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MCH 114.01: Related Metals Processes - WEL I

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

COURSE SYLLABUS

COURSE NUMBER AND TITLE: MCH 114 Related Metals Processes

DATE REVISED: Autumn 2018

SEMESTER CREDITS: 3

PREREQUISITES: None

Instructor: Brad Platts

E-Mail: bradley.platts@mso.umt.edu

(According to Federal and UM policies I cannot answer any email that does not come from an official UM email address; no Hotmail, AOL, yahoo, gmail, etc.)

Phone: 243-7647

Office: Welding Lab Office

Office Hours: By appointment or as posted on Faculty office door.

COURSE DESCRIPTION: Through classroom study and lab practice, students will learn to use metalworking machine equipment and high accuracy measuring tools. Students will perform a variety of tasks to demonstrate their ability to accurately build from blueprints and maintain stated dimensional tolerances.

STUDENT PERFORMANCE OUTCOMES:

Occupational Performance Objectives

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

1. Students will develop an understanding of all commonly used measuring and layout devices applicable to metalworking.
2. Students will develop the skill to safely and accurately operate all commonly used metalworking machine equipment.

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Grading Scale:

A= 100%- 90%

B= 89%- 80%

C= 79%- 70%

D= 69%- 60%

F= 59%- 0%

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

Grading Breakdown:

Lab Work	35%
Exams	30%
Quizzes	10%
Professionalism	20%
Notebook	5%

Lab Work: Students will be given blueprints that detail projects demonstrating basic required skills. Students that complete the required projects will have the opportunity to make projects of their choice as time and skill level allow. Student chosen projects are subject to instructor approval.

Exams: Students will demonstrate by written exam the necessary mathematical, organizational, and technical abilities to use machining equipment.

Quizzes: Quizzes may be given at anytime during the course scheduled meeting time. **No make-up quizzes will be allowed.**

Notebook: Compilation of class notes and handouts. To receive the full credit, the notebook must be neat and organized. It must also be contained in a three ring binder or folder.

Professionalism: See Handout

POLICIES:

- **DO NOT OPERATE ANY EQUIPMENT YOU HAVE NOT BEEN TRAINED ON**
- **NO WRITING OR STICKERS OF ANY KIND ON SCHOOL PROPERTY**
- **THE ONLY MARKING ON WORKPIECES SHOULD BE FOR IDENTIFICATION OR INSTRUCTIONAL PURPOSES**
- **NO EARPHONES, HEADPHONES, OR OTHER SOURCE OF MUSIC**
- **DO NOT PUT GARBAGE IN METAL SHAVING BINS IN MACHINING AREA**
- **ANY TOOLS USED MUST BE PUT AWAY AT THE END OF EACH CLASS PERIOD**
- **Safety is required to be practiced at all times. Disregarding safety practices or endangering anyone may result in the student being denied access to the lab areas.**
- **Eye protection is mandatory at all times in the lab area.**
- **“Make up” exams or quizzes are not given for any reason**
- **Late assignment grades will be penalized 10% for each day after the due date.**
- **Any forms of cheating during exams or quizzes result in a score of 0.**
- **Students are required to use Moodle to access course supplements**
- **You are required to be in attendance to successfully complete the course.**

REQUIRED TEXTBOOKS: Coming Soon

SUGGESTED REFERENCE MATERIALS:

Machinery's Handbook

REQUIRED SUPPLIES:

Scribe
Center Punch
Ball Peen Hammer

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/VP/SA/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).

COURSE OUTLINE:

1. Measuring and Marking Tools
 - a. Scribes, Layout Die, Punches, transfer punches
 - b. Metrology notes
 - c. Reading mics, dial calipers
 - d. Vernier Scale
 - e. GD&T
 - f. Assignments
 - i. Layout with scribe and punch
 - ii. Measure standards with calipers and mics
 - iii. Vernier
2. Cutting Action and Cutting Tools
 - a. Shear Plane, chip, chip load, heat generated, SFPM, DOC, speeds and feeds, burning
 - b. Files
 - i. Cuts, Shapes
 - ii. Use
 - c. Drill bits
 - i. Drilling notes, drill press safety
 - ii. Sharpening bits
 - iii. Drilling holes, stack drilling, peck drilling
 - d. Tool angles
 - i. Back rake, side rake, end relief, side relief, nose radius, chip breaking
 - ii. Nose radius and feed rate for finishing or roughing cuts
 - e. HSS vs Carbide
 - i. Grinding an HSS tool
 - ii. Choosing a carbide
 - f. Surface finish
 - i. Symbols, comparator
 - g. Assignments
 - i. Sharpen bit and drill a hole
 - ii. Sharpen HSS tools for roughing and finishing
3. Threads and Threading
 - a. Types of threads
 - b. Pitches, thread contact

- c. Taps and Dies
 - i. Use in various equipment and freehand, staying centered and square
- d. Assignments
 - i. Cut some threads
- 4. Machine tool types
 - a. Overview of Types- advantages, disadvantages, common uses
 - b. Lathe
 - i. Parts, direct or indirect reading
 - ii. Operations, turning, facing, threading, parting, knurling, boring
 - iii. Toolpost, tailstock tools, centers, steady rests
 - iv. Setup; setting tool at center, choosing feed and speed, chucking, chuck types
 - v. Operating safely; chuck keys, rotating equipment
 - c. Mill
 - i. Parts, # of axes
 - ii. Climb and conventional milling
 - iii. Various types of tooling and operations
 - 1. Fly cutters, boring heads, end mills, side mills
 - 2. Surfacing, drilling, slotting, boring
 - iv. Setup
 - 1. Tramming, gage blocks and sine bars, parallels, dividing heads, angle vises
 - d. Assignments
 - i. Simple lathe turning assignment NIMS?
 - ii. Simple mill assignment. bolt circle?
 - iii. Useful projects, hammer, centerpunch, draft your own....

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