



# School District of Marshfield Course Syllabus

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**Course Name: DC Advanced Construction Technology PS**  
**Length of Course: Year**  
**Credit: 1 Credit**

## **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 will provide learners the opportunity to explore the construction trades in a classroom and lab environment. Learners will develop a variety of technical skills associated with residential construction. Areas include safety procedures, building layout, rough construction, finish carpentry, masonry, electrical wiring, and cabinet making and millwork. This course is part of the Architecture, Construction, and Engineering Academy, but learners may take the course without signing up for the Academy.

**MSTC Course Title: Construction Fundamentals**

**Course Number: MSTC 10-482-107**

**Total Credits: 2**

<b>Wisconsin Standards for Technology and Engineering (TE)</b>	
<b>Broad-Based (BB)</b>	
<b>BB1:</b> Students will analyze the core concepts of technology.	
<b>Analyze and use tools and materials</b> 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).
<b>Analyze and use electricity and electronic systems</b> BB1.d	1.d.7.h: Inspect and test components such as switches, connectors, relays, solid state devices and conductors and take appropriate action.
<b>Analyze, explain and use control systems</b> BB1.e	1.e.6.h: Select and perform an appropriate maintenance is the process 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.
<b>Identify and analyze structures</b> 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).
<b>Architecture and Construction (AC)</b>	
<b>AC1:</b> Students will be able to select and use architecture and construction technologies.	
<b>Analyze construction requirements, materials, structures, techniques, and maintenance</b> 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.
<b>Demonstrate the safe and appropriate use of hand tools common to the residential and commercial construction industry</b> 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.
<b>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</b> 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.
<b>Demonstrate the value and necessity of practicing occupational safety in the construction industry facility and job site</b> 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.
<b>Demonstrate the variety of building phases, systems and techniques used in architecture and construction</b> AC1.g	1.g.11.h: Prepare the site layout utilizing common surveying equipment and/or create a site plan.
<b>Demonstrate the impact of financial, technical, environmental, political, societal and labor trends on the past and future of the construction industry</b> 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.
<b>Wisconsin Common Career Technical Standards (WCCTS)</b>	
<b>Creativity, Critical Thinking, Communication and Collaboration (4C)</b>	
<b>4C1:</b> Students will think and work creatively to develop innovative solutions to problems and opportunities.	
<b>Develop original solutions, products and services to meet a given need</b> 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.
<b>Work creatively with others to develop solutions, products, and services</b> 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.
<b>4C2:</b> Students will formulate and defend judgments and decisions by employing critical thinking skills.	
<b>Develop effective resolutions for a given problem, decision or opportunity using available information</b> 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.
<b>Develop and implement a resolution for a new situation using personal knowledge and experience</b> 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.

<b>4C3:</b> Students will communicate and collaborate with others to accomplish tasks and develop solutions to problems and opportunities.	
<b>Communicate thoughts and feelings with others using verbal and non-verbal language</b> 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.
<b>Work collaboratively with others</b> 4C3.b	3.b.7.h: Participate in group processes to generate consensus. 3.b.8.h: Lead group processes to generate consensus.
<b>Use interpersonal skills to resolve conflicts with others in an ethical manner</b> 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.
<b>Career Development (CD)</b>	
<b>CD1:</b> Students will consider, analyze and apply an awareness of self, identity and culture to identify skills and talents.	
<b>Identify person strengths, aptitudes, and passions</b> 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.
<b>Demonstrate effective decision-making, problem solving and goal setting</b> CD1.b	1.b.5.h: Use a decision-making and problem-solving model.
<b>Interact effectively with others in similar and diverse teams</b> 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.
<b>Apply a range of relevant decision-making strategies</b> 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.
<b>CD2:</b> Students will identify the connection between educational achievement and work opportunities in order to reach personal and career goals.	
<b>Apply academic experiences to the world of work, inter-relationships, and the community</b> 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.
<b>Assess attitudes and skills that contribute to successful learning in school and across the life span</b> 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.

<b>CD3:</b> Students will create and manage a flexible and responsive individualized learning plan to meet their career goals.	
<b>Investigate the world of work in order to gain knowledge of self in order to make informed career decisions</b> CD3.a	<p>3.a.10.h: Analyze how career plans may be affected by personal growth, external events and changes in motivations and aspirations.</p> <p>3.a.11.h: Apply academic and employment readiness skills in work-based learning situations such as internships, shadowing and/or mentoring experiences.</p> <p>3.a.12.h: Evaluate changes in local, national, and global employment trends, societal needs and economic conditions related to career planning.</p> <p>3.a.14.h: Implement an individual learning plan to maximize academic ability and achievement.</p>
<b>Examine and evaluate opportunities that could enhance life and career plans and articulate plans to guide decisions and actions</b> CD3.b	<p>3.b.4.h: Implement strategies for responding to transition and change with flexibility and adaptability.</p> <p>3.b.5.h: Evaluate the relationship between educational achievement and career development.</p>
<b>Employ career management strategies to achieve future career success and satisfaction</b> CD3.c	<p>3.c.5.h: Determine how principles of equal opportunity, equity, respect, inclusiveness, and fairness, affect career planning and management.</p> <p>3.c.6.h: Discuss how adaptability and flexibility, especially when initiating or responding to change, contributes to career success.</p>
<b>CD4:</b> Students will identify and apply employability skills.	
<b>Identify and demonstrate positive work behaviors and personal qualities needed to be employable</b> CD4.a	<p>4.a.6.h: Evaluate how self-discipline, self-worth, positive attitude and integrity displayed in a work situation affect employment status.</p> <p>4.a.7.h: Assess how flexibility and willingness to learn new knowledge and skills affect employment status.</p> <p>4.a.8.h: Apply communication strategies when adapting to a culturally diverse environment.</p> <p>4.a.9.h: Use positive work-qualities typically desired in each of the career cluster’s pathways.</p> <p>4.a.10.h: Manage work roles and responsibilities to balance them with other life roles and responsibilities.</p>
<b>Demonstrate skills related to seeking and applying for employment to find and obtain a desired job</b> CD4.b	<p>4.b.5.h: Use multiple resources to locate job opportunities.</p> <p>4.b.6.h: Prepare a resume, cover letter, employment application.</p> <p>4.b.7.h: Employ critical thinking and decision-making skills to exhibit qualifications to a potential employer in an interview.</p>
<b>Identify and exhibit traits for retaining employment</b> CD4.c	<p>4.c.4.h: Model behaviors that demonstrate reliability and dependability.</p> <p>4.c.5.h: Maintain appropriate dress and behavior for the job to contribute to a safe and effective workplace/jobsite.</p> <p>4.c.6.h: Complete required employment forms and documentation.</p>

	4.c.7.h: Summarize key activities necessary to retain a job in an industry.
<b>Develop positive relationships with others</b> 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.
<b>Environment, Health, and Safety (EHS)</b>	
<b>EHS1:</b> 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.	
<b>Implement personal and jobsite safety rules and regulations to maintain and improve safe and healthful working conditions and environments</b> 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.

<b>Key Vocabulary:</b>			
Arbor	Miter	Router	Table saw
Fascia	Awl	Bandsaw	Jointer
Fence	Outfeed	Band Clamp	Hardboard
Jig	Bits	Level	Plumb
Top Plate	Square	Neutral Wire	Board Foot
Square Foot	Lineal Foot	Anchor Bolts	Crosscut
Rip	Masonry	Penny	Aggregate
Kick Back	Chamfer	Butt joint	Face
Tongue and Groove	Face	Snipe	Sill
Chuck	Collet	Dowel	GFCI
Varnish	Header	Mortar	Green Lumber
Air Dried	Miter Joint	Rough Lumber	Veneer

## Topics/Content Outline- Units and Themes:

### Quarter 1 and Quarter 2

- Items needed for shop
- Organizations/clubs
- Course content and activities
- Grading system
- Plans and Codes
- Footings and Foundations
- Floor Framing
- Wall and Ceiling Framing
- Roof Framing
- Roofing Materials and Methods
- Windows and Doors
- Plot Plans
- Building Lines
- Vertical Planes and Lines
- Laser plane System

### Quarter 3

- Cabinetry Unit
- Styles and Rails
- Door making
- Shaper Safety

### Quarter 4

- Work site safety
- Tools and equipment
- Mixing and material handling
- Brick & Block laying
- Tools and Equipment
- Electrical Wiring Theory
  - Electrical Troubleshooting
- Testing Fixtures
- Plumbing Systems
- Connecting Pipe
- Fixtures
- Plumbing Tool
- Basic construction problems
- Cabinetmaking joints
- Gluing and clamping
- Bending and laminating
- Veneering and inlaying

- Plastic laminates
- Frame and panel construction
- Cabinet and furniture doors
- Drawers and drawer guides
- Shelves and cabinet interiors
- Legs and posts
- Leg and rail construction
- Table and cabinet tops
- Basic casework
- Fine furniture cabinetwork
- Preparing for finishing
- Finishing equipment and supplies
- Finishing procedures
- Staining
- Filling
- Distressing, glazing, and other overtone treatments
- Protective coatings
- Interior finishing

### **Primary Resource(s):**

**Modern Carpentry, 12<sup>th</sup> Edition**

Goodheart Wilcox

ISBN: 978-1-63126-083-4

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**House Wiring Simplified, 14<sup>th</sup> Edition**

Goodheart Wilcox

ISBN: 978-1-63126-920-2

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