

MACH102 : Machine Technology II

General Information

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| Author: | <ul style="list-style-type: none">Jorge Palma |
| Course Code (CB01) : | MACH102 |
| Course Title (CB02) : | Machine Technology II |
| Department: | MACH |
| Proposal Start: | Fall 2024 |
| TOP Code (CB03) : | (0956.30) Machining and Machine Tools |
| CIP Code: | (48.0501) Machine Tool Technology/Machinist. |
| SAM Code (CB09) : | Clearly Occupational |
| Distance Education Approved: | No |
| Will this course be taught asynchronously?: | No |
| Course Control Number (CB00) : | CCC000628526 |
| Curriculum Committee Approval Date: | 05/22/2024 |
| Board of Trustees Approval Date: | 07/16/2024 |
| Last Cyclical Review Date: | 05/22/2024 |
| Course Description and Course Note: | MACH 102 is a continuation of the fundamentals of the machinist trade. Advanced training in set-up work, tool grinding, and machine operations is presented. Related lectures cover types of threads and threading, calculating and cutting of tapers, gears and gear trains. Basic design and capacity of machine tools are investigated. |
| Justification: | Mandatory Revision |
| Academic Career: | <ul style="list-style-type: none">Credit |
| Mode of Delivery: | |
| Author: | |
| Course Family: | |

Academic Senate Discipline

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| Primary Discipline: | <ul style="list-style-type: none">Machine Tool Technology (Tool and die making) |
| Alternate Discipline: | No value |
| Alternate Discipline: | No value |

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

General Education and C-ID

General Education Status (CB25)

Not Applicable

Transferability

Transferable to CSU only

Transferability Status

Approved

Units and Hours

Summary

Minimum Credit Units (CB07) 3

Maximum Credit Units (CB06) 3

Total Course In-Class (Contact) Hours 126

Total Course Out-of-Class Hours 36

Total Student Learning Hours 162

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

Variable Credit Course

Funding Agency Category (CB23)

Not Applicable.

Cooperative Work Experience

Education Status (CB10)

Weekly Student Hours

| | In Class | Out of Class |
|------------------|----------|--------------|
| Lecture Hours | 1 | 2 |
| Laboratory Hours | 6 | 0 |
| Studio Hours | 0 | 0 |

Course Student Hours

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|--|-----|
| Course Duration (Weeks) | 18 |
| Hours per unit divisor | 54 |
| Course In-Class (Contact) Hours | |
| Lecture | 18 |
| Laboratory | 108 |
| Studio | 0 |

Total 126

Course Out-of-Class Hours

| | |
|--------------|-----------|
| Lecture | 36 |
| Laboratory | 0 |
| Studio | 0 |
| Total | 36 |

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

| Activity Name | Type | In Class | Out of Class |
|---------------|----------|----------|--------------|
| No Value | No Value | No Value | No Value |

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

MACH101 - Machine Technology I (in-development)

Objectives

- Demonstrate safety practices with machinery during milling and lathe operations.
- Perform a series of fundamental machining exercises in lathe and milling operations.
- Use precision inspection equipment.
- Demonstrate drilling, reaming, tapping and knurling procedures.
- Demonstrate the setup and utilization of various lathe and milling operations and procedures.

Entry Standards

Entry Standards

Course Limitations

Cross Listed or Equivalent Course

Specifications

Methods of Instruction

Methods of Instruction Lecture

Methods of Instruction Laboratory

Methods of Instruction Multimedia

Methods of Instruction Collaborative Learning

Methods of Instruction Presentations

Out of Class Assignments

- Reading assignments

Methods of Evaluation

Rationale

Project/Portfolio

Projects e.g. mill stop, deburring tool

Exam/Quiz/Test

Quizzes

Exam/Quiz/Test

Final examination

Textbook Rationale

No Value

Textbooks

| Author | Title | Publisher | Date | ISBN |
|------------------------|------------------------|------------------|------|-------------------|
| John Walker, Bob Dixon | Machining Fundamentals | Goodheart-Wilcox | 2023 | 978-1-64925-979-0 |

Other Instructional Materials (i.e. OER, handouts)

No Value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Perform a series of intermediate machining exercises on the engine lathe.

Articulate appropriate safety equipment and procedures used while machining.

Demonstrate proper surface, cylindrical grinding, and tool grinding techniques.

Perform a series of intermediate machining exercises on the vertical mill.

Explain the steps in the post-production part inspection process.

SLOs

Demonstrate safe and appropriate use of the lathe, mill, and grinding tools.

Expected Outcome Performance: 70.0

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| <i>ILOs</i> Core ILOs | Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems. |
| | Practice ethical and responsible behavior within personal, academic, professional, social, and societal contexts; recognize and welcome diverse lifestyle choices that promote physical, intellectual, psychological, and social well-being. |
| <i>MACH</i> Machinist - Certificate | Demonstrate the skills required in the field of machine and manufacturing technology, such as use of manual machining equipment. |
| <i>MACH</i> Machinist - A.S. Degree Major | Demonstrate the skills required in the field of machine and manufacturing technology, such as use of manual machining equipment. |

Explain the appropriate uses for each machine and small tool.

Expected Outcome Performance: 70.0

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|---|--|
| <i>ILOs</i> Core ILOs | Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems. |
| <i>MACH</i> Machinist - Certificate | Demonstrate the skills required in the field of machine and manufacturing technology, such as use of manual machining equipment. |
| <i>MACH</i> Machinist - A.S. Degree Major | Demonstrate the skills required in the field of machine and manufacturing technology, such as use of manual machining equipment. |

Calculate measurements accurately using a range of techniques in order to cut precisely.

Expected Outcome Performance: 70.0

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| <i>ILOs</i> Core ILOs | Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas. |
| | Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems. |
| | Use quantitative and/or analytical mathematical skills to solve problems and to interpret, evaluate, and process information and data to draw logical conclusions and support claims. |

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| <i>MACH</i> Machinist - Certificate | Demonstrate the skills required in the field of machine and manufacturing technology, such as technical mathematics. |
| | Demonstrate the skills required in the field of machine and manufacturing technology, such as use of manual machining equipment. |
| <i>MACH</i> Machinist - A.S. Degree Major | Demonstrate the skills required in the field of machine and manufacturing technology, such as technical mathematics. |
| | Demonstrate the skills required in the field of machine and manufacturing technology, such as use of manual machining equipment. |

Course Content

Lecture Content

Related Classroom Assignments (1 hour)

Small Tools (2 hours)

- Chisels and chipping
- Hack saws and sawing
- Files and filing

Drills (3 hours)

- Drilling operations
- Drill nomenclature
- Drill grinding for various non-ferrous and ferrous metals
- Types of drill presses

Machine Tapers (2 hours)

- How to calculate and cut tapers on engine lathe
- Methods to be used on engine lathe

Threads (2 hours)

- Definition and relationships of parts of a thread
- Design of threads and specific use
- Calculating and precision measurement of various threads

Gearing (2 hours)

- Types of gears and specific uses
- Definition and relationship of parts of gears
- Two hour lecture, discussion, and workshop on choosing, calculating, and cutting gears

Sawing and Cutting (2 hours)

- Design and operation of the horizontal saw
- Jobs using horizontal saw operations
- Design and operation of the vertical saw and cold saw
- Set up and operation of vertical saw and cold saw

Lathes (2 hours)

- Specialized engine lathe operations
- Specialized engine lathe equipment
- Types of turret lathes
- Specialized turret lathe equipment

Audio Visual Material (2 hours)

- Plain indexing and cutting spur gears – films
- Principles of gearing – film
- Gearing charts Vee and acme threading charts

Total hours: 18

Laboratory/Studio Content

Laboratory Assignments (24 hours)

- Gear - mathematical calculations, lathe, milling machine, drill press
- Horizontal and vertical sawing, lathe, surface grinder, honing, assembly, layout
- Thread cutting and measuring

Small Tools (8 hours)

- Chisels and chipping
- Hack saws and sawing
- Files and filing

Drills (16 hours)

- Drilling operations
- Drill nomenclature
- Drill grinding for various non-ferrous and ferrous metals
- Types of drill presses

Machine Tapers (8 hours)

- How to calculate and cut tapers on engine lathe
- Methods to be used on engine lathe

Threads (14 hours)

- Definition and relationships of parts of a thread
- Design of threads and specific use
- Calculating and precision measurement of various threads

Gearing (12 hours)

- Types of gears and specific uses
- Definition and relationship of parts of gears
- Two hour lecture, discussion, and workshop on choosing, calculating, and cutting gears

Sawing and Cutting (14 hours)

- Design and operation of the horizontal saw
- Jobs using horizontal saw operations
- Design and operation of the vertical saw and cold saw
- Set up and operation of vertical saw and cold saw

Lathes (12 hours)

- Specialized engine lathe operations
- Specialized engine lathe equipment
- Types of turret lathes
- Specialized turret lathe equipment

Total hours: 108

Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

No

GCC Major Requirements

No Value

GCC General Education Graduation Requirements

No Value

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Resources

Did you contact your departmental library liaison?

No

If yes, who is your departmental library liaison?

No Value

Did you contact the DEIA liaison?

No

Were there any DEIA changes made to this outline?

No Value

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

No Value

If additional resources are needed, add a brief description and cost in the box provided.

No Value