# Engineering Design Course No. 21006 Credit: 1.0

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

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

Course Description: A **technical level** course offering students experience in solving problems by applying a design development process. Often using solid modeling computer design software, students develop, analyze, and test product solutions models as well as communicate the features of those models.

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:

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Identify and demonstrate knowledge in Engineering Design in: |  |
|  | 1. Historic influences |  |
|  | 1. Architectural styles |  |
|  | 1. Form and function |  |
|  | 1. Engineering achievements |  |
|  | 1. Evolution of technology |  |
|  | 1. History-design and its influences on products. |  |
| 1.2 | Explore careers opportunities in engineering fields to include: |  |
|  | 1. Educational requirements |  |
|  | 1. Opportunities for employment |  |
|  | 1. Job requirements. |  |
| 1.3 | Gain knowledge of the design process and implement the process during design challenges using: |  |
|  | 1. Teamwork |  |
|  | 1. Teamwork; Collaboration |  |
| 1.4 | Identify and demonstrate knowledge in the use of technology to include: |  |
|  | 1. Software |  |
|  | 1. Hardware |  |
|  | 1. Printing. |  |
| 1.5 | Demonstrate proper sketching techniques in the creation of Orthographic and isometric drawings. |  |
| 1.6 | Identify major geometric terms and shapes as well as demonstrate proper drafting techniques in constructing geometric forms to include: |  |
|  | 1. Polygons |  |
|  | 1. Triangles |  |
|  | 1. Circle |  |
|  | 1. Ellipse. |  |
| 1.7 | Identify and demonstrate proper use of drafting equipment such as a T-Square, Compass, Divider, Triangles, and Templates. |  |
| 1.8 | Demonstrate understanding of Orthographic views by constructing: |  |
|  | 1. One view drawings |  |
|  | 1. Two view drawings |  |
|  | 1. Three view drawings |  |
|  | 1. Multi-View drawings |  |
| 1.9 | Demonstrate proper ANSI dimensioning practices on Orthographic, section, auxiliary, and assembly’s drawings and apply size and location dimensions and proper tolerance. |  |
| 1.10 | Understand and use proper drafting techniques when constructing pictorial drawings: |  |
|  | 1. Axonometric |  |
|  | 1. Isometric; Diametric |  |
|  | 1. Diametric |  |
|  | 1. Trimetric |  |
|  | 1. Perspective |  |
|  | 1. Oblique. |  |
| 1.11 | Use proper techniques when creating Auxiliary drawings to include: |  |
|  | 1. Cutting Plane |  |
|  | 1. Section lining |  |
|  | 1. Assembly section. |  |
| 1.12 | Demonstrate proper techniques used in creating drawings on CAD. |  |
| 1.13 | Demonstrate understanding of the terminology and commands: |  |
|  | 1. Cartesian Coordinate System |  |
|  | 1. 2-D Orthographic |  |
|  | 1. 3-D model |  |
|  | 1. Working Drawings |  |
|  | 1. Design Concept |  |
|  | 1. Parametric models |  |
|  | 1. Mass Properties. |  |
| 1.14 | Demonstrate assembly skills to solve a variety of design problems and create: |  |
|  | 1. Sub-assemblies |  |
|  | 1. Drive constraints |  |
|  | 1. Design modifications |  |
| 1.15 | Understand manufacturing materials and processes creating solid models and assembly models with: |  |
|  | 1. CNC product |  |
|  | 1. 3-D Parametric Modeling |  |
|  | 1. Laser product. |  |
| 1.16 | Recognize different machine processes used in manufacturing a product and explain the need for product efficiency throughout the manufacturing processes. |  |
| 1.17 | Complete a presentation to include documentation that explains Engineering Design practices and product design. |  |
| 1.18 | Demonstrate the use of: |  |
|  | 1. Visual aids in presentation |  |
|  | 1. Technical Writing skills |  |
|  | 1. Communication techniques. |  |
| 1.19 | Create a Portfolio showing evidence of the skill and understanding of Engineering Design. |  |

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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