



Burlington County Institute of Technology

Medford Campus

Career and Technical Programs

Career Cluster: *Architecture and Construction*

Program Name: *Carpentry/Carpenter*

Program Title: *Construction Technology*

CIP Code: *460201*

Board Approval Date: January, 2024



Program of Study

- Grade 9
 - ◆ Introduction to Construction Technologies
 - ◆ Tools and Materials Fundamentals
- Grade 10
 - ◆ Blueprint Reading and Basic Drafting
 - ◆ Woodworking and Carpentry Skills
 - ◆ Basic Mechanical Systems in Construction
- Grade 11
 - ◆ Construction Project Management
 - ◆ Residential Design and Layout
 - ◆ Interior Finishing and Drywall Installation
- Grade 12
 - ◆ Advanced Carpentry and Framing
 - ◆ Exterior Finishing and Roofing Techniques
 - ◆ Sustainable Building Practices
 - ◆ Capstone Project in Construction Technologies



→ Program Descriptor

- ◆ The Construction Technologies High School Program is an engaging and comprehensive four-year educational journey, designed to prepare students for diverse opportunities in the construction industry. Starting in the 9th grade, the program introduces students to the fundamentals of construction technologies, covering essential safety protocols, tool and material usage, and foundational construction principles. As students progress through the grades, they delve into more specialized areas, including blueprint reading, carpentry, mechanical systems, and project management. Each year builds upon the last, culminating in the 12th grade with advanced coursework and a capstone project that synthesizes all the skills and knowledge acquired. The program emphasizes a balance between theoretical learning and practical application, ensuring students develop a robust understanding of construction technologies. By the end of the program, students are well-equipped with the necessary skills and knowledge for entry-level positions in the construction field or for pursuing further education in construction and related disciplines. This program not only prepares students for immediate career opportunities but also lays a solid foundation for lifelong learning and professional development in the ever-evolving world of construction technologies.

→ Program Outcome

- ◆ Upon completing the Construction Technologies High School Program, students will have acquired a comprehensive understanding of the construction industry, encompassing foundational skills in tools and materials, blueprint interpretation, carpentry, and basic mechanical systems. They will have developed practical expertise through hands-on projects in areas such as woodworking, residential design, interior finishing, and sustainable building practices. Graduates of the program will be equipped with the knowledge to manage construction projects effectively, understanding the importance of safety, efficiency, and collaboration. These skills and experiences prepare students for successful entry into construction-related careers or further education in the field, positioning them to be adaptable, skilled, and knowledgeable contributors in the evolving world of construction technologies.



→ Work Based Learning Opportunities

- ◆ Volunteering: Our Construction Technology students have a unique Work-Based Learning (WBL) opportunity to volunteer with Habitat for Humanity on Saturdays. This hands-on experience allows them to apply their skills in real-world construction projects while giving back to the community.
- ◆ Simulated Workplace:
- ◆ The Construction Technology class takes learning beyond the classroom by participating in a Simulated Workplace Work-Based Learning (WBL) opportunity. This immersive experience mirrors real-world construction settings, allowing students to apply their skills and knowledge in a simulated, hands-on environment. Through this program, they gain valuable insights and readiness for future careers in construction, equipping them with the practical experience they need to excel in the field.

→ Industry Valued Credentials

- ◆ OSHA 10



Course Descriptions

1. Grade 9

- a. *Introduction to Construction Technologies:* Introduction to Construction Technologies is a foundational course designed to provide students with a thorough introduction to the construction industry. This course covers essential safety protocols, such as personal protective equipment usage, hazard identification, and adherence to OSHA standards, ensuring students understand the critical importance of safety in all construction environments. It offers a comprehensive overview of various construction fields, including residential, commercial, and infrastructure development, along with an exploration of emerging trends such as green building and smart construction technologies. Students will learn about career opportunities available in the industry, from skilled trades to project management and architectural design. The curriculum also covers basic construction methods, materials, and tools, offering insights into fundamental building processes and techniques. Additionally, students will gain an understanding of the role of regulations and building codes in ensuring safe, efficient, and ethical construction practices. Through a combination of theoretical learning and practical demonstrations, this course aims to cultivate a foundational knowledge of the construction industry, while highlighting its significance and impact on society.
- b. *Tools and Materials Foundations:* In the Tools and Materials Foundations course, students learn about the tools and materials commonly used in the construction industry. The course emphasizes the importance of safety when using tools, teaching students how to handle, maintain, and store them properly to avoid accidents and keep them in good condition. Students will get hands-on experience with both hand tools and power tools, learning which tools are best for different types of construction jobs. The course also introduces various construction materials such as wood, concrete, and modern sustainable options, explaining their characteristics and how to choose the right material for a specific project. Students will understand how the choice of materials affects the strength and longevity of what they build. Through practical activities, this course aims to give students the basic skills and knowledge they need to use construction tools and materials safely and effectively.



2. Grade 10

- a. *Blueprint Reading and Basic Drafting* In the Blueprint Reading and Basic Drafting course, students will gain essential skills in interpreting and creating construction blueprints. The course begins by teaching students how to read and understand architectural symbols, which are the language of blueprints. Students will learn to analyze floor plans and elevations, crucial for visualizing the final structure. The course also covers the basics of drafting, where students will practice drawing simple construction plans, and developing their ability to translate ideas into visual representations. Through hands-on exercises, students will create their own basic construction drawings, learning the principles of scale, dimension, and layout. This course is designed to provide a strong foundation in blueprint reading and drafting, skills that are vital for any career in the construction and architectural fields.
- b. *Woodworking and Carpentry Skills* The Woodworking and Carpentry Skills course provides students with a practical foundation in woodworking and carpentry. Throughout the course, students will master fundamental techniques such as accurate measuring, precise cutting, efficient assembling, and professional finishing of wood structures. Emphasizing hands-on practice, the course allows students to work on a variety of projects, from simple constructs to more complex wooden items, reinforcing their skills through real-world application. Safety is a key focus, with students learning to operate carpentry tools correctly and safely, including both hand tools and power tools. Proper maintenance and care of these tools are also covered to ensure their longevity and safe usage. By the end of the course, students will have developed a solid skill set in woodworking and carpentry, equipping them with the necessary competencies to create quality woodwork, either as a hobby or a stepping stone to a professional career in the field.
- c. *Basic Mechanical Systems in Construction*: The Basic Mechanical Systems in Construction course offers students an introductory overview of the key mechanical systems integral to modern construction: electrical, plumbing, and HVAC (Heating, Ventilation, and Air Conditioning). Students will delve into the basic concepts of each system, understanding how they function individually and contribute to the overall operation of a building. The course places a strong emphasis on safety practices associated with working on these systems, ensuring students learn the necessary precautions and protocols. Hands-on learning includes simple installation techniques, providing students with practical experience in basic electrical wiring, plumbing tasks, and HVAC system components. By the end of the course, students will



have a foundational understanding of these mechanical systems, preparing them for more advanced studies or entry-level work in construction and building maintenance.

3. Grade 11

- a. *Construction Project Management*: The Construction Project Management course immerses students in the foundational principles of managing construction projects. It covers crucial aspects such as project planning, scheduling, budgeting, and managing resources effectively. Students will be guided through the various stages of a construction project, including initiation, detailed planning, execution, ongoing monitoring, and project closure. Through this course, students gain insights into the challenges of construction management and learn strategies for successful project delivery, including dealing with common project constraints and stakeholder management. This comprehensive approach equips students with the skills necessary to oversee construction projects efficiently, preparing them for roles in construction management and related fields.
- b. *Residential Design and Layout*: In the Residential Design and Layout course, students dive into the world of residential architecture and interior design. The course focuses on space planning and the interpretation of architectural drawings, teaching students how to design functional and visually appealing residential spaces. Students will learn the basics of residential architectural design, including room layout, ergonomic considerations, and aesthetic aspects. Practical exercises will involve creating their own residential design projects, allowing them to apply principles of effective layout and design. This course not only enhances students' design skills but also deepens their appreciation of the intricacies involved in creating comfortable and attractive living environments.
- c. *Interior Finishing and Drywall Installation*: The Interior Finishing and Drywall Installation course provides a comprehensive look into the techniques and skills required for high-quality interior finishing. Students will learn the essentials of drywall installation, including how to properly hang, mud, and tape drywall to create smooth, ready-to-paint surfaces. The course covers various painting techniques and finishes, teaching students how to achieve a professional look in their work. Additionally, basic elements of interior design are introduced, allowing students to understand how finishing touches can significantly enhance the aesthetic appeal of a space. Hands-on practice is a key component, as students will work on actual projects to apply and perfect their skills in drywall installation and interior finishing. By the end of the course, students will be capable of executing a range of interior finishing tasks with proficiency, preparing them for careers in construction, renovation, or interior design.



4. Grade 12

- a. *Advanced Carpentry and Framing*: The Advanced Carpentry and Framing course builds upon foundational carpentry skills, introducing students to sophisticated framing techniques and structural principles. Students will explore various complex framing methods, learning how to construct and assemble load-bearing structures that form the backbone of any building. The course emphasizes precision in carpentry, teaching advanced techniques for accurate measuring, cutting, and joining. It also delves into the understanding of different types of framing materials and their appropriate applications. Through hands-on projects, students will have the opportunity to apply these advanced skills, enhancing their ability to tackle challenging carpentry tasks in real-world scenarios.
- b. *Exterior Finishing and Roofing Techniques*: In the Exterior Finishing and Roofing Techniques course, students gain expertise in the critical aspects of building exteriors. The course offers in-depth knowledge about various roofing materials, their installation methods, and key considerations for choosing suitable materials. Students will learn the techniques of installing siding, external fixtures, and how to ensure proper weather-proofing and insulation for building durability. Hands-on training is a significant component, as students will practice these techniques, learning to address common challenges faced in exterior finishing. The course aims to prepare students with the skills necessary for quality exterior construction work, which is crucial for the structural integrity and aesthetic appeal of buildings.
- c. *Sustainable Building Practices*: In Sustainable Building Practices, students are introduced to the principles of environmentally responsible and resource-efficient construction. The course covers a range of green building technologies and practices, emphasizing energy efficiency and sustainable material use. Students will explore eco-friendly construction materials and learn how to incorporate them into building designs. The curriculum also includes energy conservation strategies and sustainable design principles, focusing on creating buildings that are both environmentally friendly and economically viable. Through this course, students will gain an understanding of the growing field of sustainable construction, equipping them with the knowledge to contribute to a more sustainable future in the construction industry.
- d. *Capstone Project in Construction Technologies*: The Capstone Project in Construction Technologies marks the culmination of the Construction Technologies program. In this comprehensive course, students are challenged to apply all the skills and knowledge they have acquired throughout the program. The project involves the planning, execution, and evaluation of a construction project,



simulating real-world scenarios. Students will take on various roles, integrating aspects of carpentry, design, project management, and sustainable practices. This hands-on experience not only consolidates students' learning but also prepares them for transition into professional construction roles or further educational pursuits. The capstone project serves as a showcase of their abilities and readiness to enter the construction industry.



Curriculum Maps

Course: Safety

Unit: OSHA 10

Length: 1 Week

Standards

- 9.3.12.AG-FD.1 Develop and implement procedures to ensure safety, sanitation and quality in food product and processing facilities.
- 9.3.12.AC-CST.5 Apply practices and procedures required to maintain jobsite safety.
- 9.3.12.AR.2 Analyze the importance of health, safety and environmental management systems, policies and procedures common in arts, audio/video technology and communications activities and facilities.
- 9.3.12.ED.4 Evaluate and manage risks to safety, health and the environment in education and training settings.
- 9.3.HT-RFB.2 Demonstrate safety and sanitation procedures in food and beverage service facilities.
- 9.3.HU-ED.5 Evaluate safety and sanitation procedures associated with the early childhood education environment to assure compliance and prevent potential hazards.
- 9.3.LW.4 Conduct law, public safety, corrections and security work tasks in accordance with employee and employer rights, obligations and responsibilities, including occupational safety and health requirements.
- 9.3.LW-ENF.8 Explain the appropriate techniques for managing crisis situations in order to maintain public safety.
- 9.3.MN.3 Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.
- 9.3.MN-HSE.3 Demonstrates a safety inspection process to assure a healthy and safe manufacturing environment.
- 9.3.MN-HSE.5 Evaluate continuous improvement protocols and techniques in health, safety and/or environmental practices.
- 9.3.12.TD.5 Describe transportation, distribution and logistics employee rights and responsibilities and employers' obligations concerning occupational safety and health.



- 9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.
- 9.3.12.TD-OPS.3 Comply with policies, laws and regulations in order to maintain safety, security and health and mitigate the economic and environmental risk of transportation operations.

Essential Question(s)

- Why is it important to practice safety?
- What do safe practices look like in my industry?
- How can I keep myself and others safe?

Content

- Walking working surfaces
- Emergency action plans
- Fire protection
- Electrocution hazards
- Personal protective equipment
- Hazard communication
- Materials handling, storage, use and disposal.

Skills

- Explain why OSHA is important to workers.
- Explain workers rights under OSHA
- Discuss employer responsibilities under OSHA.
- Discuss the use of OSHA standards.
- Explain how OSHA inspections are conducted.
- Utilize helpful worker safety and health resources.
- Identify hazards in the workplace associated with walking and working surfaces.



- Identify best practices for eliminating or controlling hazards associated with walking and working surfaces in the workplace.
- Recognize employer requirements to protect workers from walking and working surface hazards.
- Recognize benefits of an Emergency Action Plan.
- Identify elements of the Fire Protection Plan.
- Identify conditions under which evacuation actions may be necessary in an emergency situation.
- Identify conditions under which shelter-in-place may be necessary in an emergency situation.
- Identify characteristics of an effective emergency escape route.
- Recognize the five types of fire extinguishers, including the types of fires they can extinguish.
- Review requirements for proper maintenance of portable fire extinguishers.
- Identify major electrical hazards.
- Describe types of electrical hazards.
- Describe electrical protection methods.
- Recognize employer requirements to protect workers from electrical hazards.
- Recall employer responsibilities toward affected employees regarding PPE.
- Identify when face and head protection should be used.
- Recall which types of hand and foot protection should be used in a specific situation.
- Recognize the differences between respirator types.
- Identify the differences between full-body protection levels.
- Identify the employer's responsibilities under the HCS, including training requirements.
- Identify components of a Hazard Communication program.
- Describe requirements of the different types of Hazard Communication labels.
- Locate pertinent information about chemicals on labels, including other forms of hazard communication, to ensure "right to understanding" provisions of GHS requirements.
- Identify types of material handling equipment.
- Describe hazards associated with material handling activities (e.g., storage, use, and disposal).
- Identify methods to prevent hazards associated with material handling equipment.
- Recognize employer requirements to protect workers from material handling hazards
- Identify the main causes of machinery accidents.



- Recognize basic machinery parts that expose workers to hazards.
- Recognize workplace situations involving machinery that requires guarding.
- Identify the requirements for safeguards.
- Identify types of machine guards including types of devices used to safeguard machines.
- Identify strategies to control chemical hazards.
- Identify strategies to control biological hazards.
- Identify strategies to control physical hazards.
- Identify strategies to control ergonomic hazards.
- Identify OSHA requirements pertaining to bloodborne pathogens.
- List the potential routes of exposure from bloodborne pathogens.
- Identify the risks associated with Human Immunodeficiency Virus (HIV), Hepatitis B, and Hepatitis C Virus.
- Identify methods of preventing transmission of bloodborne pathogens & managing occupational exposures.
- Restate methods of the safe disposal of sharps.
- Recount steps which should be taken in the event of an exposure to a potential bloodborne pathogen.
- Recognize risk factors associated with work-related musculoskeletal disorders (MSD)s.
- Identify good posture.
- Describe safe lifting techniques.
- Identify ergonomic control methods for eliminating/reducing work-related MSDs.
- Identify the number one cause of death for U.S. teens.
- List eight risk factors for young drivers.
- Identify the biggest risk factor for young drivers.
- Define distracted driving.
- Provide examples and/or causes of distracted driving.
- Identify the biggest risk factor for distracted driving
- Discuss the risk of having other young passengers in the car.
- List some actions employers should take to keep employees safe while driving.
- List some actions employees can take to safely drive on the job.
- Define the term violence.
- Recall who is at risk for encountering workplace violence.



- Describe workplace violence prevention strategies.
- Identify how to StartSafe and StaySafe to prevent or lessen workplace violence.
- Recognize the costs of workplace accidents.
- Recognize the benefits of implementing an effective safety and health program.
- Describe the elements of an effective safety and health program.
- Identify three methods to prevent workplace hazards.

Assessments

- OSHA 10 Assessment and Certificate

Course: CTE

Unit: Career Awareness

Length: Woven Throughout

Standards

- 9.2.12.CAP.1: Analyze unemployment rates for workers with different levels of education and how the economic, social, and political conditions of a time period are affected by a recession.
- 9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
- 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth.
- 9.2.12.CAP.4: Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
- 9.2.12.CAP.5: Assess and modify a personal plan to support current interests and postsecondary plans.
- 9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.



- 9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
- 9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
- 9.2.12.CAP.9: Locate information on working papers, what is required to obtain them, and who must sign them.
- 9.2.12.CAP.10: Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans)
- 9.2.12.CAP.11: Demonstrate an understanding of Free Application for Federal Student Aid (FAFSA) requirements to apply for postsecondary education
- 9.2.12.CAP.12: Explain how compulsory government programs (e.g., Social Security, Medicare) provide insurance against some loss of income and benefits to eligible recipients.
- 9.2.12.CAP.13: Analyze how the economic, social, and political conditions of a time period can affect the labor market.
- 9.2.12.CAP.14: Analyze and critique various sources of income and available resources (e.g., financial assets, property, and transfer payments) and how they may substitute for earned income
- 9.2.12.CAP.15: Demonstrate how exemptions, deductions, and deferred income (e.g., retirement or medical) can reduce taxable income.
- 9.2.12.CAP.16: Explain why taxes are withheld from income and the relationship of federal, state, and local taxes (e.g., property, income, excise, and sales) and how the money collected is used by local, county, state, and federal governments. •
- 9.2.12.CAP.17: Analyze the impact of the collective bargaining process on benefits, income, and fair labor practice. •
- 9.2.12.CAP.18: Differentiate between taxable and nontaxable income from various forms of employment (e.g., cash business, tips, tax filing and withholding). •
- 9.2.12.CAP.19: Explain the purpose of payroll deductions and why fees for various benefits (e.g., medical benefits) are taken out of pay, including the cost of employee benefits to employers and self-employment income.
- 9.2.12.CAP.20: Analyze a Federal and State Income Tax Return



- 9.2.12.CAP.21: Explain low-cost and low-risk ways to start a business.
- 9.2.12.CAP.22: Compare risk and reward potential and use the comparison to decide whether starting a business is feasible.
- 9.2.12.CAP.23: Identify different ways to obtain capital for starting a business

Essential Question(s)

- How does one prepare for a career?
- How does one improve marketability?
- Why is career planning important?
- What are the risks in starting a business?

Content

- There are strategies to improve one's professional value and marketability.
- Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
- An individual's income and benefit needs and financial plan can change over time.
- Securing an income involve an understanding of the costs and time in preparing for a career field, interview and negotiation skills, job searches, resume development, prior experience, and vesting and retirement plans
- Understanding income involves an analysis of payroll taxes, deductions and earned benefits.
- There are ways to assess a business's feasibility and risk and to align it with an individual's financial goals

Skills

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.



- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Assessments

- Career Research Project
- Resume/Cover Letter

Course: Introduction to Construction Technologies

Length: Semester

Standards

- 9.3.12.AC.3 Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
- 9.3.12.AC.4 Evaluate the nature and scope of the Architecture & Construction Career Cluster and the role of architecture and construction in society and the economy.
- 9.3.12.AC.5 Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
- 9.3.12.AC.6 Read, interpret and use technical drawings, documents and specifications to plan a project.
- 9.3.12.AC.7 Describe career opportunities and means to achieve those opportunities in each of the Architecture & Construction Career Pathways.

Essential Question(s)

- What are the key safety protocols in construction, and why are they critical to construction environments?



- How do different construction fields like residential, commercial, and infrastructure development vary, and what are the emerging trends in these areas?
- What range of career opportunities does the construction industry offer, from skilled trades to project management and design?
- What are the fundamental construction methods and techniques, and how are they applied in various construction projects?
- How do building codes and regulations influence construction practices, and why are they important for safe and efficient construction?

Content

- Safety Protocols in Construction:
 - Importance of personal protective equipment (PPE) usage.
 - Identifying potential hazards in construction environments.
 - Adherence to Occupational Safety and Health Administration (OSHA) standards.
- Overview of Construction Fields:
 - Understanding different sectors such as residential, commercial, and infrastructure development.
 - Exploration of emerging trends in construction, including green building and smart construction technologies.
- Career Opportunities in Construction:
 - Range of career paths in the construction industry, from skilled trades to project management and architectural design.
- Basic Construction Methods:
 - Introduction to fundamental construction techniques and practices.
 - Overview of standard building processes.
- Construction Materials and Tools:
 - Identification and use of various construction materials.
 - Familiarity with common construction tools and their applications.
- Building Codes and Regulations:
 - Understanding the importance of building codes and regulations in construction.



- Role of regulations in ensuring safe and efficient building practices.
- Theoretical Learning and Practical Applications:
 - Combining classroom learning with practical demonstrations and exercises.
 - Application of theoretical knowledge to real-world scenarios in construction.
- Impact of Construction on Society:
 - Discussing how construction impacts societal development and infrastructure.
 - Exploring the social and economic significance of the construction industry.

Skills

- Understand and Apply Safety Protocols:
 - Demonstrate knowledge of essential safety protocols in construction, including the use of personal protective equipment (PPE).
 - Identify potential hazards in construction environments and understand how to mitigate them.
- Comprehend Various Construction Fields:
 - Gain an understanding of different sectors within the construction industry, such as residential, commercial, and infrastructure development.
 - Recognize emerging trends like green building and smart construction technologies.
- Explore Career Opportunities:
 - Identify various career paths available in the construction industry, ranging from skilled trades to project management and architectural design.
- Learn Basic Construction Methods:
 - Understand fundamental construction techniques and standard building processes.
 - Apply basic knowledge of construction methods in theoretical or practical scenarios.
- Familiarize with Construction Materials and Tools:
 - Identify and understand the uses of different construction materials.
 - Gain familiarity with common construction tools and their practical applications.
- Understand Building Codes and Regulations:
 - Comprehend the importance and role of building codes and regulations in ensuring safe and efficient construction practices.



- Apply Theoretical Knowledge Practically:
 - Integrate classroom learning with practical demonstrations and exercises.
 - Demonstrate the ability to apply theoretical concepts to real-world construction situations.
- Recognize the Impact of Construction on Society:
 - Discuss the societal and economic implications of the construction industry.
 - Understand the broader significance of construction in societal development and infrastructure.

Assessments

- Safety Protocols and Construction Fields Examination:
 - Description: This written examination assesses students' understanding of essential safety protocols in construction, including the use of personal protective equipment and hazard identification. The exam also covers different construction fields, such as residential, commercial, and infrastructure development, along with emerging trends in the industry.
 - Assessment Aspects: Students' knowledge of safety standards and practices, their understanding of various sectors within the construction industry, and their awareness of current and future trends in construction technologies.
 - Practical Project with Reflection:
 - Description: Students will participate in a practical project, which could involve creating a basic construction plan, a model, or a mock-up using learned construction methods and materials. Following the project, students will write a reflective piece discussing their practical application of theoretical knowledge, the challenges they encountered, and the insights they gained about the construction process.
 - Assessment Aspects: Practical application of construction methods and techniques, effectiveness and creativity in the project execution, and depth of understanding and insight demonstrated in the reflective piece.
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Course: Tools and Materials Fundamentals

Length: Semester

Standards

- 9.3.12.AC.1 Use vocabulary, symbols and formulas common to architecture and construction.
- 9.3.12.AC.2 Use architecture and construction skills to create and manage a project.
- 9.3.12.AC-CST.9 Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
- 9.3.12.AC-CST.7 Compare and contrast the building systems and components required for a construction project.

Essential Question(s)

- What are the key safety practices associated with using hand and power tools in construction?
- How do different hand tools and power tools specifically contribute to various construction tasks?
- What are the distinct properties of common construction materials like wood, concrete, and metals, and how do these properties determine their use in construction projects?
- How do sustainable building materials differ from traditional materials, and what are their benefits in construction?
- What factors should be considered when selecting materials for a construction project, and how do these choices impact the overall quality and longevity of the structure?

Content

- Tool Safety and Handling:
 - Importance of safety when using construction tools.
 - Proper handling, maintenance, and storage of hand and power tools to prevent accidents.
- Hand Tools in Construction:



- Identification and usage of various hand tools common in construction.
- Techniques for effectively using hand tools in different construction tasks.
- Power Tools and Their Applications:
 - Understanding different power tools used in the construction industry.
 - Learning the specific applications of power tools for various construction jobs.
- Characteristics of Construction Materials:
 - Introduction to various construction materials like wood, concrete, metals, and their properties.
 - Understanding the strengths, limitations, and suitable uses of different materials.
- Sustainable Building Materials:
 - Exploration of modern sustainable and eco-friendly building materials.
 - Understanding the environmental impact and benefits of using sustainable options.
- Material Selection for Projects:
 - Criteria for choosing the right materials for specific construction projects.
 - Understanding how material choice affects the durability and functionality of a structure.
- Practical Application and Skills Development:
 - Hands-on activities and exercises to practice using tools and materials.
 - Developing fundamental skills needed for safe and effective use of construction tools and materials.
- Impact of Materials on Construction Quality:
 - Analyzing how the choice of materials influences the overall quality and longevity of construction projects.

Skills

- Practice Tool Safety and Handling:
 - Demonstrate proper safety practices when using hand and power tools.
 - Effectively handle, maintain, and store construction tools to prevent accidents.
- Use Hand Tools Effectively:
 - Identify various hand tools used in construction and understand their specific uses.
 - Skillfully use hand tools in various construction tasks.
- Operate Power Tools:



- Gain proficiency in operating different power tools used in the construction industry.
- Understand the appropriate applications of power tools for specific construction jobs.
- Understand Construction Materials:
 - Recognize different construction materials such as wood, concrete, and metals, and comprehend their properties.
 - Evaluate the strengths and limitations of various materials in construction.
- Select Sustainable Building Materials:
 - Identify sustainable and eco-friendly building materials.
 - Understand the environmental impact and advantages of using sustainable materials in construction.
- Make Informed Material Selections:
 - Choose appropriate materials for specific construction projects based on criteria like strength, durability, and suitability.
 - Assess how material choices impact the quality and longevity of a construction project.
- Apply Practical Skills:
 - Apply hands-on skills in using tools and materials through practical activities.
 - Develop basic competencies necessary for safe and effective use of construction tools and materials.
- Analyze Material Impact on Construction Quality:
 - Analyze and understand how the choice of materials influences the overall quality and durability of construction work.

Assessments

- Practical Tool and Material Usage Assessment:
 - Description: This assessment involves a hands-on practical where students demonstrate their ability to safely and effectively use a variety of hand and power tools. They will also be required to identify different construction materials and explain their appropriate uses in specific construction scenarios.
 - Assessment Aspects: Proficiency in handling and using construction tools, accuracy in identifying and explaining the properties and uses of various construction materials, and adherence to safety protocols during the practical exercise.
 - Written Examination and Material Selection Project:
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- Description: A written examination will test students' knowledge of tool safety, the characteristics of construction materials, and sustainable building practices. Additionally, students will complete a material selection project, where they choose appropriate materials for a given construction scenario, justifying their choices based on material properties, sustainability, and project requirements.
 - Assessment Aspects: Understanding of safety practices in tool usage, comprehension of material properties and applications, and the ability to make informed decisions in material selection for construction projects.

Course: Blueprint Reading and Basic Drafting

Length: Semester

Standards

- 9.3.12.AC.6 Read, interpret and use technical drawings, documents and specifications to plan a project.
- 9.3.12.AC.5 Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
- 9.3.12.AC-CST.7 Compare and contrast the building systems and components required for a construction project.
- 9.3.12.AC-DES.1 Justify design solutions through the use of research documentation and analysis of data.
- 9.3.12.AC-DES.2 Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
- 9.3.12.AC-DES.3 Describe the requirements of the integral systems that impact the design of buildings.
- 9.3.12.AC-DES.4 Apply building codes, laws and rules in the project design.
- 9.3.12.AC-DES.5 Identify the diversity of needs, values and social patterns in project design, including accessibility standards.
- 9.3.12.AC-DES.6 Apply the techniques and skills of modern drafting, design, engineering and construction to projects.



- 9.3.12.AC-DES.7 Employ appropriate representational media to communicate concepts and project design.
- 9.3.12.AC-DES.8 Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.

Essential Question(s)

- What is the significance of architectural symbols in blueprints, and how do they contribute to the interpretation of construction plans?
- How do floor plans provide a detailed layout of a structure, and what key elements are crucial for their interpretation?
- In what ways do elevations in blueprints offer insights into the external appearance and design of a building?
- How are basic drafting techniques applied to create accurate and detailed construction drawings?
- Why are scale and dimension critical in drafting, and how do they affect the accuracy and feasibility of construction plans?

Content

- Understanding Architectural Symbols:
 - Learning the common symbols used in architectural blueprints.
 - Understanding how these symbols represent various elements of a construction plan.
- Analyzing Floor Plans:
 - Reading and interpreting floor plans.
 - Understanding the layout and spatial arrangement of structures as depicted in floor plans.
- Studying Elevations:
 - Learning to read and analyze elevations in blueprints.
 - Understanding how elevations represent the exterior views of buildings.
- Basics of Drafting:
 - Introduction to drafting techniques and tools.
 - Practice in drawing basic construction plans and layouts.



- Developing Construction Drawings:
 - Creating simple construction drawings.
 - Applying principles of scale, dimension, and layout in drafting.
- Visualizing Structures:
 - Techniques for visualizing the final structure from blueprints.
 - Understanding the relationship between blueprints and actual buildings.
- Principles of Scale and Dimension:
 - Applying scale and dimension in construction drawings.
 - Understanding the importance of accuracy in drafting.
- Hands-on Drafting Practice:
 - Engaging in hands-on exercises to develop drafting skills.
 - Creating basic construction drawings as practical applications of learned skills.

Skills

- Understanding Architectural Symbols:
 - Learning the common symbols used in architectural blueprints.
 - Understanding how these symbols represent various elements of a construction plan.
- Analyzing Floor Plans:
 - Reading and interpreting floor plans.
 - Understanding the layout and spatial arrangement of structures as depicted in floor plans.
- Studying Elevations:
 - Learning to read and analyze elevations in blueprints.
 - Understanding how elevations represent the exterior views of buildings.
- Basics of Drafting:
 - Introduction to drafting techniques and tools.
 - Practice in drawing basic construction plans and layouts.
- Developing Construction Drawings:
 - Creating simple construction drawings.
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- Visualizing Structures:
 - Techniques for visualizing the final structure from blueprints.
 - Understanding the relationship between blueprints and actual buildings.
- Principles of Scale and Dimension:
 - Applying scale and dimension in construction drawings.
 - Understanding the importance of accuracy in drafting.
- Hands-on Drafting Practice:
 - Engaging in hands-on exercises to develop drafting skills.
 - Creating basic construction drawings as practical applications of learned skills.

Assessments

- Blueprint Interpretation and Drafting Project:
 - Description: This assessment requires students to interpret a set of provided blueprints, identifying and explaining various architectural symbols, floor plans, and elevations. Following the interpretation, students will undertake a drafting project where they create their own basic construction drawings, applying the principles of scale, dimension, and layout learned in class.
 - Assessment Aspects: Accuracy in interpreting architectural symbols and blueprint details, proficiency in applying drafting techniques to create construction drawings, and adherence to principles of scale and dimension in the drafting project.
 - Written Examination and Practical Blueprint Exercise:
 - Description: A written examination tests students' knowledge of blueprint reading, including the understanding of architectural symbols, floor plans, and elevations. Additionally, a practical exercise involves students reading and extracting key information from a blueprint, demonstrating their ability to visualize the final structure based on the plans.
 - Assessment Aspects: Comprehension of blueprint reading concepts and symbols in the written exam, and the ability to accurately interpret and analyze blueprints in the practical exercise.
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Course: Woodworking and Carpentry Skills

Length: Semester

Standards

- 9.3.12.AC-CST.8 Demonstrate the construction crafts required for each phase of a construction project.
- 9.3.12.AC-CST.9 Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
- 9.3.12.AC-CST.5 Apply practices and procedures required to maintain jobsite safety.
- 9.3.12.AC-CST.6 Manage relationships with internal and external parties to successfully complete construction projects.

Essential Question(s)

- What are the key techniques for accurate measuring and cutting in woodworking projects?
- How do different finishing techniques affect the appearance and durability of wood structures?
- What are the best practices for safely using and maintaining hand tools and power tools in carpentry?
- How does the selection of wood type impact the outcome of a woodworking project?
- What role do joinery techniques play in the strength and quality of wood constructions?

Content

- Fundamental Woodworking Techniques:
 - Learning and practicing accurate measuring techniques for woodworking projects.
 - Mastering precise cutting methods for various types of wood.
- Assembling Wood Structures:
 - Techniques for efficient and sturdy assembly of wooden structures.
 - Understanding different joining methods and their appropriate applications.
- Finishing Techniques:
 - Applying professional finishing techniques to woodwork for aesthetic and protective purposes.
 - Exploring various finishes like stains, varnishes, and paints.



- Hands-on Project Work:
 - Engaging in a variety of woodworking projects, ranging from basic constructs to more complex items.
 - Applying learned skills in real-world scenarios to reinforce practical knowledge.
- Tool Safety and Operation:
 - Emphasizing the importance of safety in woodworking.
 - Learning to correctly and safely use hand tools and power tools in carpentry.
- Tool Maintenance and Care:
 - Understanding the proper maintenance and care of woodworking tools.
 - Techniques to ensure tool longevity and safe usage.
- Wood Selection and Properties:
 - Identifying different types of wood and understanding their properties.
 - Selecting the appropriate wood type for various projects based on characteristics like grain, hardness, and durability.
- Joinery Techniques:
 - Learning various joinery techniques and their applications in woodworking.
 - Practicing joinery skills to enhance the strength and quality of wood constructions.

Skills

- Master Fundamental Woodworking Techniques:
 - Accurately measure and cut wood for various projects.
 - Apply efficient assembling methods for constructing wood structures.
- Execute Professional Finishing Techniques:
 - Apply finishing techniques such as staining, varnishing, and painting to woodwork.
 - Achieve a professional finish that enhances both the appearance and durability of wood projects.
- Complete Hands-on Woodworking Projects:
 - Successfully complete a range of woodworking projects, from simple to complex designs.
 - Utilize skills learned in class in real-world woodworking scenarios.
- Operate Tools Safely and Correctly:
 - Use hand tools and power tools correctly and safely in carpentry.



- Understand and adhere to safety protocols while working with woodworking tools.
- Maintain and Care for Woodworking Tools:
 - Perform proper maintenance and care for woodworking tools.
 - Ensure tools are kept in good condition for safe and effective use.
- Select Appropriate Wood Types:
 - Identify different types of wood and their properties.
 - Choose suitable wood types for various projects based on characteristics like grain, hardness, and durability.
- Apply Joinery Techniques:
 - Demonstrate skill in various joinery techniques.
 - Use joinery to enhance the strength and aesthetic of wood constructions.

Assessments

- Woodworking Project Completion:
 - Description: Students will undertake a comprehensive woodworking project, incorporating skills such as measuring, cutting, assembling, and finishing. They will select an appropriate project, plan it, and execute it using the techniques learned in class. The assessment will focus on the accuracy of measurements, quality of cuts and assembly, application of finishing techniques, and overall craftsmanship.
 - Assessment Aspects: Precision in measuring and cutting, effectiveness of assembly techniques, quality and appropriateness of finishing, and overall aesthetic and structural integrity of the completed project.
 - Practical Skills and Safety Test:
 - Description: A practical test where students demonstrate their ability to safely and correctly use a variety of hand tools and power tools. This assessment may include a series of tasks or challenges that require the application of different tools and techniques. Alongside this, students might also complete a written test covering tool maintenance, wood selection, and joinery techniques.
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- Assessment Aspects: Adherence to safety protocols while using tools, proficiency in handling and operating different tools, knowledge of tool maintenance, understanding of wood selection criteria, and application of joinery techniques in practical tasks.

Course: Basic Mechanical Systems in Construction

Length: Semester

Standards

- 9.3.12.AC-CST.9 Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
- 9.3.12.AC-MO.2 Use troubleshooting procedures when solving a maintenance problem in buildings.
- 9.3.12.AC-MO.3 Apply construction skills when repairing, restoring or renovating existing buildings.
- 9.3.12.AC-MO.4 Determine work required to repair or renovate an existing building.
- 9.3.12.AC-MO.5 Plan and practice preventative maintenance activities to service existing buildings.
- 9.3.12.AC-MO.6 Maintain and inspect building systems to achieve safe and efficient operation of buildings.

Essential Question(s)

- What are the fundamental principles of electrical systems in construction, and how do they contribute to building functionality?
- How do plumbing systems operate within residential and commercial buildings, and what are the key components of these systems?
- What role do HVAC (Heating, Ventilation, and Air Conditioning) systems play in building comfort and efficiency, and how are they maintained?
- Why are safety practices crucial when working with electrical, plumbing, and HVAC systems, and what protocols should be followed?



- How do the electrical, plumbing, and HVAC systems integrate within the overall construction of a building, and why is understanding their interdependence important?

Content

- Fundamentals of Electrical Systems:
 - Basic principles of electrical systems in construction.
 - Understanding simple electrical wiring, circuitry, and safety measures.
- Introduction to Plumbing Systems:
 - Basic concepts of plumbing in construction, including water supply and drainage systems.
 - Practical skills in simple plumbing tasks and understanding plumbing fixtures.
- Basics of HVAC Systems:
 - Understanding the components and functioning of Heating, Ventilation, and Air Conditioning (HVAC) systems.
 - Familiarity with basic HVAC maintenance and simple installation techniques.
- Safety Practices in Mechanical Systems:
 - Emphasizing safety protocols when working with electrical, plumbing, and HVAC systems.
 - Understanding the risks and precautionary measures associated with each system.
- Hands-on Installation Techniques:
 - Applying hands-on skills in basic installations and repairs of electrical, plumbing, and HVAC systems.
 - Developing practical experience through supervised projects.
- Overview of Building Codes and Standards:
 - Introduction to relevant building codes and standards related to mechanical systems.
 - Understanding the importance of compliance with these regulations for safe and efficient system operations.
- System Integration in Construction:
 - Understanding how electrical, plumbing, and HVAC systems integrate within the overall building design and operation.
 - Recognizing the interdependencies of these systems in modern construction.
- Basic Troubleshooting and Maintenance:



- Skills in identifying and addressing common issues in electrical, plumbing, and HVAC systems.
- Basic maintenance practices to ensure system longevity and efficiency.

Skills

- Understand Electrical System Basics:
 - Grasp the fundamental principles of electrical systems in construction.
 - Learn basic electrical wiring and circuitry, with an emphasis on safety measures.
- Learn Basic Plumbing Concepts:
 - Acquire knowledge of basic plumbing systems, including water supply and drainage.
 - Gain practical skills in handling simple plumbing tasks and fixtures.
- Comprehend HVAC System Fundamentals:
 - Understand the components and functioning of Heating, Ventilation, and Air Conditioning (HVAC) systems.
 - Develop skills in basic HVAC maintenance and installation techniques.
- Adhere to Safety Practices:
 - Apply safety protocols specific to working with electrical, plumbing, and HVAC systems.
 - Recognize and mitigate risks associated with these mechanical systems.
- Perform Hands-on Installations:
 - Execute basic installations and repairs in electrical, plumbing, and HVAC systems under supervision.
 - Apply hands-on experience to reinforce theoretical learning.
- Understand Building Codes and Standards:
 - Familiarize with relevant building codes and standards for mechanical systems.
 - Recognize the importance of compliance for safe and efficient system operations.
- Integrate Systems in Construction:
 - Understand the integration of electrical, plumbing, and HVAC systems within building construction.
 - Acknowledge the interdependencies and coordination required among these systems.
- Conduct Basic Troubleshooting and Maintenance:
 - Identify and address common issues in electrical, plumbing, and HVAC systems.
 - Perform basic maintenance to ensure system efficiency and longevity.



Assessments

- Mechanical Systems Knowledge Test:
 - Description: This written examination assesses students' understanding of the fundamental concepts of electrical, plumbing, and HVAC systems as covered in the course. The test will include questions on the principles, safety protocols, and basic operations of each system, as well as the regulations and standards governing these systems.
 - Assessment Aspects: Comprehension of the principles and functionality of electrical, plumbing, and HVAC systems, understanding of safety practices, and knowledge of relevant building codes and standards.
- Practical Skills Demonstration:
 - Description: A hands-on practical assessment where students demonstrate basic installation and maintenance skills in electrical, plumbing, and HVAC systems. This may include tasks like simple wiring, pipe fitting, or basic HVAC component setup and troubleshooting. The assessment will focus on the application of safety practices, accuracy of work, and the ability to follow procedures.
 - Assessment Aspects: Proficiency in handling tools and equipment, adherence to safety protocols, accuracy and quality of the practical work, and effective application of theoretical knowledge to practical tasks.

Course: Construction Project Management

Length: Semester

Standards

- 9.3.12.AC-CST.1 Describe contractual relationships between all parties involved in the building process.
- 9.3.12.AC-CST.2 Describe the approval procedures required for successful completion of a construction project.



- 9.3.12.AC-CST.3 Implement testing and inspection procedures to ensure successful completion of a construction project.
- 9.3.12.AC-CST.4 Apply scheduling practices to ensure the successful completion of a construction project.
- 9.3.12.AC-CST.5 Apply practices and procedures required to maintain jobsite safety.
- 9.3.12.AC-CST.6 Manage relationships with internal and external parties to successfully complete construction projects.
- 9.3.12.AC-CST.7 Compare and contrast the building systems and components required for a construction project.
- 9.3.12.AC-CST.8 Demonstrate the construction crafts required for each phase of a construction project.
- 9.3.12.AC-CST.9 Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.

Essential Question(s)

- How do you develop a comprehensive project plan for a construction project, considering scope, schedule, and budget constraints?
- What strategies can be employed to effectively manage and control project budgets in construction project management?
- How do you optimize resource allocation, considering manpower, materials, and equipment, to ensure the smooth execution of a construction project?
- What challenges are commonly faced during the different stages of a construction project, and how can these challenges be proactively addressed to ensure project success?
- How do you navigate the complexities of stakeholder management in construction project management, considering diverse interests and expectations?

Content

- Project Planning:
 - Overview of project planning principles
 - Defining project scope and objectives



- Identification of project stakeholders
- Scheduling:
 - Techniques for creating project schedules
 - Critical Path Method (CPM) and Gantt charts
 - Time management strategies in construction projects
- Budgeting:
 - Principles of budget development in construction
 - Cost estimation and control
 - Budgeting tools and software
- Resource Management:
 - Allocation and optimization of resources
 - Human resource management in construction
 - Procurement and material management
- Construction Project Stages:
 - Initiation phase: Project conceptualization and feasibility
 - Planning phase: Detailed project planning and strategy development
 - Execution phase: Implementation of project plans
- Monitoring and Control:
 - Project monitoring and performance measurement
 - Change management in construction projects
 - Quality control and assurance
- Project Closure:
 - Finalization and handover of the project
 - Evaluation of project outcomes
 - Documentation and lessons learned
- Challenges in Construction Management:
 - Identifying and addressing common challenges
 - Risk management strategies
 - Problem-solving in construction projects



- Stakeholder Management:
 - Identification of project stakeholders
 - Communication and collaboration strategies
 - Conflict resolution in construction projects
- Ethics and Professionalism:
 - Ethical considerations in construction project management
 - Professional conduct and responsibilities
 - Legal aspects of construction management

Skills

- Develop Comprehensive Project Plans:
 - Create detailed project plans encompassing scope, schedule, and budget.
 - Define clear project objectives and milestones.
- Execute Effective Scheduling:
 - Utilize project scheduling tools such as Gantt charts and Critical Path Method (CPM).
 - Implement time management strategies to meet project deadlines.
- Manage Project Budgets:
 - Develop accurate cost estimations for construction projects.
 - Effectively control project budgets through cost monitoring and analysis.
- Optimize Resource Allocation:
 - Allocate and manage resources efficiently, considering manpower, materials, and equipment.
 - Implement procurement strategies to ensure timely availability of materials.
- Navigate Construction Project Stages:
 - Successfully guide projects through initiation, planning, execution, and closure phases.
 - Develop strategies for each project stage, addressing unique challenges.
- Implement Monitoring and Control Measures:
 - Establish effective project monitoring systems.
 - Implement control measures to manage changes and ensure project adherence to plans.
- Facilitate Project Closure:



- Oversee the finalization and handover of completed projects.
- Evaluate project outcomes and document lessons learned for continuous improvement.
- Address Challenges in Construction Management:
 - Identify potential challenges in construction projects.
 - Implement proactive strategies and solutions to overcome challenges.
- Demonstrate Stakeholder Management Skills:
 - Identify key project stakeholders and their interests.
 - Employ communication and collaboration strategies to manage stakeholder expectations.
- Apply Ethical and Professional Standards:
 - Adhere to ethical considerations in construction project management.
 - Demonstrate professionalism and comply with legal aspects governing the construction industry.
- Evaluate Project Outcomes:
 - Assess project success and identify areas for improvement.
 - Use project evaluation for future planning and decision-making.
- Promote Sustainable Practices:
 - Understand and integrate sustainable building practices into project management.
 - Consider environmental impact and energy-efficient solutions.

Assessments

- Comprehensive Project Plan: Students will be tasked with developing a comprehensive project plan for a hypothetical construction project. This assessment will require them to consider all aspects, including scope definition, scheduling, budgeting, risk analysis, and resource allocation. Students must present their plan, demonstrating an understanding of effective project management principles.
 - Case Study Analysis: Students will analyze real or simulated case studies of construction projects. They will be required to identify challenges faced during different project stages, propose solutions, and evaluate the success or failure of the project management strategies employed. This assessment will test their ability to apply theoretical knowledge to practical scenarios in construction project management.
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Course: Residential Design and Layout

Length: Semester

Standards

- 9.3.12.AC-DES.1 Justify design solutions through the use of research documentation and analysis of data.
- 9.3.12.AC-DES.2 Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
- 9.3.12.AC-DES.3 Describe the requirements of the integral systems that impact the design of buildings.
- 9.3.12.AC-DES.4 Apply building codes, laws and rules in the project design.
- 9.3.12.AC-DES.5 Identify the diversity of needs, values and social patterns in project design, including accessibility standards.
- 9.3.12.AC-DES.6 Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
- 9.3.12.AC-DES.7 Employ appropriate representational media to communicate concepts and project design.
- 9.3.12.AC-DES.8 Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.

Essential Question(s)

- How can space planning principles be effectively applied to optimize residential environments for both functionality and aesthetics?
- What are the key elements of architectural drawings, and how can their interpretation enhance the design process in residential architecture?
- How do ergonomic considerations influence the layout and design of rooms in residential spaces, and why is it crucial for creating comfortable living environments?
- What role do aesthetic considerations play in residential design, and how can color schemes, lighting, and decor contribute to the overall visual appeal of a living space?



- In what ways do foundational concepts in residential architectural design contribute to the creation of well-designed living spaces, and how can these principles be practically applied in design projects?

Content

- Space Planning:
 - Understanding how to optimize residential spaces for both functionality and aesthetics.
 - Recognition of traffic flow and spatial relationships within a home.
- Architectural Drawing Interpretation:
 - Ability to interpret common architectural drawings used in residential design.
 - Familiarity with floor plans, elevations, and other relevant drawings.
- Room Layout:
 - Application of effective room layout principles.
 - Consideration of ergonomic factors for optimal room design.
- Ergonomic Considerations:
 - Exploration of ergonomic considerations in residential design.
 - Application of ergonomic principles to enhance design functionality.
- Aesthetic Aspects:
 - Understanding of aesthetic aspects in residential design.
 - Knowledge of color schemes, lighting, and decor for visual appeal.
- Residential Architectural Design Basics:
 - Grasp of foundational concepts in residential architectural design.
 - Application of architectural principles to create well-designed living spaces.
- Principles of Effective Layout:
 - Understanding of principles governing effective layout in residential design.
 - Application of layout principles for optimal functionality.
- Designing Functional Spaces:
 - Ability to design functional residential spaces.
 - Consideration of practicality and usability in designed spaces.
- Visual Appeal in Residential Design:



- Exploration of principles contributing to visual appeal in residential design.
- Application of design techniques for visually pleasing living spaces.
- Practical Design Exercises:
 - Engagement in hands-on residential design projects.
 - Application of theoretical knowledge through practical exercises.

Skills

- Space Planning:
 - Understand the fundamental principles of space planning.
 - Apply knowledge of traffic flow and spatial relationships within residential spaces.
 - Optimize spaces for functionality and aesthetics.
- Architectural Drawing Interpretation:
 - Interpret and analyze common architectural drawings used in residential design.
 - Recognize and understand floor plans, elevations, and other relevant drawings.
 - Visualize and comprehend the structure and layout of residential spaces.
- Room Layout:
 - Implement effective room layout principles.
 - Consider ergonomic factors when designing room layouts.
 - Create rooms that prioritize comfort and usability.
- Ergonomic Considerations:
 - Explore ergonomic considerations in residential design.
 - Understand how ergonomic factors contribute to effective design.
 - Apply ergonomic principles in designing functional living spaces.
- Aesthetic Aspects:
 - Delve into the aesthetic aspects of residential design.
 - Understand color schemes, lighting, and decor in design.
 - Create visually cohesive and harmonious residential environments.
- Residential Architectural Design Basics:
 - Grasp the basics of residential architectural design.



- Understand foundational concepts in designing living spaces.
- Apply architectural principles to residential design.
- Principles of Effective Layout:
 - Understand the principles governing effective layout in residential design.
 - Apply layout principles for optimal functionality.
 - Create layouts that enhance the overall design and flow of residential spaces.
- Designing Functional Spaces:
 - Learn to design functional residential spaces.
 - Consider the practicality and usability of designed spaces.
 - Apply functional design principles in real-world scenarios.
- Visual Appeal in Residential Design:
 - Explore principles that contribute to visual appeal in residential design.
 - Understand the importance of aesthetics in creating attractive living spaces.
 - Apply design techniques for visual appeal in residential settings.
- Practical Design Exercises:
 - Engage in hands-on residential design projects.
 - Apply theoretical knowledge to practical design exercises.
 - Showcase creativity and skills in crafting functional and aesthetically pleasing living environments.

Assessments

- Design Project Presentation:
 - Students will individually work on a residential design project, applying the principles learned in class. They will create a comprehensive presentation that includes floor plans, elevations, and a written explanation of their design choices. This assessment evaluates their ability to translate theoretical knowledge into practical design solutions.
 - Room Transformation Exercise:
 - In this hands-on assessment, students will choose a real or simulated residential space and develop a redesign plan. They will consider space planning, ergonomic factors, and aesthetic elements. The
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assessment includes a written reflection on the design process, highlighting the key considerations and challenges faced during the transformation of the chosen space.

Course: Interior Finishing and Drywall Installation

Length: Semester

Standards

- 9.3.12.AC-MO.3 Apply construction skills when repairing, restoring or renovating existing buildings.
- 9.3.12.AC-MO.4 Determine work required to repair or renovate an existing building.
- 9.3.12.AC-MO.5 Plan and practice preventative maintenance activities to service existing buildings.
- 9.3.12.AC-MO.6 Maintain and inspect building systems to achieve safe and efficient operation of buildings.

Essential Question(s)

- How do you ensure a seamless and well-finished drywall installation?
- What are the key factors to consider when choosing paint for different interior surfaces?
- How can interior design principles be applied to enhance the aesthetic appeal of a residential space during finishing?
- In what ways does proper preparation of surfaces contribute to the overall quality of interior finishing work?
- Why is attention to detail crucial in achieving professional and high-quality results in interior finishing and drywall installation?

Content

- Drywall Installation Techniques:
 - Proper hanging of drywall sheets



- Mud and taping methods for seamless joints
- Sanding and smoothing surfaces
- Painting Techniques and Finishes:
 - Understanding paint types and their applications
 - Roller and brush techniques
 - Achieving various finishes (e.g., textured, glossy)
- Interior Design Basics:
 - Introduction to fundamental interior design principles
 - Incorporating color schemes and patterns
 - Enhancing aesthetic appeal through finishes
- Hands-On Practice:
 - Application of drywall installation techniques on real projects
 - Painting and finishing practical exercises
 - Working with common interior design elements
- Professionalism and Quality:
 - Emphasizing attention to detail in finishing work
 - Quality assurance in interior finishing
 - Industry standards and best practices in the field

Skills

- Mastering Drywall Installation:
 - Demonstrate proficiency in hanging drywall sheets securely and efficiently.
 - Execute mud and taping techniques to achieve seamless and well-finished joints.
 - Apply sanding and smoothing methods to prepare surfaces for painting.
- Painting Proficiency:
 - Identify different types of paint and their suitable applications.
 - Develop skills in using rollers and brushes for precise and even painting.
 - Experiment with various painting techniques to achieve desired finishes.
- Interior Design Understanding:



- Grasp fundamental principles of interior design for residential spaces.
- Apply knowledge of color schemes, patterns, and design elements to enhance interiors.
- Explore the relationship between finishes and overall aesthetic appeal.
- Hands-On Practical Application:
 - Engage in real projects to practically apply drywall installation techniques.
 - Execute painting and finishing exercises to gain hands-on experience.
 - Work with common interior design elements in a practical setting.
- Professionalism and Quality Assurance:
 - Cultivate attention to detail in all aspects of interior finishing work.
 - Uphold standards of quality assurance in every step of the finishing process.
 - Familiarize with industry standards and best practices to ensure professional outcomes.

Assessments

- Practical Finishing Project:
 - Students will undertake a comprehensive finishing project, including drywall installation, mudding, taping, and painting. The project will be assessed based on the quality and smoothness of the finished surfaces, adherence to proper techniques, and attention to detail. Students will present their completed project, discussing the decisions made in terms of color, finishes, and design elements.
- Written Assessment on Interior Finishing Principles:
 - This assessment will evaluate students' understanding of interior finishing principles. It will include questions on drywall installation techniques, painting methods, and the application of interior design concepts. Students will be required to demonstrate their knowledge of materials, tools, and safety practices associated with interior finishing.

Course: Advanced Carpentry and Framing

Length: Semester



Standards

- 9.3.12.AC-MO.3 Apply construction skills when repairing, restoring or renovating existing buildings.
- 9.3.12.AC-MO.4 Determine work required to repair or renovate an existing building.
- 9.3.12.AC-MO.5 Plan and practice preventative maintenance activities to service existing buildings.
- 9.3.12.AC-MO.6 Maintain and inspect building systems to achieve safe and efficient operation of buildings.

Essential Question(s)

- What are the key principles underlying advanced framing techniques, and how do they contribute to the structural integrity of a building?
- How can different types of framing materials be strategically chosen and applied based on the requirements of a construction project?
- What advanced measuring and cutting techniques are essential for precision in carpentry, and how do they impact the quality of the final structure?
- In what ways do load-bearing structures differ from non-load-bearing ones, and how can they be designed and constructed for optimal stability?
- How do advanced joinery techniques enhance the durability and strength of carpentry connections, and what considerations are crucial in their application to different framing scenarios?

Content

- Advanced Framing Techniques:
 - Overview of advanced framing methods
 - Techniques for precise and complex framing
- Structural Principles in Carpentry:
 - Understanding the structural aspects of carpentry
 - Application of load-bearing principles
- Complex Framing Methods:



- Exploring intricate framing techniques
- Hands-on practice with complex framing
- Construction of Load-Bearing Structures:
 - Building structures that bear loads
 - Applying load-bearing principles in construction
- Precision Carpentry Techniques:
 - Advanced measuring and cutting techniques
 - Achieving precision in carpentry work
- Types of Framing Materials:
 - Understanding various framing materials
 - Identifying the right material for specific applications
- Applications of Different Framing Materials:
 - Practical applications of framing materials
 - Hands-on projects with diverse framing materials
- Advanced Measuring and Cutting Techniques:
 - Mastery of advanced measurement methods
 - Techniques for precise and intricate cuts
- Joinery in Advanced Carpentry:
 - Advanced joinery techniques
 - Creating strong and durable connections
- Hands-On Projects in Advanced Framing:
 - Applying learned skills in practical projects
 - Real-world scenarios for hands-on experience
- Real-World Applications of Advanced Carpentry Skills:
 - Applying advanced carpentry skills in real-world contexts
 - Practical applications in construction and framing projects

Skills

- Mastering Advanced Framing Techniques:



- Develop proficiency in executing advanced framing methods with precision and accuracy.
- Understanding Structural Principles in Carpentry:
 - Comprehend the fundamental structural principles that underlie carpentry work and apply them effectively.
- Applying Complex Framing Methods:
 - Gain hands-on experience and mastery in executing intricate framing techniques for various construction scenarios.
- Constructing Load-Bearing Structures:
 - Learn to design and build load-bearing structures, applying engineering principles to ensure stability and safety.
- Executing Precision Carpentry Techniques:
 - Acquire advanced skills in measuring, cutting, and executing carpentry tasks with a high degree of precision.
- Identifying Types of Framing Materials:
 - Recognize and understand the properties of different framing materials, making informed choices for construction projects.
- Applying Different Framing Materials:
 - Apply theoretical knowledge of framing materials through practical projects, gaining proficiency in their use.
- Mastering Advanced Measuring and Cutting Techniques:
 - Master advanced techniques for accurate measurement and intricate cutting in carpentry projects.
- Perfecting Joinery in Advanced Carpentry:
 - Acquire expertise in advanced joinery techniques, ensuring strong and durable connections in carpentry work.
- Hands-On Projects in Advanced Framing:
 - Apply learned skills to real-world projects, gaining practical experience in executing advanced framing tasks.
- Applying Advanced Carpentry Skills in Real-World Contexts:



- Demonstrate the ability to apply advanced carpentry skills in diverse real-world construction scenarios, ensuring practical competence.

Assessments

- Advanced Framing Project:
 - Task: Design and execute a comprehensive advanced framing project, incorporating complex framing methods learned during the course. This may include constructing load-bearing structures, applying precise measuring and cutting techniques, and utilizing different framing materials appropriately.
 - Assessment Criteria: Accuracy of measurements, precision in framing techniques, proper selection and application of framing materials, overall structural integrity.
- Critical Analysis of Framing Techniques:
 - Task: Conduct a detailed analysis of various advanced framing techniques, comparing their strengths, weaknesses, and suitability for different construction scenarios. Prepare a written report or presentation discussing the impact of these techniques on structural stability and the efficiency of the construction process.
 - Assessment Criteria: Depth of analysis, understanding of framing principles, ability to articulate findings, critical thinking in evaluating framing methods.

Course: Exterior Finishing and Roofing Techniques

Length: Semester

Standards

- 9.3.12.AC-MO.3 Apply construction skills when repairing, restoring or renovating existing buildings.
- 9.3.12.AC-MO.4 Determine work required to repair or renovate an existing building.
- 9.3.12.AC-MO.5 Plan and practice preventative maintenance activities to service existing buildings.
- 9.3.12.AC-MO.6 Maintain and inspect building systems to achieve safe and efficient operation of buildings.



- 9.3.12.AC-CST.5 Apply practices and procedures required to maintain jobsite safety.

Essential Question(s)

- How can students demonstrate proficiency in installing different roofing materials while ensuring structural integrity?
- What techniques are essential for precise installation of various siding materials to enhance both aesthetic appeal and functionality?
- How can students seamlessly integrate external fixtures into exterior finishes, considering both functionality and visual coherence?
- What effective strategies can students employ for weather-proofing and insulation to enhance building durability, energy efficiency, and comfort?
- How can students ensure strict adherence to safety protocols during exterior construction work, and what measures are taken to assess and maintain the quality of exterior finishes?

Content

- Roofing Materials and Installation:
 - Overview of different roofing materials (e.g., asphalt shingles, metal, tiles).
 - Techniques for proper installation and maintenance of roofing materials.
 - Understanding roof structures and support systems.
- Siding Installation:
 - Types of siding materials (e.g., vinyl, wood, fiber cement).
 - Hands-on training in the installation of siding for different building exteriors.
 - Considerations for insulation and weather-proofing.
- External Fixtures and Features:
 - Installation of external fixtures such as windows, doors, and decorative elements.
 - Ensuring functionality, aesthetics, and weather resistance in fixture installation.
 - Integration of fixtures with exterior finishes.



- Weather-Proofing and Insulation:
 - Importance of weather-proofing in exterior construction.
 - Techniques for ensuring insulation and energy efficiency.
 - Addressing common challenges related to weather exposure.
- Hands-On Practical Exercises:
 - Application of roofing and siding techniques in real-world scenarios.
 - Problem-solving for common issues encountered during exterior finishing.
 - Collaboration on projects to enhance practical skills.
- Safety Protocols:
 - Adherence to safety measures during exterior construction work.
 - Understanding and implementing safety standards for roofing and finishing projects.
 - Emergency response procedures for potential risks.
- Quality Assurance in Exterior Construction:
 - Assessing the quality of exterior finishes.
 - Implementing measures to enhance durability and longevity.
 - Evaluation of completed projects for adherence to industry standards.
- Project Management in Exterior Construction:
 - Planning and organizing exterior finishing projects.
 - Time management and coordination with other construction activities.
 - Budgeting and resource allocation for exterior construction projects.
- Emerging Trends in Exterior Construction:
 - Exploration of innovative materials and technologies in roofing and finishing.
 - Sustainable practices and eco-friendly options for exterior construction.
 - Awareness of industry trends and advancements.

Skills

- Roofing Expertise:
 - Successfully execute roofing projects using various materials.
 - Ensure structural integrity and compatibility of roofing materials.



- Siding Installation Mastery:
 - Execute precise installation of different siding materials for diverse exteriors.
 - Apply siding techniques to enhance both aesthetic appeal and functionality.
- Fixture Integration Skills:
 - Install external fixtures seamlessly into exterior finishes.
 - Ensure proper functionality and visual coherence of external fixtures.
- Weather-Proofing and Insulation Competence:
 - Implement effective weather-proofing and insulation strategies.
 - Enhance building durability, energy efficiency, and comfort through proper insulation.
- Hands-On Application:
 - Successfully complete hands-on projects, demonstrating problem-solving skills and collaboration in a team.
 - Apply learned techniques in real-world scenarios.
- Safety Adherence:
 - Follow strict safety protocols during exterior construction work.
 - Implement safety measures to prevent accidents and respond appropriately to emergency situations.
- Quality Assurance Proficiency:
 - Assess the quality of exterior finishes.
 - Evaluate completed projects to ensure they meet industry standards and deliver high-quality results.
- Project Management Competency:
 - Plan and organize exterior finishing projects.
 - Successfully manage time, resources, and budget for effective project completion.
- Awareness of Emerging Trends:
 - Demonstrate awareness of industry trends.
 - Apply sustainable practices in exterior construction, staying informed about innovative materials and technologies.

Assessments

- Exterior Finishing Project:
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- Students will plan and execute a comprehensive exterior finishing project, demonstrating their skills in installing roofing materials, siding, and external fixtures. The assessment will include evaluations of precision, craftsmanship, and adherence to safety standards.
- Roofing Techniques Test:
 - Students will undergo a written and practical assessment focused on roofing techniques. The test will cover topics such as identifying roofing materials, understanding installation methods, and troubleshooting common roofing challenges. The practical component may involve a hands-on task to assess the application of learned roofing techniques in a controlled setting.

Course: Sustainable Building Practices

Length: Semester

Standards

- 9.3.12.AC-DES.1 Justify design solutions through the use of research documentation and analysis of data.
- 9.3.12.AC-DES.2 Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
- 9.3.12.AC-DES.3 Describe the requirements of the integral systems that impact the design of buildings.
- 9.3.12.AC-DES.4 Apply building codes, laws and rules in the project design.
- 9.3.12.AC-DES.5 Identify the diversity of needs, values and social patterns in project design, including accessibility standards.
- 9.3.12.AC-DES.6 Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
- 9.3.12.AC-DES.7 Employ appropriate representational media to communicate concepts and project design.
- 9.3.12.AC-DES.8 Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.



Essential Question(s)

- What are the foundational principles of sustainable building practices, and how do they contribute to environmentally responsible construction?
- How can green building technologies and eco-friendly construction materials be effectively integrated into construction projects to enhance sustainability?
- What strategies and considerations are crucial for designing and implementing energy-efficient buildings in the context of sustainable construction?
- How do architects and construction professionals assess the sustainability and life cycle of different building materials, and what criteria influence material selection for sustainable projects?
- What economic factors and considerations are involved in sustainable construction, and how do these contribute to the long-term viability and success of environmentally conscious building projects?

Content

- Introduction to Sustainable Construction:
 - Overview of sustainable building practices
 - Understanding the environmental impact of construction
- Green Building Technologies:
 - Exploration of eco-friendly construction materials
 - Introduction to innovative sustainable technologies
- Energy Efficiency in Construction:
 - Strategies for energy-efficient building design
 - Incorporating renewable energy sources
- Sustainable Material Use:
 - Selection and utilization of sustainable construction materials
 - Assessing the life cycle of building materials
- Economic Viability of Sustainable Construction:
 - Cost considerations in sustainable building practices
 - Analyzing the economic benefits of sustainable construction



- Principles of Sustainable Design:
 - Understanding sustainable design principles
 - Integrating aesthetics with sustainability in construction
- Case Studies in Sustainable Construction:
 - Examining real-world examples of successful sustainable construction projects
 - Learning from case studies to apply sustainable practices in future projects.

Skills

- Introduction to Sustainable Construction:
 - Develop an understanding of the principles and importance of sustainable building practices in the construction industry.
 - Identify key environmental considerations associated with construction projects.
- Green Building Technologies:
 - Explore and evaluate various eco-friendly construction materials and technologies.
 - Demonstrate the ability to incorporate green building technologies into construction designs.
- Energy Efficiency in Construction:
 - Implement strategies for designing energy-efficient buildings.
 - Integrate renewable energy sources into construction projects.
- Sustainable Material Use:
 - Select and utilize sustainable construction materials based on project requirements.
 - Assess and compare the life cycle sustainability of different building materials.
- Economic Viability of Sustainable Construction:
 - Analyze the economic considerations involved in sustainable construction projects.
 - Evaluate the long-term economic benefits of incorporating sustainable practices.
- Principles of Sustainable Design:
 - Apply sustainable design principles to construction projects.
 - Integrate aesthetic considerations with sustainable design concepts.
- Case Studies in Sustainable Construction:
 - Analyze and draw insights from real-world case studies of successful sustainable construction projects.



- Apply lessons learned from case studies to inform decision-making in future sustainable construction endeavors.

Assessments

- Sustainable Building Project:
 - Objective: Students will work collaboratively to design and present a sustainable building project. The project should incorporate green building technologies, eco-friendly materials, and energy-efficient strategies. Assessment will include the viability of the design in terms of sustainability, environmental impact, and cost-effectiveness.
- Case Study Analysis:
 - Objective: Students will analyze real-world case studies of sustainable construction projects. They will assess the project's adherence to sustainable practices, evaluate the effectiveness of implemented technologies and materials, and propose improvements or alternatives. This assessment will test students' critical thinking and ability to apply sustainable building principles to practical scenarios.

Course: Capstone Project in Construction Technologies

Length: Semester

Standards

- 9.3.12.AC-DES.1 Justify design solutions through the use of research documentation and analysis of data.
- 9.3.12.AC-DES.2 Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
- 9.3.12.AC-DES.3 Describe the requirements of the integral systems that impact the design of buildings.
- 9.3.12.AC-DES.4 Apply building codes, laws and rules in the project design.
- 9.3.12.AC-DES.5 Identify the diversity of needs, values and social patterns in project design, including accessibility standards.



- 9.3.12.AC-DES.6 Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
- 9.3.12.AC-DES.7 Employ appropriate representational media to communicate concepts and project design.
- 9.3.12.AC-DES.8 Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.

Essential Question(s)

- How does effective project planning contribute to the successful execution of construction projects?
- What role do scheduling techniques like Critical Path Method (CPM) play in ensuring project timelines are met?
- How can construction execution be optimized through the application of advanced carpentry and framing skills?
- In what ways do sustainable building practices enhance the overall construction process and project outcomes?
- How does project management contribute to successful construction projects, and what key principles should be considered?

Content

- Project Planning:
 - Overview of project planning principles
 - Defining project scope and objectives
 - Identification of project stakeholders
- Scheduling:
 - Techniques for creating project schedules
 - Critical Path Method (CPM) and Gantt charts
 - Time management strategies in construction projects
- Construction Execution:



- Hands-on experience in executing construction tasks
- Application of carpentry and framing skills
- Utilization of sustainable building practices
- Project Management:
 - Application of project management principles
 - Budgeting and resource allocation
 - Stakeholder communication and management
- Evaluation and Reflection:
 - Assessment of project outcomes
 - Reflection on challenges and solutions
 - Presentation of the completed construction project

Skills

- Project Planning:
 - Develop comprehensive project plans, including defining scope, objectives, and deliverables.
 - Identify and analyze project stakeholders, considering their roles and impact.
 - Apply project planning principles to create effective project schedules.
- Scheduling:
 - Utilize various techniques for creating project schedules, ensuring accuracy and efficiency.
 - Implement Critical Path Method (CPM) and Gantt charts to manage project timelines.
 - Apply time management strategies to construction projects, optimizing resource utilization.
- Construction Execution:
 - Demonstrate proficiency in executing construction tasks with hands-on experience.
 - Apply advanced carpentry and framing skills in real-world scenarios.
 - Incorporate sustainable building practices into construction execution.
- Project Management:
 - Apply project management principles in overseeing construction projects.
 - Develop and manage budgets, ensuring effective resource allocation.
 - Communicate with stakeholders, fostering collaboration and addressing concerns.



- Evaluation and Reflection:
 - Assess project outcomes, identifying successes and areas for improvement.
 - Reflect on challenges encountered during the project and propose viable solutions.
 - Present the completed construction project, showcasing acquired skills and knowledge.

Assessments

- Comprehensive Project Evaluation:
 - Students will undertake a detailed assessment of a construction project, including project planning, scheduling, execution, and evaluation. They will analyze the effectiveness of project management principles applied, identify challenges faced during execution, and propose strategies for improvement.
 - Capstone Project Presentation:
 - Students will present their capstone projects to a panel of industry professionals. The presentation will cover project planning, execution, problem-solving strategies, and the integration of various construction skills. Evaluation will be based on the clarity of communication, depth of understanding demonstrated, and the overall success of the capstone project.
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Resources

→ Course Resources

- ◆ Modern Carpentry, Wagner, Willis H, Smith, Howard Bud, Huth, Mark W., Goodheart-Willcox; 13th Edition, 2021.
- ◆ Carpentry Workbook: Procter, Thomas E., American Technical Publishers, 7th edition, 2013.