School District of Marshfield Course Syllabus

Course Name: DC Construction Technology Capstone PS
Length of Course: Year
Credit: 2 Credits

Program Goal:

Empower learners to be college and career ready through standards-based experiences in the classroom and career-based learning experiences with business and industry partners. Learners will engage through technology in design, building, problem-solving, repair or service, in a collaborative environment through theory and hands-on experiences.

Course Description:

This course is a continuation of Advanced Construction Technology. The content learned in Advanced Construction Technology will be the foundation for Construction Capstone. Learners will continue to acquire the knowledge and skills needed for the construction trades and related occupations. Learners must be accepted into the Architecture, Construction, and Engineering Academy, enrollment is limited. Acceptance into the program will be by application. Expect to follow lab safety procedures.

Board Approved April 2023

MSTC Course Title: Blueprint Reading for Construction Trades
Course Number: MSTC 10-601-130
Total Credits: 2

MSTC Course Title: Electricity for the Construction Trades
Course Number: MSTC 10-601-140
Total Credits: 2

Wisconsin Standards for Technology and Engineering (TE)	
Broad-Based (BB)	
BB1: Students will analyze the core concepts of technology.	
Analyze and use tools and materials BB1.b	1.b.5.h: Select appropriate resources and explain how trade-offs between competing values, such as availability, cost, desirability, and waste influenced their decision. 1.b.6.h: Choose and perform the material processing operations of forming (e.g., bending, pressing, drawing, rolling), bonding (e.g., gluing, soldering, brazing, spot welding, gas welding, arc welding), fastening (e.g., screws, nuts & bolts, rivets, clips, pins, nails) and finishing (e.g., surface preparation, cleaning, treatment, coating).
Analyze and use electricity and electronic systems BB1.d	1.d.7.h: Inspect and test components such as switches, connectors, relays, solid state devices and conductors and take appropriate action.
Analyze, explain, and use control systems BB1.e	1.e.6.h: Select and perform appropriate maintenance in order for the product or system to continue functioning properly, to extend its life or to upgrade its capability given a flawed product or system.
Identify and analyze structures BB1.f	1.f.6.h: Justify the application of structural materials and their trade-offs in the design of structures based on design requirements through optimization (i.e., engineering design process).
Architecture and Construction (AC)	
AC1: Students will be able to select and use architecture and construction technologies.	
Analyze construction requirements, materials, structures, techniques, and maintenance AC1.a	1.a.12.h: Analyze how structures require maintenance, alteration, or renovation periodically to improve them or to alter their intended use. 1.a.13.h: Explain how structures can include prefabricated materials.
Demonstrate the safe and appropriate use of hand tools common to the residential and commercial construction industry AC1.c	1.c.5.h: Demonstrate and use the common hand tools of the trade safely and properly. 1.c.6.h: Maintain and care for hand tools used in residential and commercial construction.

Demonstrate the safe and appropriate use of portable power tools that are common to the residential construction industry and are appropriate to the individual student's level AC1.d	1.d.5.h: Demonstrate the use of portable power tools, such as circular saws, table saws, saber saws, drills, planers, and sanders, safely and properly. 1.d.6.h: Demonstrate the use of portable pneumatic tools, such as rough framing nail guns, interior finishing and brad nail guns, hammers, impact wrenches, drills, and compressors, safely and appropriately. 1.d.7.h: Maintain and care for portable power tools and portable pneumatic tools.
Demonstrate project management procedures and processes as they occur in a construction project AC1.e	1.e.13.h: Estimate materials from blueprints and specifications. 1.e.14.h: Explain the sequencing of events for specific construction projects.
Demonstrate the value and necessity of practicing occupational safety in the construction industry facility and job site AC1.f	1.f.5.h: Demonstrate the safe use of electrical connection methods and electrical wiring procedures. 1.f.6.h: Demonstrate the safety procedures and practices in various work environment settings pertaining to residential and commercial construction.
Demonstrate the variety of building phases, systems and techniques used in architecture and construction AC1.g	1.g.9.h: Develop building plans and schedules by using processes common to residential and commercial construction.
Demonstrate the impact of financial, technical, environmental, political, societal, and labor trends on the past and future of the construction industry AC1.h	1.h.11.h: Explain the environmental regulations that influence residential and commercial design. 1.h.12.h: Identify the skills and building techniques that are utilized to construct energy efficient, safe, healthy, and comfortable structures.
Wisconsin Common Career Technical Standards (WCCTS)	
Creativity, Critical Thinking, Communication and Collaboration (4C)	
4C1: Students will think and work creatively to develop innovative solutions to problems and opportunities.	
Develop original solutions, products, and services to meet a given need 4C1.a	1.a.7.h: Develop original ways to solve a given problem. 1.a.8.h: Design a product or service that could fulfill a human need or desire. 1.a.9.h: Apply past experiences to current problems in developing innovative solutions.
Work creatively with others to develop solutions, products, and services 4C1.b	1.b.7.h: Incorporate the skills and experiences of others to develop a new solution to a problem. 1.b.8.h: Work as part of a team to design a product or service that could fulfill a human need or desire. 1.b.9.h: Work as part of a team to improve an existing product or process.
4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.	
Develop effective resolutions for a given problem, decision or opportunity using available information 4C2.a	2.a.11.h: Determine the information needed to address an identified problem. 2.a.12.h: Contrast the benefits and drawbacks of various proposed resolutions to a given situation.

	2.a.13.h: Predict how an action could result in unintended consequences, both positive and negative. 2.a.14.h: Analyze the impact of a decision using a systems thinking model. 2.a.15.h: Determine the best resolution for a problem, decision or opportunity based on given criteria. 2.a.16.h: Defend an action taken or a decision implemented.
Develop and implement a resolution for a new situation using personal knowledge and experience 4C2.b	2.b.5.h: Apply past experience to develop a course of action for a new situation. 2.b.6.h: Use existing knowledge to develop a resolution for a new situation, problem, or opportunity.
4C3: Students will communicate and collaborate with others to accomplish tasks and develop solutions to problems and opportunities.	
Communicate thoughts and feelings with others using verbal and non-verbal language 4C3.a	3.a.9.h: Develop a mutually acceptable response to a question or problem. 3.a.11.h: Communicate effectively in the presence of a language barrier. 3.a.12.h: Utilize effective listening skills in creating consensus in a group.
Work collaboratively with others 4C3.b	3.b.7.h: Participate in group processes to generate consensus. 3.b.8.h: Lead group processes to generate consensus.
Use interpersonal skills to resolve conflicts with others in an ethical manner 4C3.c	3.c.7.h: Resolve conflicts productively with individuals as they arise. 3.c.8.h: Lead a team or group through a conflict resolution process to reach a productive outcome.
Career Development (CD)	
CD1: Students will consider, analyze and apply an awareness of self, identity and culture to identify skills and talents.	
Identify person strengths, aptitudes, and passions CD1.a	1.a.3.h: Evaluate various occupations and career pathways to identify personal, academic and career goals based on personal strengths, aptitudes, and passions.
Demonstrate effective decision-making, problem solving and goal setting CD1.b	1.b.5.h: Use a decision-making and problem-solving model.
Interact effectively with others in similar and diverse teams CD1.c	1.c.11.h: Evaluate how the personal strengths and assets of others contribute to a cooperative group atmosphere. 1.c.12.h: Assess how respect and appreciation for individual and cultural differences impacts group processes.
Apply a range of relevant decision-making strategies CD1.d	1.d.5.h: Predict the outcome of various decisions on personal, social and career success. 1.d.6.h: Evaluate the impact of personal decision-making strategies on specific outcomes.
CD2: Students will identify the connection between educational achievement and work opportunities in order to reach personal and career goals.	

Apply academic experiences to the world of work, inter-relationships, and the community CD2.a	2.a.3.h: Evaluate how performance and connections within the learning community enhance future opportunities. 2.a.4.h: Determine those opportunities that best support attainment of a specific career goal.
Assess attitudes and skills that contribute to successful learning in school and across the life span CD2.b	2.b.7.h: Interpret and analyze the impact of current education, training, and work trends on life, learning and career plans. 2.b.8.h: Assess education and training opportunities to acquire new skills necessary for career advancement. 2.b.9.h: Analyze local and regional labor market and job growth information to select a career pathway for potential advancement.
CD3: Students will create and manage a flexible and responsive individualized learning plan to meet their career goals.	
Investigate the world of work in order to gain knowledge of self in order to make informed career decisions CD3.a	3.a.10.h: Analyze how career plans may be affected by personal growth, external events and changes in motivations and aspirations. 3.a.11.h: Apply academic and employment readiness skills in work-based learning situations such as internships, shadowing and/or mentoring experiences. 3.a.12.h: Evaluate changes in local, national, and global employment trends, societal needs and economic conditions related to career planning. 3.a.14.h: Implement an individual learning plan to maximize academic ability and achievement.
Examine and evaluate opportunities that could enhance life and career plans and articulate plans to guide decisions and actions CD3.b	3.b.4.h: Implement strategies for responding to transition and change with flexibility and adaptability. 3.b.5.h: Evaluate the relationship between educational achievement and career development.
Employ career management strategies to achieve future career success and satisfaction CD3.c	3.c.5.h: Determine how principles of equal opportunity, equity, respect, inclusiveness, and fairness, affect career planning and management. 3.c.6.h: Discuss how adaptability and flexibility, especially when initiating or responding to change, contributes to career success.
CD4: Students will identify and apply employability skills.	
Identify and demonstrate positive work behaviors and personal qualities needed to be employable CD4.a	4.a.6.h: Evaluate how self-discipline, self-worth, positive attitude, and integrity displayed in a work situation affect employment status. 4.a.7.h: Assess how flexibility and willingness to learn new knowledge and skills affect employment status. 4.a.8.h: Apply communication strategies when adapting to a culturally diverse environment. 4.a.9.h: Use positive work-qualities typically desired in each of the career cluster's pathways. 4.a.10.h: Manage work roles and responsibilities to balance them with other life roles and responsibilities.

Demonstrate skills related to seeking and applying for employment to find and obtain a desired job CD4.b	4.b.5.h: Use multiple resources to locate job opportunities. 4.b.6.h: Prepare a resume, cover letter, employment application. 4.b.7.h: Employ critical thinking and decision-making skills to exhibit qualifications to a potential employer in an interview.
Identify and exhibit traits for retaining employment CD4.c	4.c.4.h: Model behaviors that demonstrate reliability and dependability. 4.c.5.h: Maintain appropriate dress and behavior for the job to contribute to a safe and effective workplace/jobsite. 4.c.6.h: Complete required employment forms and documentation. 4.c.7.h: Summarize key activities necessary to retain a job in an industry.
Develop positive relationships with others CD4.d	4.d.5.h: Participate in co-curricular and community activities to enhance the school experience. 4.d.6.h: Evaluate the best method to assist co-workers in accomplishing goals and tasks. 4.d.7.h: Examine the skills required to enable students to successfully transition to post-secondary opportunities. 4.d.8.h: Use a systematic approach to academic and career planning for students to achieve their learning, socio-cultural and work goals.
Environment, Health, and Safety (EHS)	
EHS1: Students will identify the importance and interrelationships of health, safety and environmental systems and evaluate the impacts of these systems on organizational performance for continuous improvement.	
Implement personal and jobsite safety rules and regulations to maintain and improve safe and healthful working conditions and environments EHS1.d	1.d.7.h: Assess workplace conditions with regard to personal and environmental health and safety. 1.d.8.h: Identify different workplace systems that protect and enhance personal and environmental health and safety. 1.d.9.h: Describe employee rights and responsibilities to maintain workplace health and safety, including compliance with rules and laws.

Key Vocabulary:			
Tread	Truss	Rafter	Miter Joint
On Center	Blueprints	Permit	Spacing
Fascia	Outfeed	Band Clamp	Plumb
Jig	Header	Level	Crosscut
Try Square	Square	Combination Square	Face
Top Plate	Lineal Foot	Carbide Tipped	Template
Face	Chamfer	Anchor Bolts	Hardboard

Bark	Neutral Wire	Butt joint	Sill
Joint	Green Lumber	Snipe	GFCI
Rough Lumber	Grain	Dowel	Stair Rise

Topics/Content Outline- Units and Themes:

Quarter 1

- Opportunities in various building trade fields
- Types of careers
- Training and education
- Pay and benefits
- Shop tools and machines
- Shop furnishings
- Lumber room
- Community Construction Project
  - Layout
  - Framing
  - Trusses
  - Roofing
  - Siding

Quarter 2

- Properties of concrete
- Portland cement
- Selection of materials for quality concrete
- Design of mix
- Yields and mix corrections
- Tools and equipment
- Mixing concrete
- Site preparation and forming
- Placing and reinforcing concrete
- Finishing and curing
- Casting quality concrete
- Admixtures and special mixes
- Masonry construction
- Job opportunities in concrete industries
- Construction tools, materials, and methods
- Reading prints
- Floor framing
- Wall framing
- Ceiling framing

- Roof framing
- Roof coverings
- Roof trim
- Installing windows
- Installing doors
- Exterior wall coverings
- Thermal insulation and vapor barriers
- Sound insulation
- Interior wall and ceiling finish
- Ceiling tile and suspended ceiling
- Finish flooring
- Interior trim
- Cabinets and millwork
- Stairs
- Porches and decks
- Post-and-beam construction
- Factory manufactured buildings

Quarter 3:

- Energy use in the home
- Building materials
- Standard home construction
- Solar homes
  - Passive Solar Energy
  - Active Solar Energy
- Fine Cabinetry Skills
- Earth shelter
- Math sections
- Tools
- Basic wiring terms and techniques
- 3-way switch
- Switched receptacle

Quarter 4:

- Planning and design-rough in
- Career information
- Tools, planning, and preparation
- Installing drain, waste, and vent pipes
- Installing copper water supply line
- Installing bath fixtures
- Installing kitchen fixtures
- Installing shower and whirlpool
- Career information

Primary Resource(s):
Modern Carpentry, 12th Edition Goodheart Wilcox ISBN: 978-1-63126-083-4 © 2015
House Wiring Simplified, 14th Edition Goodheart Wilcox ISBN: 978-1-63126-920-2 © 2017