

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Machining Fundamentals I
COURSE NUMBER	MACH 0108
DIVISION	Career and Technical Education
DEPARTMENT	MACH
CIP CODE	48.0501
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 1 Lab: 4
PREREQUISITES	MACH 0101, MACH 0103, MACH 0104
COREQUISITES	MACH 0107

COURSE DESCRIPTION

This course will introduce the learner with the skills to properly identify, set-up, and operate metal turning and milling equipment 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. 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 read and interpret drawings and translate them into physical parts made from a variety of materials using manually operated machine tools
2. Students will be able to set up and safely operate manually operated machine tools.
3. Students will be able to inspect machined parts to verify dimensions fall within specified tolerances using a variety on precision measuring tools.
4. Students will be able to plot tool paths for CNC lathe and CNC mill parts in G-code from technical drawings.
5. Student will be able to accurately calculate proper machining feeds, speeds, and formulas.

TEXTBOOKS

<http://kckccbookstore.com/>

METHOD 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. Hazards of association.
 - A. Analyze hazards of lathes and mills.
 - B. Equipment nomenclature.
 - C. Equipment safety.
 - D. Application of cutting fluids.
 - E. Recordkeeping.
 - F. Job Planning.
- II. Work Holding devices and tooling.
 - A. Identifies methods of work holding.
 - B. Determines correct tool holding methods.
 - C. Plans tooling lists and selects proper tooling.
 - D. Plans sequence of operations.
 - E. Equipment adjustments to maintain accuracy.
 - F. Identifies backlash and corrective actions.
 - G. Proper cleanness of shop and related equipment.
 - H. Properly identifies chuck mounting systems.
- III. Lathe operations.
 - A. Adjust equipment for speeds and feeds.
 - B. Machines parts to proper tolerances.
 - C. Sets-up equipment for operations.
 - D. Machine maintenance.
 - E. Performs PMI on engine lathes.
 - F. Identify types and classification for fits.
 - G. Calculation of formulas for common mathematic problems used in lathe operations.
- IV. Vertical milling machine operations.
 - A. Adjust equipment for speeds and feeds.
 - B. Machines parts to proper tolerances.
 - C. Sets-up equipment for operations.
 - D. Machine maintenance.
 - E. Performs PMI on vertical mills.
 - F. Identify types and classification for fits.
 - G. 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. Perform safety inspections
 - 1. Conduct a Job Hazard (JHA) for lathes and mills.
 - 2. Recite safety rules for lathe and mills.
 - 3. Recite nomenclature

- B. Analyze prints
 - 4. Create job analysis for production of parts from blueprints.
 - 5. Create job analysis for one off replication of parts.
 - 6. Maintain log for tooling used.
 - 7. Analyze blueprints to select correct tooling and layout.

- C. select cutting fluids
 - 8. select and apply cutting fluids.

- D. perform maintenance on equipment
 - 9. record a preventative maintenance log.
 - 10. apply precautions needed to minimize shop hazards with equipment

- E. perform engine lathe operations
 - 11. identify part holding chucks, collets, and centers.
 - 12. install chucks on lathe.
 - 13. adjust equipment for speed and feeds for different materials.
 - 14. apply cutting fluids.
 - 15. check accuracy of equipment.
 - 16. adjust equipment to maintain accuracy.
 - 17. identify graduations marked on machine dials.
 - 18. adhere to safety of equipment.
 - 19. create job procedure list for sequence of operations.
 - 20. set-up and select tooling.
 - 21. set-up tool holders and tool blocks.
 - 22. face parts in chucks.
 - 23. straight and shoulder turn parts in chucks.
 - 24. machine parts between centers.
 - 25. drill, ream, and tap holes with lathe.
 - 26. counter sink, holes with lathe.
 - 27. machine parts to specified size.
 - 28. perform machine maintenance.
 - 29. record maintenance performed on equipment.

- F. perform vertical milling machine operations
 - 30. identify part holding devices for milling procedures.
 - 31. adjust equipment for speed and feeds for different materials.
 - 32. describe chatter and possible remedies.
 - 33. describe cutter loading.
 - 34. correct common milling problems.
 - 35. check accuracy of equipment.
 - 36. adjust equipment to maintain accuracy.
 - 37. identify graduations marked on machine dials.
 - 38. adhere to safety of equipment.
 - 39. create job procedure list for sequence of operations.

40. apply cutting fluids.
41. describe climb milling.
42. describe conventional milling.
43. identify types of collets and tool holders.
44. set-up and select tooling.
45. set-up tool holders and collets.
46. align machine head to table or fixtures.
47. indicate vise to milling table.
48. perform face milling operations.
49. perform peripheral milling operations.
50. perform fly cutting operations.
51. perform slotting operations.
52. drill, ream, and tap holes with vertical mill.
53. counter sink, counter bore holes with vertical mill.
54. machine parts in vise.
55. machine parts square.
56. machine parts to specified size.
57. perform machine maintenance.
58. record maintenance performed on equipment.

G. calculate mathematical formulas

59. identify fits and calculate parts for final machining.
60. calculate feed and speeds with chip load per tooth.
61. calculate trigonometric functions.
62. convert metric to American and back to mm.
63. calculate depth of cuts.

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>.

