# Introduction to Engineering Course No. 41310 Credit: 1.0

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

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

Course Description: An **Introductory level** course designed to introduce students to concepts in Engineering with a focus on Science, Technology, Engineering, & Math; including units on safety and tools, computer use, design, automation, robotics, space, flight, and electricity.

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: Safety & Introduction

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Demonstrate use of PPE including safety glasses and ear protection. |  |
| 1.2 | Identify and use both standard and metric systems of measurement. |  |
| 1.3 | Recognize and follow safety rules for using lab tools and machines. |  |
| 1.4 | Distinguish between concepts of invention and innovation. |  |
| 1.5 | Describe engineering and explain how engineers participate in or contribute to the invention and innovation of products |  |
| 1.6 | Investigate various engineering disciplines and identify how engineering can encompass a spectrum of diverse interests. |  |

## Benchmark 2: Methodology & Communication

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Understand the steps in the engineering design process. |  |
| 2.2 | Describe the elements of design and apply this concept to the design process using CAD software. |  |
| 2.3 | Use sketches as a communication tool, including thumbnail, perspective, isometric, and orthographic sketches. |  |
| 2.4 | Describe the purpose and importance of working in a team to solve an engineering problem. |  |

## Benchmark 3: Mechanical & Manufacturing Content

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Describe the effects of resistance in mechanical, electrical, fluid, and thermal systems. |  |
| 3.2 | Recognize various tools, fasteners, and joining systems employed in selected engineering processes. |  |
| 3.3 | Understand Manufacturing and its processes. |  |
| 3.4 | Identify the six simple machines and explain their applications. |  |
| 3.5 | Distinguish between the three classes of levers. |  |

## Benchmark 4: Electronics & Robotics Content

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | List benefits of robot use in today’s world and their impact on society. |  |
| 4.2 | Identify the parts of an atom: protons, neutrons, and electrons. |  |
| 4.3 | Express how electrons transfer from one atom to another to create electron flow. |  |
| 4.4 | Define current, voltage, and resistance. |  |
| 4.5 | Clarify the properties of a magnet. |  |
| 4.6 | Build an electromagnet to demonstrate its characteristics and functions. |  |

## Benchmark 5: Flight

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Experience principles of flight using: kites, whirly gigs, model airplanes, hot air balloons, and/or model rockets. |  |
| 5.2 | State the history and development of flight exploration. |  |

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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