

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Machining III
COURSE NUMBER	MACH 0201
DIVISION	Career and Technical Education
DEPARTMENT	MACH
CIP CODE	48.0501
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 1 Lab: 4
PREREQUISITES	MACH 0103, MACH 0105, MACH 0107, MACH 0108, MACH 0109

COURSE DESCRIPTION

This course will introduce the learner with the advanced operations and to properly identify, setup, and operate metal turning, milling equipment and safely. This course will emphasize hands on approach as well as classroom activities to familiarize the student with the process to complete job task analysis. Materials covered in this course will enhance the procedures learned in MACH 0108, 0109. This course will also cover common mathematical formulas that will be implemented into the curriculum to achieve expected learner outcomes.

PROGRAM ALIGNMENT

This course is part of a program aligned through the Kansas Board of Regents and Technical Education Authority. For more information, please visit:

https://kansasregents.org/workforce_development/program-alignment

PROGRAM LEARNING OUTCOMES

1. Students will be able to select tools, set up, and operate CNC mills and lathes.
2. Students will be able to program CNC mills and lathes by reading and interpreting technical drawings.
3. Students will be able to create CAD drawings of precision parts based on written descriptions and rough sketches.
4. Students will be able to make adjustments to CNC offsets based on measured dimensions to machine parts within specified print tolerances.

TEXTBOOKS

<http://kckccbookstore.com/>

METHODS OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom.

Methodology will be selected to best meet student needs.

COURSE OUTLINE

- I. General Applications.
 - A. Analyze special tooling
 - B. Define special holders
 - C. Determines correct tool holding methods
 - D. Plan tooling lists and selects proper tooling
 - E. Plan sequence of operations
 - F. Equipment adjustments to maintain accuracy
 - G. Identifies backlash and corrective actions
 - H. Proper cleanness of shop and related equipment
 - I. Equipment safety
 - J. Recordkeeping
 - K. Job planning
 - L. Identifies backlash and corrective actions
- II. Lathe operations.
 - A. Adjust equipment for speeds and feeds
 - B. Machines parts to proper tolerances
 - C. Set-up equipment for operations
 - D. Turn parts within tolerance ranges
 - E. Record maintenance performed on equipment
 - F. Machine maintenance
 - G. Performs PMI on engine lathes
 - H. Identify types and classification for fits
 - I. Calculation of formulas for common mathematic problems used in lathe operations
- III. Vertical milling machine operations.
 - A. Adjust equipment for speeds and feeds
 - B. Machine parts to proper tolerances
 - C. Sets-up equipment for operations
 - D. Mill parts within tolerance range
 - E. Machine maintenance
 - F. Perform PMI on vertical mills
 - G. Record maintenance performed on equipment
 - H. Identify types and classification for fits
 - I. Calculation of formulas for common mathematic problems used in milling operations

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Utilize general applications
 1. Conduct a job hazard (JHA) for lathes and mills.
 2. Recite safety rules for lathe and mills.
 3. Recite nomenclature of parts for lathe and mills.
 4. Create job analysis for production of parts from blueprints.
 5. Create job analysis for one off replication of parts.
 6. Maintain logs for tooling used.
 7. Analyze blueprints to select correct tooling and layout.
 8. Create blueprint for part replication.
 9. Select and apply cutting fluids.
 10. Record preventative maintenance log.
 11. Apply precautions needed to minimize shop hazards with equipment

- B. Perform engine lathe operations
 12. Identify part holding chucks, collets, and centers.
 13. Indicate parts in 4 jaw chuck.
 14. Indicate parts on face plate.
 15. Adjust equipment for speed and feeds for different materials.
 16. Take affirmative action to correct cutting conditions.
 17. Apply cutting fluids.
 18. Check accuracy of equipment.
 19. Adjust equipment to maintain accuracy.
 20. Demonstrate knowledge of the uses of dro's.
 21. Identify graduations marked on machine dials.
 22. Adhere to safety of equipment.
 23. Create job procedure list for sequence of operations.
 24. Set-up and select tooling.
 25. Set-up tool holders and tool blocks.
 26. Cut taper utilizing tail stock offset method.(OD)
 27. Cut taper utilizing taper attachment method. (ID)
 28. Perform parting operation.
 29. Perform grooving operations (ID and OD).
 30. Perform production job planning sheet.
 31. Indicate parts utilizing 4-jaw chuck.
 32. Machine parts between centers.
 33. Cut internal and external single point 60* threads.(mm and inch)
 34. Cut internal and external single point 29* threads.
 35. Machine parts to specified size.

36. Perform machine maintenance.
37. Record maintenance performed on equipment.

C. Perform vertical milling machine operations

38. Identify part holding devices for milling procedures.
39. Adjust equipment for speed and feeds for different materials.
40. Describe chatter and possible remedies.
41. Correct common milling problems.
42. Check accuracy of equipment.
43. Adjust equipment to maintain accuracy.
44. Demonstrate knowledge of the uses of dro's.
45. Identify graduations marked on machine dials.
46. Adhere to safety of equipment.
47. Create job procedure list for sequence of operations.
48. Apply cutting fluids.
49. Set-up and select tooling.
50. Set-up tool holders and collets.
51. Demonstrate knowledge of climb milling vs. conventional milling operations
52. Demonstrate the use of parallels.
53. Machine parts to specified size.
54. Perform machine maintenance.
55. Machine parts to tolerance with indexing head procedures.
56. Machine parts to tolerance with rotary table.
57. Tap holes in parts on vertical mill.
58. Bore hole to size with adjustable boring head.
59. Perform pocketing operations.
60. Record maintenance performed on equipment.

D. Calculate mathematical formulas

61. Identify fits and calculate parts for final machining.
62. Calculate feed and speeds with chip load per tooth.
63. Calculate trigonometric functions.
64. Convert metric to American and back to mm.
65. Calculate depth of cuts.
66. Calculate compound rest angles.
67. Calculate tailstock for taper turning operations.
68. Calculate direct and indirect indexing solutions.
69. Calculate hole locations for patterning.
70. Calculate RPM, SFPM.

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES

Student Handbook

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

College Catalog

<https://www.kckcc.edu/academics/catalog/index.html>

College Policies and Statements

<https://www.kckcc.edu/about/policies-statements/index.html>

Accessibility and Accommodations

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.