



SCHOOL DISTRICT OF MONROE

Preparing for the Future, One Child at a Time

Advanced Metals Manufacturing

Course Description:

The curriculum for this course is developed from the [Wisconsin Standards for Technology and Engineering](#). This advanced elective course is a 2 Trimester Course. Students must meet the prerequisites as described in the course description book. Three main areas covered in this class; Semi Precision Machining, Welding & Fabrication and Manufacturing Jobs. The class is a weighted class (.5) and is articulated/transcripted with Blackhawk Technical College. There is a course fee to cover the costs associated with consumable materials. Students are required to pay for any additional materials they use for their own projects. The information in this course overview outlines what students should understand and be able to do by the end of the trimesters.

Mastery Standards:

Knowledge of equipment and safety procedures are essential to responsible use of equipment and tools in the woods manufacturing industry . (AC1.c, AC1.d, AC1.e, AC1.f, MNF1.a)

Understanding and knowledge of tools and materials is required for analyzing sound choices in methods and materials in the metals manufacturing industry. (BB1.b)

Quality design, engineering, and construction require accurate knowledge and application of measuring systems. (AC1.a, AC1.b)

Analyze and safely use GMAW & SMAW welding systems. (MNF1.g.8.h,MNF1.g.9.h)

Analyze and safely use cutting systems. (MNF1.h.6.h,MNF1.h.7.h)

Experience applying design theory allows for stronger analysis of plans and designs before investment of resources in final production. (ENG1.a, ENG2.a, ENG2.b, ENG3.a, ENG3.b-ENG4.a)

Executing and receiving evaluations and feedback on projects is vital to learning and improving skills. (ENG4.c, ENG5.a)

Specific tasks require experience and knowledge to correctly identify, select, and safely use appropriate tools, machines, products, systems, and techniques. (MNF1.a, MNF1.b, MNF1.c, MNF1.d, MNF1.e, MNF1.f, MNF1.g, MNF1.h)

Unit	Description of Unit and Learning Targets
<p>Unit Title: 1</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> How does understanding technical metalworking information and manufacturing skills help you become a proficient entry level machinist or welding fabricator? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> I can demonstrate the safety procedures and practices in various work environment settings pertaining to the Metals Manufacturing Industry. I can identify safety and health protections and procedures that are critical to worker well being. I know that there are many careers associated with the metals manufacturing industry and the additional training it takes to secure employment in the industry. I know the identity and use of 90% of the basic hand tools associated with the metal machining and welding fabrication industry. I know how to measure accurately using multiple measuring

	<p>devices.</p> <ul style="list-style-type: none"> • I know what makes a good designed project and the elements of a working drawing. • I understand that a Plan Of Procedure (POP) is a very detailed step by step plan for manufacturing a metal product or part.
<p>Unit Title: 2</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • How do you produce precision machine and fabrication parts to a high degree of accuracy using metal machine tools? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • I know the manual layout tools and procedures. • I can use manual layout tools and equipment to layout metal parts within .015 inches. • I can drill & ream basic holes. • I can manually tap threads in a hole. • I can calculate and perform countersinks and counterbores • I know the safe operation the Drill Press and can use it to produce holes and hole features. • I know how to correctly drill holes using the Drill Press. • I know how to correctly drill holes and mill parts to a finished size using the Vertical Mill. • I know how to safely and correctly face, center drill and turn parts to size using the Metal Lathe. • I know how to correctly cut accurate parts with the horizontal band saw. • I know how to correctly finish, smooth and deburr metals parts using abrasive machines.
<p>Unit Title: 3</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • How do you use various welding processes to join parts and fabricate accurate and aesthetically pleasing products? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • I know the parts of the GMAW welder and their function. • I know the safe operation of the GMAW welder and can make setting changes according to material thickness and welding position. • I can use GMAW to weld various joint configurations (butt, lap, edge, tee & outside corner) in multiple positions for various products and fabrications being made in the lab. • I know the safe operation of a GTAW welder and can make setting changes according to material thickness, material type and welding position. • I can correctly use GTAW to surface mild steel and aluminum. • I can use GTAW to weld various joint configurations (butt, lap, edge, tee & outside corner) in the flat and horizontal positions with stainless steel or mild steel. • I can use GTAW to weld various joint configurations in the flat positions with aluminum. • I can clean metal surfaces preparing them for paint and apply proper finish to metal products. • I can work together with my team to produce the parts for a given product or for mass producing projects.