# Robotics I Course No. 21009 Credit: 1.0

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

Pathways and CIP Codes: **Engineering & Applied Mathematics (14.0101)**; Manufacturing (48.0000); Automation Engineering (15.0406); Biotechnology (26.1201)

Course Description: A **technical level** course to develop and expand students’ skills and knowledge so that they can design and develop robotic devices. Topics covered in the course may include mechanics, electrical and motor controls, pneumatics, computer basics, and programmable logic controllers.

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 0: The following competency is to be taught with in ALL technical level courses offered in your school's approved pathway**.**

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 0.1 | Demonstrate an understanding of industry standards for personal safety including the safe use of tools, equipment, and hazardous materials. |  |

## Benchmark 1: Introduction and Core Knowledge

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Explain complex mathematical information used in robotic operations. |  |
| 1.2 | Demonstrate knowledge of careers in robotics and applications of robotics in research, commercial and industrial settings. |  |
| 1.3 | Demonstrate knowledge of how automated robotic systems increase production volume and precision in a variety of high-throughput operations. |  |
| 1.4 | Resolve engineering or science problems using robots. |  |

## Benchmark 2: Design and Troubleshooting

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Build, Align, fit, or assemble robotic devices or component parts using hand tools, power tools, fixtures, templates, or microscopes. |  |
| 2.2 | Troubleshoot robotic systems using knowledge of microprocessors, programmable controllers, electronics, circuit analysis, mechanics, sensor or feedback systems, hydraulics and or pneumatics. |  |
| 2.3 | Troubleshoot mechanical failures or unexpected problems including debugging programming. |  |

## Benchmark 3: Programming

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Train robots using appropriate software (multiple software platforms, if possible) to perform simple or complex tasks such as designing and carrying out a series of tests |  |
| 3.2 | Install, program, and repair programmable controllers, robot controllers, end-of-arm tools, or conveyors. |  |
| 3.3 | Integrate robotics with peripherals, sensors or other equipment. |  |

## Benchmark 4: Technical Data and Statistics

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Read blueprints, schematics, diagrams, or technical orders to determine methods and sequences of assembly. |  |
| 4.2 | Record numerical and graphical test results and analyze them to prepare for written testing and documentation. |  |
| 4.3 | Read and utilize blueprints, production layouts, and technical drawings relating to robotics. |  |
| 4.4 | Analyze test results in relation to design or rated specifications and test objectives, and modify or adjust equipment to meet specifications. |  |
| 4.5 | Verify dimensions and tolerances of parts in conformance with specifications in conjunction with robotic maintenance including assembly and disassembly of kit parts and or fabricated parts. |  |

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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