



**MERCER**  
COUNTY COMMUNITY COLLEGE

# COURSE OUTLINE

Course Number	Course Title	Credits
AMT 291	Advanced Manufacturing Internship	3.0

**Hours:**  
**Lecture/Internship**  
1/6

**Co- or Pre-requisite**  
AMT 231

**Implementation**  
**Semester & Year**  
Fall 2022

**Catalog description:**

Exposes students to advanced practice of machining. Topics include: Machine shop safety, Turning Machines, Vertical and Horizontal Milling Machines, Grinding and Abrasive Machining Processes. Corresponding internship hours reinforce lectures with practical examples which follow NIMS certification requirements. This course can be waived upon the completion of a 6-week internship in a machine shop environment.

**General Education Category:**

[Not GenEd](#)

Choose an item.

**Course coordinator:**

Michael Hanna, 609-570-3828, hannah@mccc.edu

**Required texts & Other materials:**

Required Text: **Machine Tool Practices**

By Richard Kibbe

Publisher: Pearson

Optional: **Machinery's Handbook**

By Erik Oberg and Franklin D. Jones

Publisher: Industrial Press

ISBN-10: 083112900X ISBN-13: 978-0-8311-2900-2

**Course Student Learning Outcomes (SLO):**

***Upon successful completion of this course the student will be able to:***

1. Describe, setup and complete Unified and ACME thread operations on the lath. **(ILG 4,10,11, PLO 3,5)**
2. Describe, setup and complete taper machining. **(ILG 4,10,11, PLO 3,5)**
3. Describe, setup and complete machining between centers. **(ILG 4,10,11, PLO 3,5)**
4. Describe, setup and complete straddle milling, gang milling, shaft key seat milling. **(ILG 4,10,11, PLO 3,5)**
5. Describe, setup and operate grinding machine. **(ILG 4,10,11, PLO 3,5)**

**Course-specific Institutional Learning Goals (ILG):**

**Institutional Learning Goal 2 Mathematics:** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

**Institutional Learning Goal 3 Science:** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

**Institutional Learning Goal 4 Technology:** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

**Institutional Learning Goal 10 Information Literacy:** Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

**Institutional Learning Goal 11 Critical Thinking:** Students will use critical thinking skills understand, analyze, or apply information or solve problems.

**Program Learning Outcomes for [Click or tap here to enter text.](#) **(PLO)****

1. Maintain a safe and organized workspace.
2. Interpret blueprints to manufacture parts.
3. Apply shop and tool room mathematics as needed.
4. Complete part inspection using appropriate instruments such as micrometers, calipers, and scales.
5. Set up and operate a manual drill press, lathe, milling machine, grinder and press brake.
6. Set up and operate CNC machines (lathe and mill).
7. Use NC programming (G and M codes) to control movement and cutting processes.
8. Understanding of statistical quality control.
9. Understanding of the broad spectrum of manufacturing technologies.
10. Pursue NIMS certification.

**Units of study in detail – Unit Student Learning Outcomes:**

**Unit I Advanced Lathing (SLO 1,2,3)**

The student will be able to:

1. Set up for knurling, recessing, die threading and parting on the lathe and complete each of these operations.
2. Set up to turn between centers and complete the operation.
3. Set up taper attachment and complete taper machining operation.
4. Detail the steps and procedures necessary to cut a Unified and ACME thread to the correct depth.
5. Set up a lathe for threading and cutting several different thread pitches and diameters.
6. Identify tools and procedures for thread measurement.

**Unit II Advanced Milling (SLO 4)**

The student will be able to:

1. Setup side milling cutters and cut steps and grooves.
2. Use side milling cutters for straddle milling.
3. Use side milling cutters for gang milling.
4. End milling a shaft key seat.
5. Machining T-slots, dovetails, angle milling and drilling.

**Unit III Grinding machines (SLO 5)**

The student will be able to:

1. Describe truing, dressing and balancing of grinding wheels.

2. Distinguish the difference between the objectives of truing and dressing grinding wheels.
3. Correctly position a single-point diamond dresser in relation to the grinding wheel.
4. Name the components of the horizontal spindle surface grinder.
5. Define the functions of the various component parts of the grinder.
6. Name and describe the functions of at least two accessories devices used to increase the versatility of the surface grinder.
7. Describe the basic operating principles of common grinder chucks.
8. Describe methods of holding odd-shaped nonmagnetic and thin workpieces.

**Method of Instruction**

Learning will take place via classroom instruction, demonstrations and student activities, as well as through textbook reading and homework assignments.

**Evaluation of student learning:**

Students' achievement of the course objectives will be evaluated through the use of the following:

- Internship grade based on shop projects and lab assignment results.
- In class participation, homework and attendance.

<b>Evaluation Tools</b>	<b>Percentage of Grade</b>
Internship Assignments/ Shop Projects	50%
Homework / In-Class Assignments	50%
<b>Total</b>	<b>100%</b>