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MCH 134.01: Introduction to Manual Mills

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**THE UNIVERSITY OF MONTANA MISSOULA
MISSOULA COLLEGE
INDUSTRIAL TECHNOLOGY DEPARTMENT**

COURSE SYLLABUS

COURSE NUMBER AND TITLE: MCH 134 Introduction to Manual Mills

DATE REVISED: Autumn 2017

SEMESTER CREDIT: 3

PREREQUISITES: None

INSTRUCTOR: Jeffrey J. John

E-MAIL: Jeffrey.john@mso.umt.edu

PHONE: 406-243 7646

OFFICE LOCATION: Machining Lab

OFFICE HOURS: 8:00 am – 4:00 pm

COURSE DESCRIPTION: Instruction to a career as a machinist, the importance of being a machinist, professionalism in the trade, the opportunities that exist as a machinist, types of materials, surface finish on materials. Fraction to decimal conversion, inch to metric conversion, lean manufacturing principals, and the importance of safety.

STUDENT PERFORMANCE OUTCOMES:

Occupational Performance Objectives

Upon completion of this course, the student will be able to correctly:

1. Understand how to dial in a vise.
2. Understand proper chip loads and depths of cut.
3. Understand the difference in end mills.
4. Understand how to calculate feeds.
5. Understand Machined finish properties.
6. Understand fraction to decimal conversions
7. Understand inch to metric conversion.
8. Understand how to tap and power tap.
9. Understand machine safety practices.

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

STUDENT EXPECTATIONS:

Students are expected to treat the class as they would a job in their field of study which means:

- Follow all safety rules and classroom or laboratory procedures
- Pay attention, take notes, and read and refer to the textbook
- Bring all required materials daily, or lose a percentage point per occurrence
- Participate in lab clean-up, which begins 30 minutes before the scheduled class end
- Participate in semester end lab clean-up, or lose all of the professionalism grade
- No food or drink, smoke-breaks, cell-phones or other personal multimedia in or during class
- Utilize online resume builder and create a one page letter of intent
- Practice interview and work on interview skills

Each student will be responsible for cleaning the lab area in a team effort.

COURSE GRADING SCALE:

A = 90% - 100%
 B = 80% - 89%
 C = 70% - 79%
 D = 60% - 69%
 F = <60%

IMPLIED FEATURE GRADING SCALE:

A ± .000" - .002" of design specifications*
 B ± .0021" - .004" of design specifications*
 C ± .0041" - .007" of design specifications*
 D ± .0071" - .011" of design specifications*
 F > .011" of design specifications*

NOTE: Courses must be passed with a 'C minus (C-)' or greater to count toward degree/certificate requirements.

The following criteria will be used for grading. Grades will be posted periodically and will be available to students upon request during office hours.

1. Assignments: 20%

- a. **Due Assignments** are to be turned in before 5 minutes after the class is scheduled to begin, otherwise it will be considered Late Work*.
- b. **Late Work** will not be accepted unless absences are excused; and are due the following day.
- c. **Corrected Assignments** will be returned the Monday after they are corrected. If you are absent, acquire corrected assignments before or after class.
- d. **Missed Assignments** will be made available to students with excused absences only.

2. Tests: 15%

- a. Tests, quizzes, and pop quizzes will not be made up if missed.
- b. Written test's:
 - i. 3 attempts total*
 - ii. >90% Score required to operate machinery
 - iii. Available every Monday at 8:00 AM
 - iv. Due every Friday at 12:00 AM

3. Lab: 40%

- a. Quality of project workmanship (see Feature Grading Scale)
- b. Quality of project measurement, processes, and quality control

4. Professionalism: 10%

- a. Work ethic (safety, work done on time, care of tools and equipment, etc.)
- b. Interpersonal skills (cooperation, leadership, participation, attitude, etc.)

5. Attendance: 15%

- a. 3 unexcused absence = one letter grade drop
- b. See attendance policy and student expectations

ATTENDANCE POLICY:

It is the student's responsibility to utilize class time to acquire and maintain skills in preparation for quizzes, exams, and completion of assignments and projects. Students must attend all lab and equipment safety/training days to be allowed access to the lab. Failure to do so may result in removal from the course.

Three unexcused absence will result in one letter grade drop..

Notify the instructor of absence(s) before scheduled class time, via phone or email listed above. Absences are considered an "unexcused absence" unless a doctor's note is received. There will be no "make-up" for quizzes, tests, or assignments missed due to unexcused absences. "Excused absences" will receive a matching number of days excusal period as absent starting immediately upon your return. It is the student's responsibility to get caught-up before course work is due.

REQUIRED TEXTBOOKS

GD&T by David P. Madsen ISBN-13:978-1605259383/ISBN-10:1605259381

Machinist's Ready Reference by C. Weingartner ISBN-13:978-0970339850/ISBN-10:0970339852

Machinery's Handbook 29th by Erik Oberg ISBN-13:978-0831129002/ISBN-10:083112900X

REQUIRED MATERIALS AND TOOLS: (Failure to bring required materials results in -1% professionalism)

- Basic scientific calculator
- 1" Dial Indicator
- .030 test indicator
- 6 " decimal scale (Starrett or equivalent)
- 0-1 O.D. Micrometer (non digital)
- Pocket scribe
- Standard allen wrench set
- Short sleeve smock
- Paddle lock (for locker)
- Safety glasses
- Standard thread pitch gauge
- Small dead blow mallet
- Lathe turning tool set
- 1/2" carbide end mill (2 or 4 fluted)
- 4" or 6" Dial Caliper (no plastic)
- 3 ring binder
- Tool bag or small box

ACADEMIC INTEGRITY: All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/SA/VPSA/index.cfm/page/1321>.

DISABILITY ACCOMMODATION: Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at <http://www.umt.edu/dss/> or call 406.243.2243 (Voice/Text).

NOTE: Faculty reserves the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances.

COURSE OUTLINE:

1. Safety
 - Eye, ear, hand, lung, and other body protection
 - Proper use of hand and power tools
 - Shop and machine maintenance
2. Measuring
 - Gage Blocks
 - Calipers
 - Micrometers
 - Dial indicators
3. Metals and Metal Identification
 - Steel Classifications

- Ferrous
- Non-ferrous
- Heat treating
- 4. Machine Shop Layout
 - Surface preparation
 - Layout tools
 - Layout procedures
- 5. Cutoff
 - Band saws
 - Abrasive saws
- 6. Grinding
 - Abrasive types
- 7. Drills and drilling
 - Drill press identification
 - Drill press processes
 - Twist drills
 - Speeds and feeds
 - Hold downs and fixtures
- 8. Engine Lathe Operation
 - Introduction and Safety
 - Setup and Operation
- 9. Milling Machine Operation
 - Introduction and Safety
 - Setup and Operation
- 10. Fasteners
 - Cap screws and Machine Screws
 - Cotter and roll pins
 - Taper pins
 - Press pins
 - Keys
 - Liquid locking products
- 11. Threads and Threading
 - Bolt strength classification
 - Thread size and classification
 - Thread terms and definitions
 - Hand taps and dies
 - Bolt and nut extraction
 - Tap extraction

GENERAL LAB SAFETY RULES

All students must agree to follow this non-inclusive list of safety rules and professional behavior guidelines.

Work Safely:

1. **Never work unsupervised.** All students must notify the instructor before and after working in the lab.
2. **Never work when impaired,** due to inadequate sleep or under the influence of alcohol or other substances.
3. **Never operate machinery without receiving proper instruction.** This includes but is not limited to passing Blackboard safety tests and the proper management of machine setup, speeds, feeds, and depths of cut, for any given process.
4. **Exercise as many safety precautions as possible,** including wearing safety glasses and other protective clothing and accessories at all times when working in the lab, including demonstrations and cleanup.
5. **Clean spills IMMEDIATELY!**

Know what to do in case of an EMERGENCY:

1. Know the locations of machine and laboratory emergency shut-off switches and/or power boxes.
2. Know the locations, eyewash station, fire extinguishers, fire exits, and first aid kits.
3. Report all personal injuries immediately.
4. Prevent chemical accidents by familiarizing yourself with the chemical(s) in the MSDS.

Violations of General Lab Safety Rules:

- **1st offense:** Verbal warning.
- **2nd offense OR any serious infraction:** Student is unable to use the facility for one (1) full day of scheduled lab time immediately following the offense.
- **3rd offense OR any offense creating a dangerous situation:** Student may be subject to termination from the course.

My signature below indicates that I have read and understand the descriptions, policies and procedures stated in the syllabus for MCH 134 Introduction to Manual Mills:

Student Name (Print): _____

Student Signature: _____

Date Signed: _____