

## Concepts of Residential/ Commercial Design and Construction Grade 10-12 / Unit 1

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|--|-----------------------|---------------------------------|--------------------------------------|
| <b>Subject</b><br>Concepts of Residential/Commercial Design and Construction | <b>Grade</b><br>10-12 | <b>Unit</b><br>#1 Site Planning | <b>Suggested Timeline</b><br>3 weeks |
|--|-----------------------|---------------------------------|--------------------------------------|

### Course Summary

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

### Course Units

- **Site planning**
- Career exploration
- Foundation/Structural Support
- Framing systems
- Building Utilities
- Doors and Windows
- Interior Finishes
- Exterior finishes
- Space planning and effective design

### Unit Title

Site Planning

### Unit Overview

Students will gain understanding of the complexities involved with land improvement and requirements prior to effectuating those improvements as dictated by the local, state and nation building codes.

### Unit Essential Questions

1. Why are there local building codes?
2. Why are there Physical layout and setbacks?
3. What utilities are provided publicly or must be applied privately?

### Key Understandings

1. Prior to any physical land improvements, application, understanding and documentation of building codes are essential prior to issuance of building permits.
2. Local government and bank/lender inspections coincide with project progression.

### Focus Standards Addressed in the Unit

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|------------|---|
| 3.4.10.B1. | Compare and contrast how the use of <b>technology</b> involves weighing the trade-offs between the positive and negative effects.       |
| 3.4.12.B1. | Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of <b>technologies</b> |
| 3.4.10.B2. | Demonstrate how humans devise <b>technologies</b> to reduce the negative consequences of other <b>technologies</b> .                    |

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| 3.4.12.B2.                | Illustrate how, with the aid of <b>technology</b> , various aspects of the environment can be monitored to provide information for decision making.  |
| 3.4.10.B3                 | Compare and contrast how a number of different factors, such as advertising, the strength of the economy, the goals of a company and the latest fads, contribute to shaping the design of and demand for various <b>technologies</b> . |
| Building codes            | ICC and IRC , International commercial construction and International residential construction codes.  |
| Local setbacks and zoning | Township and county allowances and restrictions  |
| Plan generation           | Site plan usage and impact to surrounding properties.  |
| Site layout               | Hands on layout of a proposed structure following required specifications. Accuracy/Details prior to excavation. Changes based upon geographical location?   |
| Utility procurement       | Generate utility Location plan.  |

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|---|---|---|
| <b>Misconceptions</b><br>The volume of information required can be overwhelming prior to actual construction. |   | <b>Proper Conceptions</b><br>Each step done properly will eliminate waste in time and material.   |
| <b>Concepts</b><br>National and local compliance required for land improvement. Surveying.                    | <b>Competencies</b><br>Site Plan generation<br>Code adherence<br>Scale and actual measurement | <b>Vocabulary</b><br>ICC, IRC,<br>Excavation, Foundation,<br>Frame, Mechanicals,<br>Interior/Exterior,<br>Model codes, Inspection,<br>Setback, Surveying, Datum,<br>Monuments, GPS,<br>Transit, Points,<br>Utilities, |

**Assessments**

Team Generation of site plan incorporating concepts presented.  
 Team placement of proposed building location points on School property.  
 Test of ability to access information regarding setbacks and zoning requirements.

**Suggested Strategies to Support Design of Coherent Instruction**

*Charlotte Danielson's Framework for Teaching: Domain 3 Instruction*

Domain 3: Instruction

- 3a- Communicating with students
- 3b-Using Questioning and Discussion Techniques
- 3c-Engaging Students in Learning
- 3d-Using assessment in Instruction
- 3e-Demonstrating Flexibility and Responsiveness

**Differentiation**

- Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.

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**Interdisciplinary Connections**

- Tech-Ed, Mathematics, English,

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**Additional Resources**

- Web
- Text
- Layout equipment
- Drafting equipment

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**CRCDC**  
**Grade 10-12 / Unit 2**

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|--|-----------------------|--------------------------------------|--------------------------------------|
| <b>Subject</b><br>Concepts of Residential/Commercial Design and Construction | <b>Grade</b><br>10-12 | <b>Unit</b><br>#2 Career Exploration | <b>Suggested Timeline</b><br>2 weeks |
|--|-----------------------|--------------------------------------|--------------------------------------|

**Course Summary**

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

**Course Units**

- Site planning
- **Career exploration**
- Foundation/Structural Support
- Framing systems
- Building Utilities
- Doors and Windows
- Interior Finishes
- Exterior finishes
- Space planning and effective design

**Unit Title**

Career Exploration

**Unit Overview**

Students will research and explore the associated occupations and career paths that will provide opportunities for them to utilize their gifts, talents and passions. This study will also enlighten them to the rigors of the varied professions.

**Unit Essential Questions**

1. Where are my talents, skills and strengths?
2. What work provides the greatest self efficacy?
3. What occupation can I do best to help others?
4. What may be my financial needs be during my working years?
5. Does age have a determination on selection of occupation?

**Key Understandings**

1. Self evaluation
2. Psychological needs for job satisfaction
3. Fiscal needs from employment

**Focus Standards Addressed in the Unit**

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|-------------------|---|
| <b>3.4.10.D1.</b> | Refine a design by using <b>prototypes</b> and modeling to ensure quality, efficiency, and productivity of a final product. |
| <b>3.4.10.D2.</b> | Diagnose a malfunctioning <b>system</b> and use tools, materials, and knowledge to repair it                                |

|                   |   |
|-------------------|---|
| <b>3.4.12.D2.</b> | Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. |
| <b>3.4.10.D3.</b> | Synthesize data, analyze trends, and draw conclusions regarding the effect of <b>technology</b> on the individual, society, and the environment.                  |

|   |   |
|---|---|
| Employable skill set                      | What are my current skills and job experience and plans for continuing education?   |
| Job opportunities                         | On a local, state, national and world arena, what is the forecast for current and future employment in this discipline?       |
| Job choice educational requirements       | Individual research and documentation.  |
| Job progression within varied disciplines | What are the possibilities for job progression within a specific discipline? Discussions with those currently employed there. |

|   |  |   |
|---|--|---|
| <b>Misconceptions</b>   |  | <b>Proper Conceptions</b>   |
| <ul style="list-style-type: none"> <li>Little chance for advancement.</li> <li>I have to know how to build the entire house.</li> </ul> |  | <ul style="list-style-type: none"> <li>With ongoing training opportunities, the enhancement of your personal toolbox may lead to advancement.</li> </ul>  |
| <b>Concepts</b><br>Recognition and development of personal skill set and aptitudes.<br><br>Recognition of opportunities.                | <b>Competencies</b><br>Accurate depiction of educational and vocational experience.<br><br>Understanding of the varied professions within the construction industry. | <b>Vocabulary</b><br>Architect, Estimator, General contractor, Self employed tradesman, Inspector, Excavator, Surveyor, Foundation and waterproofing, Frammer, Plumber, Electrician, Hvac mechanic, Mason, Siding Mechanic, Roofer, Painter, Trim Mechanic, Kitchen Design, Cabinet maker, Flooring specialist, And Structural Engineering. |

### Assessments

Resume creation for employment with a general contractor  
Class presentation outlining a specific occupation

### Suggested Strategies to Support Design of Coherent Instruction

*Charlotte Danielson's Framework for Teaching: Domain 3 Instruction*

#### Domain 3: Instruction

- 3a- Communicating with students
- 3b-Using Questioning and Discussion Techniques
- 3c-Engaging Students in Learning
- 3d-Using assessment in Instruction
- 3e-Demonstrating Flexibility and Responsiveness

### Differentiation

- Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.

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**Interdisciplinary Connections**

- Tech-Ed, Math, Science, English, Business

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**Additional Resources**

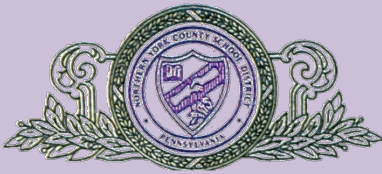
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Jeff Mauck and Dan Carey

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| Subject  | Grade | Unit                             | Suggested Timeline |
|--|-------|----------------------------------|--------------------|
| Concepts of Residential/Commercial Design and Construction | 10-12 | #3 Foundation/Structural Support | 3 weeks            |

**Course Summary**

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

**Course Units**

- Site planning
- Career exploration
- **Foundation/Structural Support**
- Framing systems
- Building Utilities
- Doors and Windows
- Interior Finishes
- Exterior finishes
- Space planning and effective design

**Unit Title**

Foundations and building structural support.

**Unit Overview**

This unit will provide an understanding of approved systems for below grade structural support.

**Unit Essential Questions**

1. Who provides the specifications for this component?
2. How does geographical location alter requirements?
3. What are the prevalent systems used in our area?
4. How does the finished structure affect the foundation design?

**Key Understandings**

1. Architectural Engineers are responsible for suitable designs and specifications based upon size and location.
2. Residential and Commercial differences
3. Shallow Foundations: Shallow footing or open trench, Grillage, Raft, Stepped, Inverted Arch
4. Deep Foundations: Pile, Well, Caisson

**Focus Standards Addressed in the Unit**

|            |  |
|------------|--|
| 3.4.10.C1. | Apply the components of the technological design process.  |
| 3.4.10.C2  | Analyze a <b>prototype</b> and/or create a working model to test a design concept by making actual observations and necessary adjustments.                                   |
| 3.4.12.C2  | Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. |

|   |   |
|---|---|
| <b>Misconceptions</b> <ul style="list-style-type: none"> <li>Concrete work is difficult.</li> </ul> | <b>Proper Conceptions</b> <ul style="list-style-type: none"> <li>Proper planning, timing, preparation, and equipment will lead to desired results reducing job stress.</li> </ul> |
|---|---|

|  |  |  |
|--|--|--|
| <b>Concepts</b><br>A foundation is means for the following, <ul style="list-style-type: none"> <li>Load distribution suitable for soil conditions.</li> <li>Uniform bearing to enhance equal settlement.</li> <li>Prevent lateral supporting movement</li> <li>Provide a level bed for building</li> <li>Increase Structural stability.</li> </ul> | <b>Competencies</b><br>Ability to recognize and communicate knowledge of the 8 types of foundations.<br><br>Component Identification.<br><br>Hands on experience with casting concrete, and setting accurately precast CMU's | <b>Vocabulary</b><br>Soils, Geographic location, Footer, Spread or open trench, Grillage, Raft, Stepped, Inverted Arch, Pile, Well, Caisson,<br><br>Forms, Concrete, columns, beams, Reinforcement devices, Steel support, Precast, Encased steel, |
|--|--|--|

**Assessments**  
Written tests, Setting precast, Casting in a form

**Suggested Strategies to Support Design of Coherent Instruction**  
*Charlotte Danielson's Framework for Teaching: Domain 3 Instruction*  
Domain 3: Instruction  
  
3a- Communicating with students  
3b-Using Questioning and Discussion Techniques  
3c-Engaging Students in Learning  
3d-Using assessment in Instruction  
3e-Demonstrating Flexibility and Responsiveness

**Differentiation**

- Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.

**Interdisciplinary Connections**

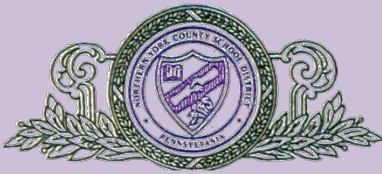
- Tech-Ed, Math, Science, History,

**Additional Resources**

- Pennlive, CADD Lab.

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**CRCDC**  
**Grade 10-12 / Unit 4**

|  |                       |                                   |                                      |
|--|-----------------------|-----------------------------------|--------------------------------------|
| <b>Subject</b><br>Concepts of Residential/Commercial Design and Construction | <b>Grade</b><br>10-12 | <b>Unit</b><br>#4 Framing Systems | <b>Suggested Timeline</b><br>9 weeks |
|--|-----------------------|-----------------------------------|--------------------------------------|

**Course Summary**

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

**Course Units**

- Site planning
- Career exploration
- Foundation/Structural Support
- **Framing systems**
- Building Utilities
- Doors and Windows
- Interior Finishes
- Exterior finishes
- Space planning and effective design

**Unit Title**

Framing systems

**Unit Overview**

This unit on wall, floor and roof systems will provide the student an understanding of the accepted and available options.

**Unit Essential Questions**

1. What are the required building materials for floor, bearing /non-bearing walls, and roof systems?
2. How will I fasten components?
3. Should we use a prefab panel?

**Key Understandings**

1. Stocked and special order components.
2. Mechanical and chemical fasteners.
3. Component/ panel placement

**Focus Standards Addressed in the Unit**

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|---|--|
| 3.4.12.E7.                              | Analyze the <b>technologies</b> of prefabrication and new structural materials and processes as they pertain to constructing the modern world. |
| 3.4.10.E7.                              | Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.                      |
| History of framing systems              | Based on available resources, Sod, Balloon, Stick, pre-fab   |
| Engineered components                   | Truss, I beam, Micro lam,  |
| Options available during design process | Site fabrication and Pre-fab components  |

|                         |   |
|-------------------------|---|
| Placement and Fastening | Mechanical and Chemical joinery                                       |
| Inspection              | Beams, columns , load and non-bearing wall sections.                  |
| Job opportunities       | Labor, Apprentice, Journeyman, Crew leader, Contactor, Sub Contractor |

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| <b>Misconceptions</b>  |  | <b>Proper Conceptions</b>   |
| <ul style="list-style-type: none"> <li>Old methods are superior to current building practices</li> </ul> |  | <ul style="list-style-type: none"> <li>Current engineering processes provide a new variety of frame solutions.</li> </ul>   |
| <b>Concepts</b><br>Evolution of building systems.  | <b>Competencies</b><br>Recognition of frame components.<br>Placement and assembly of floor, wall, and roof components. | <b>Vocabulary</b><br>Entire 2 x ? Selection,<br>Beam, Bearing,<br>Non-Bearing, Engineered components, Sheathing,<br>Mechanical fasteners,<br>Chemical fasteners, Stud,<br>Plate, Header, Jack,<br>Column, Beam, Truss, Lam beam, I beam, I joice, Rise run relationship, Pre-Fab, |

**Assessments**

Conventional Testing for component I.D.  
Selection and placement of Floor, Wall and Roof components.

**Suggested Strategies to Support Design of Coherent Instruction**

*Charlotte Danielson's Framework for Teaching: Domain 3 Instruction*

- 3a- Communicating with students
- 3b-Using Questioning and Discussion Techniques
- 3c-Engaging Students in Learning
- 3d-Using assessment in Instruction
- 3e-Demonstrating Flexibility and Responsiveness

**Differentiation**

Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.

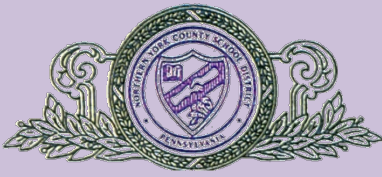
**Interdisciplinary Connections**

- Tech-Ed, History, English, Math, and Science

**Additional Resources**

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|--|-----------------------|--------------------------------------|----------------------------------|
| <b>Subject</b><br>Concepts of Residential/Commercial Design and Construction | <b>Grade</b><br>10-12 | <b>Unit</b><br>#5 Building utilities | <b>Suggested Timeline</b><br>2.5 |
|--|-----------------------|--------------------------------------|----------------------------------|

**Course Summary**

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

**Course Units**

- Site planning
- Career exploration
- Foundation/Structural Support
- Framing systems
- **Building Utilities**
- Doors and Windows
- Interior Finishes
- Exterior finishes
- Space planning and effective design

**Unit Title**

Building Utilities

**Unit Overview**

This study unit will expose the learner to the various utility components required for operation of a modern residential or commercial structure. We will also gain insight to the steps of installation during the construction phase.

**Unit Essential Questions**

1. What are the mandated utilities for contemporary structures?
2. Who determines a public or private provider?
3. What jobs are Supported for our Utility needs?

**Key Understandings**

1. Water, Electric, Fossil Fuels, Sewerage, Internet, are standard utility needs for us.
2. What are the provider options locally, regionally, nationally and throughout the world.
3. Employment opportunities.

**Focus Standards Addressed in the Unit**

|            |  |
|------------|--|
| 3.4.10.E3. | Compare and contrast the major forms of energy: thermal, radiant, electrical, mechanical, chemical, nuclear and others.                    |
| 3.4.12.E3. | Compare and contrast energy and power <b>systems</b> as they relate to pollution, renewable and non-renewable resources, and conservation. |

**Misconceptions**

**Proper Conceptions**

|  |  |   |
|--|--|---|
| <b>Concepts</b><br>This unit will provide opportunities for learning | <b>Competencies</b><br>Understanding of utility evolution.<br>Availability of these resources and their affect on a building | <b>Vocabulary</b><br>Water supply, Well, Public, Storage, Dehart Dam, |
|--|--|---|

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| <p>contemporary and historical issues related to our use of Electricity, Water, Fossil fuels, Sewerage and networks for information.</p> <p>Related job descriptions<br/>Building needs for C.O.</p> | <p>improvement.<br/>Timing for placement, IE rough in and finish during the building process</p> | <p>Hot and Cold supply lines, Electric, Supply Grid, Solar, Back up, Wind turbine, HVAC, Heating, Cooling, Fossil Fuels, Oil, Natural Gas, Geothermal, Ground source, Sewerage, Public, Private, Waste lines, Vents, Terra Cota, Cast Iron, Plastic,</p> |
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**Assessments**

Conventional testing,  
Drafting assignment for Bathroom and Kitchen layout and utilities.  
Paper with research to present based upon one occupation within these disciplines.

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**Suggested Strategies to Support Design of Coherent Instruction**

*Charlotte Danielson's Framework for Teaching: Domain 3 Instruction*

- 3a- Communicating with students
- 3b-Using Questioning and Discussion Techniques
- 3c-Engaging Students in Learning
- 3d-Using assessment in Instruction
- 3e-Demonstrating Flexibility and Responsiveness

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**Differentiation**

- Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.

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**Interdisciplinary Connections**

- Math, Science, English, Tech-Ed

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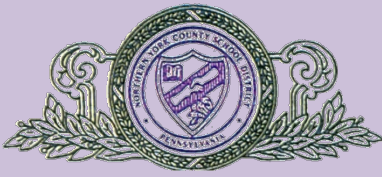
**Additional Resources**

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**CRCDC**  
**Grade 10-12 / Unit 6**

| <b>Subject</b>   | <b>Grade</b> | <b>Unit</b>      | <b>Suggested Timeline</b> |
|--|--------------|------------------|---------------------------|
| Concepts of Residential/Commercial Design and Construction | 10-12        | #6 Doors/Windows | 2.5 weeks                 |

**Course Summary**

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

**Course Units**

- Site planning
- Career exploration
- Foundation/Structural Support
- Framing systems
- Building Utilities
- **Doors and Windows**
- Interior Finishes
- Exterior finishes
- Space planning and effective design

**Unit Title**

Doors-Windows, wall and roof openings

**Unit Overview**

This unit will explore the required panel needs and structural requirements to accommodate the placement of doors, windows and mechanical systems.

**Unit Essential Questions**

1. What are the functions of a door and a window?
2. How do we design and fabricate wall openings that are structurally sound?
3. What are the requirements for ingress and egress?

**Key Understandings**

1. Variety of products
2. Inclusions of headers in bearing and non-bearing walls must facilitate appropriate load distribution.
3. A clear understanding of R/O and unit size and center lines.
4. Wall integrity with required openings.
5. Column and beam needs for load bearing.
6. Available options for doors and windows.

**Focus Standards Addressed in the Unit**

|            |  |
|------------|--|
| 3.4.12.C2. | Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. |
| 3.4.10.C2. | Analyze a <b>prototype</b> and/or create a working model to test a design concept by making actual observations and necessary adjustments                                    |
| 3.4.10.D3. | Synthesize data, analyze trends, and draw conclusions regarding the effect of <b>technology</b> on the individual, society, and the environment.                             |

|  |   |   |
|--|---|---|
| <b>Misconceptions</b> <ul style="list-style-type: none"> <li>Openings are placed only for aesthetic reasons</li> </ul>         |   | <b>Proper Conceptions</b> <ul style="list-style-type: none"> <li>Openings must be structurally sound, code compliant, and functional.</li> </ul>  |
| <b>Concepts</b><br>Structural integrity.<br>Function according to building codes.<br>R value<br>Ingress/Egress<br>Panel design | <b>Competencies</b><br>Draft structurally appropriate wall and roof panels incorporating rough openings.<br>Build panels according to drafted design. | <b>Vocabulary</b><br>Active & Passive, Argon gas,<br>Awning window, Bay window, Bow window, Casement window, Cottage window, Double hung, French door,<br>Glazing, Glider, Head, Jamb, Rough opening, Center line, nailing fin,<br>R value, Sash, sill, Transom, Bi-fold, Fire door, Hollow core, Pre-hung, Panic bar, Jack stud, |

**Assessments**  
**Drafting assignments,**  
**Construction project according to developed plans.**  
**Product identification.**

**Suggested Strategies to Support Design of Coherent Instruction**  
*Charlotte Danielson's Framework for Teaching: Domain 3 Instruction*

- 3a- Communicating with students
- 3b-Using Questioning and Discussion Techniques
- 3c-Engaging Students in Learning
- 3d-Using assessment in Instruction
- 3e-Demonstrating Flexibility and Responsiveness

**Differentiation**

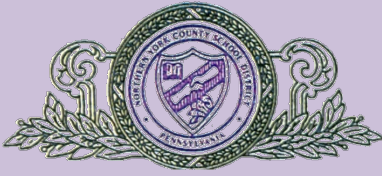
- Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.

**Interdisciplinary Connections**

- Math

**Additional Resources**

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| Subject  | Grade | Unit   | Suggested Timeline |
|--|-------|--|--------------------|
| Concepts of Residential/Commercial Design and Construction | 10-12 | #7 Interior Finishes<br>#8 Exterior Finishes | 3 weeks            |

**Course Summary**

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

**Course Units**

- Site planning
- Career exploration
- Foundation/Structural Support
- Framing systems
- Building Utilities
- Doors and Windows
- **Interior Finishes**
- **Exterior finishes**
- Space planning and effective design

**Unit Title**

**Interior and exterior finishes**

**Unit Overview**

This combined unit will expose the students to many of the available options for finishing interior and exterior surfaces.

**Unit Essential Questions**

1. What are the available options for finishing structural panels applied to the interior and exterior of walls, roofs and foundations?
2. What has the history of building finishes been?

**Key Understandings**

1. Material application.
2. Available options.
3. Geographical considerations.

**Focus Standards Addressed in the Unit**

|            |  |
|------------|--|
| 3.4.10.A1. | Illustrate how the development of <b>technologies</b> is often driven by profit and an economic market.                      |
| 3.4.12.A1  | Compare and contrast the rate of technological development over time.  |
| 3.4.10.A2. | Interpret how <b>systems</b> thinking applies logic and creativity with appropriate comprises in complex real-life problems. |
| 3.4.12.A2. | Describe how management is the process of planning, organizing, and controlling work.  |

|           |  |
|-----------|--|
| 3.4.10.A3 | Examine how <b>technology</b> transfer occurs when a new user applies an existing <b>innovation</b> developed for one purpose in a different function. |
|-----------|--|

|  |  |   |
|--|--|---|
| <b>Misconceptions</b> <ul style="list-style-type: none"> <li>All new building materials are high quality and well engineered.</li> </ul>   |  | <b>Proper Conceptions</b> <ul style="list-style-type: none"> <li>With proper research and questioning experienced tradesmen, we can make better product decisions.</li> </ul>   |
| <b>Concepts</b><br>As all areas of our consumer based world, there are a countless variety of options for building materials.<br><br>Options for Interior finishes<br>Options for exterior finishes.<br>Compliant roofing options.<br>Possible issues with use of each product.<br>Cost effectiveness of products. | <b>Competencies</b><br>Ability to research, question and select appropriate materials for each phase of the finishing process. | <b>Vocabulary</b><br>Veneer, Asphalt shingles, Metal panels, Standing seam, Tile, Rubber, Cedar shakes, Vinyl, Masonry, Stucco, Gypsum, Tilt up walls, ICF , Wood, Cladding, structural insulated panels, Paint, stains and clear coatings, Finger joint, Rubber base, Vinyl, Terrazzo, Carpet, Laminates , |

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| <b>Assessments</b><br><br>Drafting assignments,<br>Construction project according to developed plans.<br>Product identification. |
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| <b>Suggested Strategies to Support Design of Coherent Instruction</b><br><i>Charlotte Danielson's Framework for Teaching: Domain 3 Instruction</i><br><br>3a- Communicating with students<br>3b-Using Questioning and Discussion Techniques<br>3c-Engaging Students in Learning<br>3d-Using assessment in Instruction<br>3e-Demonstrating Flexibility and Responsiveness |
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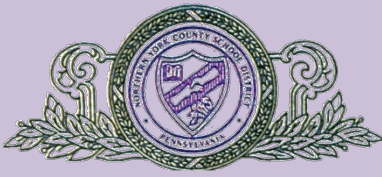
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| <b>Differentiation</b> <ul style="list-style-type: none"> <li>Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.</li> </ul> |
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| <b>Interdisciplinary Connections</b> <ul style="list-style-type: none"> <li>History, Math, Science,</li> </ul> |
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| <b>Additional Resources</b> <ul style="list-style-type: none"> <li></li> </ul> |
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| <b>Created By:</b><br>Jeff Mauck and Dan Carey |
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**CRCDC**  
**Grade 10-12 / Unit 9**

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| <b>Subject</b><br>Concepts of Residential/Commercial Design and Construction | <b>Grade</b><br>10-12 | <b>Unit</b><br>#9 Space Planning and effective design | <b>Suggested Timeline</b><br>8 weeks |
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**Course Summary**

The purpose of this course is to provide a hands-on learning experience by applying the skills and technical knowledge necessary to design residential and commercial space. Procedural and tool knowledge will enable component construction. Students will learn effective communication skills between coworkers and management. Students will be held accountable for time management as they will need to meet production deadlines.

**Course Units**

- Site planning
- Career exploration
- Foundation/Structural Support
- Framing systems
- Building Utilities
- Doors and Windows
- Interior Finishes
- Exterior finishes
- **Space planning and effective design**

**Unit Title**

Space planning and effective design.

**Unit Overview**

Students will be exposed to and realize the importance of managing their design work based upon needs, both interior and exterior. These decisions are driven by space allowances, code requirements, and geographical challenges.

**Unit Essential Questions**

1. How many square feet of space is required to accomplish our goals?
2. What accommodations may be placed to facilitate future needs?
3. How do the new improvements affect the current site?

**Key Understandings**

1. Present needs.
2. Future needs.
3. Current compliance.
4. Existing land considerations.

**Focus Standards Addressed in the Unit**

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|------------|---|
| 3.4.10.A2. | Interpret how <b>systems</b> thinking applies logic and creativity with appropriate comprises in complex real-life problems.        |
| 3.4.12.A2. | Describe how management is the process of planning, organizing, and controlling work.   |
| 3.4.10.B4. | Recognize that technological development has been evolutionary, the result of a series of refinements to a basic <b>invention</b> . |

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| <b>Misconceptions</b> <ul style="list-style-type: none"> <li>Architects and planners are seldom needed to create acceptable finished products.</li> </ul>  |   | <b>Proper Conceptions</b> <ul style="list-style-type: none"> <li>With appropriate planning there is a cost savings as codes will be adhered to thus eliminating costly changes in process.</li> </ul>  |
| <b>Concepts</b><br>Proper/ sequential, interior and exterior design generation. Post improvement impact.<br><br>Communication with design teams is imperative to reaching goals.<br>Federal, state and local specification requirements.<br>Cost per square footage and proposed budget for improvements.<br>Building needs. | <b>Competencies</b><br>Understanding of needs.<br>Generation of acceptable drafts for permit procurement. | <b>Vocabulary</b><br>Living space, Dining space,, storage space, Lab-work area space, Office space, Bathroom-Lavatory space, Ingress-Egress space, Hallways-Stair space, Mechanical indoor and outdoor space, Parking – driveway space, Handicap requirements. Traffic flow indoors and outdoors, sleeping, service areas. |

**Assessments**  
**Testing, Design generation,**

**Suggested Strategies to Support Design of Coherent Instruction**  
*Charlotte Danielson's Framework for Teaching: Domain 3 Instruction*

- 3a- Communicating with students
- 3b-Using Questioning and Discussion Techniques
- 3c-Engaging Students in Learning
- 3d-Using assessment in Instruction
- 3e-Demonstrating Flexibility and Responsiveness

**Differentiation**

- Additional lab time during students study hall, online videos, working in groups/teams, and visual aids.

**Interdisciplinary Connections**

- English, Business, Math, Science, CAD,

**Additional Resources**

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**Created By:**

Jeff Mauck and Dan Carey