# Computer Integrated Manufacturing Course No. 21010 Credit: 1.0

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| --- | --- | --- | --- |
| **Student name:**  |  | **Graduation Date:** |  |

Pathways and CIP Codes:Engineering & Applied Mathematics (14.0101)

Course Description: An **application level** course involving the study of robotics and automation. Building on computer solid modeling skills, students may use computer numerical control (CNC) equipment to produce actual models of their three-dimensional designs. Course topics may also include fundamental concepts of robotics, automated manufacturing, and design analysis.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Measurement and Interpretation

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Convert English system measurements into metric measurements. |  |
| 1.2 | Read and interpret micrometer and caliper reading measurements. |  |
| 1.3 | Calculate feed rate, cutting speed, chip thickness for various materials on a mill or lathe. |  |
| 1.4 | Understanding and determine Mass Properties related to 3D part design. |  |

## Benchmark 2: Design, Print and Production

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Prepare preliminary sketches or drawings of an assigned product. |  |
| 2.2 | Create working drawings and designs using CAD for the assigned product. |  |
| 2.3 | Create a model or product from CAD drawings and files of an assigned product. |  |

## Benchmark 3: Manufacturing Processes and automation

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Demonstrate safety practices and proper use of CIM / CNC tools and equipment. |  |
| 3.2 | Identify Flow Chart symbols and create a flow chart that illustrates Manufacturing and Non-manufacturing process |  |
| 3.3 | Identify a control system and explain its application to manufacturing. |  |
| 3.4 | Model and create a program to control an automated system. |  |
| 3.5 | Produce a machined tool product using CNC methods and equipment |  |
| 3.6 | Transfer drawings made in CAD to a CAM program. |  |
| 3.7 | Generate and Interpret G & M code within a CNC program |  |
| 3.8 | Demonstrate proper start-up and shut down of CNC Mill and Computer Systems using recommended procedures and calibration methods appropriately to calibrate and prepare for use. |  |
| 3.9 | Utilize CNC software to initialize, verify and run CNC tool paths |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

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