

Course Description**ETS2632C | Computer Integrated Manufacturing | 3.00 credits**

An introduction into the fundamentals of Computer Integrated Manufacturing as it relates to theory, operation, setup, safety, and practices. Students will learn the application of Computer Aided Drawing (CAD) and Computer Aided Manufacturing (CAM) software to develop prototypes. Pre/Corequisite: MAC1105.

Course Competencies

Competency 1: The student will demonstrate knowledge of the history of manufacturing by:

1. Exploring manufacturing through research and projects
2. Researching a topic in manufacturing and developing a presentation
3. Explaining the different procedures used in Manufacturing

Competency 2: The student will demonstrate knowledge of control systems by:

1. Identifying basic flowcharting symbols and discussing their functions
2. Creating a flowchart that portrays a manufacturing process
3. Applying flowcharting to areas other than manufacturing
4. Identifying a control system and explain its application to manufacturing
5. Modeling and creating a program to control an automated system

Competency 3: The student will demonstrate knowledge of designing for manufacturability by:

1. Demonstrating knowledge of the design process
2. Using knowledge of design to analyze products with flaws
3. Using calculated volume, mass, surface area of parts to determine material cost, waste, and packaging requirements
4. Using solid modeling software to improve a flawed design
5. Determining whether a product is safe for a given audience (e.g., children under the age of three).
6. Making ethical decisions about manufacturing
7. Creating a product using solid modeling software

Competency 4: The student will demonstrate a knowledge of Computer Aided Manufacturing (CAM) by:

1. Creating geometry using CAM software
2. Editing geometry using CAM software
3. Explaining the machine definitions used for CAM
4. Creating a Toolpath for the CAM model
5. Checking toolpath operations for accuracy

Competency 5: The student will demonstrate a knowledge of product development by:

1. Identifying the various processes that a given machine performs
2. Determining the appropriate speed rate for a given material using a tool with a given diameter
3. Determining the feed rate for a given material using a tool with a given diameter
4. Transferring the drawings made in CAD to a CAM program
5. Creating numerical code (CNC) using a CAM program
6. Verifying the creation of a part using a simulation software

Competency 6: The student will demonstrate knowledge of manufacturing processes by:

1. Explain the difference between primary and secondary manufacturing processes
2. Analyze a product to propose the manufacturing processes used to create it
3. Differentiating between the various types of manufacturing processes

Competency 7: The student will demonstrate knowledge of integration of manufacturing elements by:

1. Identifying the three categories of CIM systems

2. Comparing and contrasting the benefits and drawbacks of the three categories of CIM systems
3. Identifying the components of a Flexible Manufacturing System(FMS).
4. Creating a process design chart for a manufacturing process

Competency 8: The student will demonstrate knowledge of manufacturing applications by:

1. Identifying the potential safety issues with a CIM system and identify solutions for these problems
2. Understanding the significance of teamwork and communication
3. Designing a manufacturing system that contains at least two automated components

Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data
- Use computer and emerging technologies effectively
- Demonstrate an appreciation for aesthetics and creative activities