrapping up the Design Process and Supporting the Product

Q. LABORATORY OUTLINE: None ☒ Yes ☐