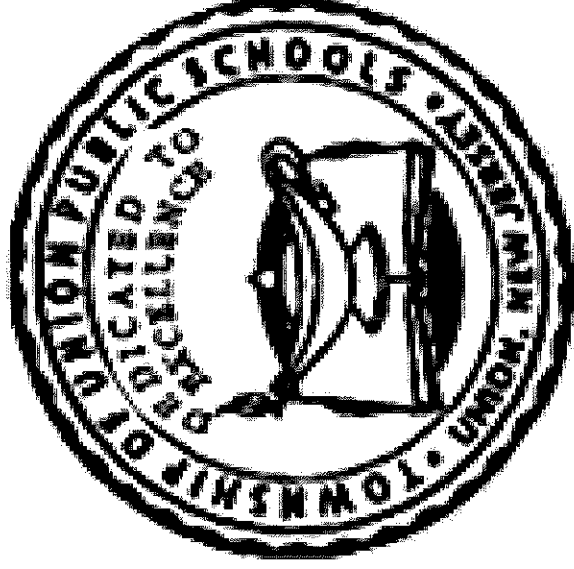


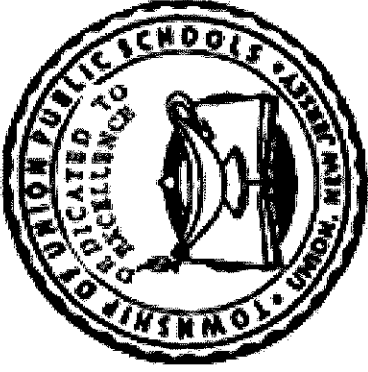
**TOWNSHIP OF UNION PUBLIC SCHOOLS**



**DRAFTING AND DESIGN / CAD I**  
**TE 150**

**Curriculum Guide**

Curriculum Guide Approved June 2015



## **Board Members**

**David Arminio, President**

**Vito Nufrio, Vice President**

**Guy Francis**

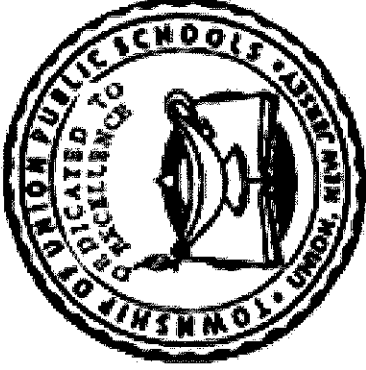
**Richard Galante**

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**TOWNSHIP OF UNION PUBLIC SCHOOLS**

Administration

**Superintendent .....Mr. Gregory Tatum**

**Assistant Superintendent .....Dr. Noreen Lishak**

**Director of Student Information/Technology .....Ms. Ann M. Hart**

**Director of Athletics, Health, Physical Education and Nurses.....Ms. Linda Ionta**

## DEPARTMENT SUPERVISORS

All Academic Areas K-2 .....	Ms. Maureen Corbett
Language Arts/Social Studies 3-5 .....	Mr. Robert Ghiretti
Mathematics/Science 3-5 .....	Ms. Theresa Matthews
Guidance K-12/SAC .....	Ms. Nicole Ahern
Language Arts.....	Ms. Mary Malyska
Math 8-12.....	Mr. Jason Mauriello
Science 6-12.....	Ms. Maureen Guilfoyle
Social Studies/Business.....	Ms. Libby Galante
World Language/ESL/Career Education/G&T/Computer Technology.....	Ms. Yvonne Lorenzo
Art/Music .....	Mr. Ronald Rago

**DRAFTING AND DESIGN / CAD I**  
**TE 150**

**Curriculum Committee Members**

**Edwin Oyola**

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## **Mission Statement**

The Township of Union Board of Education believes that every child is entitled to an education designed to meet his or her individual needs in an environment that is conducive to learning. State standards, federal and state mandates, and local goals and objectives, along with community input, must be reviewed and evaluated on a regular basis to ensure that an atmosphere of learning is both encouraged and implemented. Furthermore, any disruption to or interference with a healthy and safe educational environment must be addressed, corrected, or when necessary, removed in order for the district to maintain the appropriate educational setting.

## **Philosophy Statement**

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is to formulate a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.

## **Statement of District Goals**

- **Develop reading, writing, speaking, listening, and mathematical skills.**
- **Develop a pride in work and a feeling of self-worth, self-reliance, and self-discipline.**
- **Acquire and use the skills and habits involved in critical and constructive thinking.**
- **Develop a code of behavior based on moral and ethical principles.**
- **Work with others cooperatively.**
- **Acquire a knowledge and appreciation of the historical record of human achievement and failures and current societal issues.**
- **Acquire a knowledge and understanding of the physical and biological sciences.**
- **Participate effectively and efficiently in economic life and the development of skills to enter a specific field of work.**
- **Appreciate and understand literature, art, music, and other cultural activities.**
- **Develop an understanding of the historical and cultural heritage.**
- **Develop a concern for the proper use and/or preservation of natural resources.**
- **Develop basic skills in sports and other forms of recreation**



## **Course Description**

### **DRAFTING AND DESIGN / CAD I TE 150**

**Enrollment: Grades 9-12**

#### **Purpose and Overview**

Introduction to CAD introduces the student to the equipment, standards and language of the drafting industry. Students will be introduced to basic drawing board procedures and then the computer for drafting and design purposes. The student will become familiar with the Windows operating systems, the program itself (AutoCAD), directories, keyboard, disks, menus, files, construction and problem solving. The program is designed to give the student the skills both on the drawing board and computer to solve drafting and design related problems and to produce accurate working drawings.

Areas of concentration include: Drafting Equipment, Basic Drafting techniques, Design & Sketching, Scales and Measurements, Single View Drawings, Section Views, Orthographic Projection, Dimensioning, and Auxiliary Views.

## **Recommended Textbooks**

**BASIC TECHNICAL DRAWING** – Spencer / Dygdon, Macmillian Publishing Co. Inc.  
New York. 2005 Edition

**AutoCAD and Its Applications: Comprehensive 2015** – Terence M Shumaker, David P. Madsen, Jeffrey A. Laurich,  
J.C. Malitzke, and Craig P. Black  
22<sup>nd</sup> Edition

## **Course Proficiencies**

**Students will be able to...**

### **CAD I**

**At the completion of CAD I the student should have a basic knowledge of and demonstrated:**

1. an understanding of the definition of drafting and it's relation to industry.
2. an understanding of measurements and appropriate math skills
3. a basic knowledge of computers and AutoCAD software
4. an understanding of drafting standards and procedures
5. an understanding of a problem solving model
6. an understanding of basic and proper commands to produce quality drawings
7. the ability to construct industry grade working drawing in the areas covered
8. the ability to properly use dimensioning rules and apply them to a drawing.
9. the proper care for the computer and peripherals and equipment
10. appropriate classroom rules and regulations

## Curriculum Units

Unit 1: Introduction to Drafting / CAD

Unit 2: Basic Manual Drafting Tools & Procedures

Unit 3: Sketching & Freehand Drawing Fundamentals

Unit 4: Introduction to CAD

Unit 5: Geometry in Drafting

Unit 6: Views of Objects

Unit 7: Basic Dimensioning

Unit 8: Multi-View Drawings

Unit 9: Pictorial Drawings

Unit 10: Orthographic Projection

Unit 11: Sectional Views

Unit 12: Auxiliary Views

## Pacing Guide- Course

<u>Content</u>	Number of Days
<u>Unit 1:</u> Introduction to Drafting / CAD	5 days
<u>Unit 2:</u> Basic Manual Drafting Tools & Procedures.	10 days
<u>Unit 3:</u> Sketching & Freehand Drawing Funda.	10 days
<u>Unit 4:</u> Introduction to CAD	15 days
<u>Unit 5:</u> Geometry in Drafting	15 days
<u>Unit 6:</u> Views of Objects	20 days
<u>Unit 7:</u> Basic Dimensioning	15 days
<u>Unit 8:</u> Multi-View Drawings	15 days
<u>Unit 9:</u> Pictorial Drawings	20 days
<u>Unit 10:</u> Orthographic Projection	20 days
<u>Unit 11:</u> Sectional Views	15 days
<u>Unit 12:</u> Auxiliary Views	5 days
	<u>1 week block</u>
	<b>33 weeks +/-</b>
	3 weeks +/- testing, assessments, writing

**Unit 1:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is "Graphic Communication"?</p> <p>What is drafting?</p> <p>Why study drafting?</p> <p>What do drafters do?</p> <p>Why are drawings used?</p> <p>What does CAD mean?</p> <p>What careers are in the drafting field?</p>	<p><b><u>SWAT:</u></b></p> <p>Understand what drafters do.</p> <p>Understand drafting as a Universal Language.</p> <p>List five (5) specialized areas of drafting.</p> <p><b>9.3.12.AC.2</b></p> <p><b>9.3.12.AC.7</b></p> <p><b>9.3.12.AC-DES.2</b></p> <p><b>9.3.12.AC-DES.6</b></p>	<p>List occupations that require the ability to read and understand graphic information.</p> <p>Research samples of drawings used in the aerospace, building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Make a collection of pictures that show products made by the industries listed above.</p> <p>Collect five want ads drafting career opportunities and discuss the qualifications for each.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 2:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>Why are drafting tools used?</p> <p>When is each tool used?</p> <p>How do you choose the appropriate tool?</p> <p>What is the proper care of each tool?</p>	<p><b><u>SWAT:</u></b></p> <p>Understand the proper care of drafting equipment.</p> <p>Identify the following tools and properly apply their use.</p> <ul style="list-style-type: none"> <li>• T-Square</li> <li>• Triangles Scale</li> <li>• Compass</li> <li>• Templates</li> <li>• Protractor</li> <li>• Eraser Shield</li> <li>• Dusting Brush</li> <li>• Drafting Board</li> <li>• Computer</li> <li>• Computer Aided Drafting Software (AutoCAD)</li> </ul> <p><b>9.3.12.AC.1</b>  <b>9.3.12.AC.3</b>  <b>9.3.12.AC.6</b>  <b>9.3.12.AC-CST.5</b>  <b>9.3.12.AC-CST.9</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of drawings used in the aerospace, building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 3;**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is sketching?</p> <p>Why is it important to sketch?</p> <p>How do you freehand?</p> <p>What tools are needed to freehand?</p>	<p><b><u>SWAT:</u></b></p> <p>Understand why sketching is important in this field of work.</p> <p>Identify how to freehand.</p> <p>Identify what tools are useful to sketch.</p> <p>Understand what to draw in your sketch.</p> <p>Identify objects that need to be shown a certain way.</p> <p><b>9.3.12.AC.1</b>  <b>9.3.12.AC.6</b>  <b>9.3.12.AC-CST.2</b>  <b>9.3.12.AC-DES.2</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of sketches/drawings used in the building, structural, manufacturing, map making industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 4:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What are the main parts of a CAD system?</p> <p>What is an input device?</p> <p>What is an output device?</p> <p>How is storage devices used?</p> <p>What is the proper care of the hard and software?</p>	<p><b>SWAT:</b></p> <p>Become familiar with the Windows operating systems CAD software (AutoCAD)</p> <ul style="list-style-type: none"> <li>• Directories</li> <li>• Keyboard</li> <li>• Disks</li> <li>• Menus</li> <li>• Files</li> </ul> <p>Take learned drawing skills and transfer that knowledge to the computer</p> <p>Construction and problem solving.</p> <p><b>9.3.12.AC-DES.1</b>  <b>9.3.12.AC-DES.3</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Introduce AutoCAD to students.</p> <p>Research a variety of CAD programs and compare and contrast.</p> <p>Provide a variety of drawings and projects that utilize various commands in the program</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>



**Unit 5:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>How can geometry be used to create drawings both on paper or the computer?</p> <p>How can you bisect a given line?</p> <p>Can a line be divided into equal segments without actual dimensions?</p> <p>Can the student follow step by step instructions to complete a task?</p>	<p><b>SWAT:</b></p> <p>Understand why certain geometric constructions are frequently used to solve some drawing problems.</p> <p>Identify a variety of geometric shapes.</p> <p>Utilize appropriate terminology.</p> <p>Complete a variety of geometric drawing problems</p> <p><b>9.3.12.AC.6</b>  <b>9.3.12.AC-CST.2</b>  <b>9.3.12.AC-CST.3</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of geometric drawings used in the aerospace, building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 6:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What are the different views of an object?</p> <p>How can an object be revolved to illustrate the different views?</p> <p>How can the “glass box” be used to explain views?</p> <p>What necessary views are required?</p> <p>What type of objects requires only two views?</p> <p>How does sketching help in multi-views drawing?</p> <p>What is the correct placement of the views?</p>	<p><b>SWAT:</b></p> <p>Understand the concept of Orthographic Projection.</p> <p>Properly align front, top and right side views as per drafting standards.</p> <p>Show all visible features in each view.</p> <p>Show all hidden features in each view.</p> <p>Utilize all appropriate line types to completely describe an object.</p> <p>Correctly complete a variety of orthographic projection problems to ensure proficiency.</p> <p><b>9.3.12.AC-DES.1</b> <b>9.3.12.AC-DES.2</b> <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of multi-view drawings used in the aerospace, building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

## Unit 7:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What are four line types used in dimensioning?</p> <p>How is dimensioning set up on the computer?</p> <p>What is the preferred method of dimensioning?</p> <p>Where is the preferred placement of dimensions?</p> <p>What are proper dimensions for numbers, letters and arrowheads?</p> <p>What are the three components to leaders?</p>	<p><b>SWAT:</b></p> <p>Understand the process to completely describe objects.</p> <p>Understand proper setting of computer parameters.</p> <p>Know and apply preferred method of dimensioning.</p> <p>Know size, type and application of dimensions to a working drawing.</p> <p>Dimension angles.</p> <p>Understand placement of dimensions</p> <p><b>9.3.12.AC-DES.2</b>  <b>9.3.12.AC-DES.5</b>  <b>9.3.12.AC-DES.6</b>  <b>9.3.12.AC-DES.8</b></p>	<p>Research samples of dimensioned drawings used in the aerospace, building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 8:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is the difference between single and Multi view drawings?</p> <p>What views are used?</p> <p>How can the drawing be set up on paper space?</p> <p>Can large objects be scaled to fit on small paper?</p>	<p><b>SWAT:</b></p> <p>Understand proper set-up of drawing paper.</p> <p>Use of appropriate views to create a drawing.</p> <p>Properly place each view.</p> <p>Understand the use of the commands to move objects</p> <p><b>9.3.12.AC.1</b>  <b>9.3.12.AC.3</b>  <b>9.3.12.AC.6</b>  <b>9.3.12.AC-DES.1</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of drawings used in the building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 9:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is an Isometric drawing?</p> <p>How are angles constructed in isometric?</p> <p>How are circles constructed in isometric?</p> <p>What is an oblique drawing?</p> <p>Can you name the different types of oblique drawings?</p> <p>Can you name the different types of perspective drawings?</p> <p>What are the different lines used in perspective drawings?</p>	<p><b>SWAT:</b></p> <p>Understand the use of pictorial drawings.</p> <p>Identify the different types of Pictorial Drawings.</p> <p>Create Isometric drawings</p> <p>Create Isometric arcs and circles.</p> <p>Understand the concept of the Isometric Axis.</p> <p>Create Oblique drawings</p> <p>Create Oblique arcs and circles.</p> <p>Understand the concept of the Oblique Axis</p> <p><b>9.3.12.AC.1</b>  <b>9.3.12.AC.3</b>  <b>9.3.12.AC.6</b>  <b>9.3.12.AC-DES.1</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of pictorial drawings used in the aerospace, building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 10:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is an orthographic projection?</p> <p>How are lines projected?</p> <p>How are hidden objects shown?</p> <p>What is a 3d representation?</p> <p>Can you name the different types of views used?</p> <p>What are the different lines used orthographic drawings?</p>	<p><b>SWAT:</b></p> <p>Understand the use of orthographic drawings.</p> <p>Identify the different types of lines.</p> <p>Create drawings with arcs and circles.</p> <p>Understand the concept of projections.</p> <p>Understand why 6 views are needed to create 1 drawing.</p> <p><b>9.3.12.AC.1</b>  <b>9.3.12.AC.3</b>  <b>9.3.12.AC.6</b>  <b>9.3.12.AC-DES.1</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of projection drawings used in building, structural, and manufacturing industries.</p> <p>Assign students a variety of drawing problems to show proficiency.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

## Unit 11:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>Why do we show objects in sectional views?</p> <p>What are the different types of sectional drawings?</p> <p>What types of lines are used in sectional drawings?</p> <p>When can a cutting-plane line be omitted?</p>	<p><b>SWAT:</b></p> <p>Understand sectioning concepts.</p> <ul style="list-style-type: none"> <li>• Full sections</li> <li>• Half sections</li> <li>• Broken-out sections</li> <li>• Revolved sections</li> <li>• Removed sections</li> <li>• Offset sections</li> <li>• Section lining</li> </ul> <p>Draw various types of sections.</p> <p>Visualize a section view along a cutting plane.</p> <p><b>9.3.12.AC.1</b>  <b>9.3.12.AC.3</b>  <b>9.3.12.AC-DES.6</b></p>	<p>Research samples of sectional drawings used in the building, structural, manufacturing, map making and the electrical and electronics industries.</p> <p>Construct section views.</p> <p>Locate the cutting-plane line and prepare a multi-view drawings.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>

**Unit 12:**

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is the purpose of auxiliary views?</p> <p>How is an auxiliary view revolved?</p> <p>How is the true size and length of a line found?</p> <p>Name the two basic types of auxiliary views?</p> <p>What is a primary auxiliary view?</p>	<p><b>SWAT:</b></p> <p>Understand inclined surfaces.</p> <p>Three view Auxiliary Views Identify reference planes.</p> <ul style="list-style-type: none"> <li>• Create partial views.</li> <li>• Draw section views.</li> </ul> <p>Understand the concept of True Length and Foreshortened lines.</p> <p>List the basic types of auxiliary views and explain the purpose of each type.</p> <p><b>9.3.12.AC.1</b> <b>9.3.12.AC.3</b> <b>9.3.12.AC.6</b> <b>9.3.12.AC-DES.6</b></p>	<p>Construct an auxiliary view of the inclined surface of the object.</p> <p>Construct an auxiliary view to determine the true length of a line.</p> <p>Draw primary and secondary auxiliary views using manual and CAD methods.</p>	<ul style="list-style-type: none"> <li>• Teacher observations</li> <li>• Presentations</li> <li>• Projects</li> <li>• Rubrics</li> <li>• Checklists</li> <li>• Tests / quizzes</li> <li>• Self-evaluation</li> </ul>



New Jersey Core Curriculum Content Standards  
Academic Area

**9.3- Career & Technical Education (CTE)**  
**Content Area: 21<sup>st</sup> Century Life and Careers**

CONTENT AREA:	STANDARD 9.3 CAREER AND TECHNICAL EDUCATION
<b>ARCHITECTURE &amp; CONSTRUCTION CAREER CLUSTER</b>	
Number	Standard Statement
By the end of Grade 12, Career and Technical Education Program completers will be able to:	
<b>Career Cluster:</b>	<b>Architecture &amp; Construction (AC)</b>
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use Architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.4	Evaluate the nature and scope of the Architecture & Construction Career Cluster and the role of architecture and construction in society and the economy.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
9.3.12.AC.6	Read, Interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC.7	Describe career opportunities and means to achieve those opportunities in each of the Architecture & Construction Career Pathways.

<b>PATHWAY:</b>	<b>Construction (AC-CST)</b>
9.3.12.AC-CST.1	Describe contractual relationships between all parties involved in the building process.
9.3.12.AC-CST.2	Describe approval procedures required for successful completion of a construction project.
9.3.12.AC-CST.3	Implement testing and inspection procedures to ensure successful completion of a construction project.
9.3.12.AC-CST.4	Apply scheduling practices to ensure the successful completion of a construction project.
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.6	Manage relationships with internal and external parties to successfully complete construction projects.
9.3.12.AC-CST.7	Compare and contrast the building systems and components required for a construction project.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
<b>PATHWAY:</b>	<b>Design/Pre-Construction (AC-DES)</b>
9.3.12.AC-DES.1	Justify design solutions through the use of research documentation and analysis of data.
9.3.12.AC-DES.2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
9.3.12.AC-DES.3	Describe the requirements of the integral systems that impact the design of buildings
9.3.12.AC-DES.4	Apply building codes, laws and rules in the project design.
9.3.12.AC-DES.5	Identify the diversity of needs, values and social patterns in project design, including accessibility standards.

9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
9.3.12.AC-DES.7	Employ appropriate representational media to communicate concepts and project design.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design
<b>PATHWAY:</b>	<b>Maintenance/Operations (AC-MO)</b>
9.3.12.AC-MO.1	Recognize and employ universal construction signs and symbols to function safely in the workplace.
9.3.12.AC-MO.2	Use troubleshooting procedures when solving a maintenance problem in buildings.
9.3.12.AC-MO.3	Apply construction skills when repairing, restoring or renovating existing buildings.
9.3.12.AC-MO.4	Determine work required to repair or renovate an existing building.
9.3.12.AC-MO.5	Plan and practice preventative maintenance activities to service existing buildings.
9.3.12.AC-MO.6	Maintain and inspect building systems to achieve safe and efficient operation of buildings.

## New Jersey Scoring Rubric

### New Jersey Registered Holistic Scoring Rubric - GEPA/HSPA

In Scoring, consider the grid of written language	Inadequate Command		Limited Command		Partial Command		Adequate Command		Strong Command		Superior Command	
	Score	1	2	3	4	5	6					
<b>Content &amp; Organization</b>	<ul style="list-style-type: none"> <li>May lack opening and/or closing</li> <li>Minimal response to topic; uncertain focus</li> <li>No planning evident; disorganized</li> </ul>	<ul style="list-style-type: none"> <li>Attempts to focus and/or closing</li> <li>Attempts to focus</li> <li>May drift or shift focus</li> </ul>	<ul style="list-style-type: none"> <li>May lack opening and/or closing</li> <li>Usually has single focus</li> <li>Ideas loosely connected</li> <li>Transition evident</li> </ul>	<ul style="list-style-type: none"> <li>Generally has opening and/or closing</li> <li>Single focus</li> <li>Sense of unity and coherence</li> <li>Key ideas developed</li> </ul>	<ul style="list-style-type: none"> <li>Opening and closing</li> <li>Single, distinct focus</li> <li>Unified and coherent</li> <li>Well-developed</li> </ul>							
<b>Usage</b>	<ul style="list-style-type: none"> <li>Details random, inappropriate, or barely apparent</li> <li>No apparent control</li> <li>Severe/numerous errors</li> </ul>	<ul style="list-style-type: none"> <li>Details lack elaboration, i.e., highlight paper</li> <li>Numerous errors</li> </ul>	<ul style="list-style-type: none"> <li>Repetitious details</li> <li>Several unelaborated details</li> <li>Errors/ patterns of errors may be evident</li> </ul>	<ul style="list-style-type: none"> <li>Uneven development of details</li> <li>Few errors</li> </ul>	<ul style="list-style-type: none"> <li>Details appropriate and varied</li> <li>Details effective, vivid, explicit, and/or pertinent</li> </ul>							
<b>Sentence Construction</b>	<ul style="list-style-type: none"> <li>Assortment of incomplete and/or incorrect sentences</li> </ul>	<ul style="list-style-type: none"> <li>Excessive monotony/ same structure</li> <li>Numerous errors</li> </ul>	<ul style="list-style-type: none"> <li>Little variety in syntax</li> <li>Some errors</li> </ul>	<ul style="list-style-type: none"> <li>Few errors</li> </ul>	<ul style="list-style-type: none"> <li>Very few, if any, errors</li> </ul>							
<b>Mechanics</b>	<ul style="list-style-type: none"> <li>Errors so severe they detract from meaning</li> </ul>	<ul style="list-style-type: none"> <li>Numerous serious errors</li> </ul>	<ul style="list-style-type: none"> <li>Patterns of errors evident</li> </ul>	<ul style="list-style-type: none"> <li>Few errors</li> </ul>	<ul style="list-style-type: none"> <li>Very few, if any, errors</li> </ul>							

## Holistic Scoring Guide for Mathematics Open-Ended (OE) Items (Generic Rubric)

### **3 - Point Response**

The response shows complete understanding of the problem's essential mathematical concepts. The student executes procedures completely and gives relevant responses to all parts of the task. The response contains few minor errors, if any. The response contains a clear, effective explanation detailing how the problem was solved so that the reader does not need to infer how and why decisions were made.

### **2 - Point Response**

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student executes nearly all procedures and gives relevant responses to most parts of the task. The response may have minor errors. The explanation detailing how the problem was solved may not be clear, causing the reader to make some inferences.

### **1 - Point Response**

The response shows limited understanding of the problem's essential mathematical concepts. The response and procedures may be incomplete and/or may contain major errors. An incomplete explanation of how the problem was solved may contribute to questions as to how and why decisions were made.

### **0 - Point Response**

The response shows insufficient understanding of the problem's essential mathematical concepts. The procedures, if any, contain major errors. There may be no explanation of the solution or the reader may not be able to understand the explanation. The reader may not be able to understand how and why decisions were made.