

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Machine Fundamentals II
COURSE NUMBER	MACH 0109
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 0105, MACH 0107, MACH 0108

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/>

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 – NEED OUTLINE

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Identify safety for lathes and mills.
 - 1. Conduct a job hazard (JHA) for lathes and mills.
 - 2. Recite safety rules for lathe and mills.
 - 3. Apply precautions needed to minimize shop hazards with equipment.
 - 4. Adhere to safety of equipment.

- B. Analyze blueprints to produce parts.
 - 5. Create job analysis for production of parts from blueprints.
 - 6. Create job analysis for one off replication of parts.
 - 7. Analyze blue prints to select correct tooling and layout.
 - 8. Conduct job analysis.

- C. Select tooling for job planning.
 - 9. Maintain log for tooling used.
 - 10. Select tooling for a given job.
 - 11. Set-up tooling and apply proper holding methods.
 - 12. Record preventative maintenance log.
 - 13. Create job procedure list for sequence of operations.

- D. Select and dilute cutting fluids
 - 14. Select and dilute cutting fluids.
 - 15. Select and apply cutting fluids.

- E. Identify and use carbide inserts.
 - 16. Select carbide inserts for application.
 - 17. Identify carbide insert holders.

- F. Conduct operations with lathes for part producing.
 - 18. Identify part holding chucks, collets, and centers.
 - 19. Install chucks on lathe.
 - 20. Adjust equipment for speed and feeds for different materials.
 - 21. Describe chatter and possible remedies.
 - 22. Check accuracy of equipment.
 - 23. Adjust equipment to maintain accuracy.
 - 24. Demonstrate knowledge of the uses of dro's.
 - 25. Identify graduations marked on machine dials.
 - 26. Set-up and select tooling.
 - 27. Set-up tool holders and tool blocks.
 - 28. Align tailstock.
 - 29. Face parts in chucks.
 - 30. Straight and shoulder turn parts in chucks.
 - 31. Set-up and machine parts utilizing collets chucks.
 - 32. Set-up and machine parts utilizing face plates.
 - 33. Indicate parts utilizing 4-Jaw chuck.
 - 34. Machine parts between centers.
 - 35. Describe the uses of steady rest and follower rests.
 - 36. Drill, ream, and tap holes with lathe.
 - 37. Counter sink, counter bore holes with lathe.
 - 38. Bore holes with the lathe.
 - 39. Machine parts to specified size.
 - 40. Perform machine maintenance.
 - 41. Record maintenance performed on lathes.

- G. Conduct operations with vertical mill for part producing.
 - 42. Identify part holding devices for milling procedures.
 - 43. Adjust equipment for speed and feeds for different materials.
 - 44. Describe chatter and possible remedies.
 - 45. Describe cutter loading.
 - 46. Correct common milling problems.
 - 47. Check accuracy of equipment.
 - 48. Adjust equipment to maintain accuracy.
 - 49. Demonstrate knowledge of the uses of dro's.
 - 50. Identify graduations marked on machine dials.
 - 51. Describe climb milling.
 - 52. Describe conventional milling.
 - 53. Identify types of collets and tool holders.
 - 54. Set-up and select tooling.
 - 55. Set-up tool holders and collets.
 - 56. Align machine head to table or fixtures.

57. Indicate vise to milling table.
 58. Perform Face milling operations.
 59. Perform peripheral milling operations.
 60. Perform fly cutting operations.
 61. Perform slotting operations.
 62. Perform form milling operations.
 63. Drill, ream, and tap holes with vertical mill.
 64. Counter sink, counter bore holes with vertical mill.
 65. Machine parts in vise.
 66. Machine parts square.
 67. Machine angles using vertical mill.
 68. Machine parts to specified size.
 69. Perform machine maintenance.
 70. Record maintenance performed on mills.
- H. Correctly use the machinery's handbook.
71. Locate tolerances within machinery's handbook.
 72. Locate tolerances for fits within machinery's handbook.
 73. Identify classes of fits for threading.
 74. Locate taper tolerances within machinery's handbook.
- I. Perform mathematical calculations to determine correct solutions for tasks.
75. Identify fits and calculate parts for final machining.
 76. Calculate feed and speeds with chip load per tooth.
 77. Calculate trigonometric functions.
 78. Convert metric to American and back to mm.
 79. Calculate depth of cuts.
 80. Calculate angles and tapers.
 81. Measure threads.
 82. Perform cordial segment formulas.
- J. Correctly select and use hand tools.
83. Locate hand tools for set-up operations of lathes and mills.
 84. Correctly store hand tools.
 85. Identify spanner wrenches.
 86. Identify collets wrenches.
 87. Correctly use collets and spanner wrenches.

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>.