



# COURSE OUTLINE

## MCH121

Prepared: Neal Moss    Approved:

<b>Course Code: Title</b>	MCH121: MACHINE SHOP THEORY AND MEASUREMENT
<b>Program Number: Name</b>	4039: MECH. ENG. TN-MANUFA
<b>Department:</b>	MECHANICAL TECHNIQUES PS
<b>Semester/Term:</b>	18W
<b>Course Description:</b>	This course is designed to give the students an understanding of the theoretical aspects of machining and manufacturing including feeds, speeds, threading and gear cutting formulas. This course is also designed to strengthen the student's ability to measure and inspect to precise tolerances. Tools using micrometer and vernier scales for linear and angular measurement will be used. There will be a basic introduction to Statistical Process Control (SPC), including interpretation and recording of data.
<b>Total Credits:</b>	3
<b>Hours/Week:</b>	3
<b>Total Hours:</b>	45
<b>This course is a pre-requisite for:</b>	MCH145, MCH259
<b>Essential Employability Skills (EES):</b>	<p>#1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.</p> <p>#2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>#3. Execute mathematical operations accurately.</p> <p>#4. Apply a systematic approach to solve problems.</p> <p>#5. Use a variety of thinking skills to anticipate and solve problems.</p> <p>#10. Manage the use of time and other resources to complete projects.</p>
<b>General Education Themes:</b>	Science and Technology
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	Due to the safety concerns of this course, students who do not attend a minimum of 75% (12) of the scheduled classes will be given an F grade for this course. After 3 missed classes students lose the full 20% for the Attendance/housekeeping portion of marks.

Grade  
Definition Grade Point Equivalent  
A+ 90 – 100% 4.00  
A 80 – 89%  
B 70 - 79% 3.00  
C 60 - 69% 2.00  
D 50 – 59% 1.00  
F (Fail) 49% and below 0.00

CR (Credit) Credit for diploma requirements has been awarded.  
S Satisfactory achievement in field /clinical placement or non-graded subject area.  
U Unsatisfactory achievement in field/clinical placement or non-graded subject area.  
X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.  
NR Grade not reported to Registrar's office.  
W Student has withdrawn from the course without academic penalty.

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight
Attendance/participation	20%
Homework/assignments	30%
Tests	50%

**Books and Required Resources:**

Machining Fundamentals by John R Walker / Bob Dixon  
Publisher: Good heart- Willcox Edition: ninth  
ISBN: 987-1-61960-209-0

Machining Fundamentals (Workbook) by John R Walker  
Publisher: Good heart- Willcox Edition: ninth  
ISBN: 987-1-61960-214-4

**Course Outcomes and Learning Objectives:**

**Course Outcome 1.**

Show an awareness of safety in the operation of machines and tools used in the mechanical trades.

**Learning Objectives 1.**

Potential Elements of the Performance:

Gain an understanding of shop safety.

Develop safe work habits.

Recognize and correct unsafe work conditions.

Identify hazards when operating machine shop equipment.

Identify hazards while working with hand, electric and air powered hand tools.

**Course Outcome 2.**

Recognize the importance of precise measurement and how it affects product and workmanship in industry.

**Learning Objectives 2.**

Potential Elements of the Performance:  
Describe the role of the technician in measurement  
Use of standards and the need for standards  
Recognize the importance of maintaining accuracy  
Show how non precise measurement techniques affect companies

### **Course Outcome 3.**

Accurately layout using drawings and sketches.

### **Learning Objectives 3.**

Potential Elements of the Performance:  
Explain importance of layouts.  
Identify common layout tools.  
Safe use of layout tools while performing layouts.

### **Course Outcome 4.**

Understand safety features all the auxiliary equipment used in the Machine Shop.

### **Learning Objectives 4.**

Potential Elements of the Performance:  
Explain the safety features of various types of grinders.  
Explain the safety features of various types of drills.  
Explain the safety features of various types of Saws.

### **Course Outcome 5.**

Use of measuring tools

### **Learning Objectives 5.**

Potential Elements of the Performance:  
Discuss the use and care of measurement tools  
Identify comparative measuring equipment such as:  
Telescopic gauges  
Inside and Outside calipers  
Fillet and radius gauges  
Screw pitch gauge  
Thickness/ feeler gauge  
Be able to interpret imperial and metric readings on:  
Inside and Outside Micrometers,  
Depth Micrometers  
Pi Tapes  
Vernier Calipers  
Vernier height gauge  
Vernier protractor  
Recognize sources of error in the measuring process  
Correctly adjust, maintain and store measuring to

## **Course Outcome 6.**

Be knowledgeable in various modern measuring equipment

## **Learning Objectives 6.**

Potential Elements of the Performance:

Discuss modern computerized measuring equipment available today that enhance precise measurement

Demonstrate the basic use of laser equipment

Discuss measuring equipment available today that is used in vibration analysis, hydraulic testing.

## **Course Outcome 7.**

Select and use proper hand tools based on application

## **Learning Objectives 7.**

Potential Elements of the Performance:

Hand tool safety.

Identify the correct sized wrenches.

Identify the correct screwdriver style

Identify different types of files.

Identify hand tools used in Mechanical trades.

Care and maintenance of hand tools.

## **Course Outcome 8.**

The lathe, determine speeds, feeds and calculate thread parameters and tapers using formulas.

## **Learning Objectives 8.**

Potential Elements of the Performance:

Lathe safety & operation.

Identify parts of the lathe.

Identify various work holding devices on a lathe.

Calculate speeds and feeds.

Calculate thread parameters using formulas.

Calculate information required to cut tapers.

## **Course Outcome 9.**

The Milling machine, determine speeds, feeds and type of cutting tool to suit the application.

## **Learning Objectives 9.**

Potential Elements of the Performance:

Milling machine safety.  
Milling machine operation.  
Identify parts of the Milling machine.  
Identify various work holding devices on a Milling machine.  
Calculate speeds and feeds.  
Identify various cutting tools for the correct application.  
Explain the principle of a dividing head.

### **Course Outcome 10.**

Understand the types, properties and applications of lubricants

### **Learning Objectives 10.**

Potential Elements of the Performance:  
Identify lubricants used in different machines.  
Identify the different types of lubricants.  
Importance of viscosity in lubricants.  
Identify lubricants used in machining operations  
Practice safe handling of lubricants.

### **Course Outcome 11.**

Discuss the use of Statistical Process Control in industry

### **Learning Objectives 11.**

Potential Elements of the Performance:  
Discuss Statistical Process Control  
Discuss the advantages of using Statistical Processes  
Perform assignments in Statistical Process Control

**Date:**

Tuesday, January 2, 2018

Please refer to the course outline addendum on the Learning Management System for further information.