



Utah System of Higher Education
Custom Design and Fabrication
FY2025 / 21 Credits (630 Clock-Hours)

Foundational Courses

TECF 1010 Fabrication Math

1 Credit / 30 Clock-Hours

The Fabrication Math course is an interactive course provided by the American Welding Society. It is designed to teach students the mathematical input that is required to properly and efficiently fabricate. This course will cover the algebra and geometry associated with fabrication and provide real-world applications.

Objectives:

- Demonstrate the involvement of mathematics in steel erection, fabrication, and production.
- Apply mathematics to find solutions to real-world issues in a fabrication setting.
- Display knowledge of design principles using mathematics.
- Use mathematics to work in the most efficient and safe ways possible.

TECF 1020 Blueprints

2 Credits / 60 Clock-Hours

Blueprints is taught out of a current informative book on blueprints and blueprint reading. This course is designed to help students recognize the components of a blueprint and understand how to fabricate by reading blueprints.

Objectives:

- Differentiate between varying types of blueprints and demonstrate how to read each type.
- Display knowledge of blueprints, based on the current units.
- Interact with real blueprint examples and demonstrate how to efficiently read them, and fabricate to the standards of the blueprints, and any associated code.
- Demonstrate efficient and effective methods of completing a build by planning a series of tasks shown on a blueprint.

TECF 1030 Concept Sketching

1 Credit / 30 Clock-Hours

This course is designed to help students understand how to design and engineer materials into new and useful things. They will learn the steps to creation and design of a project, and how to finalize ideas to successfully fabricate items or projects. This will aid them in all aspects of the fabrication process by helping them understand how blueprints are engineered.

Objectives:

- Design projects that are unique, or similar, to products found in the industry.
- Create a rough draft and take proper steps to finalize and finish a product.
- Test to ensure that their designs are drawn as any blueprint or drawing would in the industry.

TECF 1040 Intro to SolidWorks

3 Credits / 90 Clock-Hours

This course is designed to teach students how to design 3-dimensional projects on a computer programming system. This is to teach them the introductory steps to engineering blueprints for projects. The drawings made in this design program will be printed and used to fabricate example assemblies that are related to structural and pipe work in the industry.

Objectives:

- Design a 3-dimensional picture for fabrication.
- Demonstrate various sketching methods that are used in the fabrication industry.
- Test to ensure that designs and drawings are made to industry standards.



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TECF 1050 Crane Rigging, Safety, and Operation

2 Credits / 60 Clock-Hours

This course will teach students how to safely operate cranes used to lift and move very heavy or large materials. They will gain hands-on experience and apply the knowledge and mathematical skills involved with operating an overhead crane. They will also learn the hazards of operating a crane, and how to prevent these risks to operate safely at all times.

Objectives:

- Calculate weight, size, and shape to perform proper lifts using the crane.
- Demonstrate safety practices to prevent injury or damages when operating an overhead crane.
- Safely lift and move objects of extreme weight and awkward shapes.
- Apply safety practices, mathematics, and proper techniques to successfully perform varying types of movements, lifts, or rolls.

TECF 1060 Project 1 – Structural Shapes Project

4 Credits / 120 Clock-Hours

In this course, students will learn about structural material shapes, how to fabricate to structural code, and methods of steel erection used in the industry today. This course will involve and implement practices from previous courses, to help students understand the process of structural steel construction. They will be trained to use a wide variety of machinery and tools to successfully fabricate structural steel components.

Objectives:

- Demonstrate proper use of tools and equipment used to fabricate in the structural industry.
- Apply the process of structural design to fabrication and to erection.
- Fabricate structural steel components based off of engineered drawings and blueprints.
- Test for competency on structural shapes, methods, and common practices, as well as safety in handling materials and equipment maintenance.

TECF 1070 Project 2 – Pipe Project

4 Credits / 120 Clock-Hours

This course will teach students about the process of pipe fabrication. This will include learning about the different pipe materials and how to identify them. They will also learn how to use and maintain tools and equipment that is used in a pipe fabrication industry setting. Techniques and practices of pipefitting will be implemented.

Objectives:

- Demonstrate safe practices when working in a pipe-fitting work environment.
- Utilize and maintain pipe-fitting equipment and tools in a safe and efficient manner.
- Demonstrate knowledge of the different materials used in this field of work.
- Fabricate pipe projects (based on engineered drawings) that are held to the same standards and code as work done in the industry.
- Test for competency on pipe shapes, fitting methods, and common practices as well as safety in handling materials and equipment maintenance.



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TECF 1080 Project 3 – Student Choice Project

4 Credits / 120 Clock-Hours

This course will allow students to take a combined variety of learned knowledge and skills and apply them to a project of their choice. Students will have the opportunity to design, finalize, and fabricate a project of their own. This will help students understand how all components of fabrication come together and allow them to fabricate complex items while maintaining industrial codes and standards.

Objectives:

- Design and submit drawings of a personal choice project. Drawings will be accurate, and sufficiently detailed in order to continue to fabrication.
- Gather materials and cut them to dimensional tolerances.
- Assemble project, tack-weld and prep for welding.
- Weld project, inspection will follow to ensure that proper practices and procedures were applied.