

Course Description**ETI1851C | Applied Mechanics | 4.00 credits**

This course adopts a practical approach to teaching the identification, usage, and maintenance of tools and equipment utilized in aerospace systems. It covers blueprint reading, geometric dimensioning, tolerancing, and using both English and metric measuring systems.

Course Competencies

Competency 1: The student will implement concepts of measurement and metrology by:

1. Defining terms used in measurement and metrology, including precision and accuracy
2. Explaining measurement tolerances
3. Describing the English and Metric measurement systems
4. Using scales and rulers for measurements
5. Utilizing micrometers and calipers for measurements
6. Explaining the use of auxiliary measurement instruments
7. Performing measurements using both auxiliary and primary measurement instruments
8. Identifying measurement instruments based on their scale and accuracy
9. Explaining the correct use of measurement instruments
10. Explaining the necessity of calibrating precision instruments

Competency 2: The student will fabricate a project from a blueprint by:

1. Explaining basic drafting standards and standard-setting organizations, including the orientation of drawings
2. Identifying different types of drawings, including assembly drawings, detail drawings, and schematics
3. Explaining the components of a drawing, including title blocks, revision blocks, and feature frames
4. Explaining the different lines and symbols found on a drawing
5. Explaining dimensioning as shown on a drawing
6. Identifying the use of geometric dimensioning and tolerancing on a drawing
7. Explaining procedures used in part layouts, including the use of layout dyes, scribes, and other drawing tools
8. Implementing a part layout from a drawing
9. Assembling a project to specifications
10. Fabricating parts through 3D printing
11. Fabricating parts through subtractive machining

Competency 3: The student will use tools and equipment by:

1. Choosing the correct hand tool based on requirements
2. Demonstrating the correct use of pneumatic tools
3. Using shop power tools, including band saws and drill presses
4. Utilizing grinding and finishing equipment such as bench grinders
5. Using sheet metal fabrication equipment, including brakes and shears
6. Fabricating a sheet metal part using correct setbacks and bend allowances
7. Using special tools such as torque wrenches
8. Building tubing projects utilizing flaring, bending, and cutting tools
9. Explaining the correct use of hoisting equipment, including hydrasets
10. Explaining proper procedures for cleaning tools and equipment
11. Inspecting tools for proper operation (e.g., safety guards in place)

Competency 4: The student will utilize correct fasteners by:

1. Identifying various types of fasteners, including bolts, nuts, washers, and rivets
2. Describing the nomenclature for classifying common nuts and bolts, as well as those used in aerospace

applications

3. Detailing the characteristics of threads on bolts, both in English and Metric measurements
4. Distinguishing between blind and solid rivets
5. Demonstrating the correct installation procedures for bolts and rivets
6. Creating threads using taps and dyes
7. Ensuring the secure fastening of bolts using safety wire, locknuts, lock washers, and cotter pins

Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Describe how natural systems function and recognize the impact of humans on the environment