MACH A195: MANUFACTURING PROCESSES

Item	Value
Curriculum Committee Approval Date	12/02/2020
Top Code	095630 - Machining and Machine Tools
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

A study of engineering materials and manufacturing processes from the viewpoint of the machinist, draftsman, and designer. Course discusses the problems of material selection coupled with economical manufacturing methods. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Explain basic lathe work (turning), milling machine work, and precision grinding processes.
2. Identify basic methods of press work on various metals including hole punching, trimming, bending, and basic extrusions.
3. Explain the basic foundry process of green sand casting, basic wood patterns, and sand molding.

Course Objectives

- I Describe the nature and properties of materials commonly used in manufacturing and their relation to manufacturing processes.
- II Describe manufacturing equipment, techniques, and procedures used in production.
- III Define limits of accuracy and capacity of manufacturing equipment.
- IV Compare the relation of design and machining to production.
- V Describe each of the following types of machines and their typical products:
- V. 1. Lathes
- V. 2. Mills
- V. 3. Drill presses
- V. 4. Grinders
- VI Explain the process and criteria for selecting each of the following casting processes:
- VI. 1. Green sand
- VI. 2. Investment
- VI. 3. Permanent mold
- VII Explain the process and the criteria for selecting each of the following forming processes:
- VII. 1. Forging
- VII. 2. Heading
- VII. 3. Rolling
- VIII Explain the process and the criteria for selecting each of the following welding processes:
- VIII. 1. Oxy - acetylene
- VIII. 2. Tig
- VIII. 3. Mig
- VIII. 4. Arc
- VIII. 5. Friction
- IX Recognize the cost and application of quality control to the manufacturing process.
- X Describe the newer trends in manufacturing to include the following:
- X. 1. CNC Machines
- X. 2. Work cells
- X. 3. Computer integrated manufacturing

Lecture Content

Course Orientation Grading practices Course overview Science, Engineering, and Technology The relationship to manufacturing The importance of basic and applied research. Key milestones in manufacturing history. Properties of Metals Hardness Ductility Malleability Elasticity Fabricating Characteristics of Metals Machinability Castability Weldability Formability Cutting tool Principles and Machinability Cutting tool materials Common cutting tools Speed and feed calculations Foundry Practices and Products Green sand casting Permanent mold casting Investment casting Forming Processes, Hot/Cold Forging Heading Rolling Welding and Abrasive Joining Oxy - acetylene Arc Tig Mig Friction Metrology and Quality Control The ratio for discrimination Measuring tools Quality control operations Automation and Newer Methods of Manufacture CNC machines Cellular manufacturing Computer integrated manufacturing

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)

Instructional Techniques

Lecture, demonstration, and a variety of field trips

Reading Assignments

.

Writing Assignments

Notebook, short answer quizzes

Out-of-class Assignments

.

Demonstration of Critical Thinking

Notebook, participation, classroom and lab, quizzes, attendance, and final examination

Required Writing, Problem Solving, Skills Demonstration

Notebook, short answer quizzes

Other Resources

1. Hand Out Materials from Instructor.