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

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MECH - 121

Created by: D. Miller

Updated by:

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Department: Mechanical & Energy Technologies

Semester/Year: Fall 2018

A. **TITLE**: Manufacturing Processes I

B. **COURSE NUMBER:** MECH 121

C. **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 3
 # Lecture Hours: 2 **per week**
 # Lab Hours: (1) three-hour lab **per week**
Other: **per week**

Course Length: 15 **Weeks**

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 provides an overview of material removal, change in form, change in condition, and heat treatment processes. The student begins with a fundamental understanding of machine tools theory and practice. Instruction includes precision layout and measurement, lathe operations and tooling, milling operations and tooling, drills, reamers, and drilling machines. Instruction involves the selection and calculation of proper cutting speeds and feeds for processes involving different materials. Instruction also includes an investigation to the variety of casting processes, products produced through each process and common defects found. Students further investigate material properties and how change can occur through processing and heat treatments. The laboratory provides the opportunity to apply the material from lecture through the hands on operation of the tooling and equipment.

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

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***	
1. Properly setup and safely operate Haas TL1-lathes, drill presses, vertical and horizontal milling machines			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
2. Determine the proper spindle speed or cutter speed and feed rates for various materials and operations			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
3. Select the correct measuring device and accurately read the device for inspection of machined parts			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
4. Identify cutting tools used in the machine shop			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
5. Select the correct cutting tool for a machining operation			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
6. Identify casting processes used to manufacture products and site an example where this processes is used to manufacture a product in the market			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets

7. Use the Machinery's Handbook to reference information pertaining to industrial practice			5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
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			ISLO ISLO ISLO	Subsets Subsets Subsets Subsets
			ISLO ISLO ISLO	Subsets Subsets Subsets Subsets

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:

John R. Walker, Modern Metalworking 2004 edition, Goodheart-Wilcox
"Machinery's Handbook – Pocket Companion", Industrial Press, Inc.

L. REFERENCES:

M. EQUIPMENT: None ☐ **Needed:** Machine Shop Laboratory

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Homework & Quizzes, Exams (4), LAB: Safety, project accuracy, work habits

Students MUST pass the laboratory if they wish to pass this course. A grade of 'F' in lab will earn a grade of 'F' for the course.

P. DETAILED COURSE OUTLINE:

I. Introduction to Manufacturing Processes
- **A. Shop Safety**
- **B. Classification of Processes**
- **C. Tool and Process Selection**

II. Measurement in Manufacturing
- **A. Measurement System**
- **B. Direct Reading Instruments**
- **C. Measurement by Transfer**
- **D. Surface Plates**
- **E. Gage Blocks**
- **F. Sine Bar**
- **G. Gages**

H. Dial Indicators

III. Material Removal Processes
- **A. Lathe Operations & Tooling**
- **B. Milling Operations & Tooling**
- **C. Drill Press Operations & Tooling**

IV. Casting Operations
- **A. Sand**
- **B. Investment**
- **C. Permanent**
- **D. Lost Foam**
- **E. Die Cast**
- **F. Centrifugal**

V. Heat Treatment
- **A. Hardening Steels**
- **B. Tempering**
- **C. Annealing**
- **D. Hardness - Strength Relationship**
- **E. Iron Carbon Diagram**
- **F. T-T-T Diagram**

Q. <u>LABORATORY OUTLINE</u>: None ☐ Yes ☒

Laboratory Sessions (Fourteen - 2 hr. 50 min. labs)

Students acquire hands-on experience in the operation of basic machine tools such as lathes, horizontal and vertical milling machines, drill presses, band saws, and power hacksaws by making and assembling a parallel clamp, hacksaw or ball peen hammer. Much of the laboratory activities are timed or sequenced with lecture material. This provides students the opportunity to combine theory with practical application. A laboratory manual containing all the working drawings and job sheets is available on the Learning Network System (LNS). A major emphasis is placed on the safety precautions necessary in a manufacturing operation as well as the manufacturing processes themselves.