

Course discipline/number/title: CAD 1149: Manufacturing Processes and Practices

A. CATALOG DESCRIPTION

1. Credits: 2
2. Hours/Week: 1 lecture, 2 lab
3. Prerequisites (Course discipline/number): None
4. Other requirements: Students must receive a grade of C or better in all CAD courses.
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: This course is designed to provide general knowledge of materials and processes used in manufacturing. This includes mold design, mechanisms, fixtures, sheet metal processes, machining processes and prototyping. This knowledge will enhance a students' ability to design manufacturable products and processes using different CAD software. Students will have the opportunity to tour manufacturing facilities to understand the various manufacturing processes.

C. DATE LAST REVISED (Month, year): February, 2024

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Safety in Manufacturing
2. Introduction to Industrial Materials and their Processes
3. Casting and Molding Metals
4. Molding Plastics and Ceramics
5. Machining (conventional)
  - a) Turning
  - b) Milling
  - c) Shearing/Punching
6. Machining (non-conventional)
  - a) Flame cutting
  - b) Laser
  - c) EDM
  - d) Waterjet
  - e) Plasma
7. Composite Materials
8. Conditioning
9. Welding Adhesive and fastener Assembly
10. Finishing Process in Manufacturing
  - a) Painting
  - b) Plating
  - c) Anodizing
11. Mechanical assembly techniques
  - a) Welding
  - b) Adhesives
  - c) Fasteners
12. Power tools and Manufacturing equipment
13. Manufacturing facility tours

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Develop safe habits in the workplace and manufacturing facilities
2. Define manufacturing process terminology
3. Demonstrate an understanding of common materials
4. Explain common manufacturing processes
5. Observe and understand manufacturing operations and their applications
6. Demonstrate the ability to document manufacturing process observations
7. Identify and understand uses of power tools
8. Design assemblies in SolidWorks with considerations for finishing process and clearances.
9. Attend selected manufacturing facility tours and document observations

- F. LEARNING OUTCOMES (MNTC): NA
- G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
  - 1. Tests
  - 2. Quizzes
  - 3. Oral Presentations
  - 4. Written reports
- H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s).  
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- I. SPECIAL INFORMATION (if any):
  - 1. Safety glasses required
  - 2. Tuition differential