

Student's Name/Initials

/

Date

Teacher's Initials

Date

MECHANICAL DESIGN

DIRECTIONS: Evaluate the student using the applicable rating scales below and check the appropriate box to indicate the degree of competency. The ratings 3, 2, 1, and N are not intended to represent the traditional school grading system of A, B, C, and D. The description associated with each of the ratings focuses on the level of student performance or cognition for each of the competencies listed below.

PERFORMANCE RATING

- 3 - Skilled--can perform task independently with no supervision
 2 - Moderately skilled--can perform task completely with limited supervision
 1 - Limitedly skilled--requires instruction and close supervision
 N - No exposure--has no experience or knowledge of this task

COGNITIVE RATING

- 3 - Knowledgeable--can apply the concept to solve problems
 2 - Moderately knowledgeable--understands the concept
 1 - Limited knowledge--requires additional instruction
 N - No exposure--has not received instruction in this area

Unit A. Performing Work Safety Practices

3 2 1 N

- ___ ___ ___ 1. Apply safety policies and procedures.
 ___ ___ ___ 2. Maintain a clean, orderly, safe work area.
 ___ ___ ___ 3. Operate a fire extinguisher.

Unit B. Demonstrating Freehand Sketching Skills

3 2 1 N

- ___ ___ ___ 1. Sketch straight lines.
 ___ ___ ___ 2. Sketch circles and arcs.
 ___ ___ ___ 3. Sketch curved lines.
 ___ ___ ___ 4. Sketch multi-view drawings.
 ___ ___ ___ 5. Sketch pictorial drawings.
 ___ ___ ___ 6. Draw freehand technical lettering.
 ___ ___ ___ 7. Indicate overall dimensions.

Unit C. Demonstrating Basic Design Techniques (Standard And Metric)

3 2 1 N

- ___ ___ ___ 1. Select proper drawing equipment to complement the design media.
 ___ ___ ___ 2. Measure using standard scales/measuring devices.
 ___ ___ ___ 3. Draw straight lines and angles.
 ___ ___ ___ 4. Draw circles and arcs.
 ___ ___ ___ 5. Draw irregular curved lines.
 ___ ___ ___ 6. Demonstrate proper use, care, and adjustment of design equipment.
 ___ ___ ___ 7. Draw line symbols using alphabet of lines.
 ___ ___ ___ 8. Draw geometric figures using straight and curved lines.

- ___ ___ ___ 9. Draw borderlines and title block.
 ___ ___ ___ 10. Perform drawing setup to applicable standards (e.g., setting layers, line type, and width).
 ___ ___ ___ 11. Identify and use view and display commands (e.g., zoom, pan, viewports, and rotation).
 ___ ___ ___ 12. Format, enter, and edit text on a drawing.
 ___ ___ ___ 13. Edit, copy, and manipulate drawing entities (e.g., properties, stretch, trimming, and scaling).

Unit D. Demonstrating Geometric Construction Skills (Standard And Metric)

3 2 1 N

- ___ ___ ___ 1. Draw straight lines.
 ___ ___ ___ 2. Bisect lines, arcs, and angles.
 ___ ___ ___ 3. Draw parallel lines.
 ___ ___ ___ 4. Divide lines and circles equally.
 ___ ___ ___ 5. Draw tangent lines, arcs, circles, and curves.
 ___ ___ ___ 6. Construct regular polygons.
 ___ ___ ___ 7. Construct circles and ellipses.

Unit E. Demonstrating Dimensioning Skills (Standard And Metric)

3 2 1 N

- ___ ___ ___ 1. Place dimensions on a drawing.
 ___ ___ ___ 2. Set and control dimensioning styles.
 ___ ___ ___ 3. Dimension using aligned and unidirectional dimensioning systems.
 ___ ___ ___ 4. Dimension using leaders for notes, arcs, and circular features.

- ___ ___ ___ 5. Dimension using dual dimensioning skills (standard and metric).
 ___ ___ ___ 6. Dimension using tolerances.
 ___ ___ ___ 7. Identify and apply geometric dimensioning and tolerancing.

Unit F. Demonstrating Orthographic Projections (Standard And Metric)

3 2 1 N

- ___ ___ ___ 1. Draw regular orthographic views.
 ___ ___ ___ 2. Draw regular, inclined, and oblique surfaces.
 ___ ___ ___ 3. Draw curved surfaces.
 ___ ___ ___ 4. Draw using standard line symbols.
 ___ ___ ___ 5. Draw surface intersections.
 ___ ___ ___ 6. Draw detailed size description.
 ___ ___ ___ 7. Draw to scale and dimension.
 ___ ___ ___ 8. Identify 1st- and 3rd-angle projection drawings.
 ___ ___ ___ 9. Draw a 3rd-angle projection drawing.

Unit G. Demonstrating Skills And Knowledge Required To Produce Technical Illustrations (Standard And Metric)

3 2 1 N

- ___ ___ ___ 1. Draw an isometric projection.
 ___ ___ ___ 2. Draw an isometric section.
 ___ ___ ___ 3. Draw an oblique projection.

**Unit H. Demonstrating Knowledge And Skills
Required To Produce Sectional Views And
Applying Standard Conventional Design
Practices**

3	2	1	N	
—	—	—	—	1. Demonstrate section line and symbol techniques.
—	—	—	—	2. Identify various types of sectional views.
—	—	—	—	3. Draw half and full sections.
—	—	—	—	4. Draw broken-out sections.

**Unit I. Demonstrating Knowledge And Skills
Required To Produce Auxiliary Views**

3	2	1	N	
—	—	—	—	1. Demonstrate the ability to rotate a point, a line, and a surface.
—	—	—	—	2. Demonstrate the ability to determine the true length of a line.
—	—	—	—	3. Draw a primary auxiliary view.

**Unit J. Demonstrating Knowledge And Skills
Required To Produce Detailed Machine
Drawings**

3	2	1	N	
—	—	—	—	1. Identify use and applications of threads and fasteners.
—	—	—	—	2. Draw bolt, nut, and thread styles.
—	—	—	—	3. Draw screws, screw heads, pins, and keys.
—	—	—	—	4. Identify a fillet and a round, and tell where and why each is used.
—	—	—	—	5. Produce a set of detail drawings applying standard machine fits, finishes, and tolerances.
—	—	—	—	6. Create a detailed parts list.
—	—	—	—	7. Select appropriate drawing layout and scale.
—	—	—	—	8. Extract attribute data.
—	—	—	—	9. Produce a machine assembly drawing.
—	—	—	—	10. Identify various manufacturing processes.

Unit K. Computer Literacy

Hardware

3	2	1	N	
—	—	—	—	1. Identify hardware components of a CAD computer system.

Operating System

3	2	1	N	
—	—	—	—	2. Format disks and copy, delete, rename, save, and back up files and folders.
—	—	—	—	3. Identify, create, and use folders and directory structures.
—	—	—	—	4. Identify various file formats (e.g., .wmf, .bmp, and .jpeg).
—	—	—	—	5. Import and export data files between formats (e.g., IGES and DXF).
—	—	—	—	6. Use software help features.

Unit L. Demonstrating Cad-Specific Skills

3	2	1	N	
—	—	—	—	1. Use the graphical user interface.
—	—	—	—	2. Create, retrieve, edit, and use symbol libraries.
—	—	—	—	3. Use inquiry commands to extract drawing data (list distance and area).
—	—	—	—	4. Control entity properties.
—	—	—	—	5. Plot/Print drawing to appropriate scale.

**Unit M. Demonstrating Basic Skills To Produce 3-D
Drawings**

3	2	1	N	
—	—	—	—	1. Create solid models.
—	—	—	—	2. Modify solid models.
—	—	—	—	3. Produce 2-D projections from 3-3 models.