COURSE OUTLINE: MCH121 - MS THEORY/MEASURE

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Course Code: Title	MCH121: MACHINE SHOP THEORY AND MEASUREMENT
Program Number: Name	4039: MECH. ENG. TN-MANUFA 4040: MACHINE SHOP 5082: MECH.TECH.IND.MAINT.
Department:	MECHANICAL TECHNIQUES PS
Academic Year:	2024-2025
Course Description:	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.
Total Credits:	3
Hours/Week:	3
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	MCH145, MCH259, MCH607
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4039 - MECH. ENG. TN-MANUFA** VLO 1 Complete all work in compliance with current legislation, standards, regulations and guidelines. VLO 3 Comply with current health and safety legislation, as well as organizational practices and procedures. VLO 4 Apply sustainability best practices in workplaces. VLO 7 Interpret, prepare and modify mechanical engineering drawings and other related technical documents. VLO 9 Manufacture, assemble, maintain and repair mechanical components according to required specifications. **4040 - MACHINE SHOP** VLO 1 Complete all work in compliance with current legislation, standards, regulations and guidelines. VLO 3 Comply with current health and safety legislation, as well as organizational practices and procedures.

	VLO 4 Support sustainability best practices in workplaces. VLO 7 Contribute to the interpretation and preparation of mechanical drawings and other related technical documents. VLO 9 Assist in manufacturing, assembling, maintaining and repairing mechanical components according to required specifications. **5082 - MECH.TECH.IND.MAINT.** VLO 1 Complete all work in compliance with current legislation, standards, regulations and guidelines. VLO 3 Comply with current health and safety legislation, as well as organizational practices and procedures. VLO 4 Support sustainability best practices in workplaces. VLO 7 Contribute to the interpretation and preparation of mechanical drawings and other related technical documents. VLO 9 Assist in manufacturing, assembling, maintaining and repairing mechanical components according to required specifications.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 10 Manage the use of time and other resources to complete projects.
General Education Themes:	Science and Technology
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Due to the safety concerns of this course, students who do not attend a minimum of ten (10) of the scheduled classes will be given an F grade for this course. After 3 missed classes students lose the full 10% 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.

Books and Required Resources:

Millwright Manual
Publisher: Queen`s Printer Government Publication Services Edition: 2nd
ISBN: 0-7718-9473-2

Millwright Manual Study Guide by Ronald A. Fournie
Publisher: Ministry of Finance
ISBN: 7960003066

Technology Of Machine Tools ISE by Steve F. Krar, Arthur R. Gill, Peter Smid, Robert J. Gerritsen, John B. Gill
Publisher: McGraw Hill Edition: 9th
ISBN: 9781266277474

Technology of Machine Tools Student Workbook by Steve F. Krar, Arthur R. Gill, Peter Smid
Publisher: McGraw Hill Edition: 9th
ISBN: 9781266321054

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
1. Show an awareness of safety in the operation of machines and tools used in the mechanical trades.	Potential Elements of the Performance: 1.1 Gain an understanding of shop safety. 1.2 Develop safe work habits. 1.3 Recognize and correct unsafe work conditions. 1.4 Identify hazards when operating machine shop equipment. 1.5 Identify hazards while working with hand, electric and air powered hand tools.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Recognize the importance of precise measurement and how it affects product and workmanship in industry.	Potential Elements of the Performance: 2.1 Describe the role of the technician in measurement 2.2 Use of standards and the need for standards 2.3 Recognize the importance of maintaining accuracy 2.4 Show how non precise measurement techniques affect companies
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Accurately layout using drawings and sketches.	Potential Elements of the Performance: 3.1 Explain importance of layouts. 3.2 Identify common layout tools. 3.3 Safe use of layout tools while performing layouts.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Understand safety features all the auxiliary equipment used in the Machine Shop.	Potential Elements of the Performance: 4.1 Explain the safety features of various types of grinders. 4.2 Explain the safety features of various types of drills. 4.3 Explain the safety features of various types of Saws.

Course Outcome 5	Learning Objectives for Course Outcome 5
5. Use of measuring tools	Potential Elements of the Performance: 5.1 Discuss the use and care of measurement tools 5.2 Identify comparative measuring equipment such as: 5.3 Telescopic gauges 5.4 Inside and Outside calipers 5.5 Fillet and radius gauges 5.6 Screw pitch gauge 5.7 Thickness/ feeler gauge 5.8 Be able to interpret imperial and metric readings on: 5.9 Inside and Outside Micrometers, 5.10 Depth Micrometers 5.11 Pi Tapes 5.12 Vernier Calipers 5.13 Vernier height gauge 5.14 Vernier protractor 5.15 Recognize sources of error in the measuring process 5.16 Correctly adjust, maintain and store measuring to
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. Be knowledgeable in various modern measuring equipment	Potential Elements of the Performance: 6.1 Discuss modern computerized measuring equipment available today that enhance precise measurement 6.2 Demonstrate the basic use of laser equipment 6.3 Discuss measuring equipment available today that is used in vibration analysis, hydraulic testing.
Course Outcome 7	**Learning Objectives for Course Outcome 7**
7. Select and use proper hand tools based on application	Potential Elements of the Performance: 7.1 Hand tool safety. 7.2 Identify the correct sized wrenches. 7.3 Identify the correct screwdriver style 7.4 Identify different types of files. 7.5 Identify hand tools used in Mechanical trades. 7.6 Care and maintenance of hand tools.
Course Outcome 8	**Learning Objectives for Course Outcome 8**
8. The lathe, determine speeds, feeds and calculate thread parameters and tapers using formulas.	Potential Elements of the Performance: 8.1 Lathe safety & operation. 8.2 Identify parts of the lathe. 8.3 Identify various work holding devices on a lathe. 8.4 Calculate speeds and feeds. 8.5 Calculate thread parameters using formulas. 8.6 Calculate information required to cut tapers.
Course Outcome 9	**Learning Objectives for Course Outcome 9**
9. The Milling machine, determine speeds, feeds and type of cutting tool to suit the application.	Potential Elements of the Performance: 9.1 Milling machine safety. 9.2 Milling machine operation. 9.3 Identify parts of the Milling machine. 9.4 Identify various work holding devices on a Milling machine. 9.5 Calculate speeds and feeds.

	9.6 Identify various cutting tools for the correct application. 9.7 Explain the principle of a dividing head.
Course Outcome 10	**Learning Objectives for Course Outcome 10**
10. Understand the types, properties and applications of lubricants	Potential Elements of the Performance: 10.1 Identify lubricants used in different machines. 10.2 Identify the different types of lubricants. 10.3 Importance of viscosity in lubricants. 10.4 Identify lubricants used in machining operations 10.5 Practice safe handling of lubricants.
Course Outcome 11	**Learning Objectives for Course Outcome 11**
11. Discuss the use of Statistical Process Control in industry	Potential Elements of the Performance: 11.1 Discuss Statistical Process Control 11.2 Discuss the advantages of using Statistical Processes 11.3 Perform assignments in Statistical Process Control

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Homework/assignments	30%
Participation	10%
Tests	60%

Date: August 9, 2024

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