MACH A105: LATHE

Item	Value
Curriculum Committee Approval Date	10/06/2021
Top Code	095630 - Machining and Machine Tools
Units	5 Total Units
Hours	162 Total Hours (Lecture Hours 54; Lab Hours 108)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

A basic course in engine lathe operation to include ID and OD threading, knurling, boring, turning, facing, and cutting tapers. This course also includes exposure to the chucker lathe, tracer lathe, and the turret lathe. Safety and measurement are also emphasized. ADVISORY: MACH A100, MACH A120 and MACH A121. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Set up the engine lathe to cut internal and external threads with single point tools.
2. Demonstrate how to face, turn, ream, bore and machine tapers on an engine lathe.
3. Demonstrate the correct use of four and three jaw chucks and collet work holding devices.

Course Objectives

- 1. Accurately: turn, face, drill, ream, and bore on an engine lathe.
- 2. Setup and cut internal threads.
- 3. Setup and cut external threads.
- 4. Accurately machine internal tapers.
- 5. Accurately machine external tapers.
- 6. Grind the common tools used in the lathe.
- 7. Identify machine nomenclature and the function of the components of an engine lathe.
- 8. Identify the cutting tool for common operations performed on a lathe.
- 9. Setup and correctly use the four jaw chuck.
- 10. Setup and correctly use collet work holding devices.

Lecture Content

Orientation Course requirements Grading procedures Shop practices Shop tour Safety General shop safety Engine lathe safety Classification and Construction of the Lathe Size classification Types of lathes Capabilities of lathes Parts and functions Work Holding Devices Three jaw chuck Four jaw chuck Face plate Collet chuck Head stock center (working between centers) Tool Set Up Tool presentation from the compound rest Tool presentation from the tail stock Cutting Tool Material and Geometry High speed steel Carbide High speed steed tool grinding Speeds and Feeds Calculations Selecting feed rate Chip identification Special speed and feed circumstances Types of cuts Facing and turning Turning to a shoulder Turning between centers Turning Tapers Using the compound rest Using the Tailstock offset method Using the taper attachment Grooving and Cut off OD grooves ID grooves Cutting off stock and parts Knurling Filing and Polishing Filing techniques Polishing ID and OD Threading Screw thread systems Screw thread terminology Classification of fits Cutting the OD thread Cutting the ID thread Drilling Reaming and Boring General drilling Pilot drilling Reaming Boring tool use Special Lathes Chucker lathe NC lathe

Lab Content

General shop safety Work Holding Devices Tool Set Up Cutting Tool Material and Geometry Speeds and Feeds Facing and turning Turning Tapers Grooving and Cut off Knurling Filing and Polishing Drilling Reaming and Boring Threading

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

Instructional Techniques

Lecture, demonstration, and laboratory activities on a variety of lathes

Reading Assignments

Students will be given handouts as study guides. Approximately 2 hours per week.

Writing Assignments

Students will write short answers, quizzes and exams; some exams may be practical. Maintaining a notebook of class assignments and activities Approximately a 1.75 hours per week.

Out-of-class Assignments

Students will refer to notes and handouts in preparation for running the parts on the machine. Once the parts are complete student will fill out inspection reports to record their accuratcy of machinng. Approximately 3 hours per week.

Demonstration of Critical Thinking

Quizzes and final exam are 40%, laboratory work evaluation; laboratory work shall count as 60% of final grade

Required Writing, Problem Solving, Skills Demonstration

Students will write short answers, quizzes and exams; some exams may be practical

Eligible Disciplines

Machine tool technology (tool and die making): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Kibbe, Richard. Machine Tool Practices, 11TH ed. Atlanta: Prentice Hall, 2020 Rationale: -

Other Resources

1. Students required to supply basic measuring tools and safety goggles.