DRAFTING & DESIGN PROGRAM STANDARDS

2015

CONTENT STANDARD 1.0: CAREER EXPLORATION

Performance Standard 1.1: Careers in Drafting

1.1.1 Investigate careers in drafting, training, and associated opportunities.
1.1.2 Describe the differences between drafting disciplines and job functions.
1.1.3 Explore career opportunities and list educational requirements for a given drafting field.
1.1.4 Identify safety risks and preventative measures in the office, at the construction site, and production site.

CONTENT STANDARD 2.0: DRAFTING FUNDAMENTALS

Performance Standard 2.1: Geometric Constructions

2.1.1 Define geometric terms and recognize various geometric shapes by name.
2.1.2 Use lines, circles, and arcs to construct regular and irregular geometric shapes.
2.1.3 Construct angles, to include acute, obtuse, and right angles.
2.1.4 Divide lines and bisect angles and arcs.
2.1.5 Construct tangent, concentric, and perpendicular geometric relationships.
2.1.6 Calculate area, perimeter, and volume of geometric shapes to include circle, square, rectangle, and triangle.

Performance Standard 2.2: Measuring and Scaling Techniques

2.2.1 Explain the concept of scaling of objects.
2.2.2 Determine appropriate engineering, architectural, and metric scales.
2.2.3 Measure object size, area, and volume utilizing appropriate industry devices.
2.2.4 Construct drawings utilizing metric and customary (i.e., SI, Imperial) measurement systems.
2.2.5 Transcribe drawings accurately using ratios and proportions.
2.2.6 Determine and apply the equivalence between fractions and decimals.
2.2.7 Convert between customary (i.e., SI, Imperial) and metric systems.

Performance Standard 2.3: Conventional Drafting Practices

2.3.1 Identify and select appropriate drafting media.
2.3.2 Produce title blocks.
2.3.3 Utilize appropriate drawing composition and layout.
2.3.4 Identify and utilize industry standard object properties (i.e., line weight, line type).
2.3.5 Produce drawings from sketches.
2.3.6 Apply appropriate annotations to drawings according to industry standards.
2.3.7 Demonstrate drawing revision control.

Performance Standard 2.4: Multi-View Drawings Using Orthographic Projection

2.4.1 Determine the principle view of an object.
2.4.2 Identify, create, and arrange multi-view drawings.
2.4.3 Identify, create, and arrange sectional views.
2.4.4 Identify, create, and arrange primary auxiliary views.

2.4.5 Identify multiple projection theories (first angle, third angle).
2.4.6 Apply appropriate units of measurement.

Performance Standard 2.5: Dimensions and Annotations

2.5.1 Differentiate appropriate dimension standards.
2.5.2 Arrange dimensions and annotations using appropriate standards.
2.5.3 Use various dimensioning styles.
2.5.4 Construct bill of materials or schedule of materials.

Performance Standard 2.6: Pictorial Drawings

2.6.1 Create oblique drawings.
2.6.2 Create isometric drawings.
2.6.3 Create perspective drawings.

Performance Standard 2.7: Hand Sketching Techniques

2.7.1 Develop design ideas using freehand sketching.
2.7.2 Create pictorial and multi-view sketches.
2.7.3 Utilize hand lettering techniques.
2.7.4 Utilize the alphabet of lines.
2.7.5 Utilize line weights, shading, and color to communicate sketch ideas.

CONTENT STANDARD 3.0: FUNDAMENTAL CADD SKILLS

Performance Standard 3.1: Basic Computer and IT Skills

3.1.1 Use and maintain computer hardware and input/output devices.
3.1.2 Apply basic commands of an operating system and software.
3.1.3 Apply file management techniques using various storage media.
3.1.4 Import and export data files using various formats.
3.1.5 Use industry reliable media to acquire information to complete drafting problems.

Performance Standard 3.2: Drawing Environment

3.2.1 Select appropriate existing title blocks.
3.2.2 Set drafting settings.
3.2.3 Determine and apply scaling factors, including plotting and printing.
3.2.4 Assign line weights, line types, and colors.
3.2.5 Utilize template files.
3.2.6 Utilize sheets/layouts for plotting/printing.

Performance Standard 3.3: Geometric Shapes and Objects using Cartesian Coordinate System

3.3.1 Describe and utilize the Cartesian Coordinate System to create geometric shapes and objects (x, y, z).
3.3.2 Calculate input coordinates.
3.3.3 Manipulate and utilize coordinate systems.

Performance Standard 3.4: CADD Commands

3.4.1 Utilize multiple entry methods to invoke CADD commands (i.e., hot keys, icons, and menus).

3.4.2 Utilize geometric relationships to ensure accuracy (i.e., endpoint, midpoint, and center.

3.4.3 Utilize CADD commands to create and modify objects.

3.4.4 Assign property styles to objects.

3.4.5 Access and integrate help resources to solve problems.

Performance Standard 3.5: Annotations

3.5.1 Define, create, and modify industry standard text styles.

3.5.2 Arrange text based on industry standards.

3.5.3 Create and modify dimension styles.

3.5.4 Arrange dimensions based on industry standards (may include dual dimensioning).

3.5.5 Use industry standard symbols to annotate drawings.

CONTENT STANDARD 4.0: 3-D CADD SKILLS AND TECHNIQUES

Performance Standard 4.1: Three-Dimensional Models

4.1.1 Interpret and define the right-hand rule for the x, y, and z-axes.

4.1.2 Develop three-dimensional models (i.e., wireframe, surface, solid, or parametric).

4.1.3 Manipulate the x-y plane in three-dimensional space.

4.1.4 Edit the shape and configuration of solid models.

4.1.5 Display objects as shaded or hidden lines removed.

4.1.6 Create working and presentation drawings from three-dimensional models.

CONTENT STANDARD 5.0: ARCHITECTURAL DRAFTING AND DESIGN

Performance Standard 5.1: Architectural Design

5.1.1 Identify and describe different architectural styles.

5.1.2 Identify construction terminology, materials and building codes.

5.1.3 Identify architectural annotation standards.

5.1.4 List and describe construction drawings.

5.1.5 Prepare a floor plan from an existing plan or sketch.

Performance Standard 5.2: Architectural Views and Details Related to Design Criteria

5.2.1 Apply architectural design concepts to plan views.

5.2.2 Create an exterior elevation from an existing floor plan.

5.2.3 Create interior elevations.

5.2.4 Create building sections and details.

5.2.5 Produce schedules.

5.2.6 Understand and apply green building/sustainable design principles to project design.

CONTENT STANDARD 6.0: MECHANICAL DRAFTING AND DESIGN

Performance Standard 6.1: Drafting Concepts Related to Basic Manufacturing Processes

6.1.1 Describe the basic engineering design process.
6.1.2 Describe standard machine processes.
6.1.3 Utilize standard welding/machining symbols per ANSI and ASME.
6.1.4 Identify common stock forms.
6.1.5 Create scaled working drawings using dimensions, tolerances, and other specifications for machine tool, fabrication, and/or welding processes.
6.1.6 Create thread and fastener representations and utilize thread designations.
6.1.7 Create assembly drawings including a bill of materials.

Performance Standard 6.2: Geometric Dimensioning and Tolerancing (GDK&T) Standards

6.2.1 Understand datums utilized for tolerancing.
6.2.2 Utilize basic dimensioning for toleranced features.
6.2.3 Utilize GD&T for assembly fits.

Performance Standard 6.3: Drafting Concepts Related to Pattern Development

6.3.1 Define developments.
6.3.2 Identify the major types of developments.
6.3.3 Construct parallel line development.