



Master Course Syllabus

MAC 1022: Advanced Milling Machine Operations

Purpose of Document

This document contains important information about this course's objectives. It may be helpful for you to retain a copy for your records, along with the class specific syllabus. This document will be especially helpful if you decide to later change your course of study.

Pikes Peak State College and the Colorado Department of Higher Education have determined that graduates should have a broad range of learning skills as well as discipline related skills. Both types of skills are detailed below.

Course Description

Prepares students to indicate the head of a vertical mill, bore holes, drill holes at an angle, and work with tolerances of .0008 inches location and diameter.

Credit Hours: 3

Contact Hours: 67.5 (Lecture/Lab Combination)

Required Course Learning Outcomes

- I. Demonstrate proficiency in indicating and adjusting the head of a vertical milling machine.
- II. Explain the consequences (in terms of work inaccuracies) of an improperly indicated head.
- III. Demonstrate the use of a boring head on the horizontal milling machine.
- IV. Explain the differences in boring with a vertical and horizontal milling machine.
- V. Demonstrate the use of a swivel vice on the horizontal milling machine.
- VI. Demonstrate the use of a sine vise on the vertical milling machine.
- VII. Demonstrate the use of angular head adjustments on the vertical milling machine to drill holes at angles and mill angled surfaces.
- VIII. Demonstrate the use of angular table adjustments on the vertical milling machine for milling angled surfaces.
- IX. Describe how form cutters differ from other milling cutters.
- X. Identify and describe the cutters used for form milling.
- XI. Describe the typical applications where form cutters are used.
- XII. Calculate the speeds and feeds required for form milling.
- XIII. Describe the setups used for form milling.
- XIV. Demonstrate form milling on the vertical milling machine.
- XV. Identify the standard forms of key seats.
- XVI. Calculate the amount of material to remove for the chordal segment.
- XVII. Identify and describe the tools used to mill key seats.
- XVIII. Identify the size of Woodruff key seat cutters.

- XIX. Describe the process used to mill key seats in the ends of a shaft.
- XX. Describe the process used to mill key seats in the middle of a shaft.
- XXI. Describe the process used to mill Woodruff key seats.
- XXII. Identify and describe the cutters used for form milling.
- XXIII. Describe the process used to mill a `T` slot.
- XXIV. Describe the process used to mill a dovetail.
- XXV. Describe the process used to mill a round/bottom slot.
- XXVI. Describe the process used to mill a rounded corner.
- XXVII. Describe the process used to form mill with a fly cutter.
- XXVIII. Demonstrate form milling on the vertical milling machine.

Required Topical Outline

- I. Indicate Head: Indicating the Head of a Vertical Milling Machine.
- II. Boring: Boring Holes on the Horizontal Milling Machines.
- III. Drilling and Milling at an Angle: Milling Machine Setups for Angled Cutting and Drilling.
- IV. Form Milling (Horizontal): Form Milling on the Horizontal Milling Machine.
- V. Milling Key Seats: Vertical Milling of Key seats.
- VI. Form Milling (Vertical): Form Milling on the Vertical Milling Machine.