

Mathematic Standards Matrix
ARCHITECTURAL DRAFTING
January 13, 2009

ARCHITECTURAL DRAFTING Standards/Measurement Criteria		MATH STANDARDS
		Strand #, Concept #, Grade Level Performance Objective # (<i>College Work Readiness Level Standards are italicize</i>)
STANDARD 1.0 – APPLY MEASUREMENT AND SCALE CONCEPTS IN DESIGN DRAFTING		
1.1	Identify types of measurement used in design drafting	See Note
1.2	Select proper measurement tools	See Note
1.3	Perform measurements with hand held instruments	See Note
1.4	Determine and apply appropriate scale	<p>Strand 4: Geometry and Measurement, Concept 1: Geometric Properties, High School Level PO 1: Use the basic properties of a circle (relationships between angles, radii, intercepted arcs, chords, tangents, and secants) to prove basic theorems and solve problems. PO 2: Visualize solids and surfaces in 3-dimensional space when given 2-dimensional representations and create 2-dimensional representations for the surfaces of 3-dimensional objects. PO 6: Solve problems using angle and side length relationships and attributes of polygons.</p> <p>Strand 4: Geometry and Measurement, Concept 4: Measurement, High School Level PO 1: Use dimensional analysis to keep track of units of measure when converting.</p>
1.5	Transcribe illustrations accurately	<p>Strand 4: Geometry and Measurement, Concept 2: Transformation of Shapes, High School Level PO 4: Determine the effects of a single transformation on linear or area measurements of a 2-dimensional figure.</p> <p>Strand 4: Geometry and Measurement, Concept 4: Measurement, High School Level PO 1: Use dimensional analysis to keep track of units of measure when converting.</p>
STANDARD 2.0 – INTERPRET ENGINEERING DOCUMENTS AND CONTROL DOCUMENTS		
2.1	Interpret dimensions, symbols, legends, scales, and directions/orientations	See Note
2.2	Analyze how content and information are communicated in schematics, blueprints, and technical drawings	See Note

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2.3	Analyze schematics, blueprints, and technical drawings for clarity, completeness, and accuracy	See Note
2.4	Recognize cross-referencing on technical drawings	See Note
2.5	Identify and describe basic types of drawings by trade	See Note
2.6	Locate and interpret information on specific documents	See Note
2.7	Check prints for dimensional accuracy, completeness, and note detail	See Note
2.8	Compare schematics to dimensional drawings	See Note
2.9	Verify drawing elements	See Note
2.10	Identify conflicting data	Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 3: Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem. PO 6: Synthesize mathematical information from multiple sources to draw a conclusion, make inferences based on mathematical information, evaluate the conclusions of others, analyze a mathematical argument, and recognize flaws or gaps in reasoning.

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3.0 – CREATE TECHNICAL DRAWINGS	
3.1	Identify, select, and use fundamental drafting techniques for drawings
3.2	Demonstrate free hand lettering technique
3.3	Identify "Alphabet of Lines" by name, line type variation, order of usage and application on technical drawings
3.4	Create title blocks
3.5	Format borders
3.6	Apply notes and dimensions
3.7	Plot or print drawings using correct layout
3.8	Organize and maintain drawings and supporting documents

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STANDARD 4.0 – UTILIZE BASIC COMPUTER CONCEPTS, OPERATIONS, AND INFORMATION TECHNOLOGY APPLICATIONS	
4.1	Use computer hardware and input/output devices for design drafting problems
4.2	Apply basic commands of operating system software
4.3	Apply file and disk management techniques
4.4	Import and export data files using different formats (dxf, dxb, Tiff, gif, pcx, eps, spd, or other formats as required)
4.5	Prepare files for electronic transfer
4.6	Access and use the Internet for file transfer
4.7	Access and use a computer network for file management and transfer

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STANDARD 5.0 – USE A CADD/VDCM (VIRTUAL DESIGN AND CONSTRUCTION MODELING) SYSTEMS AND PROCEDURES		
5.1	Explore and determine applicability of CADD/VDCM systems to the project	See Note
5.2	Analyze drawings using CADD/VDCM software functions/commands	See Note
5.3	Use CADD/VDCM software commands to set up drawing scale, format, dimensioning, etc.	See Note
5.4	Apply layers/visible items, colors, line types, editing commands, and grouping techniques	See Note
5.5	Control entity properties	See Note
5.6	Incorporate standard parts, symbol libraries, and/or templates	See Note
5.7	Control viewing commands	See Note
5.8	Create and manipulate views by modifying coordinate system settings	See Note
5.9	Minimize a drawing file for storage and transmission	See Note

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STANDARD 6.0 – DETAIL PROJECTION VIEWS/COMPONENTS		
6.1	Determine views for projection (i.e., plan, top, front, etc.)	See Note
6.2	Identify, create, and place views for orthographic features	See Note
6.3	Identify, create, and place auxiliary views to determine true size, shape, and location of non-orthogonal features	See Note
6.4	Identify, create, and place appropriate section views	See Note
6.5	Construct full, half, and offset section of an object	See Note
6.6	Utilize various material hatch patterns in section views	See Note

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STANDARD 7.0 - UTILIZE ARCHITECTURAL DESIGN DRAFTING CONCEPTS		
7.1	Use architectural terminology in context	See Note
7.2	Interpret legal land descriptions and draft finished site plan	See Note
7.3	Read and interpret architectural drawings	See Note
7.4	Read and interpret plat and/or plot maps	See Note
7.5	Apply architectural symbols to a drawing	See Note
7.6	Use industry standards, codes, and regulations for architectural drafting to solve a problem	<p>Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 1: Analyze a problem situation, determine the question(s) to be answered, organize given information, determine how to represent the problem, and identify implicit and explicit assumptions that have been made.</p> <p>Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 3: Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.</p>

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STANDARD 8.0 - DEMONSTRATE DESIGN DRAFTING CONCEPTS AS RELATED TO ARCHITECTURAL DESIGN USING CADD/VDCM SYSTEMS		
8.1	Draft a floor plan from preliminary sketch	Strand 4: Geometry and Measurement, Concept 2: Transformation of Shapes, High School Level PO 4: Determine the effects of a single transformation on linear or area measurements of a 2-dimensional figure. Strand 4: Geometry and Measurement, Concept 4: Measurement, High School Level PO 1: Use dimensional analysis to keep track of units of measure when converting.
8.2	Draft a foundation/basement foundation plan	Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level PO 2: Solve formulas for specified variables.
8.3	Draft a roof plan	Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level PO 2: Solve formulas for specified variables. Strand 3: Patterns, Algebra, and Functions, Concept 4: Analysis of Change, High School Level PO 2: Solve problems involving rate of change. Strand 4: Geometry and Measurement, Concept 1: Geometric Properties, High School Level PO 10: Solve problems using right triangles, including special triangles. PO 11: Solve problems using the sine, cosine, and tangent ratios of the acute angles of a right triangle.
8.4	Draft an electrical plan locating receptacle, switch, and lighting outlets	Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level PO 2: Solve formulas for specified variables.
8.5	Draft a plumbing plan showing drain vent system	Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level PO 2: Solve formulas for specified variables. Strand 3: Patterns, Algebra, and Functions, Concept 4: Analysis of Change, High School Level PO 2: Solve problems involving rate of change.
8.6	Draft an HVAC plan locating HVAC diffusers, outlets, equipment	Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level PO 2: Solve formulas for specified variables.
8.7	Draft a reflected ceiling plan combining elements of electrical and HVAC plans	See Note

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8.8	Draft, locate, and label fasteners on production, assembly drawings, and parts lists	See Note
8.9	Prepare and draft a window and door schedule	See Note
8.10	Apply dimensions with annotations	See Note
8.11	Develop a set of working drawings for a residential or small commercial structure	<p>Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level PO 2: Solve formulas for specified variables.</p> <p>Strand 3: Patterns, Algebra, and Functions, Concept 4: Analysis of Change, High School Level PO 2: Solve problems involving rate of change.</p> <p>Strand 4: Geometry and Measurement, Concept 1: Geometric Properties, High School Level PO 10: Solve problems using right triangles, including special triangles. PO 11: Solve problems using the sine, cosine, and tangent ratios of the acute angles of a right triangle.</p> <p>Strand 4: Geometry and Measurement, Concept 2: Transformation of Shapes, High School Level PO 1: Determine whether a transformation of a 2-dimensional figure on a coordinate plane represents a translation, reflection, rotation, or dilation and whether congruence is preserved. PO 4: Determine the effects of a single transformation on linear or area measurements of a 2-dimensional figure.</p> <p>Strand 4: Geometry and Measurement, Concept 4: Measurement, High School Level PO 1: Use dimensional analysis to keep track of units of measure when converting.</p>
8.12	Draft cabinet elevations	See Note
8.13	Prepare bill of materials for drawings	<p>Strand 1: Number and Operations, Concept 3: Estimation, High School Level PO 2: Use estimation to determine the reasonableness of a solution. PO 3: Determine when an estimate is more appropriate than an exact answer.</p> <p>Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level PO 2: Solve formulas for specified variables.</p>

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STANDARD 9.0 – CREATE DRAWINGS OF STRUCTURAL SECTIONS AND DETAILS USING CADD/VDCM SYSTEMS		
9.1	Draft structural shapes and details	Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 3: Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.
9.2	Draft longitudinal and/or cross sections and details	Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 3: Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.
9.3	Draft wall sections and details	Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 3: Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.
9.4	Draft a stairway section	Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 3: Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.
9.5	Draft structural connections	Strand 5: Structure and Logic, Concept 2: Logic, Reasoning, Problem Solving and Proof, High School Level PO 3: Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.
STANDARD 10.0 – CREATE PICTORIAL DRAWINGS AND MODELS		
10.1	Identify and create isometric drawings using both manual and electronic techniques	Strand 4: Geometry and Measurement, Concept 1: Geometric Properties, High School Level PO 2: Visualize solids and surfaces in 3-dimensional space when given 2-dimensional representations and create 2-dimensional representations for the surfaces of 3-dimensional objects.
10.2	Identify and create perspective drawings (1-point and 2-point) using both manual and electronic techniques	See Note
10.3	Identify and render materials	See Note

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