School District of Marshfield Course Syllabus

Course Name: Exploratory Construction & Metals
Length of Course: Semester
Credit: 1/2 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 semester-long exploratory class introduces learners to shop safety in both a metals and construction lab. Students will learn basic print reading and fabrication skills in a hands-on approach in both areas. The purpose of the combined class is to show how they can relate to one another but also to allow learners to explore both industries before deciding which path to continue on.

Board Approved April 2023

Wisconsin Standards for Technology and Engineering (TE)	
Broad-Based (BB)	
BB1: Students will analyze the core concepts of technology.	
Analyze and use technological systems BB1.a	1.a.5.h: Describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.
Analyze and use tools and materials BB1.b	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).
Architecture and Construction (AC)	
AC1: Students will be able to select and use architecture and construction technologies.	
Apply measurement systems in the planning and layout process used in the residential construction industry AC1.b	1.b.13.h: Convert scaled blueprint drawing measurements to full dimensions for a given construction project. 1.b.14.h: Apply conventional construction measurement processes accurately (i.e., geometric, and trigonometric functions).
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.
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.
Manufacturing (MNF)	
MNF1: Students will be able to select and use manufacturing technologies.	
Identify, select, and safely use tools, machines, products and systems for specific tasks MNF1.a	1.a.7.h: Identify safety and health protections and procedures that are critical to worker well-being. 1.a.9.h: Select and apply the appropriate units and scales for situations involving measurement.
Select, use, and identify manufacturing systems MNF1.e	1.e.8.h: Use a manufacturing system to produce a product.
Select and use manufacturing technologies MNF1.f	1.f.8.h: Recognize technologies provide a means for humans to alter or modify materials and to produce products.
Analyze and use GMAW, GTAW, SMAW and oxy-acetylene welding MNF1.g	1.g.10.h: Demonstrate appropriate use of welding blueprint symbols and codes used in industry.

	1.g.11.h: Demonstrate safety and choose the proper safety equipment given the process being used (i.e., oxy-acetylene, GMAW, SMAW, GTAW, etc).
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.8.h: Assess education and training opportunities to acquire new skills necessary for career 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	3.b.4.h: Implement strategies for responding to transition and change with flexibility and adaptability.

and articulate plans to guide decisions and actions CD3.b	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:			
Accuracy	Crosscut	Gauge	Mockup
Aesthetics	Ding	Grain	Rip
Burr	Efficiency	Hem	Tab
Concave	Fastener	Kerf	True
Convex	Flush	Manufacturability	Units

Topics/Content Outline- Units and Themes:

Quarter 1 and 2:

Unit 1: Measurement

- Ruler Reading
- Blueprint Reading

Unit 2: Shop Safety

- General Shop Safety

Unit 3: Careers

- Career Exploration in Woodworking and Metalworking

Unit 4: Metal Working

- Metal Shop Safety
- Problem Solving
- Plan Layout
- Prototype
- Tools
- Basic Sheet Metal fabrication
- Fasteners
- Assembly

Unit 5: Wood Working

- Wood Shop Safety
- Hand Tools
- Power Tools
- Wood Species
- Prepping a board
- Wood assembly

Primary Resource(s):
Metalwork Technology and Practice Glencoe ISBN: 0-02676-460-1 © 1989
Machining Fundamentals, 8th Edition Goodheart Wilcox ISBN: 1-59070-249-2 © 2004
Welding Technology Fundamentals, 3rd Edition Goodheart Wilcox ISBN: 1-59070-405-3 © 2005
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