

I. COURSE DESCRIPTION:

This course is a continuation of MCH132-2. The course will focus on the student's understanding of the theoretical aspects of machining and manufacturing. It will include a review of topics from MCH 132 and also an introduction to milling machines. This course will cover all types of Milling Machines, their uses, cutters and cutter selection. Students will also be introduced to speeds and feeds and simple gear calculations and cutting.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. ***Have an awareness of safety in the operation of the machines and tools used in the trades.***

Potential Elements of the Performance:

- ✓ Justify the importance of shop safety
- ✓ Explain why it is important to develop safe work habits
- ✓ Recognize and correct unsafe work practices
- ✓ Identify hazards when operating machine shop equipment
- ✓ Identify hazards associated with machining different materials

2. ***Understand measurement (metric and imperial) and be able to use the various measuring tools to do their work.***

Potential Elements of the Performance:

- ✓ Measure to 1/64" (0.5mm) with a steel rule
- ✓ Measure 0.0001" (0.002mm) using a vernier micrometer
- ✓ Measure to .001" (0.02mm) using vernier measuring tools
- ✓ Use a dial indicator

3. ***Setup work in a lathe, determine feeds, speeds and how to calculate using threading formulas to cut a thread.***

Potential Elements of the Performance:

- ✓ Describe how a lathe operates
- ✓ Identify the various parts of a lathe
- ✓ Safely setup and operate a lathe using various work-holding devices
- ✓ Calculate speeds and feeds
- ✓ Calculate using formulas the information required to cut threads

4. ***Identify different types of Milling Machines and their operation including speeds and feeds.***

Potential Elements of the Performance:

- ✓ Identify three types of Milling Machines
- ✓ Learn about Horizontal Boring Mills
- ✓ Identify different applications and how to select the proper machine
- ✓ Learn how to operate equipment and adjust speeds and feeds
- ✓ Calculate speeds and feeds based on cutter selection
- ✓ Calculate speeds and feeds based on material specification
- ✓ Discuss variables in speeds and feeds in relation to work holding and machine type

5. ***Understand the types of milling cutters, and holders. Be able to select the proper cutter based on machine type and application.***

Potential Elements of the Performance:

- ✓ Explain various types of standard and specialized cutters
- ✓ Demonstrate care and safe handling of cutters
- ✓ Identify proper holding and driving methods for cutters
- ✓ Select proper cutter for different machining applications (I.E. flat facing)
- ✓ Identify cutters required to machine keyways, slots and gears
- ✓ Understand the difference between conventional and climb milling
- ✓ Understand standard and specialized work holding

6. ***Understand Spur Gears and how to successfully calculate using formulas.***

Potential Elements of the Performance:

- ✓ Discuss Spur Gears and there applications
- ✓ Calculate the required information to cut a spur gear using formulas
- ✓ Select the proper cutter for gear cutting
- ✓ Introduce the dividing head and learn how it functions
- ✓ Calculate indexing required to cut a Spur Gear
- ✓ Calculate simple gear train ratio's

7. ***Understand the types, properties and applications of lubricants.***

Potential Elements of the Performance:

- ✓ Identify lubricants used in different machines
- ✓ Learn the importance of viscosity in lubricants
- ✓ Identify lubricants used in machining operations (I.E. cutting fluids)
- ✓ Practice the safe handling of lubricants

III. TOPICS:

1. Safety and awareness in the shop
2. Precision measurement
3. Lathe operation and threading formulas
4. Milling machine types
5. Milling cutters and holders
6. Calculating and cutting Spur Gears
7. Understanding the types, properties and applications of lubricants

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Machine Shop Fundamentals Text and Workbook

Calculator, Binder, Paper and Pens

V. EVALUATION PROCESS/GRADING SYSTEM:

Tests	70 %
Assignments	20 %
Attendance and Participation	<u>10 %</u>
TOTAL	100 %

The following semester grades will be assigned to students in postsecondary courses:

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

VI. SPECIAL NOTES:Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

<include any other special notes appropriate to your course>

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.