

Linn-Benton Community College
Machine Tool Technology Department
Course Syllabus

Course Name: CNC LATHE

Course Number: MA3.421 01/02

Hours, Days: 1:00-3:50 PM (01) or 6:00-8:50 PM (02) Wednesday and Thursday

Credits: 4

Calculator Required: Yes. (Sharp EL506X recommended)

Location: IC 119 / Modular Classroom

Instructor: Chris Berry

Office hours: Wednesday 4:00-5:00pm, Thursday 5:00-6:00pm

Phone number: Office 541-917-4509 / Cell 503-931-7728 (Text Only)

Email address: berryc@linnbenton.edu

Course Description: This course provides training in the safe operation and part programming of the CNC Turning Center. Students gain hands on skill and knowledge of NC code by completing a series of assignments. Manual, Manual Data Input (MDI) and Memory modes of operation on the Fanuc control will be covered.

Course Objectives: Students successfully completing this course will be able to:

- Read, write and edit NC code for two axes turning.
- Understand and follow Safety Procedures for CNC Machine Tools.
- Set Workshift Wear and Geometry Offsets.
- Plan a logical order of operations and tool changes.
- Demonstrate hands on skill when performing routine machine operator tasks.

Methods of Instruction: A combination of Lectures, Demonstrations, Programming Exercises, Quizzes, a Midterm Exam and a Final Exam are used to guide students to a series of competencies.

General Class Format:

- Classroom lecture and discussion; practical considerations on a topic are covered.
- The instructor demonstrates the application of the lecture topic at the Turning Center.
- Students study the hand-outs that relate to the topic as necessary.
- Following the directions in the Programming Exercise students draw the part and write the part program and have another student check the part program.
- After the procedure for proving a new part program has been performed, the part is turned.
- The drawing and a copy of the student's program are submitted for grading.

Methods of Evaluation: Student's progress will be assessed with a series of skills tests and laboratory assignments. Midterm and Final examinations will be given. Students are required to keep an organized notebook; the notebook factors into the final grade.

Skills tests = 15%

Lab assignments = 35%

Midterm exam = 10%

Final Exam = 25%

Notebook = 15%

Course Content: (Subject to change at instructor's discretion)

Week 1 Lecture and discussion topics: introductions, objectives, Syllabus, Cartesian coordinate System, lathe X and Z plane, the Fanuc 16T and 10 T controls, the Mori Seiki and Hitachi Seiki Turning Centers. Demonstration: Start-up procedure, Manual operation,, modes screen and the control panel Lab: Exercise 1 make a steel part using manual control.

Week 2 Lecture and discussion topics: G&M code for the Fanuc Controller, MDI Mode, Override Control, modal commands and Notepad. Demonstration: MDI Operation, safety considerations, absolute and incremental programming, spindle control, make an example part. Lab: Exercise 2, use MDI to make a part. Use incremental coordinates to cut two chamfers.

Week 3 Lecture and discussion topics: Automatic operation, Edit and Memory Modes, Circular Interpolation, new codes, New Programming Proving Procedure. Demonstration: example part program to show Memory operation and Circular Interpolation, IK and R values. Lab: Exercise 3, write, test and run a part program with Single Step turned on.

Week 4 Lecture and discussion topics: Geometry Offsets, Wear Offsets and Workshift, safe tool changes. Demonstration: Change Workshift for more than one tool, example part program with tool changes. Lab: Exercise 4, write a part program with Circular Interpolation, including roughing and finishing passes.

Week 5 Lecture and discussion topics: Canned Cycles, advantages and limitations. Demonstration: Example part program with G90. Lab: Exercise 5, write a part program that uses roughing and finishing passes.

Week 6 Lecture and discussion topics: multiple Repetitive Cycles G71 & G70, Threading on the Turning Center G76. Demonstration: Example programs, Multiple Repetitive Cycles G71 & G70, G76. Lab: Exercise 6, Threading.

Week 7 Lecture and discussion topics: Drilling and boring on the Turning Center. Demonstration: Example part program using center drill, pilot drill, insert drill, boring bar. Lab: Exercise 7, Make the part with inside diameter work.

Week 8 Lecture and discussion topics: Right Angle Trigonometry as it applies to toolpaths and tangent point calculation. Demonstration: Example part program with G71 and G70. Lab: Exercise 8, The Fillet.

Week 9 Lecture and discussion topics: Tool Nose Radius Compensation. Demonstration: Example part with G40, G42. Lab: Exercise 9, Tool Nose Radius Compensation.

Week 10 Lecture and discussion topics: Review for Final Exam. Lab: All projects due.

Week 11 Final Examination.

Request for Special Needs or Accommodations

Direct questions about or requests for special needs or accommodations to the LBCC Disability Coordinator, RCH-105, 6500 Pacific Blvd. SW, Albany, Oregon 97321, Phone 541-917-4789 or via Oregon Telecommunications Relay TTD at 1-800-735-2900 or 1-800-735-1232. Make sign language interpreting or real-time transcribing requests 2-4 weeks in advance. Make all other requests at least 72 hours prior to the event. LBCC will make every effort to honor requests. LBCC is an equal opportunity educator and employer.

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Students who may need accommodations due to documented disabilities, who have medical information which the instructor should know, or who need special arrangements in an emergency should speak with their instructor during the first week of class. If you believe you may need accommodations but are not yet registered with the Center for Accessibility Resources (CFAR), please visit the [CFAR Website](#) for steps on how to apply for services or call 541-917-4789.