North Central State College

MASTER SYLLABUS
2019-2020

A. Academic Division: Technology and Workforce Development

B. Discipline: Manufacturing

C. Course Number and Title: MFGT1110 – Manufacturing Processes

D. Course Coordinator: Chris Barker
Assistant Dean: Toni Johnson, PhD

Instructor Information:
- Name: Click here to enter text.
- Office Location: Click here to enter text.
- Office Hours: Click here to enter text.
- Phone Number: Click here to enter text.
- E-Mail Address Click here to enter text.

E. Credit Hours: 3
Lecture: 2 hour
Laboratory: 2 hours

F. Prerequisites: None

G. Syllabus Effective Date: Fall, 2019

H. Textbook(s) Title:

Shop Reference for Students and Apprentices
- Author: Edward G. Hoffman
- Year: 2001
- Edition: 2nd
- ISBN: 0-0831130792

I. Workbook(s) and/or Lab Manual: Provided by Instructor

J. Course Description: This course offers an introduction to manufacturing methods and basic machine tool operation. Students will be provided the background needed to read and interpret technical drawings and proper use of a variety of inspection and measuring tools. Students will also develop and use shop documents such as job plans and blueprints. Diligent attention is given to safety in the modern manufacturing environment.

K. College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Critical Thinking	
Information Literacy	
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Demonstrate proficiency in safety regulations.*	Week one and throughout semester:
2. Demonstrate proficiency in interpreting industrial drawings and blueprints.	Lab projects and activities, guided notes in workbook, homework and Exams.
3. Demonstrate proficiency in the use of measuring instruments.*	Lab projects and activities, guided notes in workbook, homework and Exams.
4. Operate Machine Tools accurately and in accordance with OSHA safety regulations.	Lab projects and activities, guided notes in workbook, homework and Exams.
5. Demonstrate accurate layouts to print specifications, following OSHA chemical handling safety procedures.	Lab projects and activities, guided notes in workbook, homework and Exams.
6. Demonstrate application of math skills to lab and lecture assignments and apply empirical data to determine speeds and feeds to optimize production efficiencies**.***	Lab projects and activities, guided notes in workbook, homework and Exams.
7. Demonstrate ability to locate information.	Lab projects and activities, guided notes in workbook, homework and Exams.
8. Distinguish between different manufacturing processes such as forgings, extrusions, castings, forming, and finishing.*	Lab projects and activities, guided notes in workbook, homework and Exams.
9. Demonstrate an understanding of the interrelationships between material properties and manufacturing processes.*	Lab projects and activities, guided notes in workbook, homework and Exams.
10. Distinguish between different fabrication processes such as welding, fasteners, and adhesives.*	Lab projects and activities, guided notes in workbook, homework and Exams.

*indicates a TAG outcome

M. Topical Timeline (Subject to Change):

Week 1 COURSE ORIENTATION Workbook PART I VIDEO MAKING STUFF STRONGER
SAFETY ORIENTATION: CHEMICAL SAFETY, MSDS, AND PPE INSTRUCTION TO BE FOLLOWED FOR ALL LABS

Week 2

- The Atomic Structures of Materials
- Properties of Metals
  - Materials Lab – *file, drill, weigh, magnet test, conductivity test, & Rockwell test provided samples*

Week 3

- Changing the Properties of Metals
- Mining and Extraction of Metals

SHORT VIDEOS:

Steel manufacture: A Virtual Tour

Steel From Start to Finish
Steelmaking
Stainless steel
Alloy wheels
Bearing assemblies
Aluminum pots
Surgical tools
Hammer production

Week 4

- Extraction and Refinement of Common Nonmetallic Materials
- Selection and Application of Materials

SHORT VIDEOS:

Forging and ring rolling
Blow molding
SME injection molding
Cutlery
Die casting
Steel pipe analysis
Spectral analysis of metals

Week 5 Workbook PART II

- Design Specs and Process Capability
  - Rapid Prototype Lab: GUEST DEMO
  - SPC inspection and charting lab
  - *Calculate Mean, Standard Deviation. Complete data collection and charts required*
- Processing by CASTING
- Processing by HOT WORKING
  - Hot Forming Lab

Week 6

- Processing by COLD WORKING
- Powder Metallurgy
- Principles of Machining
  - Drill Press Lab – Saw and file blanks square.
    - *Dye part and layout holes with scribe and scale.*
    - *Locate information from charts to Identify tap drills and taps per print spec.*
    - *Calculate RPM and Feed rates for various HSS tooling and set machine accordingly.*
    - *Use measuring tools including height gage, micrometers and dial calipers.*
    - *File and check corner radii with radius gage*
- Machine Tool Operations
- Grinding wheels

Week 7

- Milling Lab -- Prep parts for CNC project (name plate)
  - *Locate information from charts to Calculate RPM and Feed rates for various HSS tooling*
  - *Use measuring tools including height gage, micrometers and dial calipers.*

Week 8

- Turning on a Mandrel Lab (pen kits)
  - *Locate information from charts to Calculate RPM and Feed rates for various HSS tooling and set machine accordingly.*
  - *Use measuring tools including height gage, micrometers and dial calipers.*

Week 9

- Non-Traditional Manufacturing Processes
- Joining Processes
  - Adhesives, Plastic Welding, Fasteners, and Riveting lab
    - *Prepare parts for assembly according to print specs.*

        - *Locate information from charts to identify tooling and calculate RPMs for drilling and tapping according to print specs.*
        - *Assemble components according to print specs for fasteners, adhesives, riveting, or welding according to print specs.*
    - Plastics and Composites
        - *Accurately measure and mix chemicals to fabricate SILICON MOLD.*
        - *Accurately measure and mix chemicals to complete RESIN mix and pour.*
    - Other Industrial Materials
    - Corrosion and Protection of Materials

Week 10

- Glass Etching Lab
    - *Cut etching template.*
    - *Apply template using specified adhesives.*
    - *Accurately measure and mix etching chemicals to composite materials.*
    - *Dispose of contaminated material according to EPA specs.*

Week 11 Workbook Pages PART III

- Quality Assurance

Week 12

- Inspection and Measurement

Week 13 and 14

- CNC MILLING LAB
    - *Calculate Cartesian Coordinates for Name Plate programming project.*
    - *Load Part according to programmed instructions.*
    - *Use measuring tools including height gage, micrometers and dial calipers.*

Week 15 Workbook Pages PART IV

- Product Design
    - Engineering Design Project
        - *Use measuring tools to create model of design project.*
        - *Calculate dimensions for box pattern.*
        - *Design, print, and cut model, then assemble using appropriate adhesives.*
- Automation
    - Robotics lab: GUEST DEMO

Week 16

- Comprehensive Final Exam
- Build a wind farm
    - *Design blades for model turbine.*
    - *Calculate geometry for optimum design efficiency.*
    - *Use layout tools, adhesives, rivets, etc. to assemble turbine blades per design.*
    - *Use meters to test and record amps and volts.*
    - *Calculate watts according to provided formula.*

N. Course Assignments:

1. Fabricate projects from technical drawings using the lathe, mill, drill press and layout tools to print specifications. Students will use carbide tooling, machine tools and accessories including drill jigs in the lab setting. Student will follow safety rules.
2. Wear PPE's including work shoes appropriate for machine shop environment and OSHA approved side shields for those students wearing prescription glasses.
3. Use scientific calculator and Shop Reference for Students and Apprentices to determine speeds and feeds and optimize efficiency.
4. Complete ALL LABS, according to schedule, using MSDS and appropriate safety provisions.
5. Complete written homework assignments, scheduled tests, and Final Exam as scheduled.

O. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00-59	F	0.00	Failure

P. Grading and Testing Guidelines:

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Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

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S. Classroom Expectations:

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T. College Procedures/Policies:

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf

The information can also be found Choose an item.