



## **Language of Architecture & Construction (Construction Careers Exploration)**

### ***Course Description***

Language of Architecture and Construction (Construction Careers Exploration) is a 10.0 credit seminar-style course that exposes students to many career industries and fields. The course is split into two sections, (each consisting of 4 units, which are taken in the freshman's year) in which students are actively taking two (four) of the eight topics/units covered during one academic year. These topics include: Graphic Design; Construction; Drafting-General; Freshmen Seminar; Leadership, Education and Training; Printing; Safety; and Automotive.

Students acquire introductory-level knowledge and skills of these disciplines, and allows them to make an informed decision about their continued program of study in a given career field.

## Language of Architecture & Construction (Construction Careers Exploration)

<b>Pacing Guide</b>		
<b>Unit</b>	<b>Topic</b>	<b>Suggested Timing</b>
<b><i>COHORT A – 36 weeks of instruction</i></b>		
Unit 1	Introduction and Overview of Graphic Design	approx. 9 weeks
Unit 2	Introduction and Overview of Construction	approx. 9 weeks
Unit 3	Introduction and Overview of Drafting - General	approx. 9 weeks
Unit 4	Introduction and Overview of Freshmen Seminar	approx. 9 weeks
<b><i>COHORT B – 36 weeks of instruction</i></b>		
Unit 5	Introduction and Overview of Leadership, Education and Training	approx. 9 weeks
Unit 6	Introduction and Overview of Printing	approx. 9 weeks
Unit 7	Introduction and Overview of Safety	approx. 9 weeks
Unit 8	Introduction and Overview of Automotive	approx. 9 weeks

## Educational Technology Standards

8.1.12.A.3, 8.1.12.D.1, 8.1.12.F.1

### ➤ Technology Operations and Concepts

- Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

**Example from unit:** Students will create and present industry-related career readiness proposal.

### ➤ Digital Citizenship

- Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.

**Example from unit:** Students will correctly cite all utilized research, as well as identify appropriate sources.

### ➤ Critical Thinking, Problem Solving, Decision Making

- Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

**Example from unit:** Students will assess technology and its use at in the given career field covered in the unit.

## Career Ready Practices

*Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.*

### **CRP1. Act as a responsible and contributing citizen and employee**

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

**Example from unit:** Students will articulate skills and practices required of successful employees in the drafting industry.

### **CRP2. Apply appropriate academic and technical skills.**

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

**Example from unit:** Students will utilize technical skills required of the drafting industry.

### **CRP4. Communicate clearly and effectively and with reason.**

Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

**Example from unit:** Students will articulate working introductory knowledge of drafting concepts.

## Career Ready Practices

### **CRP11. Use technology to enhance productivity.**

Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

**Example from unit:** Students will utilize technology to transfer drafting concepts into a digital medium.

### **CRP12. Work productively in teams while using cultural global competence.**

Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

**Example from unit:** Students will work collaboratively to develop materials that are culturally sensitive.

## Differentiated Instruction

### Strategies to Accommodate Students Based on Individual Needs

<u><b>Time/General</b></u>	<u><b>Processing</b></u>	<u><b>Comprehension</b></u>	<u><b>Recall</b></u>
<ul style="list-style-type: none"> <li>• Extra time for assigned tasks</li> <li>• Adjust length of assignment</li> <li>• Timeline with due dates for reports and projects</li> <li>• Communication system between home and school</li> <li>• Provide lecture notes/assignments, and tutorials outline</li> </ul>	<ul style="list-style-type: none"> <li>• Extra Response time</li> <li>• Have students verbalize steps</li> <li>• Repeat, clarify or reword directions</li> <li>• Mini-breaks between tasks</li> <li>• Provide a warning for transitions</li> <li>• Video lessons online</li> </ul>	<ul style="list-style-type: none"> <li>• Precise step-by-step directions</li> <li>• Short manageable tasks</li> <li>• Brief and concrete directions</li> <li>• Provide immediate feedback</li> <li>• Small group instruction</li> <li>• Emphasize multi-sensory learning</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher-made checklist</li> <li>• Use visual graphic organizers</li> <li>• Reference resources to promote independence</li> <li>• Visual and verbal reminders</li> <li>• Graphic organizers</li> </ul>
<u><b>Assistive Technology</b></u>	<u><b>Tests/Quizzes/Grading</b></u>	<u><b>Behavior/Attention</b></u>	<u><b>Organization</b></u>
<ul style="list-style-type: none"> <li>• Computer/whiteboard</li> <li>• Video lesson</li> <li>• Spell-checker</li> <li>• Text speech software</li> </ul>	<ul style="list-style-type: none"> <li>• Adjusted rubrics for projects</li> <li>• Study guides</li> <li>• Shortened tests</li> <li>• Read directions aloud</li> </ul>	<ul style="list-style-type: none"> <li>• Consistent daily structured routine</li> <li>• Simple and clear classroom rules</li> <li>• Frequent feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Individual daily planner</li> <li>• Display a written agenda</li> <li>• Note-taking assistance</li> <li>• Color code materials</li> </ul>

## **Differentiated Instruction**

### **Strategies to Accommodate Students Based on Content-Specific Needs**

- Paired instruction
- Frequent one-on-one, informal and formal meetings
- Frequent revision of individualized goals and objectives
- Extra time for assigned tasks
- Adjust length of assignment
- Timeline with due dates for reports and projects
- Communication system between home and school
- Small group instruction



## Enrichment

### Strategies Used to Accommodate Based on Students Individual Needs:

- Adaption of Material and Requirements
- Evaluate Vocabulary
- Elevated Text Complexity
- Elevated Projects Rubrics
- Independent Written and Video Online Tutorials
- Projects completed individual or with Partners
- Self Selection of Research
- Tiered/Multilevel Activities
- Online Learning Communities
- Individual Response Board
- Independent Book Studies
- Open-ended activities
- Community/Subject expert mentorships

## Assessments

### Suggested Formative/Summative Classroom Assessments

- Presentation of unit applicability in professional and education sectors
- Teacher-created Unit Assessments, Topic Assessments, Quizzes
- Industry-applicable DBQs, Essays, Short Answer
- Spot site visits and demonstrations/role-plays
- Projects, Portfolio, Presentations, Prezi, Gallery Walks
- Homework
- Concept Mapping
- Primary and Secondary Source analysis
- Photo, Video, Political Cartoon, Radio, Game Analysis
- Create an Original Song, Animation, Board Game

## Interdisciplinary Connections

### English Language Arts

- Close reading of unit-specific industry-related content (NJSLSA.R1)
- Develop a proposal to increase recruitment in a given industry (NJSLSA.W2)

### Social Studies

- Research the history of careers in field of site assignment (6.1.12)
- Research prominent historical individuals in a given industry/profession (6.2.12)

### Fine & Performing Arts

- Create a poster recruiting young people to focus their studies on a specific career or industry (1.2.12)
- Create a brochure for a specific industry (1.2.12)

### Math

- Unit topic-specific/ industry applications (N.Q.A.1)
- Unit topic-specific/industry projection scenarios (A.CED.A.1)

### Science

- Research and discuss latest developments in unit/industry-specific technology (HS-ETS1-4)
- Investigate applicable-careers within the field of the given unit (9.2.12)

### World Language

- Translate unit-specific industry content (7.1.ILA)
- Create a translated index of unit-specific industry vocabulary (7.1.ILA)

## New Jersey Student Learning Standards

### 9.3–Architecture and Construction (AC)

#### Career Cluster: Architecture and Construction (AC)

- 9.3.12.AC.1 Use of vocabulary, symbols and formulas common to architecture and construction
- 9.3.12.AC.6 Read, interpret and use technical drawings, documents and specifications to plan a project

#### Pathway: Design/Preconstruction(AC-DES)

- Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues
- 9.3.12.AC-DES.6 Apply the techniques and skills of modern drafting, design, engineering and construction to projects

#### Pathway: Maintenance/Operations (AC-MO)

- 9.3.12.AC-MO.1 Recognize and employ universal construction signs and symbols to function safely in the workplace

## **Common Career Technical Core (CCTC)**

### **Architecture and Construction (AC)**

- AC.1 Use of vocabulary, symbols and formulas common to architecture and construction
- AC.6 Read, interpret and use technical drawings, documents and specifications to plan a project

#### **Pathway: Design/Preconstruction(AC-DES)**

- AC-DES.2 Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues
- AC-DES.6 Apply the techniques and skills of modern drafting, design, engineering and construction to projects

#### **Pathway: Maintenance/Operations (AC-MO)**

- AC-MO.1 Recognize and employ universal construction signs and symbols to function safely in the workplace

## Common Core State Standards (CCSS)

### CCSS - English-Language Arts

#### Key Ideas and Details:

#### Research to Build and Present Knowledge:

- CCSS.ELA-LITERACY.W.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

#### Range of Writing:

- CCSS.ELA-LITERACY.W.11-12.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences

## Common Core State Standards (CCSS)

### CCSS – Mathematics

#### Make Geometric Constructions

- CCSS. MATH. CONTENT G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
- CCSS.MATH.CONTENT G.CO.13 Construct an equilateral triangle, a square, and a rectangular hexagon inscribed in a circle

<b>Course:</b> Language of Architecture & Construction (Construction Careers Exploration) <b>Unit:</b> 3- Drafting-General <b>Grade Level:</b> 9-12	<b>Unit Overview:</b> Students will be exposed to the various techniques in drafting and the types of drafting equipment. In addition, CAD commands and functions will be introduced to bring awareness to their connection to General Drafting. Students will be able to complete tasks centered on sketching, lettering, and text. The four step design model will be introduced and awareness in careers in drafting will be discussed.
<b>New Jersey Student Learning Standards (NJSLS):</b> 9.3.12.AC.1 9.3.12.AC.6 9.3.12.AC-DES.2 9.3.12.AC-DES.6 9.3.12.AC-MO.1	
<b>Common Career Technical Core (CCTC):</b> AC.1 AC.6 AC-DES.2 AC-DES.6 AC-MO.1	
<b>Common Core State Standards (CCSS):</b> W.11-12.7 W.11-12.10 G.CO.12 G.CO.13	

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
Identify and use the most common drafting tools,  <b>NJSLS:</b> 9.3.12.AC.1  <b>CCTC:</b> AC-MO.1  <b>CCSS:</b> W.11-12.7	What is the most important drafting tool, in your opinion?  How will having the ability to identify key drafting tools increase my ability to draw and design with accuracy?  In what other scenarios may I have used, or will	Identifying key tools in drafting: Identify key tools used to construct accurate drawings	<b><u>Marketing A Tool</u></b> Students will create a marketing campaign to advertise the benefits of a specific/assigned drafting tool  <b><u>Scavenger Hunt</u></b> Scavenger hunt to identify drafting tools.	<b><u>Drafting Tools</u></b> <a href="http://www2.wisd.net/archive/industrialtech/DRAFTING/draftingtools.htm">http://www2.wisd.net/archive/industrialtech/DRAFTING/draftingtools.htm</a>  <b><u>Drafting Tools Video:</u></b> <a href="https://www.youtube.com/watch?v=PREI1YyGhQI">https://www.youtube.com/watch?v=PREI1YyGhQI</a>



Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
<p>Students will be able to apply knowledge and skills to sketch and communicate ideas.</p> <p><b>NJSLS</b> :9.3.12.AC.6</p> <p><b>CCTC:</b> AC-DES.6</p> <p><b>CCSS:</b> W.11-12.7 G.CO.12</p>	<p>use, a drafting tool?</p> <p>What makes communicating ideas difficult?</p> <p>Why is it important?</p> <p>How can technical drawings and sketches assist students with completing real –life models?</p>	<p>Identifying technical drawings: Identify technical drawings and understand how they assist with creating real-life models which can be used in industry (as well as in the classroom setting)</p> <p>Using drafting tools to accurately construct technical drawings</p>	<p><b><u>Creating Drawings</u></b></p> <p>Create technical drawings with accuracy, which can lead to model production</p>	<p><b><u>Drafting Sketches</u></b>  <a href="http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html">http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html</a></p> <p><b><u>Important Design Concepts</u></b>  <a href="https://www.goshen.edu/art/design/concepts.html">https://www.goshen.edu/art/design/concepts.html</a></p> <p><b><u>Line Types in Technical Drawings</u></b>  <a href="https://www.youtube.com/watch?v=t2NjPpsegE">https://www.youtube.com/watch?v=t2NjPpsegE</a></p>
<p>Identify the types of careers available in drafting and related fields</p> <p><b>NJSLS:</b> 9.3.12.AC.6</p> <p><b>CCTC:</b> AC.1</p>	<p>What are the possible career options for someone who wants to study drafting and or architecture?</p> <p>What is the salary and job outlook for drafting</p>	<p>Ability to research careers and report findings to a group in the form of a presentation</p> <p>Analyze different career paths, compare and</p>	<p><b><u>Utilizing Occupational Handbook</u></b></p> <p>Utilize the Occupational Outlook Handbook to research job outlook, careers, and salary opportunities as it relates to drafting and</p>	<p><b><u>Occupational Outlook handbook,</u></b></p> <p><b><u>US Bureau of Statistics</u></b></p>

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
<b>CCSS:</b> .W.11-12.7	and architectural careers?  How are drafting and architecture related?	contrast educational requirements to determine possible paths for college and life thereafter	architectural landscaping, design, etc  <b>Reporting Findings</b> Report research found in Occupational Handbook to the class as a group project	
Students will be able to create free hand sketches, sets of drawings, and turn them into accurate mechanical drawings  <b>NJSLS:</b> 9.3.12.AC-DES.6  <b>CCTC:</b> AC-DES.6  <b>CCSS:</b> G.CO.12 G.CO.13	What is the difference between free hand sketches, sets of drawings, and mechanical drawings?  How do the different types of drawings lead to the ultimate goal of constructing an industrial model?	Determine the difference between free hand sketches, sets of drawings, and mechanical drawings  <ul style="list-style-type: none"> <li>• Have the ability to utilize drafting tools to complete the various types of drawings accurately</li> </ul>	Provide students with a sample sketch and measurements, allow them to duplicate the sketch (grade based upon correct measurements and accuracy of drawing)  Students will complete examples of freehand sketches, sets of drawings, and mechanical drawing over the course of the marking period	<b>Free Hand Sketches</b> <a href="http://ef.engr.utk.edu/ef101-2002/as/book/as_chap3.pdf">http://ef.engr.utk.edu/ef101-2002/as/book/as_chap3.pdf</a>  <b>Sketching Techniques</b> <a href="https://www.youtube.com/watch?v=dmt6_n7Sgqg">https://www.youtube.com/watch?v=dmt6_n7Sgqg</a>  <b>Mechanical Drawings Techniques</b> <a href="https://www.youtube.com/watch?v=pgv3AUfZCBI">https://www.youtube.com/watch?v=pgv3AUfZCBI</a>
Explain the importance of models in industry	What purpose do models serve?	<ul style="list-style-type: none"> <li>• Application of drafting tools, and</li> </ul>	<b>Model Designing Activity</b>	<b>Creating Models in Industry</b> <a href="https://www.teachengine">https://www.teachengine</a>

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
<p><b>NJSLS:</b> 9.3.12.AC.6</p> <p><b>CCTC:</b> AC-DES.6</p> <p><b>CCSS:</b> W.11-12.7</p>	<p>How much attention to detail should be in a model?</p> <p>Does a creating life-like model help industry?</p>	<p>technical drawings and sketches to create real- life models</p>	<p>Design real-life models of items that can utilizing in industrious settings (ex: model cars)</p>	<p><a href="http://www.ck12.org/activities/view/build-a-scale-model">ering.org/activities/view/build a scale model</a></p>
<p>List and describe the four steps in the design model</p> <p><b>NJSLS:</b> 9.3.12.AC-DES.6</p> <p><b>CCTC:</b> AC-MO.1</p> <p><b>CCSS:</b> W.11-12.10 G.CO.12</p>	<p>Compare the drafting design model to the scientific method, how are both methods used to create, research, and design experiments and models? How are drafting and science interrelated</p>	<p>Compare and contrast the steps of the scientific method and the drafting design model and apply the skills from both methods when creating models</p> <p>Applying the scientific method to solve problems in drafting.</p> <ul style="list-style-type: none"> <li>•</li> </ul>	<p><b><u>Answering Open-Ended</u></b></p> <p>Students will answer Open-ended questions about the key functions of the scientific and drafting design methods.</p> <p>Students will create a Venn Diagram to illustrate the similarities and differences amongst the two methods</p>	<p><b><u>Steps of the Design Model in Engineering</u></b></p> <p><a href="https://www.youtube.com/watch?v=4O0T0zt4o7c">https://www.youtube.com/watch?v=4O0T0zt4o7c</a></p> <p><b><u>Engineering Design Process</u></b></p> <p><a href="https://www.youtube.com/watch?v=ZQF8iU7ygoM">https://www.youtube.com/watch?v=ZQF8iU7ygoM</a></p>

## Unit Vocabulary

Aerospace engineer  
 Agricultural engineer  
 Algorithms  
 Architects  
 Brainstorming  
 Ceramic engineer  
 Chemical engineer  
 Checker  
 Civil engineer  
 Design  
 Design drafter  
 Design method  
 Detail drafter  
 Detailer  
 Drafting  
 Drafting trainee  
 Electrical engineer

Heuristics  
 Industrial engineer  
 Industrial designer  
 Landscape  
 Architecture  
 Layout drafter  
 Mechanical drawings  
 Mechanical engineer  
 Metallurgical engineer  
 Mockup  
 Model  
 Nuclear Engineer  
 Petroleum engineer  
 Problem  
 Problem solving  
 Prototype

## Suggested Structured Learning Experiences

Students will visit the Center for Architecture to view the ways in which simple architectural designs are created. Students will get the opportunity to look and touch models and ask questions about the ways in which designs are developed and produced over time.

**The Center for Architecture**  
**536 Laguardia Place**  
**NY, NY 10012**  
[www.cfafoundation.org](http://www.cfafoundation.org)

Students will tour NJIT and attend architecture based classes in order to get an idea of what learning looks like at the college level. Students will interact with NJIT students by means of a question and answer session. Lastly, the program leader will inform students about the requirements needed for acceptance in the higher educational institute.

**New Jersey Institute Of Technology**  
**New Jersey School of Architecture**  
**University Heights**  
**Newark , NJ 07102**  
[www.architecture.njit.edu](http://www.architecture.njit.edu)

## Suggested Unit Projects

*Choose At Least One*

Students will complete a PowerPoint presentation that compares the Scientific Method and the drafting design models to find out how both methods enable research and proof of evidence when researching implementation of design and model completion

Students will complete sketches and add them to a portfolio over the course of the academic school year. The sample drawings can be used to display designs they've created when applying to college.