## COURSE OUTLINE

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET123</td>
<td>Machine Shop Techniques I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Hours:** Lecture.lab 2/3  
**Pre-requisite:** EET140 and MET122  
**Implementation:** F/2017

---

## COURSE DESCRIPTION

Introduces the theory and practical concepts of manual machining, primarily focused on using the lathe for turning operations to manufacture cylindrical part assemblies. Topics include shop mathematics, machine tool safety practices, measuring devices, and an understanding of lathe components. Corresponding labs apply practical hands-on examples which follow NIMS certification requirements.

---

**Required Text:** *Precision Machining Technology 2nd Edition*  
By Peter J. Hoffman and Eric S. Hopewell  
Publisher: Delmar/Cengage Learning  
ISBN-9781285444543

**Optional** *Machinery’s Handbook*  
By Erik Oberg and Franklin D. Jones  
Publisher: Industrial Press  

Revision date: 4/4/2017

Course Coordinator: D.T.DeFino 3456, definod@mccc.edu
General Objectives
Course Competencies/Goals

Students will be able to:
1. Properly demonstrate safe operation of manual lathe. (GEKG 1, 4 / CS A, B, F)
2. Become familiar with industry reference materials used for machining calculations. (GEKG 2, 4 / CS A, B, D)
3. Demonstrate proper work holding setups based on machining operation. (GEKG 1, 2, 4 / CS A, B, D)
4. Perform basic machining operations that include facing, turning and drilling. (GEKG 1, 2, 4 / CS A, B, D)
5. Perform advanced machining operations that include threading and knurling. (GEKG 1, 2, 4 / CS A, B, D)
6. Learn and follow proper shop safety practices and policies. (GEKG 1 / CS A, B, D, F)

General Education Knowledge Goals [ GEKG ]

Goal 1. Communication. Students will communicate effectively in both speech and writing.
Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

MCCC Core Skills [ CS ]

Goal A. Written and Oral Communication in English. Students will communicate effectively in speech and writing, and demonstrate proficiency in reading.
Goal B. Critical Thinking and Problem-solving. Students will use critical thinking and problem solving skills in analyzing information.
Goal D. 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.
Goal E. Computer Literacy. Students will use computers to access, analyze or present information, solve problems, and communicate with others.
Goal F. Collaboration and Cooperation. Students will develop the interpersonal skills required for effective performance in group situations.
Unit Objectives

Unit I - Introduction to Lathe Components
The student will be able to:

1. Identify all major manual lathe components. (CG 1)
2. Understand proper safety guidelines when using industrial power tools. (CG 6)
3. Identify and understand the operational control components of a manual lathe. (CG 1)
5. Perform speed and feed rate adjustments using lathe controls. (CG 1, 2)
6. Become familiar with various work holding methods used on lathes. (CG 1, 3)
7. Understand differences between facing and turning operations. (CG 1, 4)

Unit II - Basic Lathe Machining Operations
The student will be able to:

1. Demonstrate proper work holding setup for facing operation. (CG 3, 4)
2. Demonstrate proper work holding setup for turning operation. (CG 3, 4)
3. Calculate proper speed and feed rate using reference material for material being machined. (CG 2, 4)
4. Identify different tool holders used for turning and facing operations. (CG 4)
5. Perform drilling operation on a lathe. (CG 3, 4)
6. Properly use digital readout (DRO) to determine desired machining dimensions. (CG 2, 4)
7. Become familiar with proper required coolants based on material. (CG 4, 6)

Unit III - Advanced Lathe Machining Operations
The student will be able to:

1. Demonstrate proper work holding setup required for turning between centers operation. (CG 3, 5)
2. Demonstrate proper work holding setup required for threading operation. (CG 3, 5)
3. Calculate proper speed and feed rate for threading operation. (CG 2, 5)
4. Demonstrate proper work holding setup required for knurling operation. (CG 3, 5)
5. Calculate proper speed and feed rate for knurling operation. (CG 2, 5)
6. Demonstrate proper work holding setup for taper turning. (CG 3, 5)
7. Calculate taper dimensions and angle using industry reference manual. (CG 2, 5)
**Method of Instruction**

Learning will take place via classroom instruction, lab demonstrations, and student activities, as well as through textbook reading and homework assignments. Lab activities will augment this. Use of equipment and manual skills will be developed in the lab.

**Student Evaluation**

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

- Three unit tests assessing students’ comprehension of terminology, calculations and practices related to the unit objectives. (GO 2, 3 and 6)
- Lab grade based on shop projects and lab assignment results. (GO 1, 4, 5 and 6)
- In class participation, homework and attendance. (GO 2 and 3)

<table>
<thead>
<tr>
<th>Evaluation Tools</th>
<th>Percentage of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Unit Tests</td>
<td>50%</td>
</tr>
<tr>
<td>Lab Assignments / Shop Projects</td>
<td>25%</td>
</tr>
<tr>
<td>Homework / In-Class Assignments</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Academic Integrity**

Students are required to perform all the work specified by the faculty and are responsible for the content and integrity of all academic work submitted, such as papers, reports, and examinations. A student will be guilty of violating the Rule of Academic Integrity if he or she:

- Knowingly represents the work of others as his or her own;
- Uses or obtains unauthorized assistance in any academic work;
- Gives fraudulent assistance to another student.
- Intentionally damages any contents of the lab or classroom
- Is found to have stolen anything from the lab or classroom

**Penalty**

First violation for stealing or damaging is F in the course.
First violation on test or project is an “F” grade for the test or project.
Second violation is “F” in the course.

**Special Accommodations**

Any student in this class who has special needs because of a disability is entitled to receive accommodations. Eligible students at Mercer County Community college are assured services under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. If you believe you are eligible for services, please contact Arlene Stinson, the Director of Academic
Support Services at her office in LB 221 or at the office telephone number which is (609) 570-3525.