Mill Training Packet

Introduction:

Mill training is required for using the Milling Machines in the Olin Machine Shops. The training consists of a set of background reading, a test about the reading, a training session with an instructor, and a test piece. The instructor led portion is done in groups of three in two three hour sections of time and cannot be scheduled without completing the background reading and passing the test. The training is not complete until one makes the test piece. This training packet is the record of your training status so keep track of it until you have completed the training, upon which it will be kept by the shop as a permanent record.

1) Obtain milling machine training packet (that is this packet) by downloading the training packet
2) After completing the readings complete the quiz and turn it in to an instructor
3) Instructor will score it and then send you a session invitation with available training times
4) Add your name and session availability on the link provided by the instructor
5) NOTE: Be available for 2 consecutive training sessions precisely one week apart
6) Receive training instruction from a shop instructor
7) Fabricate your test piece during you second training session
8) Have instructor record completion of your machine training on the tools.olin.edu website

Completion Checklist:

	Instructor's initials	Date
Completion of reading test		
Completion of training session		
Completion of test part		
Signed Machine Training Acknowledgment Sheet		

Readings:

The readings are pulled from *Machine Shop Practice*, volumes 1 and 2 by K.H. Moltrecht and the *Machinery's Handbook*, 26th Edition. These books are on reserve in the library, or a scan of the appropriate pages can be found in P:\Machine Shop Share\Training. Please skim the text and study the picture of the following sections related to the mill and operations covered in mill training. The readings are designed to establish a foundation that can then be built upon during the instructor lead portion. The reading and test are estimated to take 1-2hrs. You are not expected to get a perfect score on this test.

Basic Mill Construction	Vol 2: pg 69-80
End Milling Cutters	Vol 2: pg 111-116

Cutting Speeds and Feeds	Vol 2: pg 132-143
Climb Milling	Vol 2: pg 151-153
Face Milling	Vol 2: pg 166-171
End Milling	Vol 2: pg 171-173
Edge Finding	Vol 1: pg 430-432
Reaming	Vol 1: pg 92-96, 133-134
Tapping	Vol 1: pg 96-100
Allowances and Tolerances for Fits	MHb: pg 621-641

Reading Test Instructions:

Skim all of the readings before starting the test. Attempt to answer all of the questions in a closed book environment, and then using a different pen color check your answers and answer unanswered questions using the book. You will need correct answers to all of the questions before you can schedule a training session with an instructor.

Reading Test:

1) How many axes does a standard knee-type milling machine have? What are they and sketch their orientation and positive direction on the machine?

2) Compare climb milling and conventional milling?

3) When should conventional milling be used?

4) When should climb milling be used?

5) What part of the end mill is used for face milling?

6) What part of the end mill is used for profiling?

7) What is an edge finder used for?

8) What type of end mill is best used for cutting aluminum? How many flutes?

9) What type of end mill is best used for cutting steel? How many flutes?

10) When looking from the top of the milling machine spindle, which direction should the cutting tool rotate for right handed cutting tools? We only have right handed cutting tools in the Olin shop.

11) What is the difference in form and use between a plug and bottoming tap?

12) Why would a machinist use a reamer?

13) What size hole would you drill in preparation for reaming a 0.250 hole?

14) If you calculate that an appropriate spindle speed for drilling a certain size hole is 1000 RPM, what speed is appropriate for reaming the same size hole?

15) When is it ok to remove your safety glasses in the shop?

16) When is it appropriate to work alone in the shop

17) When is it ok to run a machine with two operators?

18) When is it ok to leave machinery running unattended?

19) What are the mini-shop hours of operation?

20) What is the emergency assistance phone number at Olin?

21) Can gloves be worn when using the mill?

22) When can compressed air be used to clean machinery?

23) When is it permissible to slow down the rotation components of a machine with one's hand?

24) For a standard HSS end mill, what is a typical LOC (length of cut/length of flutes). State your answer in diameters of the cutter.