STEAM High School
Construction Management Concentration
Summary Overview

Concentration Overview

This Concentration is designed to prepare students for careers and further education and training in the management of construction projects, such as construction manager, construction engineer, cost estimator, construction superintendent, scheduler, and construction inspector. It provides a balanced focus on technical construction knowledge, such as methods, materials, systems, and layouts, as well as the managerial, financial, and planning skills necessary to complete construction projects successfully. Using hands-on construction projects, students will develop skills in all phases of the construction process from preconstruction to closeout. Students will create and use technical drawings and schematics using computer-aided drawing (CAD) software. Students will develop plans, budgets, timelines for construction projects and monitor and evaluate the uses of resources. Students will develop critical thinking and leadership skills and participate effectively as a member of a team to identify and resolve risks and financial challenges, and monitor day-to-day activities. Students will develop clear and accurate communication skills, and an awareness of issues around diversity, ethical business practices, and social responsibility. Students will also obtain OSHA 10 certification in safety protocols and student certification in industry-standard Procore Construction Software. Students will also have the opportunity to obtain certifications as Microsoft Office Specialist: Word Associate, Microsoft Office Specialist: Excel Associate, and other relevant certifications.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the project that they are involved in. Some examples for this concentration include, but are not limited to:
    - OSHA 10 Certification
    - Procore Construction Software Student Certification
    - Additional Procore Certifications
    - Procore Continuing Education Courses (e.g., Construction 101 Course Series) accredited by the American Institute of Architects
    - Autodesk AutoCAD, Revit, and Navisworks Certification
    - NCCER (National Center for Construction Education & Research) Training and Certification
    - AGC (Associated General Contractors) Training and Certification
    - Microsoft Projects Scheduling Software
    - Microsoft Office Specialist: Word Associate
    - Microsoft Office Specialist: Excel Associate
    - Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.
- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other concentrations and programs.

Integrated High School Academics

TBD

Concurrent College Enrollment

TBD

Calendar for Construction Management Concentration

Level	Quarter	Driving Question/ Project	Units of Study
1 9th Grade	**1**	**What is construction management?** **Project #1: TBD**	• Introduction to Construction and Construction Management • Careers in Construction Management • Communication and Employability Skills • Basic Safety: Personal Protective Equipment (PPE), Hand Tools, Power Tools, OSHA 10 Certification • Work-Based Learning: Career Coaching, Job Shadowing
	2	**What is the role or importance of plans?** **Project #2: TBD**	• Project Delivery Methods • Phases of Construction: Preconstruction • Construction Math • Construction Drawings: Reading Plans • Mechanical, Electrical, and Plumbing Systems • Work-Based Learning: Career Coaching, Job Shadowing

	3	**How do processes and tools support completion of a project?**
		
		Project #3: TBD
			• Project Management Fundamentals
			  ○ Planning and Documentation
			  ○ Procore Construction Management Software
			  ○ Documents: Budgets, Schedules
			• Phases of Construction
			  ○ Construction and Closeout
			  ○ Roles and Responsibilities
			• Work-Based Learning: Career Coaching, Job Shadowing

	4	**Now what? How can we plan, prevent, and respond to problems during a project?**
		
		Project #4: TBD
			• Phases of Construction
			  ○ Introduction to Material Handling
			  ○ Introduction to Basic Rigging
			• Work-Based Learning: Career Coaching, Job Shadowing

2 10th Grade	**1**	**What is my plan? Why is safety a priority?** **Project #1: TBD**	• Careers in Construction Management • Safety Review and Inspection ○ OSHA 10 Certification • Work-Based Learning: Career Coaching, Job Shadowing
	2	**Why use technical drawing tools?** **Project #2: TBD**	• Construction Drawings: Technical Drawing and CAD • Systems: Mechanical, Electrical, Plumbing, Structural • Work-Based Learning: Career Coaching, Job Shadowing
	3	**How do good business practices impact construction management?** **Project #3: TBD**	• Project Management Fundamentals-Planning, Documentation, Organization ○ Documents: Contracts, Budgets, Schedules • Work-Based Learning: Career Coaching, Job Shadowing
	4	**How are accurate estimates and budgeting accomplished?** **Project #4: TBD**	• Project Management Fundamentals-Planning, Documentation, Organization ○ Cost Control: Estimating, Budgeting • Work-Based Learning: Career Coaching, Job Shadowing

3 11th Grade	**1**	**How has awareness of climate change influenced construction management?**
		
		Project #1: TBD
			• College and Career Preparation in Construction Management
			• Safety
			  ○ Review, Inspection and Training
			  ○ Regulations and Compliance
			• Work-Based Learning: Career Coaching, Job Shadowing

	2		• Construction Drawings
			  ○ Advanced Technical and Architectural Drawing and CAD
			  ○ Building Information Modeling (BIM)
			• Systems: Mechanical, Electrical, Plumbing, Structural, Civil
			• Work-Based Learning: Career Coaching, Job Shadowing

	3	**How can I create a plan for a project that meets and balances**	• Project Management Fundamentals-Planning, Documentation, Organization
			  ○ Start Up, Operation and Maintenance
			  ○ Documents: Contracts, Budgets, Schedules, Permits
			• Work-Based Learning: Career Coaching, Job Shadowing

	4	**given criteria and regulations?**
		
		Project #2: TBD
			• Project Management Fundamentals-Planning, Documentation, Organization
			  ○ Cost Control and Risk Management: Estimating, Budgeting, Insurance
			  ○ Resource Control: Materials, Tools, Labor, Time
			• Work-Based Learning: Career Coaching, Job Shadowing

4
12th Grade
	1	**How does design influence use and vice versa?**
		
		Project #1: TBD
			• College and Career Preparation in Construction Management
			• Safety
			  ○ Review, Inspection and Training
			  ○ Regulations and Compliance
			• Work-Based Learning: Career Coaching, Job Shadowing

	2		• Construction Drawings
			  ○ Advanced Technical and Architectural Drawing and CAD
			  ○ Building Information Modeling (BIM)
			• Systems: Mechanical, Electrical, Plumbing, Structural, Civil, Architectural
			• Sustainability and LEED
			• Work-Based Learning: Internship

	3	**How can we improve this specific project and make it successful?**
		
		Project #2: TBD
			• Project Management Fundamentals: Planning, Documentation, Organization
			  ○ Quality Control
			  ○ Documents: Contracts, Budgets, Schedules, Permits, Submittals, Requests for Information (RFIs), Change Orders
			• Work-Based Learning: Career Coaching, Job Shadowing

	4		• Project Management Fundamentals: Planning, Documentation, Organization
			  ○ Cost Control and Risk Management: Estimating, Budgeting, Insurance, Safety
			  ○ Resource Control of Materials, Tools, Labor, Scheduling, Safety, Budget
			• Work-Based Learning: Internship

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STEAM High School
Construction Management Concentration
Course Syllabus
Level 1

Concentration Overview

This concentration is designed to prepare students for careers and further education and training in the management of construction projects, such as construction manager, construction engineer, cost estimator, construction superintendent, scheduler, and construction inspector. It provides a balanced focus on technical construction knowledge, such as methods, materials, systems, and layouts, as well as the managerial, financial, and planning skills necessary to complete construction projects successfully. Using hands-on construction projects, students will develop skills in all phases of the construction process from preconstruction to closeout. Students will create and use technical drawings and schematics using computer-aided drawing (CAD) software. Students will develop plans, budgets, timelines for construction projects and monitor and evaluate the uses of resources. Students will develop critical thinking and leadership skills and participate effectively as a member of a team to identify and resolve risks and financial challenges, and monitor day-to-day activities. Students will develop clear and accurate communication skills, and an awareness of issues around diversity, ethical business practices, and social responsibility. Students will also obtain OSHA 10 certification in safety protocols and student certification in industry-standard Procore Construction Software. Students will also have the opportunity to obtain certifications as Microsoft Office Specialist: Word Associate, Microsoft Office Specialist: Excel Associate, and other relevant certifications.

Course Description

In this foundational course, students will build structures and engage in hands-on projects introducing them to residential, commercial, industrial, and infrastructure technologies that will help them understand the careers and opportunities available in the construction industry. Through project-based learning, students will develop a strong knowledge of construction safety, construction mathematics, and the use of hand and power tools. Students will learn construction vocabulary and terms, as well as drawings and symbols associated with construction design, Students will learn the fundamentals of construction management, construction roles, project delivery methods and phases, and the various sectors of the construction industry and the mechanical, electrical, and plumbing systems involved in all sectors. Throughout the course, students will develop career ready practices and employability skills by both working in and leading teams to create and implement construction plans. Students will become familiar with the requirements for OSHA 10 certification as well as student certification in Procore Construction Software.

All students will engage in project-based learning at a minimum of a project each quarter. Intrinsic to project-based learning is examining a driving question or identifying a problem by articulating what is already known and what students need to know to answer the question. Students are guided to develop and execute a plan culminating in a presentation demonstrating their response to the initial question or problem. This process concludes with self-reflection regarding their learning. In this foundational course, projects will focus on self-assessment of skills, problem-solving, and planning for their continued growth. Projects focusing on the basics of construction and managing the phases of construction projects will be key.

Work-Based Learning

All of the instruction for this course will be project-based where students will be developing, planning, executing, and presenting authentic construction plans and projects based on community needs. Students will be connected with working construction professionals through field trips to local construction sites, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the project that they are involved in. Some examples for this concentration include, but are not limited to:
    - OSHA 10 Certification
    - Procore Construction Software Student Certification
    - Additional Procore Certifications

- Procore Continuing Education Courses (e.g., Construction 101 Course Series) accredited by the American Institute of Architects
- Autodesk AutoCAD, Revit, and Navisworks Certification
- NCCER (National Center for Construction Education & Research) Training and Certification
- AGC (Associated General Contractors) Training and Certification
- Microsoft Projects Scheduling Software
- Microsoft Office Specialist: Word Associate
- Microsoft Office Specialist: Excel Associate
- Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.

- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other concentrations and programs.

Pre-Requisites

N/A

Course Objectives

Upon completion of this course students will know and be able to:

1. Categorize structures as residential, commercial, mixed use, industrial, and infrastructure projects.
2. Explore trends in construction of buildings.
3. Research careers associated with construction.
4. Identify the phases of a construction project.
5. Summarize preconstruction activities for different types of construction.
6. Identify different aspects of construction planning.
7. Interpret simple drawings, plans and symbols.
8. Identify construction materials and tools and their properties.
9. Use standard construction techniques to build a structure.
10. Compute units of measurement common in construction.
11. Explain and follow all safety rules and procedures.
12. Use Procore Construction Software to plan and document projects.

Integrated Academics

N/A

Concurrent College Enrollment

TBD

Equipment and Supplies

- **School will provide:** Tools, equipment, and supplies to complete projects
- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot

Textbook

TBD

Grading

10% Research and planning for current projects
10% Work Journal
80% Projects, Presentations, Participation and Performance

Additional Course Policies

Students are expected to:

- Meet all deadlines and be on time. Meeting deadlines and being on time are a major part of being a construction professional.
- Produce their best work, including being prepared presentations.
- Participate in class including contributing to discussions and critiquing their own and others' work, as well as diligently working on their own projects.
- Seek help when needed.

- Be attentive, ask questions if they do not understand something, and offer their opinions.
- Use Procore Construction Software for preparing and sharing all work.
- Give credit and use proper citations for all research and project ideas.

Course Calendar

Quarter	Driving Question/ Project	Units of Study
1	**What is construction management?** **Project #1: TBD**	• Introduction to Construction and Construction Management • Careers in Construction Management • Communication and Employability Skills • Basic Safety: Personal Protective Equipment (PPE), Hand Tools, Power Tools, OSHA 10 Regulations • Work-Based Learning: Career Coaching, Job Shadowing
2	**Why are plans important?** **Project #2: TBD**	• Project Delivery Methods • Phases of Construction: Preconstruction • Construction Math • Construction Drawings: Reading Plans • Mechanical, Electrical, and Plumbing Systems • Work-Based Learning: Career Coaching, Job Shadowing

3	**How do processes and tools support completion of a project?**
	
	Project #3: TBD
		• Project Management Fundamentals
		  ○ Planning and Documentation
		  ○ Procore Construction Management Software
		  ○ Documents: Budgets, Schedules
		• Phases of Construction
		  ○ Construction and Closeout
		  ○ Roles and Responsibilities
		• Work-Based Learning: Career Coaching, Job Shadowing

4	**Now what? How can we plan for, prevent, and respond to problems during a project?**
	
	Project #4: TBD
		• Phases of Construction
		  ○ Introduction to Material Handling
		  ○ Introduction to Basic Rigging
		• Work-Based Learning: Career Coaching, Job Shadowing

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STEAM High School
Construction Management Concentration
Scope and Sequence
Level 1

First Quarter
Driving Question: What is construction management?
Project #1: TBD

Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Introduction to Construction and Construction Management	• What is the role of construction in the community and society? • How has construction been influenced by past events? • What are the different roles on a construction project? • What are the five construction sectors?	• Identify and describe the role of construction in the community and society. • Describe how construction technology has been influenced by past events. • Describe the role of the owner on a construction project. • List four different trades and describe how they participate during construction. • Describe the work of architects and engineers. • Describe the typical roles within a construction company and how they interact with one another. • Describe the common characteristics of the five construction sectors. • Explain the differences between residential and commercial construction and give an example of a mixed-use project. • Explain what the construction of Infrastructure involves and who funds the projects. • Describe the size and scope of Industrial projects and explain what sets them apart from projects in other sectors. • Distinguish between architectural and civil construction systems. • Explain the differences in requirements and outcomes between private and public sector construction projects.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,7,11 **Cluster Standards** AC 4,5 **Pathway Standards** AC-CST 1 AC-DES 5	**ELA** 9-10R 1,2,3,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Careers in Construction Management	• What are different careers available in construction management and what types of skills do they require? • What are the financial and professional benefits of pursuing a construction management career? • What is the typical career path for construction professionals?	• Identify different careers available in construction management and the types of skills they require. • Summarize the current and future outlook for jobs. • Describe the financial and professional benefits of pursuing a construction management career. • Describe the typical career path for construction professionals. • Identify different ways to pursue a career in the construction industry.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,7,10,11 **Cluster Standards** AC 4,5,7 **Pathway Standards** AC-CST 1 AC-DES 2,5	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

First Quarter Driving Question: What is construction management? Project #1: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
		• Describe an area of interest in construction management and investigate its entry-level requirements, and its growth potential.			
Communication and Employability Skills	• What is the importance of good communication? • What does it mean to be a professional? • What is the role of an employee in the construction industry? • What is the importance of critical thinking in solving problems? • Why is resilience an important skill in the construction industry? • Why are good social skills necessary in the construction trade? • What is the importance of teamwork? • What are some important social issues of concern in the workplace? • How are computers used in the construction industry?	• Describe the communication process and the importance of listening and speaking skills and their relationship to job performance. • Describe the importance of good reading and writing skills and their relationship to job performance. • Communicate effectively using verbal and writing skills. • Communicate effectively on the job using electronic communication devices. • Discuss professional standards and employability skills, including the role of an employee in the construction industry. • Explain the importance of critical thinking in solving problems. • Explain the importance of resilience in solving problems and adapting to changes as they arise. • Explain the importance of social skills and identify ways good social skills are applied in the construction trade. • Describe how to work in a team environment and how to be an effective leader. • Explain how to resolve conflicts with co-workers and supervisors. • Explain how to give and receive constructive criticism. • Identify and describe various social issues of concern in the workplace. • Explain common uses for computers in the construction industry. • Use basic computer systems for planning, communication, and documentation.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,8,9,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 6 AC-DES 2,5	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Basic Safety: **Personal Protective Equipment (PPE), Hand Tools, Power**	• What are the causes and consequences of the most common types of workplace incidents? • What is the role of the OSHA in job-site safety?	• Describe the causes and consequences of the most common types of workplace incidents. • Explain the benefits of safety and the costs of workplace incidents. • Explain how to recognize, reduce, and avoid workplace hazards.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance**	**Career Ready Practices** CRP 1,2,3,4,58,11,12 **Cluster Standards** AC 3	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9

First Quarter Driving Question: What is construction management? Project #1: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Tools, OSHA 10 Regulations	• How is PPE used to protect workers from different types of injuries? • What are the guidelines for the safe use of hand and power tools?	• Explain the role of the OSHA in job-site safety. • Describe common fall hazards and methods to prevent them. • Describe struck-by hazards and how to avoid them. • Describe common caught-in/caught-between hazards and how to prevent them. • Define safe work procedures around electrical hazards. • Explain how PPE is used to protect workers from different types of injuries. • Demonstrate the use and care of PPE, including eye and ear protection, respirators, hard hats, gloves, safety harnesses, and safety shoes. • Describe common environmental hazards and how workers should respond to them. • Identify fire hazards and describe basic firefighting procedures. • Explain the importance and function of safety data sheets (SDS). • Identify common hand tools and demonstrate how to use them safely. • Summarize basic power tool safety guidelines. • Identify common power tools and explain how to use them safely.	• Class Presentation • Teacher Observation Checklist	**Pathway Standards** AC-CST 5,9 AC-DES 4 AC-MO 1	9-10WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

Second Quarter Driving Question: What is the importance of plans? Project #2: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Delivery Methods **Phases of Construction:** **Preconstruction**	• What are different methods of project delivery? • What are the major phases of a construction project? • What is the project design process? • What is the project planning process?	• Identify different types of project delivery, such as Design-Bid-Build, Design-Build, Construction Management at Risk, Public Private Partnership, Integrated Project Delivery, Engineer-Procure-Construct, and Energy Performance Contracting. • Identify each major phase of a construction project. • Explain the project bidding process and who is responsible. • Explain the project design process and who is responsible. • Explain the project planning process and who is responsible. • Identify the elements of a project plan. • Describe the role of drawings and specifications in the planning process. • Identify the planning requirements for materials, equipment, tools, and labor needed for a project.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,8,11,12 **Cluster Standards** AC 1,4,5 **Pathway Standards** AC-CST 1,4,6 AC-DES 1,2,3	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Construction Math	• What kinds of calculations are commonly used on a construction project? • What kinds of measurements are commonly used on a construction project?	• Calculate and solve problems with whole numbers, fractions, and decimals. • Define equivalent fractions and calculate their lowest common denominators. • Define improper fractions and convert them into mixed numbers. • Explain place value with whole numbers and decimals. • Convert between decimals, fractions, and percentages. • Identify and demonstrate the use of common length-measuring tools. • Identify common length, weight, volume, and temperature units in both the inch-pound and metric systems and convert them into other comparable units. • Identify different types of angles. • Identify common geometric shapes and summarize their characteristics. • Calculate the area of two-dimensional shapes. • Calculate the volume of three-dimensional shapes.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,8,11 **Cluster Standards** AC 1,6 **Pathway Standards** AC-CST 8 AC-DES 2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Construction Drawings:			**Written**	**Career Ready Practices** CRP 1,2,4,7,8,11	**ELA** 9-10R 1,2,4,7,8,9

Second Quarter Driving Question: What is the importance of plans? Project #2: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Reading Plans **Mechanical, Electrical, and Plumbing Systems**	• What are the basics of construction drawing? • What are different classifications of construction drawings? • What are the basic components of electrical, mechanical, and plumbing systems? • What are the basic electrical, mechanical, and plumbing symbols used on plans? • What is the purpose of written specifications?	• Summarize the purposes of construction drawings and written specifications. • Describe different classifications of construction drawings. • Describe the types of drawings usually included in a set of plans. • Identify basic construction terms, drawing components, abbreviations and drawing symbols commonly used on plans. • Explain how dimensions relate to various drawing scales. • Interpret and use drawing dimensions. • Relate information on construction drawings to actual locations on the print. • Explain the basic concepts and components of mechanical, electrical, and plumbing systems. • Define basic terminology for mechanical electrical and plumbing systems used in construction drawings. • Identify mechanical, electrical, and plumbing symbols commonly used on plans. • Interpret a drawing of a basic residential HVAC system. • Interpret simple wiring and circuit diagrams. • Interpret a drawing of a simple residential plumbing system. • Read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings.	• Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Cluster Standards** AC 1,6 **Pathway Standards** AC-CST 6,7 AC-DES 1,2,3,6,7	9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

Third Quarter Driving Question: How do processes and tools support completion of a project? Project #3: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Management Fundamentals **Planning and Documentation** **Procore Construction Management Software**	• What is involved in the project planning process? • What is the link between planning and scheduling? • Why is it important to have documentation on a project? • How is Procore Construction Management Software use to plan and document a project?	• Explain the project planning process. • Identify the elements of a project plan. • Identify the planning requirements for materials, equipment, tools, and labor needed for a project. • Describe the link between planning and scheduling. • Describe the various resources that need to be considered when planning a job. • Develop a plan for completing a construction project. • Explain the need for documentation on a project. • Identify the types of documents used on a project. • Describe the role of drawings and specifications in project planning. • Complete Procore Construction Management Software Student Certification.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist • Procore Student Certification	**Career Ready Practices** CRP 1,2,4,6,8,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,4,6 AC-DES 1,2,4,6,7,8	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Project Management Fundamentals **Documents: Budgets, Schedules**	• What is the importance of budgeting for a construction project? • What is the importance of scheduling and time management?	• Develop a budget for a simple construction project. • Determine the most effective strategies to minimize costs. • Explain the importance of scheduling as a project management function. • Explain the importance of effective time management. • Describe how to implement and manage project schedules. • Identify types of project scheduling systems. • Develop a schedule for a construction project.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,7,8,11 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,4,6 AC-DES 1,2,4,6,7,8	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Phases of Construction **Construction and Closeout** **Roles and Responsibilities**	• What are the roles and responsibilities of different professionals in the construction and closeout processes? • How do construction teams function?	• Identify the roles and responsibilities of owners, architects, engineers, designers, specialty contractors, trades, material and equipment suppliers in the construction and closeout processes. • Describe the project construction process. • Describe the project closeout process. • Describe how construction teams function. • Describe the use of teamwork to solve problems. • Distinguish between the roles of team leaders and team members. • Identify characteristics of good leaders.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,7,8,9,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,3,4,6,8 AC-DES 2,4,6,8 AC-MO 3,4,5,6	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

Third Quarter Driving Question: How do processes and tools support completion of a project? Project #3: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
		• Participate as part of a construction team to construct a building or a model of a building using a variety of tools, equipment, and machines. • Describe the use of time-management techniques to develop and maintain work schedules and meet deadlines. • Complete and closeout a project according to established criteria.			
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

Fourth Quarter Driving Question: Now what? How can we plan for, prevent, and respond to problems during a project? Project #4: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Phases of Construction **Introduction to Material Handling**	• What is material handling? • What common safety precautions are needed when handling materials?	• Identify the basic concepts of material handling and common safety precautions. • Identify various types of non-motorized and motorized material handling equipment and describe how they are used. • Define a load and establish a plan prior to moving a load. • Apply proper material-handling techniques and equipment. • Recognize hazards and follow safety procedures required for material handling.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,5,8,11 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 5,9 AC-DES 8 AC-MO 1	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Phases of Construction **Introduction to Basic Rigging**	• What kinds of rigging and rigging equipment are commonly used in construction? • What common safety precautions are needed when using rigging equipment?	• Identify and describe various types of rigging slings, hardware, and equipment. • Describe how to inspect common rigging hardware. • Identify and describe various types of hoists. • Identify and describe basic rigging hitches and the related Emergency Stop hand signal.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,5,8,11 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 5,9 AC-DES 8 AC-MO 1	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

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STEAM High School
Construction Management Concentration
Course Syllabus
Level 2

Concentration Overview

This concentration is designed to prepare students for careers and further education and training in the management of construction projects, such as construction manager, construction engineer, cost estimator, construction superintendent, scheduler, and construction inspector. It provides a balanced focus on technical construction knowledge, such as methods, materials, systems, and layouts, as well as the managerial, financial, and planning skills necessary to complete construction projects successfully. Using hands-on construction projects, students will develop skills in all phases of the construction process from preconstruction to closeout. Students will create and use technical drawings and schematics using computer-aided drawing (CAD) software. Students will develop plans, budgets, timelines for construction projects and monitor and evaluate the uses of resources. Students will develop critical thinking and leadership skills and participate effectively as a member of a team to identify and resolve risks and financial challenges, and monitor day-to-day activities. Students will develop clear and accurate communication skills, and an awareness of issues around diversity, ethical business practices, and social responsibility. Students will also obtain OSHA 10 certification in safety protocols and student certification in industry-standard Procore Construction Software. Students will also have the opportunity to obtain certifications as Microsoft Office Specialist: Word Associate, Microsoft Office Specialist: Excel Associate, and other relevant certifications.

Course Description

In this course, students will continue to build structures and engage in hands-on projects as they deepen their understanding of the careers and opportunities available in the construction industry. Students will create technical drawings to address real design problems using computer assisted drawing (CAD) software. Students will continue to learn about the fundamentals of construction management as they implement their designs and manage the planning, construction, and closeout process, including estimating, budgeting, scheduling, and documentation. Students will continue to learn about mechanical, electrical, and plumbing systems, as well as structural systems used in all types of construction. Throughout the course, students will develop career ready practices and employability skills by both working in and leading teams to create and implement construction plans. Students will continue to learn about OSHA 10 regulations, as well as developing their skills using Procore Construction Software.

All students will engage in project-based learning at a minimum of a project each quarter. Intrinsic to project-based learning is examining a driving question or identifying a problem by articulating what is already known and what students need to know to answer the question. Students are guided to develop and execute a plan culminating in a presentation demonstrating their response to the initial question or problem. This process concludes with self-reflection regarding their learning. In this course, projects will focus on problem-solving and issues around documenting and controlling the resources of a construction project.

Work-Based Learning

All of the instruction for this course will be project-based where students will be developing, planning, executing, and presenting authentic construction plans and projects based on community needs. Students will be connected with working construction professionals through field trips to local construction sites, job shadowing and Career Coaching leading to opportunities for direct job training and real-world experience. Students will maintain a portfolio of their experiences to document the development of their skills, including a professional resume.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the project that they are involved in. Some examples for this concentration include, but are not limited to:
    - OSHA 10 Certification
    - Procore Construction Software Student Certification
    - Additional Procore Certifications
    - Procore Continuing Education Courses (e.g., Construction 101 Course Series) accredited by the American Institute of Architects
    - Autodesk AutoCAD, Revit, and Navisworks Certification
    - NCCER (National Center for Construction Education & Research) Training and Certification

- AGC (Associated General Contractors) Training and Certification
- Microsoft Projects Scheduling Software
- Microsoft Office Specialist: Word Associate
- Microsoft Office Specialist: Excel Associate
- Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.

- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other concentrations and programs.

Pre-Requisites

Construction Management Level 1

Course Objectives

Upon completion of this course students will know and be able to:

1. Research careers associated with construction.
2. Summarize preconstruction, construction, and closeout activities for different types of construction.
3. Identify and demonstrate the processes of estimating, budgeting, and scheduling components of construction planning.
4. Design and interpret and simple construction drawings and plans using CAD software.
5. Use construction materials, tools, and techniques to build a structure and document the process.
6. Compute units of measurement common in construction.
7. Explain and follow all safety rules and procedures.
8. Use Procore Construction Software to plan and document projects.

Integrated Academics

N/A

Concurrent College Enrollment

TBD

Equipment and Supplies

- **School will provide:** Tools, equipment, and supplies to complete projects
- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot

Textbook

TBD

Grading

10% Research and planning for current projects
10% Work Journal
80% Projects, Presentations, Participation and Performance

Additional Course Policies

Students are expected to:

- Meet all deadlines and be on time. Meeting deadlines and being on time are a major part of being a construction professional.
- Produce their best work, including being prepared for presentations.
- Participate in class including contributing to discussions and critiquing their own and others' work, as well as diligently working on their own projects.
- Seek help when needed.
- Be attentive, ask questions if they do not understand something, and offer their opinions.
- Use Procore Construction Software for preparing and sharing all work.
- Give credit and use proper citations for all research and project ideas.

Course Calendar

Quarter	Driving Question/ Project	Units of Study
1	**What is my career plan? Why is safety a priority?** **Project #1: TBD**	• Careers in Construction Management • Safety Review and Inspection o OSHA 10 Certification • Work-Based Learning: Career Coaching, Job Shadowing
2	**Why use technical drawing tools?** **Project #2: TBD**	• Construction Drawings: Technical Drawing and CAD • Systems: Mechanical, Electrical, Plumbing, Structural • Work-Based Learning: Career Coaching, Job Shadowing
3	**How do good business practices impact construction management?** **Project #3: TBD**	• Project Management Fundamentals-Planning, Documentation, Organization o Documents: Contracts, Budgets, Schedules • Work-Based Learning: Career Coaching, Job Shadowing
4	**How are accurate estimates and budgeting accomplished?** **Project #4: TBD**	• Project Management Fundamentals-Planning, Documentation, Organization o Cost Control: Estimating, Budgeting • Work-Based Learning: Career Coaching, Job Shadowing

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STEAM High School
Construction Management Concentration
Scope and Sequence
Level 2

First Quarter
Driving Question: What is my career plan? Why is safety a priority?
Project #1: TBD

Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Careers in Construction Management	• What are different careers available in construction management and what types of skills do they require? • What are the financial and professional benefits of pursuing a construction management career? • What is the typical career path for construction professionals?	• Summarize the current and future outlook for jobs. • Recognize and describe how construction management careers make a difference in the community. • Describe industry sectors and the progression path for construction management careers. • Identify different construction management careers and the types of skills they require. • Identify ways to pursue a career in the construction industry. • Describe the advantages of professional training programs and their relationship with apprenticeships. • Summarize the path to a construction management career through community colleges and universities. • Describe an area of personal interest in construction management and investigate entry-level requirements and growth potential.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,7,10,11 **Cluster Standards** AC 1,7 **Pathway Standards** AC-CST 1 AC-DES 2,5	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Safety Review and Inspection **OSHA 10 Regulations**	• What are the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards? • What is the purpose and function of the Occupational Safety and Health Administration (OSHA)?	• Explain the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards. • Explain the importance and the elements of an effective safety program. • Define job site safety regulations and requirements. • Explain the purpose and function of the Occupational Safety and Health Administration (OSHA). • Review the requirements of the OSHA 10-hour Construction Course. • Explain the difference between compliance and best practices. • Demonstrate the use and care of PPE, including eye and ear protection, respirators, hard hats, gloves, safety harnesses, and safety shoes.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,5,8,11 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 3,5,6,9 AC-DES 2,4 AC-MO 1	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

First Quarter Driving Question: What is my career plan? Why is safety a priority? Project #1: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
		• Describe hand and power tool safety requirements. • Explain the importance and function of safety data sheets (SDS). • Explain fall protection, ladder safety, stair safety, and scaffold safety procedures. • Define safe work procedures around electrical hazards. • Demonstrate how to use common hand and power tools safely. • Identify construction hazards on the jobsite, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.			
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

Second Quarter Driving Question: Why use technical drawing tools? Project #2: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Construction Drawings: Technical Drawing and CAD **Construction Systems: Mechanical, Electrical, Plumbing, Structural**	• What are the types of drawings usually included in a set of plans? • What are the components of technical drawings? • How are technical drawing created and revised using CAD? • What are the basic components of electrical, mechanical, plumbing, and structural systems? • What are the basic electrical, mechanical, plumbing, and structural symbols used on plans?	• Describe the types of drawings usually included in a set of plans. • Read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings. • Explain the purpose of written specifications. • Read and interpret appropriate architectural symbols, schematics, blueprints, work drawings, manuals, and bulletins. • Apply technical drawing and design standards. • Prepare multi-view drawings, using orthographic projections. • Prepare sectional view drawings. • Create 2D patterns from 3D objects using the processing of parallel lines, radial lines, and triangulation developments. • Prepare pictorial drawings. • Create and revise technical drawings, using CAD. • Explain the basic concepts and components of mechanical, electrical, plumbing, and structural systems. • Define basic terminology for mechanical, electrical, plumbing, and structural systems used in construction drawings. • Identify mechanical, electrical, plumbing, and structural systems symbols commonly used on plans. • Interpret a drawing of simple residential HVAC, plumbing, structural and electrical systems. • Interpret simple wiring and circuit diagrams.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,7,8,11,12 **Cluster Standards** AC 1,6 **Pathway Standards** AC-CST 6,7 AC-DES 1,3,6,7,8 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

Third Quarter Driving Question: How do good business practices impact construction management? Project #3: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Management Fundamentals **Planning, Documentation, Organization: Documents: Contracts, Budgets, Schedules**	• How is the planning process carried out? • Why is documentation needed on a project? • What are the types of documents used on a project? • What is the link between planning and scheduling? • What is the importance of scheduling? • What is the International Building Code (IBC)? • What are the relevant codes and regulations that must be adhered to in project planning?	• Describe the steps in the planning process. • Describe the issues related to regional and community planning. • Explain the scope and purpose of the International Building Code. • Explain the state and local building codes and regulations that pertain to different types of construction projects. • Explain the need for documentation and the types of documents used on a project. • Identify the documents needed for closeout. • Identify the parts of a typical project manual. • Describe the role of drawings and specifications in planning and documentation. • Identify the types of contracts used in the construction industry. • Describe the insurance requirements for a company and a project. • Explain the importance of using and maintaining a record of project correspondence. • Describe the change order process. • Describe the processing of contractor payments. • Describe the link between planning and scheduling. • Explain the importance of scheduling as a project management function. • Explain the importance of effective time management. • Describe how to implement and manage project schedules using scheduling software. • Identify types of project scheduling systems. such as Procore and MS Projects. • Create a step-by-step list of the tasks that will complete a project. • Describe the various resources that need to be considered when planning a job. • Assign resources to each activity in a list.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,9,11,12 **Cluster Standards** AC 1,2,6 **Pathway Standards** AC-CST 1,2,4,6 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Work-Based Learning:	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6

Third Quarter Driving Question: How do good business practices impact construction management? Project #3: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Career Coaching, Job Shadowing			• Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Cluster Standards** AC 7	**Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7
				Pathway Standards AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**Math**
					Science

Fourth Quarter Driving Question: How are accurate estimates and budgeting accomplished? Project #4: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Management Fundamentals **Planning, Documentation, Organization: Cost Control: Estimating, Budgeting**	• What is the importance of being aware of costs on the job? • What is the estimating process? • What is the relationship between estimated cost, actual cost, and projected cost? • What is cost control?	• Explain the steps of a cost estimating process. • Explain estimated cost, actual cost, and projected cost. • Describe the elements of cost control and cost reporting. • Explain the cost analysis process. • Describe how to estimate and acquire materials required for a project. • Explain the use of purchase orders and contracts in acquiring materials. • Identify the planning requirements for materials, equipment, tools, and labor for a project. • Complete a simple material estimate. • Explain the importance of being aware of costs on the job. • Describe the factors that affect the purchase and use of construction materials.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,8,9,11,12 **Cluster Standards** AC 1,2,6 **Pathway Standards** AC-CST 1,2,4,6,9 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7,8,9 9-10WHST 2,5,6,7 **Math** **Science**

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STEAM High School
Construction Management Concentration
Course Syllabus
Level 3

Concentration Overview

This concentration is designed to prepare students for careers and further education and training in the management of construction projects, such as construction manager, construction engineer, cost estimator, construction superintendent, scheduler, and construction inspector. It provides a balanced focus on technical construction knowledge, such as methods, materials, systems, and layouts, as well as the managerial, financial, and planning skills necessary to complete construction projects successfully. Using hands-on construction projects, students will develop skills in all phases of the construction process from preconstruction to closeout. Students will create and use technical drawings and schematics using computer-aided drawing (CAD) software. Students will develop plans, budgets, timelines for construction projects and monitor and evaluate the uses of resources. Students will develop critical thinking and leadership skills and participate effectively as a member of a team to identify and resolve risks and financial challenges, and monitor day-to-day activities. Students will develop clear and accurate communication skills, and an awareness of issues around diversity, ethical business practices, and social responsibility. Students will also obtain OSHA 10 certification in safety protocols and student certification in industry-standard Procore Construction Software. Students will also have the opportunity to obtain certifications as Microsoft Office Specialist: Word Associate, Microsoft Office Specialist: Excel Associate, and other relevant certifications.

Course Description

In this course, students will continue to build structures and engage in hands-on projects as they deepen their understanding of the careers and opportunities available in the construction industry. Students will create technical drawings and models to address real design problems using computer assisted drawing (CAD) software and apply their knowledge to using Building Information Modeling (BIM) software. Students will continue building their knowledge of the fundamentals of construction management as they implement their designs and manage the planning, construction, and closeout process, including documentation, cost control, risk management, and resource control. Students will also learn about the processes, roles and responsibilities involved in the start-up, operation, and maintenance of completed construction projects. Students will continue to learn about the mechanical, electrical, plumbing, and structural systems, as well as the civil engineering systems used in all types of construction. Throughout the course, students will develop career ready practices and employability skills by both working in and leading teams to create and implement construction plans. Students will work to obtain OSHA 10 certification and will demonstrate adherence to all safety protocols and take responsibility for personal and site safety. Students will continue to develop their skills using Procore Construction Software.

All students will engage in project-based learning at a minimum of two projects a year. Intrinsic to project-based learning is examining a driving question or identifying a problem by articulating what is already known and what students need to know to answer the question. Students are guided to develop and execute a plan culminating in a presentation demonstrating their response to the initial question or problem. This process concludes with self-reflection regarding their learning. In this course, projects will focus on problem-solving, and the importance of managing people and resources on a construction project as the students designing a solution to a need within the school, making a plan, implementing the plan, and carrying the project through to completion.

Work-Based Learning

All of the instruction for this course will be project-based where students will be developing, planning, executing, and presenting authentic construction plans and projects based on community needs. Students will be connected with working construction professionals through field trips to local construction sites, job shadowing and Career Coaching leading to opportunities for direct job training and real-world experience. Students will maintain a portfolio of their experiences to document the development of their skills, including a professional resume and applications for potential post-secondary education and training.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the project that they are involved in. Some examples for this concentration include, but are not limited to:
    - OSHA 10 Certification
    - Procore Construction Software Student Certification

- Additional Procore Certifications
- Procore Continuing Education Courses (e.g., Construction 101 Course Series) accredited by the American Institute of Architects
- Autodesk AutoCAD, Revit, and Navisworks Certification
- NCCER (National Center for Construction Education & Research) Training and Certification
- AGC (Associated General Contractors) Training and Certification
- Microsoft Projects Scheduling Software
- Microsoft Office Specialist: Word Associate
- Microsoft Office Specialist: Excel Associate
- Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.

- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other concentrations and programs.

Pre-Requisites

Construction Management Levels 1 and 2

Course Objectives

1. Research a career of personal interest associated with construction management.
2. Explore post-secondary opportunities for education and training.
3. Develop a professional resume and applications for post-secondary institutions.
4. Summarize start-up, operation, and maintenance activities for different types of construction.
5. Identify and demonstrate the processes of cost and resource control in construction management.
6. Design and interpret construction drawings, models, and plans using CAD and BIM software.
7. Use construction materials, tools, and techniques to build a structure and document the process.
8. Compute units of measurement common in construction.
9. Explain and follow all safety rules and procedures.
10. Use Procore Construction Software to plan and document projects.

Integrated Academics

N/A

Concurrent College Enrollment

TBD

Equipment and Supplies

- **School will provide:** Tools, equipment, and supplies to complete projects
- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot

Textbook

TBD

Grading

10% Research and planning for current projects
10% Work Journal
80% Projects, Presentations, Participation and Performance

Additional Course Policies

Students are expected to:

- Meet all deadlines and be on time. Meeting deadlines and being on time are a major part of being a construction professional.
- Produce their best work, including being prepared for presentations.
- Participate in class including contributing to discussions and critiquing their own and others' work, as well as diligently working on their own projects.
- Seek help when needed.
- Be attentive, ask questions if they do not understand something, and offer their opinions.
- Use Procore Construction Software for preparing and sharing all work.

- Give credit and use proper citations for all research and project ideas.

Course Calendar

Quarter	Driving Question/ Project	Units of Study

1	**How has awareness of climate change influenced construction management?**
	
	Project #1: TBD
		• College and Career Preparation in Construction Management
		• Safety
		  ○ Review, Inspection and Training
		  ○ Regulations and Compliance
		  ○ OSHA 10 Certification
		• Work-Based Learning: Career Coaching, Job Shadowing

2		• Construction Drawings:
		  ○ Advanced Technical and Architectural Drawing and CAD
		  ○ Building Information Modeling (BIM)
		• Systems: Mechanical, Electrical, Plumbing, Structural, Civil
		• Work-Based Learning: Career Coaching, Job Shadowing

3	**How can I create a plan for a project that meets and balances given criteria and regulations?**
	
	Project #2: TBD
		• Project Management Fundamentals-Planning, Documentation, Organization
		  ○ Start Up, Operation and Maintenance
		  ○ Documents: Contracts, Budgets, Schedules, Permits
		• Work-Based Learning: Career Coaching, Job Shadowing

4		• Project Management Fundamentals-Planning, Documentation, Organization
		  ○ Cost Control and Risk Management: Estimating, Budgeting, Insurance
		  ○ Resource Control: Materials, Tools, Labor, Time
		• Work-Based Learning: Career Coaching, Job Shadowing

3

STEAM High School
Construction Management Concentration
Scope and Sequence
Level 3

First Quarter
Driving Question: How has awareness of climate change influenced construction management?
Project #1: TBD

Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
College and Career Preparation in Construction Management	• What are different careers available in construction management and what types of skills do they require? • What is the typical career path for construction professionals?	• Identify different construction management careers and the types of skills they require. • Describe the progression path for construction management careers in different industry sectors. • Summarize the path to a construction management career through community colleges and universities. • Complete draft applications for post-secondary employment and/or training and education.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio • Job Applications • College Applications **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,6,7,8,10,11 **Cluster Standards** AC 1,7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Safety **Review, Inspection and Training** **Regulations and Compliance** **OSHA 10 Certification**	• What are the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards? • What is the purpose and function of the Occupational Safety and Health Administration (OSHA)?	• Explain the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards. • Explain the importance and the elements of an effective safety program. • Explain the purpose and function of the Occupational Safety and Health Administration (OSHA). • Complete the requirements of the OSHA 10-hour Construction Course. • Demonstrate the use and care of PPE, including eye and ear protection, respirators, hard hats, gloves, safety harnesses, and safety shoes. • Explain the importance and function of safety data sheets (SDS). • Demonstrate how to use common hand and power tools safely. • Explain fall protection, ladder safety, stair safety, and scaffold safety procedures. • Define safe work procedures around electrical hazards. • Identify other construction hazards on the jobsite, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,5,7,8,11 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 3,5,6,9 AC-DES 2,4 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

First Quarter Driving Question: How has awareness of climate change influenced construction management? Project #1: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
		• Explain the importance of codes, laws, standards, or regulations related to construction technology. • Identify areas where codes, laws, standards, or regulations related to construction technology may be required. • Explain the difference between compliance and best practices. • Comply with appropriate codes, laws, standards, or regulations.			
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards AC 7	**Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7
				Pathway Standards AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**Math** **Science**

Second Quarter Driving Question: How has awareness of climate change influenced construction management? Project #1: TBD (continued)					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Construction Drawings: **Advanced Technical and Architectural Drawing and CAD** **Building Information Modeling (BIM)** **Systems: Mechanical, Electrical, Plumbing, Structural, Civil**	• What is the International Building Code (IBC)? • What are the relevant codes and regulations that must be adhered to in project designs and plans? • What are the types of drawings usually included in a set of plans? • What are the components of architectural drawings? • How are architectural drawings created and revised using CAD? • What is Building Information Modeling (BIM)?	• Define the architectural design process. • Summarize the purpose of building and zoning codes. • Explain the scope and purpose of the International Building Code. • Explain the state and local building codes and regulations that pertain to different types of construction projects. • Identify the components in a complete set of construction drawings. • Create architectural designs using computer-aided drafting (CAD). • Apply the elements and principles of design in the architectural design process to create a solution. • Incorporate sustainable building strategies into architectural design. • Incorporate Americans with Disabilities Act (ADA) regulations into designs. • Prepare design sketches. • Draw a functional floor plan. • Distinguish between architectural and civil construction systems. • Describe BIM and its relation to architectural drawings. • Use and interpret models using BIM software such as Procore and Autodesk Navisworks. • Define terminology for mechanical, electrical, plumbing, structural, and civil engineering systems used in construction drawings. • Identify mechanical, electrical, plumbing, structural, and civil engineering systems symbols commonly used on plans. • Design and interpret drawings that include mechanical, electrical plumbing, structural, and civil engineering systems.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,7,8,11,12 **Cluster Standards** AC 1,3,6 **Pathway Standards** AC-CST 6,7 AC-DES 1,2,3,4,6,7 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance**	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9

Second Quarter Driving Question: How has awareness of climate change influenced construction management? Project #1: TBD (continued)					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
			• Presentations • Teacher/Mentor Observation Checklist		11-12WHST 2,5,6,7
				Pathway Standards AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**Math**
					Science

Third Quarter Driving Question: How can I create a plan for a project that meets and balances given criteria and regulations? Project #2: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Management Fundamentals **Planning, Documentation, Organization:** **Start Up, Operation and Maintenance** **Documents: Contracts, Budgets, Schedules, Permits**	• How is the planning process carried out? • Who is involved in the startup, operation, and maintenance of construction projects? • Why is documentation needed on a project? • What are the types of documents used on a project? • What is the link between planning and scheduling? • What is the importance of scheduling?	• Describe the steps of the planning process. • Describe how the startup, operation and maintenance phase of a project is carried out and who is responsible. • Explain the need for documentation and the types of documents used on a project. • Identify documents needed for project close out. • Identify the parts of a typical project manual. • Describe the role of drawings and specifications in planning and documentation. • Identify the types of contracts used in the construction industry. • Describe the insurance requirements for a company and a project. • Explain the importance of using and maintaining a record of project correspondence. • Describe processing of contractor payments. • Describe the link between planning and scheduling. • Explain the importance of scheduling as a project management function. • Explain the importance of time management. • Describe how to implement and manage project schedules. • Utilize different types of project scheduling systems, such as Procore and MS Projects. • Create a step-by-step list of the tasks that will complete a project. • Describe the various resources that need to be considered when planning a job. • Assign resources to each activity in a list.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,7,8,9,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,2,4,6 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2,3,4,5,6	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

Fourth Quarter Driving Question: How can I create a plan for a project that meets and balances given criteria and regulations? Project #2: TBD (continued)					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Management Fundamentals **Planning, Documentation, Organization:** **Cost Control and Risk Management: Estimating, Budgeting, Insurance**	• What is the importance of being aware of costs on the job? • What is the estimating process? • What is the relationship between estimated cost, actual cost, and projected cost? • What is cost control?	• Explain the steps of the cost estimating process. • Explain estimated cost, actual cost, and projected cost. • Describe the elements of cost control and cost reporting. • Explain the cost analysis process. • Describe how to estimate and acquire materials required for a project. • Explain the use of purchase orders and contracts in acquiring materials. • Identify the planning requirements for materials, equipment, tools, and labor needed for a project. • Complete a simple material estimate. • Explain the importance of being aware of costs on the job. • Describe the factors that affect the purchase and use of construction materials.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,8,9,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,2,4,6,7 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Project Management Fundamentals **Planning, Documentation, Organization:** **Resource Control: Materials, Tools, Labor, Time**	• Why is it important to control resources on the job? • What are methods used to control materials and other resources on a project.? • What is productivity? • What are factors that affect productivity?	• Explain why it is important to control resources on the job. • Identify methods to control project materials. • Define productivity and explain how it differs from production. • Identify methods used to control labor productivity. • Explain factors that affect productivity, both positively and negatively. • Determine how to solve problems and manage conflicts that affect productivity. • Describe how to improve job-site productivity. • Describe how to control various job resources required on a project.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,8,9,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,2,4,6,7 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

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STEAM High School
Construction Management Concentration
Course Syllabus
Level 4

Concentration Overview

This concentration is designed to prepare students for careers and further education and training in the management of construction projects, such as construction manager, construction engineer, cost estimator, construction superintendent, scheduler, and construction inspector. It provides a balanced focus on technical construction knowledge, such as methods, materials, systems, and layouts, as well as the managerial, financial, and planning skills necessary to complete construction projects successfully. Using hands-on construction projects, students will develop skills in all phases of the construction process from preconstruction to closeout. Students will create and use technical drawings and schematics using computer-aided drawing (CAD) software. Students will develop plans, budgets, timelines for construction projects and monitor and evaluate the uses of resources. Students will develop critical thinking and leadership skills and participate effectively as a member of a team to identify and resolve risks and financial challenges, and monitor day-to-day activities. Students will develop clear and accurate communication skills, and an awareness of issues around diversity, ethical business practices, and social responsibility. Students will also obtain OSHA 10 certification in safety protocols and student certification in industry-standard Procore Construction Software. Students will also have the opportunity to obtain certifications as Microsoft Office Specialist: Word Associate, Microsoft Office Specialist: Excel Associate, and other relevant certifications.

Course Description

In this course, students will continue to engage in hands-on projects to build more advanced structures and deepen their understanding of the careers and opportunities available in the construction industry. Students will create technical drawings and model of real design problems using computer assisted drawing (CAD) and Building Information Modeling (BIM) software. Students will continue to expand their knowledge of the fundamentals of construction management with a focus on quality control as they implement and manage the planning and construction process, including all documentation, cost control, risk management, and resource control. Students will also extend their knowledge of the processes, roles and responsibilities involved in all phases of construction projects. Students will continue to learn about the mechanical, electrical, plumbing, structural, and civil engineering systems, as well as the architectural systems used in all types of construction. Throughout the course, students will develop career ready practices and employability skills by both working in and leading teams to create and implement construction plans. Students will demonstrate adherence to all safety protocols and take responsibility for personal and site safety. Students will continue to develop their skills using Procore Construction Software.

All students will engage in project-based learning at a minimum of one project a year. Intrinsic to project-based learning is examining a driving question or identifying a problem by articulating what is already known and what students need to know to answer the question. Students are guided to develop and execute a plan culminating in a presentation demonstrating their response to the initial question or problem. This process concludes with self-reflection regarding their learning. In this course, students will focus on creating and implementing a construction project that addresses a need in the school or in the community. This experience will include mentorship from a member of the local construction industry. Students are expected to develop and demonstrate their knowledge and skills from the previous years.

Work-Based Learning

All of the instruction for this course will be project-based where students will be developing, planning, executing, and presenting authentic construction plans and projects based on community needs. Students will be connected with working construction professionals through field trips to local construction sites, job shadowing and Career Coaching leading to opportunities for direct job training and real-world experience. During this course, students will complete a long-term internship experience with a local company or organization. Students will maintain a portfolio of their experiences to document the development of their skills, including a professional resume and applications for potential post-secondary education and training.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the project that they are involved in. Some examples for this concentration include, but are not limited to:
    - OSHA 10 Certification

- Procore Construction Software Student Certification
- Additional Procore Certifications
- Procore Continuing Education Courses (e.g., Construction 101 Course Series) accredited by the American Institute of Architects
- Autodesk AutoCAD, Revit, and Navisworks Certification
- NCCER (National Center for Construction Education & Research) Training and Certification
- AGC (Associated General Contractors) Training and Certification
- Microsoft Projects Scheduling Software
- Microsoft Office Specialist: Word Associate
- Microsoft Office Specialist: Excel Associate
- Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.

- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other concentrations and programs.

Pre-Requisites

Construction Management Levels 1, 2 and 3

Course Objectives

1. Research a career of personal interest associated with construction management.
2. Explore post-secondary institutions for education and training.
3. Develop a professional resume and applications for post-secondary opportunities.
4. Summarize the components of all phases of the construction process for different types of construction projects.
5. Identify and demonstrate the construction management processes of planning, cost control, resources, control, risk management and documentation.
6. Design and interpret and construction drawings, plans and symbol using CAD and BIM software.
7. Use construction materials, tools, and techniques to build a structure and document the process.
8. Compute units of measurement common in construction.
9. Explain and follow all safety rules and procedures.
10. Use Procore Construction Software to plan and document projects.

Integrated Academics

1 CTE Integrated ELA Credit

Concurrent College Enrollment

TBD

Equipment and Supplies

- **School will provide:** Tools, equipment, and supplies to complete projects
- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot

Textbook

TBD

Grading

10% Research and planning for current projects
10% Work Journal
80% Projects, Presentations, Participation and Performance

Additional Course Policies

Students are expected to:

- Meet all deadlines and be on time. Meeting deadlines and being on time are a major part of being a construction professional.
- Produce their best work, including being prepared for presentations.
- Participate in class including contributing to discussions and critiquing their own and others' work, as well as diligently working on their own projects.

- Seek help when needed.
- Be attentive, ask questions if they do not understand something, and offer their opinions.
- Use Procore Construction Software for preparing and sharing all work.
- Give credit and use proper citations for all research and project ideas.

Course Calendar

Quarter	Driving Question/ Project	Units of Study

1	**How does design influence use and vice versa?**
	
	Project #1: TBD
		• College and Career Preparation in Construction Management
		• Safety
		  ○ Review, Inspection and Training
		  ○ Regulations and Compliance
		• Work-Based Learning: Career Coaching, Job Shadowing

2		• Construction Drawings
		  ○ Advanced Technical and Architectural Drawing and CAD
		  ○ Building Information Modeling (BIM)
		• Systems: Mechanical, Electrical, Plumbing, Structural, Civil, Architectural
		• Sustainability and LEED
		• Work-Based Learning: Internship

3	**How can we improve this specific project and make it successful?**
	
	Project #2: TBD
		• Project Management Fundamentals-Planning, Documentation, Organization
		  ○ Quality Control
		  ○ Documents: Contracts, Budgets, Schedules, Permits, Submittals, Requests for Information (RFIs), Change Orders
		• Work-Based Learning: Career Coaching, Job Shadowing

4		• Project Management Fundamentals-Planning, Documentation, Organization
		  ○ Cost Control and Risk Management: Estimating, Budgeting, Insurance, Safety
		  ○ Resource Control: Materials, Tools, Labor, Scheduling, Safety, Budget
		• Work-Based Learning: Internship

4

STEAM High School
Construction Management Concentration
Scope and Sequence
Level 4

First Quarter
Driving Question: How does design influence use and vice versa?
Project #1: TBD

Unit	Key Questions	Key Learning Targets (Students will know and be able to:)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
College and Career Preparation in Construction Management	• What are different careers available in construction management and what types of skills do they require? • What is the typical career path for construction professionals?	• Identify different construction management careers and the types of skills they require. • Describe the progression path for construction management careers in different industry sectors. • Summarize the path to a construction management career through community colleges and universities. • Complete draft applications for post-secondary employment and/or training and education.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio • Job Applications • College Applications **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,7,8,10,11 **Cluster Standards** AC 1,7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Safety: **Review, Inspection and Training** **Regulations and Compliance** **OSHA 10 Certification**	• What are the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards? • What is the purpose and function of the Occupational Safety and Health Administration (OSHA)?	• Explain the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards. • Explain the importance and the elements of an effective safety program. • Explain the purpose and function of the Occupational Safety and Health Administration (OSHA). • Complete the requirements of the OSHA 10-hour Construction Course. • Demonstrate the use and care of PPE, including eye and ear protection, respirators, hard hats, gloves, safety harnesses, and safety shoes. • Explain the importance and function of safety data sheets (SDS). • Demonstrate how to use common hand and power tools safely. • Explain fall protection, ladder safety, stair safety, and scaffold safety procedures. • Define safe work procedures around electrical hazards. • Identify other construction hazards on the jobsite, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,5,8,11,12 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 3,5,6,9 AC-DES 2,4 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

First Quarter Driving Question: How does design influence use and vice versa? Project #1: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
		• Explain the importance of codes, laws, standards, or regulations related to construction technology. • Identify areas where codes, laws, standards, or regulations related to construction technology may be required. • Explain the difference between compliance and best practices. • Comply with appropriate codes, laws, standards, or regulations.			
Work-Based Learning: **Career Coaching, Job Shadowing**	• What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

Second Quarter Driving Question: How does design influence use and vice versa? Project #1: TBD (continued)					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Construction Drawings: **Advanced Technical and Architectural Drawing and CAD** **Building Information Modeling (BIM)** **Systems: Mechanical, Electrical, Plumbing, Structural, Civil** **Sustainability and LEED**	• What is the International Building Code (IBC)? • What are the relevant codes and regulations that must be adhered to in project designs and plans? • What are the types of drawings usually included in a set of plans? • What are the components of architectural drawings? • How are architectural drawings created and revised using CAD? • What is Building Information Modeling (BIM)? • What does sustainability mean in the construction industry? • What is LEED?	• Define the architectural design process. • Summarize the purpose of building and zoning codes. • Explain the scope and purpose of the International Building Code. • Explain the state and local building codes and regulations that pertain to different types of construction projects. • Identify the components in a complete set of construction drawings. • Create architectural design solutions using computer-aided drafting (CAD). • Apply the elements and principles of design in the architectural design process to create a solution. • Incorporate sustainable building strategies into architectural design. • Incorporate Americans with Disabilities Act (ADA) regulations into design solutions. • Develop a site analysis. • Prepare design sketches. • Draw a functional floor plan. • Distinguish between architectural and civil construction systems. • Design a foundation plan, based on a floor plan. • Draw a reflected ceiling plan (RCP), based on a floor plan. • Create sectional views. • Design exterior and interior elevations. • Create perspective views, including renderings. • Create door and window schedules. • Create a walk-through presentation of a section of a building. • Use and interpret models using BIM software such as Procore and Autodesk Navisworks. • Use BIM to document design and design changes. • Define terminology for mechanical, electrical, plumbing, structural, and civil engineering systems used in construction drawings. • Identify mechanical, electrical, plumbing, structural, and civil engineering systems symbols commonly used on plans.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,7,8,11,12 **Cluster Standards** AC 1,3,6 **Pathway Standards** AC-CST 1,2,4,6,7 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

Second Quarter Driving Question: How does design influence use and vice versa? Project #1: TBD (continued)					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
		• Design and interpret drawings that include mechanical, electrical plumbing, structural, and civil engineering systems. • Explain applications of sustainability in different types of construction projects. • Define LEED (Leadership in Energy and Environmental Design) and its application in various types construction projects			
Work-Based Learning: **Internship**	• How does an employee convey professionalism in the workplace? • Why are internships necessary? • How does an internship experience contribute to a professional portfolio? • What are areas of improvement and challenge during the internship experience?	• Apply job search techniques to seek out, evaluate and obtain internship opportunities. • Communicate with industry/potential employers through the internship experience. • Apply learned knowledge and skills to workplace situations. • Explain the importance of professionalism and ethics in the workplace. • Comply with workplace policies and regulations. • Communicate effectively both verbally and in writing. • Explain the importance of being prompt, being able to take directions and being motivated to accomplish assigned tasks. • Analyze and resolve problems that arise in completing assigned tasks.	**Written** • Self-Assessment • Reflection Summary: Internship Experience • Professional Portfolio • Employability Profile **Performance** • Internship Checklist • Employer/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 1,2,3,4,5,6,7 **Pathway Standards** AC-CST 1,2,3,4,5,6,7,8,9 AC-DES 1,2,3,4,5,6,7,8 AC-MO 1,2,3,4,5,6	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

Third Quarter Driving Question: How can we improve this specific project and make it successful? Project #2: TBD					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Management Fundamentals **Planning, Documentation, Organization: Quality Control** **Documents: Contracts, Budgets, Schedules, Permits, Submittals, Requests for Information (RFIs), Change Orders**	• How is the planning process carried out? • Who is involved in the startup, operation, and maintenance of construction projects? • Why is documentation needed on a project? • What are the types of documents used on a project? • What is the link between planning and scheduling? • What is the importance of scheduling?	• Define quality control and explain a supervisor's responsibility for overseeing quality control. • Explain the benefits of implementing a quality control system. • Describe the steps of the planning process. • Explain the need for documentation and the types of documents used on a project. • Identify the parts of a typical project manual. • Describe the role of drawings and specifications in planning and documentation. • Identify the types of contracts used in the construction industry. • Describe the insurance requirements for a company and a project. • Explain the importance of using and maintaining a record of project correspondence. • Describe how to process contractor payments. • Describe the link between planning and scheduling. • Explain the importance of scheduling as a project management function. • Explain the importance of effective time management. • Describe how to implement and manage project schedules using project scheduling systems, such as Procore and MS Projects. • Create a step-by-step list of the tasks that will complete a project. • Describe the various resources that need to be considered when planning a job. • Assign resources to each activity in a list.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,8,9,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,2,3,4,6,7 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Career Coaching, Job Shadowing**	What can be learned from industry professionals?	• Participate in Career Coaching process. • Participate in Job Shadowing process with local construction professionals.	**Written** • Career Coaching Self-Assessment • Job Shadow Reflection • Professional Portfolio **Performance** • Presentations • Teacher/Mentor Observation Checklist	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 7 **Pathway Standards** AC-CST 1,6 AC-DES 2,5 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**

Fourth Quarter Driving Question: How can we improve this specific project and make it successful? Project #2: TBD (continued)					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
Project Management Fundamentals **Planning, Documentation, Organization: Quality Control,** **Cost Control and Risk Management: Estimating, Budgeting, Insurance, Safety**	• What is the importance of being aware of costs on the job? • What is the estimating process? • What is the relationship between estimated cost, actual cost, and projected cost? • What is cost control?	• Explain the steps of the cost estimating process. • Explain estimated cost, actual cost, and projected cost. • Describe the elements of cost control and cost reporting. • Explain the cost analysis process. • Describe how to estimate and acquire materials required for a project. • Explain the use of purchase orders and contracts in acquiring materials. • Identify the planning requirements for materials, equipment, tools, and labor needed for a project. • Complete a simple material estimate. • Explain the importance of being aware of costs on the job. • Describe the factors that affect the purchase and use of construction materials. • Discuss how quality control and safety go hand-in-hand during construction.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,8,9,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,2,3,4,5,6,7,8,9 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Project Management Fundamentals **Planning, Documentation, Organization:** **Resource Control: Materials, Tools, Labor, Scheduling, Safety, Budget**	• Why is it important to control resources on the job? • What are methods used to control materials and other resources on a project.? • What is productivity? • What are factors that affect productivity? • What is the relationship between a construction manager and subcontractors?	• Explain why it is important to control resources on the job. • Identify methods used to control materials on a project. • Define productivity and explain how it differs from production. • Identify methods used to control labor and subcontractor productivity. • Explain the relationship of the construction manager to the subcontractors on a job site. • Explain factors that affect productivity, both positively and negatively. • Determine how to solve problems and manage conflict that affect productivity. • Describe how to improve job-site productivity. • Describe how to control the various job resources.	**Written** • Research Project • Project • Self-Assessment • Professional Portfolio **Performance** • Class Presentation • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,5,6,8,9,11,12 **Cluster Standards** AC 1,2,3,4,5,6 **Pathway Standards** AC-CST 1,2,3,4,5,6,7,8,9 AC-DES 1,2,3,4,6,7,8 AC-MO 1,2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9 11-12WHST 2,5,6,7 **Math** **Science**
Work-Based Learning: **Internship**	• How does an employee convey professionalism in the workplace? • Why are internships necessary?	• Apply job search techniques to seek out, evaluate and obtain internship opportunities. • Communicate with industry/potential employers through the internship experience. • Apply learned knowledge and skills to workplace situations.	**Written** • Self-Assessment • Reflection Summary: Internship Experience • Professional Portfolio • Employability Profile	**Career Ready Practices** CRP 1,2,4,6,8,10,11,12 **Cluster Standards** AC 1,2,3,4,5,6,7	**ELA** 11-12R 1,2,4,7,8,9 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,8,9

Fourth Quarter Driving Question: How can we improve this specific project and make it successful? Project #2: TBD (continued)					
Unit	**Key Questions**	**Key Learning Targets** **(Students will know and be able to:)**	**Assessment** **Evidence of Learning**	**CCTC Standards**	**NYS Standards**
	• How does an internship experience contribute to a professional portfolio? • What are areas of improvement and challenge during the internship experience?	• Explain the importance of professionalism and ethics in the workplace. • Comply with workplace policies and regulations. • Communicate effectively both verbally and in writing. • Explain the importance of being prompt, being able to take directions and being motivated to accomplish assigned tasks. • Analyze and resolve problems that arise in completing assigned tasks.	**Performance** • Internship Checklist • Employer/Mentor Observation Checklist	**Pathway Standards** AC-CST 1,2,3,4,5,6,7,8,9 AC-DES 1,2,3,4,5,6,7,8 AC-MO 1,2,3,4,5,6	11-12WHST 2,5,6,7 **Math** **Science**

CCTC: Common Career and Technical Core Standards for Construction Management

Career Ready Practices

1	Act as a responsible and contributing citizen and employee.
2	Apply appropriate academic and technical skills.
3	Attend to personal health and financial well-being.
4	Communicate clearly and effectively and with reason.
5	Consider the environmental, social, and economic impacts of decisions.
6	Demonstrate creativity and innovation.
7	Employ valid and reliable research strategies.
8	Utilize critical thinking to make sense of problems and persevere in solving them.
9	Model integrity, ethical leadership, and effective management.
10	Plan education and career paths aligned to personal goals.
11	Use technology to enhance productivity.
12	Work productively in teams while using cultural global competence.

Full Text: Career Ready Practices

Career Cluster and Pathway Standards

Area	Number	Standard
Career Cluster: **Architecture & Construction**	**AC 1**	Use vocabulary, symbols and formulas commonly used in design and construction.
	AC 2	Use architecture and construction skills to create and manage a project.
	AC 3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace/jobsite.
	AC 4	Understand the nature and scope of the Architecture & Construction Career Cluster and the role architecture and construction play in society and the economy.
	AC 5	Understand the roles and responsibilities among trades and professions, including labor/management relationships.
	AC 6	Read, interpret, and use technical drawings, documents, and specifications to plan a project.
	AC 7	Evaluate a wide range of career concentration opportunities for success in architecture and construction careers.
Career Pathway: **Construction**	**AC-CST 1**	Understand contractual relationships with all parties involved in the building process to ensure successful build of a project.
	AC-CST 2	Understand approval procedures to ensure effective flow of information in the construction process.
	AC-CST 3	Understand and implement testing and inspection procedures to ensure successful completion of a construction project.
	AC-CST 4	Understand the purpose of scheduling as it relates to the successful completion of a construction project.
	AC-CST 5	Understand and apply practices and procedures required to maintain jobsite safety.
	AC-CST 6	Manage relationships with internal and external parties to successfully complete construction projects.
	AC-CST 7	Compare and contrast the building systems and components for a given project.
	AC-CST 8	Demonstrate the construction crafts required for each phase of a given project.
	AC-CST 9	Safely use and maintain appropriate tools, machinery, equipment, and resources to accomplish construction project goals.
Career Pathway: **Design/ Pre-Construction**	**AC-DES 1**	Justify design solutions through the use of research documentation and analysis of data.
	AC-DES 2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
	AC-DES 3	Understand the integral systems that impact the design of buildings and structures.
	AC-DES 4	Apply building codes, laws and rules in the design and construction of projects.
	AC-DES 5	Identify the diversity of needs, values, and social patterns in project design, including accessibility standards, to appropriately meet client needs.
	AC-DES 6	Apply the techniques and skills of modern drafting, design, engineering, and construction to projects.
	AC-DES 7	Employ appropriate representational media to communicate concepts and design.

Area	Number	Standard
	AC-DES 8	Apply principles, conventions, standards, applications, and restrictions pertaining to the selection and use of construction materials, components, and assemblies for project design.
Career Pathway: **Maintenance/ Operations**	**AC-MO 1**	Recognize and employ universal construction signs and symbols to function safely in the workplace.
	AC-MO 2	Use troubleshooting procedures when solving a maintenance problem to maintain buildings and structures.
	AC-MO 3	Apply construction skills when repairing, restoring, or renovating existing structures.
	AC-MO 4	Determine work required to repair or renovate an existing building or structure.
	AC-MO 5	Plan and practice preventative maintenance activities to service existing structures.
	AC-MO 6	Maintain and inspect building systems to achieve safe and efficient operation of facilities.

Full Text: Architecture & Construction

New York State Standards for ELA and Literacy

NYS ELA Standards

9th-10th Grade Reading Standards (Literary and Informational Text)

Key Ideas and Details	
9-10R1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly/implicitly and make logical inferences; develop questions for deeper understanding and for further exploration. (RI&RL)
9-10R2	Determine one or more themes or central ideas in a text and analyze its development, including how it emerges and is shaped and refined by specific details; objectively and accurately summarize a text. (RI&RL)
9-10R3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text. In literary texts, analyze how complex and/or dynamic characters develop, interact with other characters, advance the plot, or develop a theme. (RL) In informational texts, analyze how the author unfolds an analysis or argument, including the sequence, the introduction and development of ideas, and the connections that exist. (RI)
Craft and Structure	
9-10R4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings. Analyze the impact of specific word choices on meaning, tone, and mood. Examine technical or key terms and how language differs across genres. (RI&RL)
9-10R5	In literary texts, consider how varied aspects of structure create meaning and affect the reader. (RL) In informational texts, consider how author's intent influences particular sentences, paragraphs, or sections. (RI)
9-10R6	Analyze how authors employ point of view, perspective, and purpose to shape explicit and implicit messages (e.g., examine rhetorical strategies, literary elements, and devices). (RI&RL)
Integration of Knowledge and Ideas	
9-10R7	Analyze how a subject / content is presented in two or more formats by determining which details are emphasized, altered, or absent in each account. (e.g., analyze the representation of a subject / content or key scene in two different formats, examine the differences between a historical novel and a documentary). (RI&RL)
9-10R8	Delineate and evaluate an argument and specific claims in a text, assessing the validity or fallacy of key statements by examining whether the supporting evidence is relevant and sufficient. (RI&RL)
9-10R9	Choose and develop criteria in order to evaluate the quality of texts. Make connections to other texts, ideas, cultural perspectives, eras, and personal experiences. (RI&RL)

9th-10th Grade Writing Standards

Text Types and Purposes	
9-10W1	Write arguments to support claims that analyze substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
9-10W2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
9-10W3	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
9-10W4	Create a poem, story, play, art work, or other response to a text, author, theme, or personal experience; demonstrate knowledge and understanding of a variety of techniques and genres. Explain divergences from the original when appropriate.
9-10W5	Draw evidence from literary or informational texts to support analysis, reflection, and research. Apply grade 9/10 Reading standards to both literary and informational text, where applicable.
Research to Build and Present Knowledge	
9-10W6	Conduct research to answer questions, including self-generated questions, or solve a problem; narrow or broaden the inquiry when appropriate. Synthesize multiple sources, demonstrating understanding of the subject under investigation.
9-10W7	Gather relevant information from multiple sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas; avoid plagiarism and follow a standard format for citation.

9th-10th Grade Speaking and Listening

Comprehension and Collaboration	
9-10SL1	Initiate and participate effectively in a range of collaborative discussions with diverse partners on complex topics, texts, and issues; express ideas clearly and persuasively, and build on those of others.

9-10SL2	Integrate multiple sources of information presented in diverse formats (e.g., including visual, quantitative, and oral), evaluating the credibility, accuracy, and relevance of each source.
9-10SL3	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric; identify any fallacious reasoning or exaggerated or distorted evidence.
Presentation of Knowledge and Ideas	
9-10SL4	Present claims, findings, and supporting evidence clearly, concisely, and logically; organization, development, substance, and style are appropriate to task, purpose, and audience.
9-10SL5	Make strategic use of digital media and/or visual displays in presentations to enhance understanding of findings, reasoning, and evidence, and to add elements of interest to engage the audience.
9-10SL6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

9th-10th Grade Language Standards

Conventions of Academic English	
Anchor L1	Demonstrate command of the conventions of academic English grammar and usage when writing or speaking*.
Anchor L2	Demonstrate command of the conventions of academic English capitalization, punctuation, and spelling when writing*
Knowledge of Language	
9-10L3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
Vocabulary Acquisition and Use	
9-10L4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies.
9-10L5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
9-10L6	Acquire and accurately use general academic and content-specific words and phrases, sufficient for reading, writing, speaking, and listening; demonstrate independence in applying vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Core Conventions Skills for Grades 9-12

- Use parallel structure.
- Use various types of phrases and clauses to add variety and interest to writing or presentations.
- Understand that usage is a matter of convention that can change over time.
- Resolve issues of complex or contested usage, consulting references as needed.

Core Punctuation and Spelling Skills for Grades 9-12

- Use punctuation (commas, parentheses, dashes, hyphens) to clarify and enhance writing.
- Use a semicolon to link two or more closely related independent clauses.
- Use a colon to introduce a list or quotation.

11th-12th Grade Reading Standards (Literary and Informational Text)

Key Ideas and Details	
11-12R1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly/implicitly and make logical inferences, including determining where the text is ambiguous; develop questions for deeper understanding and for further exploration. (RI&RL)
11-12R2	Determine two or more themes or central ideas in a text and analyze their development, including how they emerge and are shaped and refined by specific details; objectively and accurately summarize a complex text. (RI&RL)
11-12R3	In literary texts, analyze the impact of author's choices. (RL) In informational texts, analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop. (RI)
Craft and Structure	
11-12R4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings. Analyze the impact of specific word choices on meaning, tone, and mood, including words with multiple meanings. Analyze how an author uses and refines the meaning of technical or key term(s) over the course of a text. (RI&RL)
11-12R5	In literary texts, analyze how varied aspects of structure create meaning and affect the reader. (RL) In informational texts, analyze the impact and evaluate the effect structure has on exposition or argument in terms of clarity, persuasive/rhetorical technique, and audience appeal. (RI)
11-12R6	Analyze how authors employ point of view, perspective, and purpose, to shape explicit and implicit messages (e.g., persuasiveness, aesthetic quality, satire, sarcasm, irony, or understatement). (RI&RL)
Integration of Knowledge and Ideas	
11-12R7	In literary texts, analyze multiple adaptations of a source text as presented in different formats (e.g., works of art, graphic novels, music, film, etc.), specifically evaluating how each version interprets the source. (RL) In informational texts, integrate and evaluate sources on the same topic or argument in order to address a question, or solve a problem. (RI)
11-12R8	Delineate and evaluate an argument in applicable texts, applying a lens (e.g. constitutional principles, logical fallacy, legal reasoning, belief systems, codes of ethics, philosophies, etc.) to assess the validity or fallacy of key arguments, determining whether the supporting evidence is relevant and sufficient. (RI&RL)
11-12R9	Choose and develop criteria in order to evaluate the quality of texts. Make connections to other texts, ideas, cultural perspectives, eras, and personal experiences. (RI&RL)

11th-12th Grade Writing Standards

Text Types and Purposes	
11-12W1	Write arguments to support claims that analyze substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
11-12W2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
11-12W3	Write narratives to develop real or imagined experiences or events using effective techniques, well-chosen details, and well-structured event sequences.
11-12W4	Create a poem, story, play, art work, or other response to a text, author, theme, or personal experience; demonstrate knowledge and understanding of a variety of techniques and genres. Explain connections between the original and the created work.
11-12W5	Draw evidence from literary or informational texts to support analysis, reflection, and research. Apply grade 11/12 Reading standards to both literary and informational text, where applicable.
Research to Build and Present Knowledge	
11-12W6	Conduct research through self-generated question, or solve a problem; narrow or broaden the inquiry when appropriate. Synthesize multiple sources, demonstrating understanding and analysis of the subject under investigation.
11-12W7	Gather relevant information from multiple sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas; avoid plagiarism, overreliance on one source, and follow a standard format for citation.

11th-12th Grade Speaking and Listening

Comprehension and Collaboration	
11-12SL1	Initiate and participate effectively in a range of collaborative discussions with diverse partners on complex topics, texts, and issues; express ideas clearly and persuasively, and build on those of others.
11-12SL2	Integrate multiple sources of information presented in diverse formats (e.g., including visual, quantitative, and oral). Evaluate the credibility and accuracy of each source, and note any discrepancies among the data to make informed decisions and solve problems.

11-12SL3	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric; assess the premises and connections among ideas, diction, and tone.
Presentation of Knowledge and Ideas	
11-12SL4	Present claims, findings, and supporting evidence, conveying a clear and distinct perspective; alternative or opposing perspectives are addressed; organization, development, substance, and style are appropriate to task, purpose, and audience.
11-12SL5	Make strategic use of digital media and/or visual displays in presentations to enhance understanding of findings, reasoning, and evidence, and to add elements of interest to engage the audience.
11-12SL6	Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate.

11th-12th Grade Language Standards

Conventions of Academic English	
Anchor L1	Demonstrate command of the conventions of academic English grammar and usage when writing or speaking*.
Anchor L2	Demonstrate command of the conventions of academic English capitalization, punctuation, and spelling when writing*
Knowledge of Language	
11-12L3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
Vocabulary Acquisition and Use	
11-12L4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies.
11-12L5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
11-12L6	Acquire and accurately use general academic and content-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in applying vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Core Conventions Skills for Grades 9-12

- Use parallel structure.
- Use various types of phrases and clauses to add variety and interest to writing or presentations.
- Understand that usage is a matter of convention that can change over time.
- Resolve issues of complex or contested usage, consulting references as needed.

Core Punctuation and Spelling Skills for Grades 9-12

- Use punctuation (commas, parentheses, dashes, hyphens) to clarify and enhance writing.
- Use a semicolon to link two or more closely related independent clauses.
- Use a colon to introduce a list or quotation.

Full Text: New York State Next Generation English Language Arts Learning Standards (nysed.gov)

NYS Literacy Standards: NYS Next Generation 6-12 Literacy Standards in History/Social Studies, Science, and Technical Subjects

Reading Standards for Literacy in Science and Technical Subjects 9-10	
RST 1	Cite specific evidence to support analysis of scientific and technical texts, charts, diagrams, etc. attending to the precise details of the source. Understand and follow a detailed set of directions.
RST 2	Determine the key ideas or conclusions of a source; trace the source's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the source.
RST 3	Analyze how and why scientific ideas and reasoning are developed and modified over the course of a text, source, argument, etc. Craft and Structure
RST 4	Determine the meaning of symbols, key terms, and other content-specific words and phrases as they are used in scientific or technical sources; describe how the inclusion of charts, graphs, diagrams, data influence conclusion(s).
RST 5	Describe how the text structures information or ideas into categories or hierarchies, including how the major sections contribute to the whole and to an understanding of the topic.
RST 6	Describe purpose and/or point of view when an author is presenting information, describing a procedure, discussing an experiment, etc. Integration of Knowledge and Ideas
RST 7	Translate scientific or technical information expressed as written text into visual form (e.g., a table or chart), and translate information expressed visually or mathematically (e.g., in an equation) into words.
RST 8	Assess the extent to which the reasoning and evidence in a source support the author's claim or a recommendation for solving a scientific or technical problem.
RST 9	Compare and contrast findings presented in a source to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 9-10	
WHST 1	Write arguments focused on discipline-specific content.
WHST 2	Write informative/explanatory text focused on discipline-specific content.
WHST 3	Write narratives to understand an event or topic, appropriate to discipline-specific norms, conventions, and tasks.
WHST 4	Write responses to texts and to events (past and present), ideas, and theories that include personal, cultural, and thematic connections.
WHST 5	Conduct short as well as more sustained research projects to answer a question (including a self-generated question), analyze a topic, or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
WHST 6	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question and the accuracy of each source by applying discipline-specific criteria; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST 7	Draw evidence from informational texts to support analysis, reflection, and research.

NYS Literacy Standards: NYS Next Generation 6-12 Literacy Standards in History/Social Studies, Science, and Technical Subjects

Reading Standards for Literacy in Science and Technical Subjects 11-12	
RST 1	Cite specific evidence to support analysis of scientific and technical texts, charts, diagrams, etc. attending to the precise details of the source, and attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
RST 2	Determine the key ideas or conclusions of a source; summarize complex concepts, processes, or information presented in a source by paraphrasing in precise and accurate terms.
RST 3	Analyze how and why scientific ideas and reasoning are developed and modified over the course of a text, source, argument, etc.; analyze/evaluate the results and conclusions based on explanations in the text.
RST 4	Determine the meaning of symbols, key terms, and other content-specific words and phrases as they are used in scientific or technical sources.
RST 5	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
RST 6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
RST 7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
RST 8	Evaluate the data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
RST 9	Compare and contrast findings presented in a source to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11-12	
WHST 1	Write arguments focused on discipline-specific content.
WHST 2	Write explanatory and analytical text focused on discipline-specific content and which uses strategies for conveying information like those used in the respective discipline.
WHST 3	Write narratives to understand an event or topic, appropriate to discipline-specific norms, conventions, and tasks.
WHST 4	Write responses to texts and to events (past and present), ideas, and theories that include personal, cultural, and thematic connections.
WHST 5	Conduct short as well as more sustained research projects to answer a question (including a self-generated question), analyze a topic, or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
WHST 6	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience as well as by applying discipline-specific criteria used in the social sciences or sciences; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
WHST 7	Draw evidence from informational texts to support analysis, reflection, and research.

Full Text: New York State Next Generation Learning Standards for Literacy in History/Social Studies, Science and Technical Subjects (nysed.gov)

New York State Next Generation Mathematics Learning Standards

Full Text: New York State Next Generation Mathematics Learning Standards

New York State High School Science Learning Standards

Full Text: New York State High School Science Learning Standards