KMAT-0105 Basic Mill

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Competencies and Learning Objectives

1. Demonstrate how to clamp and hold a workpiece.
    - Use a standard milling vise to hold a workpiece
    - Elevate workpiece using parallels
2. Adjust correct speeds and feeds for side milling.
    - Calculate speed using RPM formula
    - Set correct speeds and feeds on mill
    - Use digital readouts to mill part to size
3. Perform precise positioning using an edge finder.
    - Identify reference point on blueprint
    - Locate edges on x- and y-axes
4. Demonstrate drilling and tapping using a mill.
    - Drill hole in workpiece
    - Attach tap to mill
    - Adjust RPMs for tapping
    - Tap a hole using the mill
5. Demonstrate conventional and climb milling.
    - Rough cut window in material using conventional method
    - Finish cut window using climb milling method
6. Demonstrate boring using a mill.
    - Prepare workpiece for boring
    - Bore hole using an adjustable boring head
7. Demonstrate correct layout procedures.
    - Coat workpiece with layout fluid
    - Scribe position lines on workpiece using a height gauge
8. Demonstrate plunge milling.
    - Locate reference point

- Mill hole using plunge method

Course Description

This course is an introduction to setting up and using a mill in a machine shop. Basic milling and the theory, which includes operation and performance of vertical knee mills will be covered.

Competencies

Upon completion of the course, you will be rated as MC (Mastered Competency) or NM (Not-Mastered Competency) based on ability to demonstrate the established competencies for the course. You will:

1. Demonstrate how to clamp and hold a workpiece.
2. Adjust correct speeds and feeds for side milling.
3. Perform precise positioning using an edge finder.
4. Demonstrate drilling and tapping using a mill.
5. Demonstrate conventional and climb milling.
6. Demonstrate boring using a mill.
7. Demonstrate correct layout procedures.
8. Demonstrate plunge milling.

Assessment

During the course you be given written and performance exams.

Lab Final 1

Lab Final 2

Lab Final 3

Written Exam

You must pass with at least a score of 80% or higher on each summative assessment to be considered Master Competent and complete the course.

Course work

The course work for this class will be available partially online and partially in the lab. You will need to complete both the online and classroom portions to obtain the all of the course information.

Safety

In this course, you are expected to utilize safe behaviors and safety equipment for a machine shop. Safety will be evaluated in all performance exams.

Flexibility

If you feel that you are ready to do the lab final or exams without completing the course modules, please contact your instructor.

Contact and Assistance

If you need additional assistance with course material, you may consult with your instructor during open lab times Mon-Thur from 5pm to 9pm.

If you have questions about coursework outside of lab hours you may contact your instructor via text/voice 347-920-1047 or email darrell.smith@slcc.edu.

If you have technical issues with Internet access, computer labs, applications, BruinMail, Printing, or software navigate to http://www.slcc.edu/student/help.aspx

If you have technical issues with Canvas, navigate to https://faculty.slcc.edu/elearning/canvas.aspx

Syllabus

The expectations for this course are described in detail in the course syllabus. (Link to syllabus)

Course Navigation

In the left navigation bar is a Course Tools menu. It provides information about what tools you need for the course, and how to navigate in Canvas. Start the course with the first module below. You can also click on the **Modules** link in the left navigation bar to navigate through the course.

Modules

Module 1

Module 1: Overview

Introduction to the Module: This module will cover clamping and holding a workpiece. You will have access to learning materials and activities including a video demonstration. You will also complete a lab activity in the shop. Assessment of competencies in this module will take place in a lab final in Module 6 to be taken when you have completed modules 1-6.

The course work in this module, combined with class sessions should prepare you to:

Demonstrate how to clamp and hold a workpiece.

1. Use a standard milling vise to hold a workpiece
2. Elevate workpiece using parallels

Module 1: Tooling U

The learning resources listed below will give you a basic overview of the manual mill in a machine shop. It is recommended that you complete all of the Tooling U modules listed below within one week. * Learning modules contain learning material, assignments and a practice quizzes.

Click here to enter Tooling U. *(Instructor uses materials and learning activities from this publisher)*

1. Basics of the Manual Mill
2. Intro to holding a workpiece
3. Clamping Basics

*Note: Modules vary in length so budget your time wisely.

Module 1: Video Demonstration

Watch the video titled: How to clamp and hold a workpiece

Information included in this video demonstration

1. How to clamp a workpiece using a standard milling vice
2. How to elevate a workpiece using parallels

Click this link to view the video.

Module 1: Check in Lab 1

Now that you have completed the learning materials for Module 1, check in with your instructor for information about Lab 1: Mill Cover Plates/Drill Cover Plates.

Module 2

Module 2: Overview

Introduction to the Module: This module will introduce you to setting speeds and feeds using a mill. You will have access to learning materials and activities including a video demonstration. Assessment of competencies in this module will take place in a lab final at the end of Module 6, to be completed when you have completed modules 1-6.

The course work in this module, combined with class sessions should prepare you to:

Adjust correct speeds and feeds for side milling.

1. Calculate speed using RPM formula
2. Set correct speeds and feeds on mill
3. Use digital readouts to mill part to size

Module 2: Tooling U

The learning resources listed below will give you information about setting speeds and feeds on a mill. It is recommended that you complete all of the Tooling U modules listed below within one week. * Learning modules contain learning material, assignments and a practice quizzes.

Click here to enter Tooling U.

1. Overview of the Manual Mill Setup
2. Manual Mill Operation

*Note: Modules vary in length so budget your time wisely.

Module 2: Video Demonstrations

Watch the video titled: Setting Speeds & Feeds for Side Milling

Information included in this video demonstration

1. How to calculate speeds using an RPM formula
2. How to set correct speeds and feeds on a mill
3. How to use digital readouts to mill a part to size

Click this link to view the video.

Module 2: Check in

Now that you have completed the learning materials for Module 2, check in with your instructor if you have questions, or move on to Module 3.

Module 3

Module 3: Overview

Introduction to the Module: This module will cover edge finding. You will have access to a video demonstration. You will also practice this skill in Labs 1-5 in the shop. Assessment of competencies in this module will take place in a lab finals at the end of Module 7.

The course work in this module, combined with class sessions should prepare you to:

Perform precise positioning using an edge finder.

1. Identify reference point on blueprint
2. Locate edges on x- and y-axes

Module 3: Video Demonstration

Watch the video titled: Finding an edge

Information included in this video demonstration

1. How to identify references points on a blueprint *(Note: This video was never created.)*
2. How to locate edges on x and y axises

Click this link to view the video.

Module 3: Check in

Now that you have completed the learning materials for Module 3, check in with your instructor if you have questions, or proceed to module 4.

Module 4

Module 4: Overview

Introduction to the Module: This module will cover conventional and climb milling. You will have access to learning materials and activities including a video demonstration. You will also complete a lab activity in the shop. Assessment of competencies in this module will take place in a lab final at the end of module 6.

The course work in this module, combined with class sessions should prepare you to:

Demonstrate conventional and climb milling.

1. Rough cut window in material using conventional method
2. Finish cut window using climb milling method

Module 4: Tooling U

The learning resources listed below will give you a basic overview of the conventional and climb milling. It is recommended that you complete all of the Tooling U modules listed below within one week. * Learning modules contain learning material, assignments and a practice quizzes.

Click here to enter Tooling U.

1. Supporting and Locating Principles
2. Locating Devices
3. Fixture Body Construction

*Note: Modules vary in length so budget your time wisely.

Module 4: Video Demonstrations

Watch the video titled: Conventional and Climb Millin

Information included in this video demonstration

1. How to rough cut window using the conventional method
2. How to finish cut window using the climb milling method

Click this link to view the video.

Module 4: Check in Lab 4

Now that you have completed the learning materials for Module 4, check in with your instructor for information about lab 4: Mill Cover Plate Window.

Module 5

Module 5: Overview

Introduction to the Module: This module will cover boring on a mill. You will have access to learning materials and activities including a video demonstration. You will also complete a lab activity in the shop. Assessment of competencies in this module will take place in a lab final at the end of module 6.

The course work in this module, combined with class sessions should prepare you to:

Demonstrate how to bore using a mill.

1. Prepare workpiece for boring
2. Bore hole using an adjustable boring head

Module 5: Tooling U

The learning resources listed below will give you a basic overview of the basic operation of a lathe in a machine shop. It is recommended that you complete all of the Tooling U modules listed below within one week. * Learning modules contain learning material, assignments and a practice quizzes.

Click here to enter Tooling U.

1. Hole Making on the Mill
2. Hole Inspection

*Note: Modules vary in length so budget your time wisely.

Module 5: Video Demonstrations

Watch the video titled: How to bore using a mill

Information included in this video demonstration

1. How to prepare a workpiece for boring
2. How to bore a hole using an adjustable boring head

Click this link to view the video.

Module 5: Check in Lab 5

Now that you have completed the learning materials for Module 5, check in with your instructor for information about Lab 5: Bore Cover Plate.

Module 6

Module 6: Overview

Introduction to the Module: This module will cover correct layout procedures. You will have access to learning materials and activities including a video demonstration. You will also

complete a lab activity in the shop. Assessment of competencies in this module will take place in a lab final at the end of this module.

The course work in this module, combined with class sessions should prepare you to:

Demonstrate correct layout procedures.

1. Coat workpiece with layout fluid
2. Scribe position lines on workpiece using a height gauge

Module 6: Tooling U

The learning resources listed below will cover basic layout procedures in a machine shop. It is recommended that you complete all of the Tooling U modules listed below within one week*. Learning modules contain learning material, assignments and a practice quizzes.

Click here to enter Tooling U.

1. Benchwork and Layout Operations

*Note: Modules vary in length so budget your time wisely.

Module 6: Video Demonstration

Watch the video titled: Layout Procedures

Information included in this video demonstration

1. How to coat a workpiece with layout fluid
2. How to scribe position lines on workpiece using a height gauge

Click this link to view the video.

Module 6: Check in Lab Final 1

Now that you have completed the learning materials for Module 1-6, check in with your instructor for information about the Lab Final 1: Mill Housing LXWXH/SCRIBE

Module 7

Module 7: Overview

Introduction to the Module: This module will cover plunge milling. You will have access to learning materials including a demonstration video and lab activity. Assessment of competencies in this module will take place in lab finals 2 and 3 and a final exam at the end of this module.

The course work in this module, combined with class sessions should prepare you to:

Demonstrate plunge milling.

1. Locate reference point
2. Mill hole using plunge method

Module 7: Video Demonstration

Watch the video titled: Plunge Milling

Information included in this video demonstration

1. How to locate a reference point
2. How to mill a hole using the plunge method

Click this link to view the video.

Module 7: Check-in Lab 7

Once you have reviewed the learning materials and activities for Module 7, check-in with your instructor for information about lab 7: Mill Housing Cavity A.

Module 7: Check in Lab Final 2 & 3

Now that you have completed the learning materials for Module 7, check in with your instructor for information about Lab Finals 2 & 3: Mill Housing Cavity B, Housing Saw and Bore.

Module 7: Written Exam

Once you have reviewed the Tooling U learning resources, lecture and labs, take the exam to see what you have learned.

Module 7: Check in Written Exam

Now that you have completed Module 7, check in with your instructor to discuss your Exam results and completion of the course.