UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
CNC Machinist Technician
FY2026 / 6 Credits (180 Clock-Hours)

CNC Machinist Technician

Institutions: Ogden-Weber, Salt Lake

Technical Certificate (Catalog Year: 2026, 6 Credits/180 Clock-Hours Required, CIP: 48.0503)

Foundational Courses (6 Credits/180 Clock-Hours)		Credits	Clock-Hours
TEMT 1003	CNC Technician Fundamentals	2	60
TEMT 1510	Geometric Dimensioning and Tolerancing Basic	1	30
TEMT 1015	Machining Concepts	1	30
TEMT 1120	CNC Mill Basic Operation	1	30
TEMT 1220	CNC Lathe Basic Operation	1	30

Revised: January 09, 2025

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FY2026 / 6 Credits (180 Clock-Hours)

PROGRAM DESCRIPTION

The essential role of a Machinist technician is to operate Computer Numerical Control machines to fabricate parts under the supervision of a machinist. The technician loads parts in the machine, cycles machine and safely and accurately to pre-form a variety of functions. Most go on to earn machinist certificates at technical colleges while working as interns, or apprentices in manufacturing to gain practical experience as they move up to a machinist level.

Objectives:

- Obtain general knowledge in manufacturing setting.
- Operate Computer Numerical Controlled lathe.
- Operate Computer Numerical Controlled vertical mill.

FOUNDATIONAL COURSE DESCRIPTIONS

CNC Technician Fundamentals — 2 Credits/60 Clock-Hours

An introductory course to basic procedures and machining operations encountered in the machine shop manufacturing industry. Topics include essential safety practices, SDS, basic measuring tools, and alphabet of lines, title block data, dimensions, tolerances, surface finish, and multiple-view drawings, with sectional, auxiliary and projected views.

Objectives:

- Identify safe practices in a machine shop.
- Identify correct clean-up procedures.
- Interpret a Material Safety Data Sheet (SDS).
- Demonstrate accurate use and reading of steel rules, micrometers, and calipers.
- Perform basic layout procedures.
- Add, subtract, multiply, and divide to solve a problem following the correct order of operations.
- Add, subtract, multiply, and divide fractions and decimals, as well as how to convert these numbers to percentages.
- Interpret blueprint title block and revision information.
- Visualize a three-dimensional part from a blueprint drawing.
- Calculate dimensions and tolerances from views shown on a blueprint.
- Identify surface finish requirements.
- Determine threading data from blueprint specifications.
- Inspect and document finish dimension using various metrology.
- Calculate taper dimensions from blueprint specifications.

Geometric Dimensioning and Tolerancing Basic — 1 Credit/30 Clock-Hours

This course teaches students to interpret Geometric Dimensioning and Tolerancing (GD&T) on blueprints used in manufacturing. Topics include symbols, terms, datum, material condition modifiers, and tolerance zones.

Objectives:

- Solve problems of location and positional tolerances using GD&T symbols.
- Solve problems of linear tolerances using GD&T symbols.

- Solve tolerance problems of feature form, profile, and function using GD&T symbols.

Machining Concepts **1 Credit/30 Clock-Hours**

This course instructs basic machining concepts. It gives students a working overview of machining practices. This course is designed to provide students with basic measuring equipment, basic Inspection, and documentation of machined parts.

Objectives:

- Demonstrate safe work habits and be conscious of safety when working with machinery.
- Describe basic blueprints, drawings, and establish tolerances.
- Apply basic mathematics in the machine tool technology.
- Demonstrate proper machine tool usage.
- Describe 5's concepts.
- Select and plan machining operations on equipment.
- Demonstrate beginning skills in quality control, inspection, gauging methods, and production control as they relate to manufacturing production.

CNC Mill Basic Operation **1 Credit/30 Clock-Hours**

This course introduces CNC vertical milling. Students will be taught safe setup and operation of CNC vertical mill, CNC terminology, preparatory steps to run a CNC program.

Objectives:

- Demonstrate proper work holding for CNC mill machine.
- Demonstrate basic CNC mill machine setup.
- Demonstrate setting program zero for CNC mill machines.
- Use motion commands of rapid positioning, linear interpolation, and circular interpolation.
- Demonstrate interpersonal skills.
- Inspect and document finish dimension using various metrology.

CNC Lathe Basic Operation **1 Credit/30 Clock-Hours**

This course introduces CNC lathe operation. Students will be taught safe setup and operation of CNC lathe, CNC terminology, preparatory steps to run a CNC program.

Objectives:

- Demonstrate proper work holding for CNC lathe machine.
- Demonstrate basic CNC lathe machine setup.
- Demonstrate setting program zero for CNC lathe machines.
- Inspect and document finish dimension.
- Demonstrate interpersonal skills.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Construction Technology
FY2026 / 21 Credits (630 Clock-Hours)

Construction Technology

Institutions: Bridgerland, Salt Lake, Snow, Uintah Basin, USU-Eastern

Technical Certificate (Catalog Year: 2026, 21 Credits/630 Clock-Hours Required, CIP: 46.0415)

Foundational Courses (21 Credits/630 Clock-Hours)		Credits	Clock-Hours
TECO 1010	Introduction to Carpentry	2	60
TECO 1020	Carpentry Concepts	4	120
TECO 1030	Construction Print Reading	3	90
TECO 1040	Advanced Carpentry Concepts	4	120
TECO 1050	Interior Finishes	4	120
TECO 1060	Exterior Finishes	4	120
Supplemental Courses			
Bridgerland (9 Credits/270 Clock-Hours)			
TECO 1200	Cabinet Technology	4	120
TECO 1100	Construction Estimating	3	90
TECO 1070	General Safety & Computer Essentials	2	60
Salt Lake (9 Credits/270 Clock-Hours)			
TECO 1080	OSHA 30 for Construction	2	60
TECO 1210	Cabinetmaking & Renewable Materials I	4	120
TECO 1220	Cabinetmaking & Renewable Materials II	4	120
TECO 1300	Furniture Design and Construction I	3	90
TECO 1305	Furniture Design and Construction II	3	90
TECO 1420	Woodworking and Millwork I	4	120
TECO 1425	Woodworking and Millwork II	4	120
TECO 1500	Edgebander Operator	1	30
TECO 1510	CNC Operator	1	30
TECO 1520	Moulder Operator/Inline Rip Saw Operation	2	60
TECO 1530	Knife Grinder Operator	1	30
TECO 1230	Cabinet Installation	1	30
TECO 1400	Intro to Woodworking	2	60
TECO 1415	Print Reading for Woodworking	1	30
TECO 1410	Woodworking Shop Safety	1	30
TECO 1430	Wood Characteristics	1	30
Snow (9 Credits/270 Clock-Hours)			
TECO 1405	Introduction to Woodworking	3	90
TECO 1205	Cabinet Making	3	90
TECO 1440	Fundamentals of Fine Woodworking	3	90
Uintah Basin (0 Credits/0 Clock-Hours)			
USU - Eastern (9 Credits/270 Clock-Hours)			
TECO 1500	Masonry	2	60
TECO 1600	Building Site Layout	2	60
TECO 1610	Specialty Construction Lab	2	60
TECO 1100	Construction Estimating	3	90
TECO 1700	HVAC Maintenance	2	60
TECO 1710	Plumbing Maintenance	2	60
TECO 1720	Electrical Maintenance	2	60
TECO 1730	Electronic and Mechanical Maintenance for Buildings	3	90
TECO 1740	Interior and Exterior Building Maintenance	4	120

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Construction Technology
FY2026 / 21 Credits (630 Clock-Hours)

TECO 1750	Pool and Spa Maintenance	1	30
TEHE 1100	Hydraulic Excavator Operation	2	60
TEHE 1400	Forklift Operation	1	30
TEHE 1050	Skid Steer/Compact Loader Operation	2	60
TEHE 1600	Articulated Boom/Scissor Lift Operation	2	60

Utah System of Higher Education
Construction Technology
FY2026 / 21 Credits (630 Clock-Hours)

PROGRAM DESCRIPTION

The Construction Technology program provides a comprehensive opportunity for students to gain knowledge and skills to gain entry into the construction industry. Students are exposed to advanced skills such as building site layout, concrete, framing, interior finishes and exterior finishes. Students also gain knowledge of construction materials, blueprint reading, and estimating. Students who complete the certificate and obtain related employment have the option to continue training as apprentices in their chosen craft and receive state, national, and industry certifications.

Objectives:

- Demonstrate proper workplace and job site safety.
- Describe building materials used in construction work including estimating principles.
- Identify and demonstrate hand tools and power tools operations, with care and maintenance.
- Define techniques for reading and using construction drawings and specifications, current building codes, and local zoning ordinances.
- Demonstrate proper carpentry advanced framing layout techniques.
- Demonstrate positive workplace behaviors and communication skills to promote a successful construction team.
- Demonstrate the laying out of a construction site for building.
- Discuss and demonstrate interior and exterior finishes and skills.
- Discuss and demonstrate concrete finishes and skills.

FOUNDATIONAL COURSE DESCRIPTIONS

Introduction to Carpentry — 2 Credits/60 Clock-Hours

The Introduction to Carpentry teaches site safety, construction math, proper material handling, hand and power tool identification and use, workplace habits and attitudes. This course describes construction drawings and builds communication and employability skills needed in the workplace.

Objectives:

- Demonstrate proper workplace and job site safety.
- Demonstrate proper use of hand and power tools.
- Demonstrate proper equipment and hazardous material handling.
- Describe various types of construction drawings.
- Use whole numbers, fractions, and decimals in mathematical equations as they pertain to job site tasks.
- Demonstrate positive workplace behaviors and communication skills to promote a successful construction team.

Carpentry Concepts — 4 Credits/120 Clock-Hours

The Carpentry Concepts course teaches the uses of various fasteners, proper use of carpentry tools, interpretation of blueprints, material take-offs, and basic carpentry concepts.

Objectives:

- Describe building materials used in construction work.

- Identify hand tools and power tools operations, with care and maintenance.
- Define techniques for reading and using construction drawings and specifications.
- Demonstrate procedures for framing and layout of a residential building.
- Define the concept of the building envelope and its components.

Construction Print Reading **3 Credits/90 Clock-Hours**

The Construction Print Reading course familiarizes students with construction prints, design, symbols, specifications, measurements, as well as the importance of plot plan, foundation plan, floor plan, elevations, and section views.

Objectives:

- Demonstrate knowledge of current blueprint application in residential construction.
- Identify the different types of lines on blueprints.
- Identify the different parts of a blueprint.
- Identify the different symbols used on blueprints.
- Explain abbreviations used on blueprints.
- Use the proper sequence in reading blueprints.
- Extract pertinent construction information from blueprints.

Advanced Carpentry Concepts **4 Credits/120 Clock-Hours**

This course teaches layout of the construction site for the excavation for footings and foundation. Training will be offered in cement work, floor units, walls, windows and door openings, construction roof systems, and stair layout according to building plans.

Objectives:

- Demonstrate how to setup and use builder’s levels and establish grades on jobsite.
- Demonstrate squaring and leveling a building site.
- Explain concepts of structural concrete and flatwork.
- Demonstrate proper use of tools used to form, place, and finish concrete.
- Demonstrate procedures for framing floor, wall, roof, and stair systems and proper installation of doors and windows.

Interior Finishes **4 Credits/120 Clock-Hours**

This course introduces the materials and methods for interior wall, floor, and ceiling finishes, installing handrail/guardrails, finish flooring, (e.g., ceramic tile, wood flooring, or laminate flooring), installing shelving, decorative moldings, and hardware.

Objectives:

- Demonstrate proper installation techniques of multiple interior finishes (may include but are not limited to):
- Drywall.
- Pre-hung interior doors.
- Trim out doors with door casing.
- Baseboard molding and/or chair rail.
- Trim out windows with window seals and casing.
- Guard and hand railing according to code.

- Ceramic tile or wood or laminate flooring.
- Shelving, decorative moldings, and hardware.

Exterior Finishes **4 Credits/120 Clock-Hours**

The Exterior Finishes course provides the student an introduction to the application of exterior finishes. Subjects taught may include proper installation of roofing, siding, masonry, cornice finishes, weather barriers, and flashing.

Objectives:

- Identify and demonstrate how to apply typical roofing materials and demonstrate proper application.
- Identify and demonstrate how to apply exterior finishes and their proper weather barrier.
- Identify styles of cornice and install soffit and fascia onsite.
- Identify and demonstrate how to install exterior doors and windows with proper flashing.

SUPPLEMENTAL COURSE DESCRIPTIONS

Bridgerland

Cabinet Technology **4 Credits/120 Clock-Hours**

The Cabinet Technology course provides the opportunity for students to build and install cabinets in a residential home. Another component of the Cabinet Technology course involves millwork, which includes faceframe and door stile milling, panel glue-up, finish work millwork.

Objectives:

- Create a cut list or a sheet cutting plan using a blueprint.
- Identify, lay out, join, and assemble carcasses.
- Cut, lay out, finish, and install cabinet faceframes.
- Apply cabinet finishes (e.g. stain, glaze, paint, lacquer, or conversion varnish).
- Install cabinet hardware (e.g. drawer slides, hinges, lazy susans, pullout hardware, and pulls or knobs).
- Build a specialty millwork project such as interior molding, stair parts, or mantles.

Construction Estimating **3 Credits/90 Clock-Hours**

The Construction Estimating course teaches estimation concepts that include take-offs, labor costs, equipment costs, markups and overhead expenses. Using computer applications, students will learn how to compile a proposal from a set of plans.

- Objectives:
- Demonstrate calculation of construction related estimating.
- Identify key principles in profitability within construction projects.
- Explain and demonstrate feasibility, quantities, and time completions for construction projects.
- Use computer applications to organize a bid proposal or estimate.

General Safety and Computer Essentials **2 Credits/60 Clock-Hours**

The General Safety and Computer Essentials course covers safety and computer essentials in construction. Students receive three safety certifications: a) Forklift Operation Certification b) OSHA 10-Hour Certification, and c) First Aid / CPR / AED Certification. Students who successfully complete each of these training courses will receive appropriate certification cards. Additionally, students use spreadsheet applications to complete construction tasks.

Objectives:

- Complete the hybrid portion of the Forklift Operator Certification.
- Pass the Forklift Operator Driving Test for Class 1, 4, 5, and 7 Forklift and receive certification as a result.
- Complete OSHA 10-Hour Training and receive certification as a result.
- Complete the training covering Basic First Aid, CPR, and AED towards certification.
- Pass the scheduled Basic First Aid, CPR, and AED Pass off Exam to receive certification as a result.
- Use spreadsheet applications to complete construction tasks (e.g., quotes, cost estimates, cut lists, etc.).

Salt Lake

OSHA 30 for Construction **2 Credits/60 Clock-Hours**

This course provides an in-depth study of OSHA safety practices and its role in the construction industry. Review workers safety procedures and practices used in the construction industry. Attendance is required to be eligible for OSHA 30 completion card.

Objectives:

- Understand OSHA's training, record keeping, maintenance, and mandatory procedures, including inspection, compliance, and penalties.
- Identify jobsite safety hazards and understand how to correct them.
- Properly identify, inspect, fit, and don personal protective equipment.
- Understand fall hazards and fall arrest systems.
- Create a comprehensive company safety plan.
- Earn OSHA 30 completion card.

Cabinetmaking & Renewable Materials I **4 Credits/120 Clock-Hours**

This course explores the basics of kitchen design and cabinet construction. Includes the materials & methods that promote the responsible and sustainable use of renewable resources. Theory & hands-on instruction are designed to take students step by step through the cabinetmaking process. Safety will be discussed in depth.

Objectives:

- Explain methods of cabinetmaking.
- Safely operate power equipment.
- Make cabinetmaking joinery.
- Make cabinet doors, drawers, drawer boxes.
- Discuss introductory wood finishing techniques.

Cabinetmaking & Renewable Materials II **4 Credits/120 Clock-Hours**

In this course, students continue to explore the principles of kitchen design utilizing a variety of cabinet design software packages. The course covers the various cabinet construction methods that promote the responsible and sustainable use of renewable resources. The course also covers cabinet installation techniques.

Objectives:

- Explain advanced kitchen design using cabinet design software.
- Safely operate power equipment.
- Discuss introductory architectural woodwork in building custom fireplaces.
- Properly install complete kitchen & bathroom cabinetry.
- Perform advanced wood finishing techniques.
- Identify available for decorative trim work in cabinetmaking.

Furniture Design and Construction I **3 Credits/90 Clock-Hours**

This course includes the construction of an assigned skill building project that utilizes a variety of joinery relative to case construction. Safety will be discussed in depth. Includes topics such as sustainability in lumber selection, proper procedures, layout and design, hardware selection and glazing. Traditional wood finishes will be discussed.

Objectives:

- Safely operate power equipment.
- Complete a uniform class project.
- Produce dovetail and mortise and tenon joinery using hand and power tools.
- Perform tasks for furniture making such as hinge installation, drawer slide methods, clasps.

Furniture Design and Construction II **3 Credits/90 Clock-Hours**

This course builds upon previous joinery knowledge to construct an assigned skill building project that includes advanced features such as curved components & bent laminations. Conservation of resources will be emphasized as advanced veneering techniques & hand tool use are taught. Project costs vary as the options to build an approved personal design are available.

Objectives:

- Demonstrate the safe operation of equipment and hand tools.
- Demonstrate different methods of bending wood to create custom furniture parts.
- Apply joinery to complex parts that include curved parts and angled parts.
- Create models and mock-ups of original designs to ensure proper size and functionality.
- Complete an original design and construction for a personal project.

Woodworking and Millwork I **4 Credits/120 Clock-Hours**

This course explores the basic principles of woodworking. Safety will be discussed in depth. Topics include the theory & hands-on application of joinery, design, cut-lists, stock preparation & assembly. An assigned skill building project utilizing techniques such as frame & panel construction. Includes an introduction to use wood veneers as a sustainable practice.

Objectives:

- Safely operate power equipment.
- Use design principles used in a controlled classroom project.
- Identify common hardware options used in woodworking and describe the methods used to research proper applications and use of desired hardware.
- Explain joinery methods and cut-listing skills for the controlled classroom project.
- Demonstrate proper procedures for cut-out and assembly of the controlled classroom project.
- Perform basic wood finishing techniques including sanding, basic coloring, and top coating.
- Develop a design plan for a personal future project.

Woodworking and Millwork II **4 Credits/120 Clock-Hours**

Students continue with their skills in the construction of a skill building project that will include more advanced joinery than included in CMGT 1220. Students are taught how to create and use veneer as an inclusion of sustainable practices in woodworking. Skills such as bent laminations, tapered legs, mortise & tenon & blind dovetails are discussed.

Objectives:

- Safely operate and set up power equipment.
- Demonstrate design principles related to solid wood construction on the skill building project.
- Design and develop jigs, templates, and other custom set-ups.
- Perform procedures for cut-out and assembly of the assigned skill building project.
- Perform intermediate wood finishing techniques including sanding, scraping, coloring and top coating.
- Continue the design plan to build a personal project.

Edgebander Operator **1 Credit/30 Clock-Hours**

The edgebander Operator course provides an overview of edgebander setup and operations as typically seen in the cabinetmaking industry.

Objectives:

- Identify the stations in a typical edgebander and describe their purpose and function.
- Locate Adjustment Points for each station and demonstrate appropriate adjustments.
- Describe Quality Control Metrics for each station.
- Create a program for new materials or processes on operating system.
- Identify typical problem spots and troubleshoot solutions.
- Utilize manual to problem solve issues and locate maintenance schedule.
- Describe the importance of keeping the equipment clean and maintained.

CNC Operator **1 Credit/30 Clock-Hours**

The CNC Operator course provides students with an overview of CNC setup and operations as typically seen in the cabinetmaking industry.

Objectives:

- Power on machine and set safety locks to appropriate setting.
- Load material onto equipment and locate against correct stops.
- Utilize software to open programs and prepare them to run on the machine.

- Load new tooling, program rough measurements and fine tune and program detailed measurement.
- Identify typical problems and troubleshoot solutions.
- Perform daily maintenance tasks, locate in physical manual or software manual detailed instructions on how to perform maintenance tasks.
- Describe the importance of keeping the equipment clean and maintained.

Moulder Operator/Inline Rip Saw Operation **2 Credits/60 Clock-Hours**

The Moulder Operator/Inline Rig Saw Operation course provides students with an overview of moulder theory, operations, and setup as typically seen in the cabinetmaking industry. This course will include time spent preparing materials for processing utilizing the in-line rip saw.

Objectives:

- Operate in-line rip saw – utilize laser to create a straight edge, use fence and feed conveyor to create sized parts.
- Identify location of cutterheads in moulder, general purpose of each head and the control panel/remote on equipment.
- Locate adjustment points for each head and demonstrate appropriate adjustments.
- Discuss impact of dull cutters, feed rate, material defects, and heat on the quality of the finished product.
- Set-up equipment. Prepare heads, take measurements, install on the machine, and make appropriate adjustments.
- Align cutters to match previous runs of material.
- Discuss preventative maintenance and troubleshooting.

Knife Grinder Operator **1 Credit/30 Clock-Hours**

The Knife Grinder Operator course is designed to teach students the concepts needed to understand knife grinding as well as allow time on equipment grinding and balancing knives.

Objectives:

- Identify parts and functions of parts on a knife grinding machine.
- Discuss template design and creation.
- Compare grinding wheels and their advantages and disadvantages.
- Set-up equipment and follow template.
- Identify appropriate location of moulder head in machine and correlation to its location on the grinding arbor.
- Determine the size of steel needed to produce desired profile.
- Practice grinding and balancing knives.

Cabinet Installation **1 Credit/30 Clock-Hours**

The Cabinet Installation course details the methods and processes commonly used in installing residential cabinetry.

Objectives:

- Execute the leveling of cabinets. Describe the difference between cabinets with integrated toe kicks and those with separate base assemblies. Identify other available leveling hardware.
- Compare methods of attaching cabinets to each other as well as attaching end panels and fillers.

- Scribe End panels to walls and floors.
- Cut and install base moulding, crown moulding and associated sub mouldings.
- Adjust hardware including both glides, hinges, and other hardware assemblies.
- Identify areas where touch-ups are needed and perform minor touch-ups.
- Clean up installation site and discuss customer sign-off.

Introduction to Woodworking **2 Credits/60 Clock-Hours**

The Introduction to Woodworking course provides students with an introduction to woodworking joinery and nomenclature.

Objectives:

- Define case joints, frame joints, rails joints, and housed joints.
- Identify common joints used and/or referred to in woodworking such as dovetails, mortise and tenon, finger joints, butt joints, dado, tongue and groove, miters.
- Determine where each joint could be utilized in a typical project.
- Compare advantages and disadvantages of each joinery method.
- Demonstrate ability to create typical joinery by building a small project.

Print Reading for Woodworking **1 Credit/30 Clock-Hours**

The Print Reading for Woodworking course is an introduction to reading blueprints as typically used in the woodworking and millwork industry.

Objectives:

- Identify parts of shop drawings including legends, views, detail drawings, callouts, etc.
- Read and interpret notes related to drawings.
- Generate appropriate cut-lists using information given on drawings.
- Identify scale of drawings.
- Interpret symbols and locate details given by them.
- Identify cross-hatching and determine materials based on them.

Woodworking Shop Safety **1 Credit/30 Clock-Hours**

The Woodworking Shop Safety course is an introduction to the safe use of the equipment typically found in woodworking shops. Proper use and function of machinery will be taught.

Objectives:

- Demonstrate safe use of woodworking equipment such as the table saw, miter saw, shaper, sander, jointer, planer, edge bander, and portable power equipment.
- Identify hazard points on each piece of equipment.
- Identify common safety mistakes and discuss procedures utilized to prevent injury to persons.
- Explain the operation of equipment in order to understand why and how accidents occur.
- Discuss safety including the appropriate use of auxiliary tools such as miter gauges, finger boards, push sticks, automatic feed rollers, etc.
- Explain the proper procedures to take in an emergency situation due to a shop accident.

Wood Characteristics **1 Credit/30 Clock-Hours**

The Wood Characteristics course provides students with an introduction to wood as a medium. Topics include demonstrations on wood movement and strategies for accommodating such movement and the study of wood types, figure, and defects.

Objectives:

- Explain the movement of wood and discuss strategies for working with the material.
- Identify common lumber species and their characteristics.
- Describe lumber grading and their potential uses in industry. Identify differences in allowable defects between grades.
- Distinguish between hardwood and softwood and identify typical use.
- Identify warpage of lumber and assign the appropriate nomenclature.
- Demonstrate understanding of typical shop math – board footage calculation, net vs gross tally in the shop, etc.
- Compare the three most common cuts of lumber and their characteristics.

Snow

Introduction to Woodworking **3 Credits/90 Clock-Hours**

This course is intended for students to learn and improve their knowledge and skill using basic woodworking tools. Instruction will include wood and tool terminology, layout techniques, joinery, and finishes. Instructor will cover sharpening, proper tool selection and use, and project layout. The skills learned in this course will transfer between carpentry and fine woodworking.

Objectives:

- Demonstrate basic woodworking skills including safety.
- Perform proper layout of wood and projects.
- Accurately cut of precise measurements on wood.
- Describe different types of joinery.
- Demonstrate basic wood finishing techniques.

Cabinet Making **3 Credits/90 Clock-Hours**

This course is designed to provide students with a solid base of knowledge and skills relative to the woodworking, & cabinetmaking fields. It is an introduction to materials and processes that promote the responsible use of natural resources and sustainability in producing cabinets for industry skilled labor needs. Skills in traditional woodworking tools along with the safe operation of power equipment will be taught. Advanced instruction with sophisticated computer software and computer operated CNC equipment are included.

Objectives:

- Properly use tools, equipment, and materials necessary for cabinet making.
- Demonstrate team working skills, including safety, needed to produce cabinets.
- Demonstrate critical thinking skills in choosing quality layouts, and production pathways.
- Use CNC processes in building cabinets.

Fundamentals of Fine Woodworking **3 Credits/90 Clock-Hours**

This course is designed to instruct students with basic woodworking skills and hone those skills for industry skilled woodworking needs. This course will combine the best/most efficient use of hand tools and woodworking equipment in producing projects, helping to develop critical thinking skills. This course will discuss wood qualities of movement, grain orientation, density, durability, and other fundamental characteristics. The course will involve layout, design and building of an instructor approved project.

Objectives:

- Demonstrate multiple sturdy wood joints.
- Explain wood qualities and characteristics.
- Demonstrate the use of hand tools and machine tools and explain when to use each.
- Make tight joints, square cuts, and use proper proportions.
- Demonstrate sanding preparation and finishing techniques.

USU - Eastern

Masonry **2 Credits/60 Clock-Hours**

This course introduces mortar types, mixes, coloring agents, and additives, and when, where, and how to use them; pouring and reinforcing concrete footers, slabs, and flatwork; block and brick wall construction; masonry veneer construction; and brick floors and pavements.

Objectives:

- Demonstrate proper workplace and job site safety.
- Demonstrate proper masonry terminology.
- Identify various types of stone, brick, mortar and concrete and their application.
- Demonstrate proper use of hand and power tools.
- Demonstrate proper masonry technique.

Building Site Layout **2 Credits/60 Clock-Hours**

This course covers site selection, building placement, using a builder’s level, establishing grades, setback requirements and squaring a foundation. Students learn about material types for foundations. Types of foundations studied include basements, crawl spaces, and slab on grade.

Objectives:

- Demonstrate proper workplace communication and job site safety.
- Demonstrate proper use of layout process.
- Identify and implement code related to building set back.
- Demonstrate knowledge of various foundation types.
- Demonstrate mathematics related to squaring and site layout.

Specialty Construction Lab **2 Credits/60 Clock-Hours**

This course allows students additional application of methods they have learned. It is project based and students will utilize construction materials in interior and/or exterior construction.

Objectives:

- Demonstrate proper workplace communication and job site safety.

- Demonstrate proper use of tools and construction methods.
- Demonstrate advanced competency with construction applications.

Construction Estimating **3 Credits/90 Clock-Hours**

The Construction Estimating course teaches estimation concepts that include take-offs, labor costs, equipment costs, markups and overhead expenses. Using computer applications, students will learn how to compile a proposal from a set of plans.

Objectives:

- Demonstrate calculation of construction related estimating.
- Identify key principles in profitability within construction projects.
- Explain and demonstrate feasibility, quantities and time completions for construction projects.
- Use computer applications to organize a bid proposal or estimate.

HVAC Maintenance **2 Credits/60 Clock-Hours**

This is an introductory course to HVAC systems in residential and commercial buildings. It is focused on terminology, maintenance and troubleshooting, proper tools and use, safety and overview of HVAC systems.

Objectives:

- Demonstrate terminology related to HVAC.
- Demonstrate proper tools and use for HVAC maintenance.
- Demonstrate proper troubleshooting methods.
- Explain functionality of HVAC systems.
- Demonstrate basic maintenance and common part replacement.

Plumbing Maintenance **2 Credits/60 Clock-Hours**

This is an introductory course to plumbing in residential and commercial buildings. It is focused on maintenance and troubleshooting, proper tools and use, safety and overview of plumbing systems.

Objectives:

- Demonstrate proper terminology related to plumbing.
- Demonstrate proper tools and use for plumbing maintenance.
- Demonstrate proper troubleshooting methods.
- Explain functionality of plumbing systems, fixtures and components.
- Demonstrate basic maintenance and common part and fixture replacement.

Electrical Maintenance **2 Credits/60 Clock-Hours**

This is an introductory course to electrical systems in residential and commercial buildings. It is focused on terminology, maintenance and troubleshooting, proper tools and use, safety and overview of electrical circuits.

Objectives:

- Demonstrate proper terminology related to electrical maintenance.
- Demonstrate proper tools for and use for electrical maintenance.
- Demonstrate proper troubleshooting methods.

- Explain functionality of electrical circuits, fixtures and components.
- Demonstrate basic maintenance and common electrical related part and fixture replacement.

Electronic and Technical Maintenance for Buildings **3 Credits/90 Clock-Hours**

This course focuses on the technical problems associated with commercial, industrial and governmental buildings where everyday use results in high maintenance of technical aspects of the building. Doors, locks, sensors, electronic, mechanical and office technology are addressed in this course.

Objectives:

- Demonstrate proper safety, attitude and communication relating to everyday technical problems.
- Demonstrate proper use of tools and terminology related to the issue.
- Explain basic troubleshooting processes related to electronics, mechanical items, appliances and/or office equipment.
- Demonstrate ability to utilize troubleshooting manuals or item specific manuals.
- Demonstrate basic computer literacy and ability to successfully utilize online resources for fixing technical problems.

Interior and Exterior Building Maintenance **2 Credits/60 Clock-Hours**

This course involves identification and implementation of preventative and ongoing maintenance for interior and exterior finishes on buildings. Topics addressed may include safety, roofs, windows, doors, exterior finishes, trim, weather related issues, caulking, sealing, patching and painting of surfaces.

Objectives:

- Demonstrate ability to use online and manual resources to solve interior and exterior related maintenance problems.
- Demonstrate proper use of tools and the ability to order parts and supplies.
- Explain what preventative maintenance is and why it is important.
- Demonstrate scheduled preventative maintenance processes and schedules.

Pool and Spa Maintenance **1 Credit/30 Clock-Hours**

This course teaches Pool and Spa maintenance and prepares individuals for certification of Pool and Spa Maintenance Operator.

Objectives:

- Demonstrate and explain pool and spa health and safety regulations.
- Demonstrate competency with Pool Water Chemistry.
- Explain the Virginia Graeme Baker (VGB) Codes.
- Explain the SARA Title III.

Hydraulic Excavator Operation **2 Credits/60 Clock-Hours**

This course will cover safety related to and the fundamental operation of hydraulic excavators.

Objectives:

- Demonstrate safe start procedures for the equipment.
- Properly conduct a pre-operation inspection and related maintenance.
- Identify and explain the proper use of the machine and associated control devices.

- Demonstrate basic operating techniques.

Forklift Operation **1 Credit/30 Clock-Hours**

This course will cover safety related to and the fundamental operation of forklifts.

Objectives:

- Demonstrate safe start procedures for the equipment.
- Properly conduct a pre-operation inspection and related maintenance.
- Identify and explain the proper use of the machine and associated control devices.
- Demonstrate basic operating techniques.

Skid Steer/Compact Loader Operation **2 Credits/60 Clock-Hours**

This course will cover the fundamentals of skid steer and compact loader operation.

Objectives:

- Demonstrate safe start procedures for the equipment.
- Properly conduct a pre-operation inspection and related maintenance.
- Identify and explain the proper use of the machine and associated control devices.
- Demonstrate basic operating techniques.

Aerial Boom Lift/Scissor Lift Operation **2 Credits/60 Clock-Hours**

This course will cover safety related to and the fundamental operation of aerial boom lifts and scissor lifts.

Objectives:

- Demonstrate safe start procedures for the equipment.
- Properly conduct a pre-operation inspection and related maintenance.
- Identify and explain the proper use of the machine and associated control devices.
- Demonstrate basic operating techniques.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Control Systems and Robotics
FY2026 / 14 Credits (420 Clock-Hours)

Control Systems and Robotics

Institutions: Bridgerland, Davis

Technical Certificate (Catalog Year: 2026, 14 Credits/420 Clock-Hours Required, CIP: 47.0303)

Foundational Courses (14 Credits/420 Clock-Hours)		**Credits**	**Clock-Hours**
TECE 1000	Industrial Networking Basics	1	30
TECE 1050	Vision Systems Basic	1	30
TECE 1100	Programmable Logic Controllers II	3	90
TECE 1150	Human Machine Interface (HMI) Programming	2	60
TECE 1200	Industrial Networking II	2	60
TECE 1250	Servo Motors and Drives	1	30
TECE 1800	Integration Capstone	4	120
Supplemental Courses			
Bridgerland (6 Credits/180 Clock-Hours Required)			
TECE 1300	Programmable Logic Controllers III	3	90
TECE 1320	Vision Systems Advanced	1	30
TECE 1420	Programmable Logic Controller Platforms	1	30
TECE 1440	Human Machine Interface (HMI) Platforms	1	30
TECE 1460	Robot Platforms	1	30
TECE 1480	Vision Platforms	1	30
TECE 1500	FANUC Basic Programming	1	30
TECE 1550	FANUC ROBOGUIDE Simulation Software	2	60
TECE 1620	Robot Vision and Safety	1	30
TECE 1700	FANUC Advanced Programming	1	30
TECE 1750	Data and Manufacturing Analytics	2	60
TECE 2901	Special Applications for Controls	6	180
TECE 2998	Control Systems and Robotics Externship	6	270

Utah System of Higher Education
Control Systems and Robotics
FY2026 / 14 Credits (420 Clock-Hours)

PROGRAM DESCRIPTION

The Control Systems and Robotics program prepares qualified students for advanced work as Control System Technicians in an automated manufacturing environment. This certificate provides hands-on training in Programmable Logic Controllers (PLCs), industrial robots, industrial networking, servo system programming, vision systems, and Human Machine Interface (HMI) programming. Students work with teaching staff of industry professional who emphasize hands-on instruction and provide competency-based training based on industry input for best practices and technological relevance. There is a high demand for employees with these specialized skills.

Objectives:

- Build an operational industrial network containing computers and control devices.
- Program a process using a common PLC.
- Design and program an HMI screen to interface with a PLC and control a process.
- Program a servo-driven process with a PLC.
- Identify, locate, communicate with other devices, and inspect two different parts using machine vision.
- Build a project that integrates multiple control topics.

FOUNDATIONAL COURSE DESCRIPTIONS

Industrial Networking Basics **1 Credit/30 Clock-Hours**

The Industrial Networking Basics course introduces important Ethernet and TCP/IP concepts and terminology. It teaches students how to implement basic networking concepts. It also provides essential information about the industrial protocols and topology. This course covers Ethernet basics and the concepts necessary for an industrial network. The course includes switch configuration, power over Ethernet, addressing, and wireless Ethernet. Students who complete this course have an understanding and grounding in the basics of industrial network.

Objectives:

- Describe basic network configuration and common networking communications protocols.
- Use basic networking hardware, software, and tools and Power over Ethernet (PoE) in a network application.
- Build and test Ethernet cables.
- Configure a wireless access point.
- Discover and assign Internet Protocol (IP) addresses for various industrial control components.
- Set up a complete Industrial Ethernet network.

Vision Systems Basic **1 Credit/30 Clock-Hours**

The Vision Systems Basic course introduces students to the Cognex Insight Easy Builder and Spreadsheet application interface with an additional emphasis on lighting, lenses, and filters. This course focuses on getting the most from the In-Sight Explorer spreadsheets interface and teaching users how to walk through the process of setting up a vision application using spreadsheet programming best practices. This course covers the use of advanced tools and tools recently added to the spreadsheet environment. Students who complete this course can use basic vision systems.

Objectives:

- Identify vision hardware and connection parts using pattern matching and logic, and presence of absence of feature using histogram tools.
- Convert pixels to common measurements using calibration tools.
- Identify irregular shapes using blob tools and image filters.
- Configure input and output signals and demonstrate their use.
- Send process results to external devices.
- Create a custom interface for pass/fail results.
- Deploy application using simple interface and advanced interface.
- Demonstrate the use of multiple lighting principles and techniques.

Programmable Logic Controllers II **3 Credits/90 Clock-Hours**

The Programmable Logic Controller II course introduces students to the Studio 5000 Logix Designer (previously known as RSLogix 5000) and the CompactLogix PLC. It covers how to program using ladder logic for multiple labs based on industrial applications. This course teaches how to wire, program, and troubleshoot various systems and how to program a process on an actual machine as the final project. Students who complete this course are able to apply more complex logic to controllers.

Objectives:

- Connect to and configure a Programmable Logic Controller (PLC) using PLC programming software.
- Use tags, subroutines, data types, arrays, and sequencer code structure in PLC programming.
- Use input and output instructions, timers, counters, math instructions, and compare instructions in PLC programming.
- Connect and configure input and output (I/O) expansion cards, both local and remote.
- Demonstrate proper PLC wiring.
- Program a complete process from scratch.

Human Machine Interface (HMI) Programming **2 Credits/60 Clock-Hours**

The Human-Machine Interface (HMI) introduces students to HMI. HMI operator stations have become commonplace in modern industry because they eliminate wiring, enable operator functions to be modified in software, and provide the ability for the operator to monitor Programmable Logic Controller (PLC) operations data. This course covers how to convert a PLC program into a graphic HMI Panel. This course teaches application editing, tags and communications, creating data logs, input and output objects, local messages and alarms, diagnostics, and information messages. Students who complete this course can program HMIs to monitor PLC operations data.

Objectives:

- Describe the use and need for Human Machine Interface (HMI) in an automation environment.
- Interface an HMI with a Programmable Logic Controller (PLC) to simulate a virtualized system.
- Create graphic displays.
- Build and animate an interactive graphic display.
- Configure HMI tag-based alarms.
- Create and configure a historical trend.
- Create and view a data log model.
- Use a graphic HMI panel to control a process on an actual machine.

Industrial Networking II — 2 Credits/60 Clock-Hours

The Industrial Networking II course teaches students how to use industrial networks. Device communication can be one of the most challenging aspects of any automated system. In this course, students will network PLCs, remote I/O blocks, sensor systems, servo drives, and robots so they are able to consistently pass information between devices. This is done through configuring network communication between PLCs and I/O block, sensor systems, servos, and robots. Students who complete this course can setup and maintain an industrial network.

Objectives:

- Apply Industrial Networking concepts to devices used in industry.
- Set up industrial grade networking hardware.
- Configure network communication between Programmable Logic Controllers (PLCs), input and output (I/O) blocks, sensor systems, servos, and robots.
- Use standard PLC sequencer logic to control a process.
- Wire I/O and PLC network connections.
- Set up a remote connection to a PLC.

Servo Motors and Drives — 1 Credit/30 Clock-Hours

The Servo Motors and Drives course introduces students to servomechanisms. It covers the basic operation of a motion control application and introduces how to program a servo drive and motor to perform basic motion commands. It teaches students how to wire and program an electric motor drive to be self-controlled within a process. This course covers how to write a Programmable Logic Controller (PLC) program to perform motion control with multiple axes. Students who complete this course are able to write a PLC program.

Objectives:

- Describe the components of a servomechanism.
- Use a network to connect a PLC to motion control modules.
- Configure motion modules in a (PLC).
- Write a PLC program to perform motion control.
- Write a PLC program to perform motion control with multiple axes.

Integration Capstone — 4 Credits/120 Clock-Hours

The Integration Capstone course allows students to build and operate a system integrating all the elements they have learned. This course will involve many aspects of an industrial control system. This includes safety systems, risk assessments, and code diagrams. It covers how to integrate the following items: Programmable Logic Controllers, Human Machine Interface, servo drive, network switch, vision system, safety system, and industrial robotic arm. Instructor approval is required for the final project. Students with jobs may propose an on-the-job project contingent on instructor and employer approval. Students who complete this course show they can integrate all the elements of the controls into a single project.

Objectives:

- Demonstrate advanced troubleshooting techniques.
- Build and operate a system.
- Build a project using advanced programming in one or more of the following: Programmable Logic Controllers (PLC), Human Machine Interface (HMI), robots, servos, safety equipment, industrial networking equipment.
- Demonstrate a structured coding method.

- Report the project while following instructor reporting requirements.

SUPPLEMENTAL COURSE DESCRIPTIONS

Bridgerland

Programmable Logic Controllers III **3 Credits/90 Clock-Hours**

The Programmable Logic Controllers III course will expand on the Programmable Logic Controller II course. This course covers operation and application of safety programmable logic controllers, safety relays, safety I/O, and risk assessments. It teaches how to program a system using Proportional Integral Derivative control methods. Introduces Structured Text and Function Block programming as well as Add-On instructions. It also teaches how to program using a structured programming method. Students who complete this course are able to program advanced logic into PLCs.

Objectives:

- Write a Programmable Logic Controller program that uses the Proportional Integral Derivative method to control a process.
- Program a safety Programmable Logic Controller using regular and safety I/O.
- Use an external safety relay in a Programmable Logic Controller application.
- Perform a risk assessment.
- Use function block and structured text in basic Programmable Logic Controller projects.
- Use Add-On Instructions (AOI) to enhance a Programmable Logic Controller program.
- Program a Programmable Logic Controller using a structured method.

Vision Systems Advanced **1 Credit/30 Clock-Hours**

The Vision Systems Advanced course teaches students about vision systems. This course covers and applies advances in deep learning for inspection and quality control applications, as well as character recognition, tool applications, and more advanced lighting techniques. The course teaches students how to build and execute a custom script and advanced lighting, including off axis, dome, lighting controllers, and strobing. Students who complete this course can alter and operate visions systems in an advanced setting.

Objectives:

- Deploy VIDI deep learning tools.
- Apply advanced find tools.
- Identify text using OCR text recognition tools.
- Identify inconsistent/flexible features using advanced edge inspection tools.
- Identify unique colors using color tools.

Programmable Logic Controller Platforms **1 Credit/30 Clock-Hours**

The Programmable Logic Controller Platforms course helps students to practice using Programmable Logic Controller (PLC) platforms. This course covers how to choose a PLC platform and how to learn the software and hardware of that system. It also goes over how to set up, configure, and program this PLC in a variety of labs simulating industrial applications to provide students with an opportunity to develop their skills. Students who complete this course demonstrate an understanding and ability to program and troubleshoot PLC platforms.

Objectives:

- Use a Programmable Logic Controller (PLC) from a selected manufacturer.
- Perform Programmable Logic Controller programming on a selected platform.
- Use Programmable Logic Controller programming software to create and edit programs on a selected platform.

Human Machine Interface (HMI) Platforms **1 Credit/30 Clock-Hours**

The Human Machine Interface (HMI) Platforms course covers how to choose a robot platform from a variety of available Human Machine Interface (HMI) systems. It allows students to perform fundamental HMI tasks with the selected unit. The course also introduces students to the interface, tools, and overall operation of the system from manuals and resources provided by the various vendors, with extensive instructor guidance. Students who complete this course are able to organize, operate, and troubleshoot HMI platforms.

Objectives:

- Use a Human Machine Interface (HMI) or Supervisory Control and Data Acquisition (SCADA) software from a selected manufacturer.
- Configure communication between the selected platform and a Programmable Logic Controller (PLC).
- Create graphic displays on a selected platform.
- Build an interactive graphic display on a selected platform.
- Animate an interactive graphic display on a selected platform.

Robot Platforms **1 Credit/30 Clock-Hours**

The Robot Platforms course covers how to choose a robot platform from a variety of available Human Machine Interface (HMI) systems and perform HMI tasks, such as creating, modifying, and executing various programs. With instructor guidance, the course introduces students to the interface, tools, and overall operation of the system from vendor provided manuals and resources. Students who complete this course demonstrate how to operate, alter, maintain, and troubleshoot robot platforms and perform HMI tasks.

Objectives:

- Power up and jog the robot.
- Recover from common program and robot faults.
- Execute production operations.
- Create, modify, and execute a material handling program.
- Monitor, force, and simulate input and output signals.
- Backup and restore individual programs and files.

Vision Platforms **1 Credit/30 Clock-Hours**

The Vision Platforms course covers how to choose a vision platform from available industrial vision systems and perform fundamental tasks using that system. With instructor guidance, it covers the interface, tools, and overall operation of the system from vendor provided manuals and resources. It teaches students how to deploy applications using simple and advanced interfaces and send process results to external devices and create a customer interface for pass/fail results. Students who complete this course can help employers choose, establish, and maintain vision platforms.

Objectives:

- Identify vision hardware and connections.

- Convert pixels to common measurements using calibration tools.
- Setup software interface and acquire first images.
- Identify parts using pattern matching and Logic.
- Identify presence or absence of feature using histogram tools.
- Identify part edges using edge tools.
- Identify irregular shapes using blob tools and image filters.
- Configure input and output signals then demonstrate their use.

FANUC Basic Programming **1 Credit/30 Clock-Hours**

The FANUC Basic Programming course covers the tasks that an operator, technician, , or programmer needs to set up and program a FANUC Robotics Handling Tool Software Package. Students practice programming hands-on pendant labs with industrial grade FANUC LR Mate 200i D manipulators and FANUC System R-30i B Mate Controllers. It introduces multiple coordinate systems to powerup and jog the robot and covers how to create and execute MACROs. Students who complete this course can perform basic programming on FANUC devices.

Objectives:

- Power up and jog the robot using multiple coordinate systems.
- Recover from common program and robot faults.
- Execute production operations.
- Create, modify, and execute a material handling program.
- Create and execute MACROs.
- Monitor, Force, and Simulate Input and Output Signals.
- Apply positional offsets in a material handling operation.
- Backup and restore individual programs and files.

FANUC ROBOGUIDE Simulation Software **2 Credits/60 Clock-Hours**

The FANUC ROBOGUIDE Simulation Software course introduces procedures for creating a HandlingPRO virtual workcell. When completed, the workcell created will contain a FANUC robot with end-of-arm tooling, one or more fixtures for holding a part, and a robot TPP Program, which moves the part from one fixture to the other. The course also covers various robot programs and how to run them. Students who complete this course demonstrate the ability to work with FANUC robots.

Objectives:

- Create a program using Draw Features on Part.
- Create a program to pick and place random parts.
- Create an AVI of the workcell.
- Add a second robot to the workcell.
- Setup extended axis and add 2nd & 3rd motion group, then create machines for the 7th axis and motion groups.
- Create a program that will trace lines and move blocks.

Robot Vision and Safety **1 Credit/30 Clock-Hours**

The Robot Vision and Safety course covers the basic tasks and procedures required for an operator, technician, or programmer to set up, teach, test, and modify iRVision applications and FANUC Dual Check Safety (DCS) software. Robot vision systems are among the most advanced components in industry. Students who complete this course, can identify the components of a vision system, install vision

hardware, develop an application, program the robot, perform error recovery procedures, and follow recommended safety practices.

Objectives:

- View and/or change robot and computer parameters to facilitate access to the robot's web page.
- Perform an inspection vision process.
- Understand basic vision concepts and lighting.
- Master a robot using vision mastering.
- Create tool frame for the robot applicator and user frames necessary for use with the vision system.
- Set up and modify Speed Check parameters and DCS Safe I/O parameters.

FANUC Advanced Programming **1 Credit/30 Clock-Hours**

The FANUC Advanced Programming course helps students enhance their skills and knowledge from basic programming courses to develop a more complex scenario. FANUC robots are among the most widely used robots in industry. Students will be given a hypothetical example workcell. They will then be given the task of creating all the necessary programs to deal with multifaceted issues using advanced programming techniques. Students who complete this course are able to perform advanced programming and troubleshooting for FANUC robots.

Objectives:

- Manipulate frames related to programming issues.
- Demonstrate advanced program control structures.
- Establish PLC Robot communication using User Operator Panel.
- Pull parts through a predefined system.
- Set up multi-tasking operations.
- Design and implement methods for Error Recovery.

Data and Manufacturing Analytics **2 Credits/60 Clock-Hours**

The Data and Manufacturing Analytics course provides students with experience working with data as a data practitioner in the field of manufacturing. Utilizing real-world situations, they gain experience with the types of tasks which are required of data practitioners working in manufacturing. Students go through the data life cycle with multiple sets of data and different situations that can arise in manufacturing. Students optimize manufacturing data and practice predictive maintenance. They assess a Programmable Logic Controller (PLC)-driven manufacturing system to a database and process that data as though in a live working environment utilizing data analysis programs and techniques. Students who complete this course are able to work with manufacturing data.

Objectives:

- Present findings using a visualization program.
- Setup data transfer from a Programmable Logic Controller (PLC)-driven manufacturing system to a database.
- Analyze data in a manufacturing optimization scenario.
- Analyze data in a manufacturing predictive maintenance scenario.

Special Applications for Controls **6 Credits/180 Clock-Hours**

The Special Applications for Controls course accepts transfer credit from students who have obtained content mastery through a related Controls course participation. Content mastery may be obtained from

curricula or transcript. Credit will be determined through competency demonstration. (Requires advisor approval.)

Objectives:

- Obtain competency credit for successful completion of related industry course(s).
- Demonstrate industry level content master of prior learning.
- Create, design, and build skills necessary to be successful in the controls career cluster.

Control Systems and Robotics Externship **6 Credits/270 Clock-Hours**

The Control Systems and Robotics Externships course gives students real-world experience in a work-based environment. Students propose a high-level skill project to complete at a workplace. The project must be approved by an instructor and an employer and will be evaluated by the employer. Students may be required to design, draw schematics, create flow charts, write progress reports, program a robot, program a Programmable Logic Controller (PLC), program servos, wire devices, or present for their capstone project the following items: PLC, HMI, servo drive, network switch, vision system, safety system, and industrial robotic arm. Students who complete this course have real world experience applying what they have learned throughout their time in the program.

Objectives:

- Demonstrate advanced troubleshooting techniques.
- Build a project using advanced programming in one or more of the following: Programmable Logic Controllers (PLC), Human Machine Interface (HMI), robots, servos, safety equipment, industrial networking equipment.
- Demonstrate a structured coding method.
- Report the project while following instructor and employer reporting requirements.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Dental Assisting
FY2026 / 19Credits (600 Clock-Hours)

Dental Assisting

Institutions: Bridgerland, Davis, Mountainland, Ogden-Weber

Technical Certificate (Catalog Year: 2026, 19 Credits/600 Clock-Hours Required, CIP: 51.0601)

Foundational Courses (19 Credits/600 Clock-Hours)		Credits	Clock-Hours
TEDE 1011	Introduction to Dental Assisting	3	90
TEDE 1021	Infection Control	2	60
TEDE 1100	Dental Anatomy	2	60
TEDE 1110	Dental Radiology	3	90
TEDE 1201	Dental Instruments and Equipment	3	90
TEDE 1221	Orthodontics, Pediatrics, Prosthodontics	3	90
TEDE 1300	Dental Office Administration	1	30
TEDE 1900	Dental Assisting Externship	2	90
Supplemental Courses			
Bridgerland (10 Credits/300 Clock hours)			
TEDE 1031	Patient Information	2	60
TEDE 1041	Dental Materials	3	90
TEDE 1211	Anesthesia and Pain Control	2	60
TEDE 1231	Periodontics, Endodontics, Oral Maxillofacial Surgery	2	60
TEDE 1500	Job Seeking Skills	1	30
Davis (10 Credits/300 Clock hours)			
TEDE 1031	Patient Information	2	60
TEDE 1041	Dental Materials	3	90
TEDE 1211	Anesthesia and Pain Control	2	60
TEDE 1231	Periodontics, Endodontics, Oral Maxillofacial Surgery	2	60
TEDE 1500	Job Seeking Skills	1	30
Mountainland (5 Credits/195 Clock hours)			
TEDE 1015	Intraoral Procedures and Patient Care	2	60
TEDE 1901	Dental Assisting Externship II	3	135
Ogden-Weber (10 Credits/300 Clock hours)			
TEDE 1031	Patient Information	2	60
TEDE 1041	Dental Materials	3	90
TEDE 1211	Anesthesia and Pain Control	2	60
TEDE 1231	Periodontics, Endodontics, Oral Maxillofacial Surgery	2	60
TEDE 1500	Job Seeking Skills	1	30

Revised: January 09, 2025

Utah System of Higher Education
Dental Assisting
FY2026 / 19Credits (600 Clock-Hours)

PROGRAM DESCRIPTION

The Dental Assisting Program is designed to prepare for employment of the professional Chairside Assistant. Students focus on the basics of dental assisting, nutrition, dental prevention, dental disease, infection control, instruments and tray setups for dental procedures, dental materials, anatomy, radiology, dental specialties, law and ethics, CPR, and a clinical experience.

Objectives:

- Correlate the knowledge of anatomy, physiology, psychology, microbiology to the roles and responsibilities of a dental assistant.
- Identify commonly used equipment, supplies, instrumentation, and medications used in the dental chairside setting.
- Apply the principles of asepsis to the dental office and its environment.
- Perform competently and safely the skills of a dental assistant.
- Use legal, moral, and ethical principles to evaluate the care of a dental patient.
- Demonstrate the professional attributes of a dental assistant.
- Pass the final exam and certifications for the dental field.

FOUNDATIONAL COURSE DESCRIPTIONS

Introduction to Dental Assisting **3 Credits/90 Clock-Hours**

The Introduction to Dental Assisting course introduces the student to the dental assisting profession and teaches the fundamental concepts and principles necessary to fully participate as a member of the dental team.

Objectives:

- Describe the members of the dental healthcare team and their roles and responsibilities.
- Identify the landmarks of the face and the oral cavity.
- Identify arches, quadrants and planes, primary and permanent dentition.
- Identify the anatomy and surfaces of a tooth.
- Describe the three primary systems of tooth numbering for permanent and primary dentition.
- Discuss the caries process and how to control tooth decay.
- Discuss preventive dentistry and the relationship between nutrition and dental carries.
- Discuss how diet and nutrition can affect oral conditions and the functions of nutrients.

Infection Control **2 Credits/60 Clock-Hours**

The Infection Control course lays out the fundamentals of oral diseases, infection control, microbiology, and safety procedures in the dental office.

Objectives:

- Identify developmental disorders of the jaws and dentition.
- Discuss viral and bacterial diseases.
- Describe the modes of disease transmission and the importance of infection control.
- Perform appropriate first aid after an exposure incident.
- Discuss the CDC’s prevention guidelines and the components of an Occupational Safety and Health Administration Hazard Communication Program.

- Discuss the role of government agencies in relation to dentistry.
- Discuss the classification and methods of sterilization.
- Demonstrate properly sterilizing instruments and using the sterilization equipment.
- Discuss the history and pioneers of microbiology.

Dental Anatomy **2 Credits/60 Clock-Hours**

The Dental Anatomy course lays out the fundamentals of dental terminology. This course provides a basic overview of the anatomy and physiology of the human body, with an emphasis on head and neck anatomy.

Objectives:

- Identify and describe the four levels of organization in the human body.
- Locate the major systems of the body; explain their purposes, components, and functions: and describe the signs and symptoms of each of their common disorders.
- Explain why understanding dental anatomy and physiology is important to the dental assistant.
- Identify the regions of the head.
- Locate and identify the bones of the skull.
- Discuss the symptoms of temporomandibular joint disorders.
- Identify locations of the muscles, salivary glands, blood vessels and nerves of the head and neck.

Dental Radiology **3 Credits/90 Clock-Hours**

The Dental Radiology course introduces the student to the basic safety and use of radiation in a dental setting. Students are given the knowledge and skills to expose and process intraoral and extraoral radiographic images including the various techniques used for each. The necessary skills and knowledge required to earn the Utah State Radiation Health and Safety certificate, that is necessary for employment as a dental assistant, are taught as well.

Objectives:

- Discuss the discovery of x-radiation and pioneers in the history of dental radiography.
- Discuss radiation physics and explain how x-rays are produced.
- Define what radiation safety measures should be used when exposing radiographs.
- Demonstrate the proper infection control protocol while exposing radiographs.
- Demonstrate a working knowledge of radiation safety measures.
- Describe uses of different dental imaging systems.

Dental Instruments and Equipment **3 Credits/90 Clock-Hours**

The Dental Instruments and Equipment course identifies the proper use of instruments and equipment at the chair, and how to treat a medical emergency should one occur in the dental office.

Objectives:

- Describe areas of dental environment in a professional office.
- List clinical equipment and the basic functions.
- Describe how to prepare the treatment area for at patient.
- Explain instruments and how they are transferred.
- Discuss the role of the dental assistant in caring for the special patient.
- Describe the major medical disorders that can affect a patient’s oral health.
- Describe the preventive measures taken for a medical emergency.
- List the responsibilities of a dental assistant in an emergency and documentation.

Orthodontics, Pediatrics, Prosthodontics **3 Credits/90 Clock-Hours**

The Orthodontics, Pediatrics, Prosthodontics course introduces the clinical concepts and basic skills related the different specialties in the dental field and how their treatment is individual for each one. Types of orthodontic treatment, removable and fixed prosthodontics, pediatric dentistry are also discussed.

Objective:

- List indications and contraindications for fixed and removable prosthesis.
- Identify the role of the dental laboratory technician in dentistry.
- Describe steps when using a CAD/CAM system in the office.
- Discuss types of pediatric dental trauma and how to handle suspected abuse and neglect.
- List the causes and habits of patients that can affect their dental occlusion.
- Explain the role of an orthodontist assistant and the environment of the orthodontic practice.

Dental Office Administration **1 Credit/30 Clock-Hours**

The Dental Office Administration course provides the necessary knowledge and skills required in the dental office setting, and office administrative duties. Students learn about communication, law and ethics, job skills and many factors associated with making career decisions that can enhance a dental assistant's growth and success.

Objectives:

- Demonstrate knowledge of the law and ethics pertaining to the practice of dentistry.
- Demonstrate knowledge of the Health Insurance Portability and Accountability Act (HIPAA) of 1996 as it pertains to the practice of dentistry.
- Demonstrate knowledge regarding communication (verbal and nonverbal) in the dental office and Maslow's hierarchy of needs.
- Identify office stress and demonstrate how to resolve conflicts.
- Identify the dental office staff and areas of responsibility.
- Describe proper dental records management.
- Describe basic payroll systems in the dental office.

Dental Assisting Externship **2 Credits/90 Clock-Hours**

The Externship course presents the opportunity to practice skills acquired in dental assisting at a working dental office or clinic under the supervision of a licensed dentist.

Objectives:

- Demonstrate professionalism in a workplace setting.
- Practice competency by applying skills learned in a workplace setting.

SUPPLEMENTAL COURSE DESCRIPTIONS

Bridgerland

Patient Information **2 Credits/60 Clock-Hours**

The Patient Information course introduces patient records and how to obtain and organize patient information. Instruction in measuring and recording vital signs is highlighted.

Objectives:

- Explain the patient dental record and its legal significance.
- Discuss person health information and the HIPAA laws.
- Obtain a completed medical-dental health history for a new patient.
- Enter information in a patient's chart for completed dental treatment.
- Demonstrate taking a patient's vital signs.
- Describe techniques used for patient's assessments.
- Demonstrate computerized charting.

Dental Materials **3 Credits/90 Clock-Hours**

The Dental Materials course introduces the use of dental materials in a clinical setting. Storing, mixing, transferring an applying of materials is integrated in the instruction. Finally, this course introduces lab materials and procedures; the skills necessary to take alginate impressions; pour and trim casts; and fabricate mouth guards and custom trays.

Objectives:

- List the properties of dental materials, how to manipulate them, and how they affect their application.
- Assist with applying cavity liners, sealers, varnishes, and desensitizers.
- List the three types of impressions taken in a dental office: preliminary, study casts, and occlusal registrations.
- Trim and finish a set of dental models and construct a vacuum-formed custom tray.
- List three types of custom impression trays and describe their uses in dentistry.

Anesthesia and Pain Control **2 Credits/60 Clock-Hours**

The Anesthesia and Pain Control course explores a basic knowledge of the use of anesthesia and sedation in dentistry. An understanding of patient treatment procedures and pain control in the dental office is also discussed.

Objectives:

- Discuss dispensing of drugs, DEA, parts of a prescription and use of a PDR.
- Describe negative and positive effects of drug use.
- Discuss importance of pain control in dentistry.
- Describe processes and principles of cavity preps and classes of restorations and the need for pins, or intermediate restorative materials.
- Describe the use of matrix systems and different types that are used in dentistry.

Periodontics, Endodontics, Oral Maxillofacial Surgery **2 Credits/60 Clock-Hours**

The Periodontics, Endodontics, Oral Maxillofacial Surgery course continues the study of clinical concepts and basic skills related to dental specialties including, endodontics, and oral maxillofacial surgery procedures.

Objectives:

- Define each specialty and the instruments and materials that are used in each one.
- Demonstrate competence in performing specialty procedures.
- Describe dental implants, their components, and indications and contraindications to using them.
- Define oral pathology and identify the assistant's role in this specialty.
- Assist in procedures from all of the specialties.

Job Seeking Skills **1 Credit/30 Clock-Hours**

Job Seeking Skills explores how to prepare and successfully apply to potential career opportunities. During this course, you will be presented with essential job-seeking skills needed to find gainful employment.

Objectives:

- Create a professional resume, cover letter and reference sheet.
- Utilize online tools successfully to create an e-portfolio.
- Expand and develop networking skills.
- Utilize online resources effectively to find job openings.
- Demonstrate the ability to fill out job applications in a professional manner.
- Perform successfully in a job interview.
- Demonstrate appropriate follow-up procedures.

Davis

Patient Information **2 Credits/60 Clock-Hours**

The Patient Information course introduces patient records and how to obtain and organize patient information. Instruction in measuring and recording vital signs is highlighted.

Objectives:

- Explain the patient dental record and its legal significance.
- Discuss person health information and the HIPAA laws.
- Obtain a completed medical-dental health history for a new patient.
- Enter information in a patient's chart for completed dental treatment.
- Demonstrate taking a patient's vital signs.
- Describe techniques used for patient's assessments.
- Demonstrate computerized charting.

Dental Materials **3 Credits/90 Clock-Hours**

The Dental Materials course introduces the use of dental materials in a clinical setting. Storing, mixing, transferring an applying of materials is integrated in the instruction. Finally, this course introduces lab materials and procedures; the skills necessary to take alginate impressions; pour and trim casts; and fabricate mouth guards and custom trays.

Objectives:

- List the properties of dental materials, how to manipulate them, and how they affect their application.
- Assist with applying cavity liners, sealers, varnishes, and desensitizers.
- List the three types of impressions taken in a dental office: preliminary, study casts, and occlusal registrations.
- Trim and finish a set of dental models and construct a vacuum-formed custom tray.
- List three types of custom impression trays and describe their uses in dentistry.

Anesthesia and Pain Control **2 Credits/60 Clock-Hours**

The Anesthesia and Pain Control course explores a basic knowledge of the use of anesthesia and sedation in dentistry. An understanding of patient treatment procedures and pain control in the dental office is also discussed.

Objectives:

- Discuss dispensing of drugs, DEA, parts of a prescription and use of a PDR.
- Describe negative and positive effects of drug use.
- Discuss importance of pain control in dentistry.
- Describe processes and principles of cavity preps and classes of restorations and the need for pins, or intermediate restorative materials.
- Describe the use of matrix systems and different types that are used in dentistry.

Periodontics, Endodontics, Oral Maxillofacial Surgery **2 Credits/60 Clock-Hours**

The Periodontics, Endodontics, Oral Maxillofacial Surgery course continues the study of clinical concepts and basic skills related to dental specialties including, endodontics, and oral maxillofacial surgery procedures.

Objectives:

- Define each specialty and the instruments and materials that are used in each one.
- Demonstrate competence in performing specialty procedures.
- Describe dental implants, their components, and indications and contraindications to using them.
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Objectives:

- Create a professional resume, cover letter and reference sheet.
- Utilize online tools successfully to create an e-portfolio.
- Expand and develop networking skills.
- Utilize online resources effectively to find job openings.
- Demonstrate the ability to fill out job applications in a professional manner.
- Perform successfully in a job interview.
- Demonstrate appropriate follow-up procedures.

Mountainland

Intraoral Procedures and Patient Care **2 Credits/60 Clock-Hours**

The Intraoral Procedures and Patient Care course introduces the use of dental materials in a clinical setting. Storing, mixing, transferring, and applying of materials is integrated in the instruction. Patient care explores a basic knowledge of the use of anesthesia and sedation and care for the patient clinical chairside.

Objectives:

- Describe processes and principles of cavity preps and classes of restorations and the need for pins, or intermediate restorative materials.
- List the properties of dental materials, how to manipulate them, and how they affect their application.
- Assist with applying cavity liners, sealers, varnishes, and desensitizers.
- Discuss the importance of pain control in dentistry.
- Identify potential needs of patients in the clinical setting.

Dental Assisting Externship II **3 Credits/135 Clock-Hours**

The Dental Assisting Externship II course presents the students with an opportunity to have additional practice of the skills acquired in dental assisting at a working dental office or clinic under the supervision of a licensed dentist. This gives the student an opportunity to become proficient in the skills they have learned.

Objectives:

- Demonstrate professionalism in a workplace setting.
- Practice the application of skills in a workplace setting.

Ogden-Weber

Patient Information **2 Credits/60 Clock-Hours**

The Patient Information course introduces patient records and how to obtain and organize patient information. Instruction in measuring and recording vital signs is highlighted.

Objectives:

- Explain the patient dental record and its legal significance.
- Discuss person health information and the HIPAA laws.
- Obtain a completed medical-dental health history for a new patient.
- Enter information in a patient's chart for completed dental treatment.
- Demonstrate taking a patient's vital signs.
- Describe techniques used for patient's assessments.
- Demonstrate computerized charting.

Dental Materials **3 Credits/90 Clock-Hours**

The Dental Materials course introduces the use of dental materials in a clinical setting. Storing, mixing, transferring an applying of materials is integrated in the instruction. Finally, this course introduces lab materials and procedures; the skills necessary to take alginate impressions; pour and trim casts; and fabricate mouth guards and custom trays.

Objectives:

- List the properties of dental materials, how to manipulate them, and how they affect their application.
- Assist with applying cavity liners, sealers, varnishes, and desensitizers.
- List the three types of impressions taken in a dental office: preliminary, study casts, and occlusal registrations.
- Trim and finish a set of dental models and construct a vacuum-formed custom tray.

- List three types of custom impression trays and describe their uses in dentistry.

Anesthesia and Pain Control **2 Credits/60 Clock-Hours**

The Anesthesia and Pain Control course explores a basic knowledge of the use of anesthesia and sedation in dentistry. An understanding of patient treatment procedures and pain control in the dental office is also discussed.

Objectives:

- Discuss dispensing of drugs, DEA, parts of a prescription and use of a PDR.
- Describe negative and positive effects of drug use.
- Discuss importance of pain control in dentistry.
- Describe processes and principles of cavity preps and classes of restorations and the need for pins, or intermediate restorative materials.
- Describe the use of matrix systems and different types that are used in dentistry.

Periodontics, Endodontics, Oral Maxillofacial Surgery **2 Credits/60 Clock-Hours**

The Periodontics, Endodontics, Oral Maxillofacial Surgery course continues the study of clinical concepts and basic skills related to dental specialties including, endodontics, and oral maxillofacial surgery procedures.

Objectives:

- Define each specialty and the instruments and materials that are used in each one.
- Demonstrate competence in performing specialty procedures.
- Describe dental implants, their components, and indications and contraindications to using them.
- Define oral pathology and identify the assistant's role in this specialty.
- Assist in procedures from all of the specialties.

Job Seeking Skills **1 Credit/30 Clock-Hours**

Job Seeking Skills explores how to prepare and successfully apply to potential career opportunities. During this course, you will be presented with essential job-seeking skills needed to find gainful employment.

Objectives:

- Create a professional resume, cover letter and reference sheet.
- Utilize online tools successfully to create an e-portfolio.
- Expand and develop networking skills.
- Utilize online resources effectively to find job openings.
- Demonstrate the ability to fill out job applications in a professional manner.
- Perform successfully in a job interview.
- Demonstrate appropriate follow-up procedures.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Digital Marketing and Analytics
FY2026 / 18 Credits (540 Clock-Hours)

Digital Marketing and Analytics			
Institutions: Mountainland, Snow			
Technical Certificate (Catalog Year: 2026, 18 Credits/540 Clock-Hours Required, CIP: 11.0801)			
Foundational Courses (18 Credits/540 Clock-Hours)		**Credits**	**Clock-Hours**
TEDM 1010	Introduction to Marketing	2	60
TEDM 1030	Content Marketing and Marketing Analytics	4	120
TEDM 1040	Email Marketing	2	60
TEDM 1050	Search Engine Optimization	2	60
TEDM 1060	Digital Advertising	3	90
TEDM 1070	Social Media Marketing	3	90
TEDM 1080	Advanced Digital Marketing	2	60
Supplemental Courses			
Mountainland (2 Credits/60 Clock-Hours)			
TEDM 1020	Marketing Design	2	60
Snow (4 Credits/120 Clock-Hours)			
TEDM 1110	Digital Media Tools	4	120

Revised: January 09, 2025

Utah System of Higher Education
Digital Marketing and Analytics
FY2026 / 18 Credits (540 Clock-Hours)

PROGRAM DESCRIPTION

In the Digital Marketing and Analytics program, students will learn the fundamental principles of marketing, strategy, and best practices. Students will learn the day-to-day tasks of the modern digital marketer from lectures, guest speakers, presentations, and hands-on application. Through instruction and hands-on practice, students will learn and test their skills in Search Engine Optimization, Search Engine Marketing, Digital Advertising, Social Media Marketing, Content Marketing, and Email Marketing.

Objectives:

- Demonstrate a working knowledge of the fundamentals of digital marketing and marketing analytics.
- Define key digital marketing and analytics terms and definitions.
- Assess marketing data using industry tools and best practices.
- Create strategic digital marketing plans following industry suggested best practices.
- Implement a digital marketing strategy in a business.
- Complete industry certifications to show competencies in each digital marketing vertical.

FOUNDATIONAL COURSE DESCRIPTIONS

Introduction to Marketing — 2 Credits/60 Clock-Hours

The Introduction to Marketing course is designed to help students become proficient in the fundamentals and best practices of marketing. The course will cover key digital marketing terms, marketing research, buyer personas, positioning, buyer behaviors, brand management, product management, and pricing. Through lecture, guest speakers, presentations, and hands-on application, students will become proficient in the skills needed to be a modern-day digital marketer.

Objectives:

- Demonstrate fundamental marketing skills needed to pursue an education in digital marketing.
- Display an understanding of marketing key terms and definitions.
- Assess marketing strategies through industry case studies.
- Implement marketing best practices and strategies through hands-on business applications.
- Present marketing plans based on industry best practices.

Content Marketing and Marketing Analytics — 4 Credits/120 Clock-Hours

The Content Marketing and Marketing Analytics course is designed to help students become proficient in content marketing, web design, and marketing analytics using today’s leading platforms. The course will cover content marketing best practices, content marketing strategy, creating marketing content, website design, website building, website management, tracking marketing analytics, and measuring and reporting on marketing efforts. Students will learn through lectures, guest speakers, presentations, and hands-on applications the best practices and strategies of content marketing.

Objectives:

- Explain why content marketing is an important part of a company's overall marketing strategy.
- Demonstrate knowledge of content marketing key terminology and definitions.
- Analyze when and how to use content marketing to optimize a customer buyer's journey.

- Execute content marketing best practices and strategies through content creation.
- Demonstrate proficiency in using content marketing platforms and tools.
- Build content promotion strategies for businesses.
- Create and manage a personal website or portfolio.
- Analyze marketing data to make informed future business decisions.
- Demonstrate proficiency in using leading marketing analytics tools.

Email Marketing **2 Credits/60 Clock-Hours**

The Email Marketing and Customer Relationship Management course is designed to help students become proficient in email marketing, using today's leading platforms. The course will cover email marketing best practices, email marketing strategy, creating emails, lead generation, creating landing pages, tracking email marketing analytics, and email marketing automation. Students will learn through lectures, guest speakers, presentations, and hands-on applications the best practices and strategies of email marketing.

Objectives:

- Explain why email marketing is an important part of a company's overall marketing strategy.
- Demonstrate knowledge of email marketing key terminology and definitions.
- Analyze when and how to use email marketing to maximize their customer experience and drive more website visits, leads and sales.
- Execute email marketing best practices and strategies through hands-on projects.
- Create a variety of different email marketing content.
- Demonstrate proficiency in using email marketing tools and platforms.
- Execute and design email marketing automation workflows for contact management.

Search Engine Optimization **2 Credits/60 Clock-Hours**

The Search Engine Optimization course is designed to help students become proficient in SEO using today's leading platforms. The course will cover search engine optimization best practices, on-site SEO, off-site SEO, technical SEO, SEO audits, and today's leading SEO tools. Students will learn through lectures, guest speakers, presentations, and hands-on applications the best practices and strategies of SEO.

Objectives:

- Explain why search engine optimization is an essential part of a company's overall marketing strategy.
- Demonstrate knowledge of search engine optimization key terminology and definitions.
- Analyze when and how to use search engine optimization to increase website rankings.
- Execute search engine optimization best practices and strategies through hands-on projects.
- Manage on-site, off-site, and technical search engine optimization on their personal website/portfolio.
- Perform and present website audits for businesses.
- Demonstrate proficiency in using search engine marketing tools.

Digital Advertising **3 Credits/90 Clock-Hours**

The Digital Advertising course is designed to help students become proficient in Search Engine Marketing using today's leading platforms. The course will cover digital advertising best practices, bidding strategies, search ads, display ads, video ads, digital ads optimization analyzing ad performance, and

current leading digital advertising platforms. Students will learn through lectures, guest speakers, presentations, and hands-on applications the best practices and strategies of Digital Advertising.

Objectives:

- Explain why digital advertising is an important part of a company's overall marketing strategy.
- Demonstrate knowledge of digital advertising key terminology and definitions.
- Analyze when and how to use digital advertising to drive website traffic, leads, and sales.
- Execute digital advertising best practices and strategies through hands-on projects.
- Create digital ads on current leading advertising platforms.
- Break down digital advertising results and key metrics for improving results.
- Demonstrate proficiency in using digital advertising tools.

Social Media Marketing **3 Credits/90 Clock-Hours**

The Social Media Marketing course is designed to help students become proficient in organic and paid social media marketing on today's leading platforms. This course will cover social media branding, social media strategy, social media management, paid social media marketing, influencer marketing, social media tools, and social media analytics. Students will learn through lectures and hands-on training the best practices and strategies of social media marketing.

Objectives:

- Explain why social media marketing is an important part of a company's overall marketing strategy.
- Demonstrate knowledge of social media marketing key terminology and definitions.
- Analyze when and how to use social media marketing to maximize return on investment.
- Execute social media marketing best practices for today's most popular platforms.
- Demonstrate proficiency in using social media marketing platforms and tools.
- Create and optimize social media ad campaigns.
- Break down and report on social media analytics.

Advanced Digital Marketing **2 Credits/60 Clock-Hours**

The Advanced Digital Marketing course is designed to help students become proficient in advanced digital marketing tactics, best practices, and strategies. The course will cover advanced marketing strategies for content marketing, email marketing, search engine optimization, conversion rate optimization, digital advertising, social media marketing, or marketing analytics. Students will learn through lectures, presentations, and hands-on training these advanced marketing skills.

Objectives:

- Demonstrate knowledge of advanced digital marketing skills needed for the jobs of today.
- Research and present new digital marketing tools, skills, or best practices.
- Implement ways to stay up to date in chosen digital marketing specialty.
- Create a digital marketing resume with the skills and knowledge learned in the program.
- Complete mock interviews for specific digital marketing jobs.

SUPPLEMENTAL COURSE DESCRIPTIONS

Mountainland

Marketing Design **2 Credits/60 Clock-Hours**

The Marketing Design course will help students become familiar with graphic design concepts and platforms. The course will cover marketing design principles, design best practices, and popular graphic design platforms. Students will learn marketing design through lectures, guest speakers, presentations, and hands-on applications.

Objectives:

- Demonstrate knowledge of graphic design key terminology and definitions.
- Explain why marketing design principles are an important part of a company's marketing strategy.
- Display an understanding of how design affects businesses marketing efforts.
- Break down the differences between good and bad marketing content.
- Create marketing content on today's most popular platforms.

Snow

Digital Media Tools **4 Credits/120 Clock-Hours**

Students will become familiar with the basic skills and techniques used to communicate through the design and creation of powerful media productions. This course will provide an introduction to industry-standard software tools that are used to create and edit images, audio, video, and more. The course consists of hands-on assignments that encourage students to apply newly acquired skills and to think critically.

Objectives:

- Use industry-recognized software to create and edit digital images.
- Use software to create and edit digital, audio, and video productions.
- Define digital media terminology and theory.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Fabrication and Fitting
FY2026 / 21 Credits (630 Clock-Hours)

Fabrication and Fitting

Institutions: Mountainland

Technical Certificate (Catalog Year: 2026, 21 Credits/630 Clock-Hours Required, CIP: 48.0511)

Foundational Courses (21 Credits/630 Clock-Hours)		Credits	Clock-Hours
TECF 1010	Fabrication Math	1	30
TECF 1012	Introduction to Cutting and Welding	3	90
TECF 1015	Tool and Machine Operations	1	30
TECF 1020	Blueprints	2	60
TECF 1041	Intro to SolidWorks	1	30
TECF 1050	Crane Rigging, Safety, and Operation	2	60
TECF 1061	Structural Fabrication	4	120
TECF 1071	Pipe Fitting	4	120
TECF 1081	Final Project	3	90

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Fabrication and Fitting
FY2026 / 21 Credits (630 Clock-Hours)

PROGRAM DESCRIPTION

In this Custom Design and Fabrication program, students will learn the base principles and practices of metal fabrication across a wide variety of industrial standards. Students will learn how to read blueprints and assemble metal products according to engineered drawings. They will also learn fabrication skills, according to specific standards and codes set in place by major industrial organizations, such as the American Welding Society and the American Petroleum Institute.

Objectives:

- Operate common fabrication equipment such as drill presses, brake presses, and overhead cranes in the safest manner possible.
- Sketch drawings of fabricated product based on the application, using fundamentals of design.
- Apply the mathematics of engineering to produce a blueprint or drawing.
- Operate common machinery found in a fabrication shop, including the pipe threader, CNC tables, and overhead cranes.
- Turn drawings into physical fabricated products, including steel pipe assemblies, structural components, and any other form of metal product that would require different skills to build.
- Operate basic welding equipment, thermal cutting equipment, and hand-tools to effectively fabricate a wide range of products.

FOUNDATIONAL COURSE DESCRIPTIONS

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.

Introduction to Cutting and Welding — 3 Credits/90 Clock-Hours

Introduction to Cutting and Welding is designed to equip students with fundamental skills in operating and utilizing welding equipment, as well as performing advanced cutting processes. The course introduces students to the functions of welding machines and teaches them how to produce structurally sound tack welds. Additionally, students will learn to prepare and fabricate basic weld joints, laying the foundation for more advanced welding techniques.

Objectives:

- Produce adequate oxy-fuel, plasma-arc, and carbon-arc cuts.
- Produce adequate welds with a variety of welding processes.
- Test weld soundness by means of destructive testing according to industry standards.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Fabrication and Fitting
FY2026 / 21 Credits (630 Clock-Hours)

Tool and Machine Operations — 1 Credit/30 Clock-Hours

This course is designed to teach students how to safely and effectively operate a variety of tools and machines. Students will understand the safe operating procedures of heavy equipment such as sheet benders, shears, pipe threaders, magnetic drill presses, mechanized track systems, and other common fabrication equipment.

Objectives:

- Perform start-up and operating procedures safely.
- Select the appropriate tool/machine for the preferred outcome.
- Use tools/machines proficiently.

Blueprints — 2 Credit/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.

Concept Sketching — 1 Credits/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.

Intro to SolidWorks — 1 Credit/30 Clock-Hours

This course is designed to teach students introductory methods of design for 3-dimensional projects using CAD software. It teaches them the introductory steps for engineering project blueprints.

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.

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.

Structural Fabrication **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.

Pipe Fitting **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.

Final Project **3 Credits/90 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.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Interior Design
FY2026 / 39 Credits (1200 Clock-Hours)

Interior Design

Institutions: Bridgerland

Technical Certificate (Catalog Year: 2026, 39 Credits/1200 Clock-Hours Required, CIP: 19.0605)

Foundational Courses (39 Credits/1200 Clock-Hours)		Credits	Clock-Hours
TEID 1010	Design Theory	4	120
TEID 1025	Color Theory	1	30
TEID 1035	Rapid Sketching	2	60
TEID 1045	Materials & Sources	4	120
TEID 1050	Textiles & Pattern Development	1	30
TEID 1060	Building Codes	1	30
TEID 1070	Space Planning & AutoCAD	5	150
TEID 1080	SketchUp Pro	3	90
TEID 1090	REVIT Basics	4	120
TEID 1105	Architectural Detailing	5	150
TEID 1110	Capstone Project	5	150
TEID 1120	Product Development and Portfolio	1	30
TEID 1130	Business Practices	1	30
TEID 2999	Interior Design Externship	2	90

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Interior Design
FY2026 / 39 Credits (1200 Clock-Hours)

PROGRAM DESCRIPTION

The Interior Design program prepares graduates for careers in interior design and cultivates career skills with technical software, drafting, and digital drawings. Students learn to use design rules and apply the design process using the most relevant software in the interior design industry. Students design and draft residential and commercial projects to create a full set of working drawings. Design elements and technical drafting are taught using current building codes. This ensures students have a strong design aesthetic and understanding of design construction and architecture. Students are mentored one-on-one by industry professionals Qualifying students will be provided with client projects, field trips, and possible internships at the Las Vegas World Market. Upon completion of this competency-based certificate, students are prepared to begin their career in the Interior Design industry.

Objectives:

- Demonstrate creative and technical skills by taking a client's inspiration to a complete design concept.
- Prepare and present client projects demonstrating professionalism in verbal and visual communication and personal appearance.
- Utilize 3D consulting software for client presentations to introduce new product designs as well as construction designs.
- Present design concepts to others for feedback and critique.
- Read, understand, and develop effective construction documents.
- Develop professional business, leadership, and communication skills by planning, organizing, and participating with design teams for client projects.

FOUNDATIONAL COURSE DESCRIPTIONS

Design Theory **4 Credits/120 Clock-Hours**

The Design Theory course teaches students the design process and elements of design theory to create original designs. Students will study current and relevant design styles, furniture styles, and roof shapes. Covers how to use industry software such as Adobe Photoshop, Illustrator, InDesign, and Homestyler to apply design theory and technical software skills to 3D design renderings and in personal branding and marketing of student portfolios. Students will develop strong presentation skills by providing visual and verbal communication of their final design concepts while justifying their design decisions. Students who complete this course are prepared to apply design theory to practice.

Objectives:

- Apply technical skills such as scale, proportion, light, shadows, and perspective realism in basic 3D perspective room renderings.
- Apply the basic principles of graphic design and branding.
- Demonstrate and further enhance creativity by completing the steps of the design process and applying techniques learned from the course.
- Identify and apply key features of architecture, roof styles, and design styles through research and application of these features in individual designs.
- Demonstrate and further develop skills in professional communication by presenting final projects and justifying design decisions.

Color Theory — 1 Credit/30 Clock-Hours

The Color Theory course helps students explore the basics of color theory, beginning with the color wheel and the role of psychology in the human response to color. Students will also learn to identify tints, tones, and shades of colors through color selections and applications in designs and the subtle messaging that each of these elements can convey to a design element. Students assess design aesthetics for effectiveness and enhancement or modification. Students apply appropriate color harmonies and combinations to enhance or subdue a design. Students who complete this course are able to analyze and apply color theory to projects.

Objectives:

- Identify tints, tones, and shades of color and their effects.
- Use various color combinations in enhancing and subduing designs.
- Create unique color harmonies and trend colors using color inspirations.
- Develop and apply color schemes to designs.
- Use color psychology to appropriately select and apply color to design projects.

Rapid Sketching — 2 Credits/60 Clock-Hours

The Rapid Sketching course teaches students how to quickly sketch realistic one- and two-point perspectives quickly in the correct scale to communicate design concepts and design vision to clients and team members. Since the ability to quickly convey ideas is critical to success in the industry, students practice quick, timed sketching and rapid rendering techniques using black sketching pens and markers. Students will learn to sketch architectural features by applying the principles of line, texture, pattern, and shadow.to prepare them for working with clients and firms. Students who complete this course are able to quickly sketch ideas for clients and employers.

Objectives:

- Quickly sketch one- and two-point perspective drawings with architectural details, furniture, and accents.
- Use correct scale and proportion to sketched elements using a black pen and marker to show quick sketching techniques, such as shadows, depth, and texture.
- Complete timed rapid sketches in 15-minute and 3-minute practices.
- Apply appropriate design elements and principles in hand-rendered interior design sketches.
- Present drawings in a professional manner.

Materials and Sources — 4 Credits/120 Clock-Hours

The Materials and Sources course helps students research materials and products used for residential and commercial spaces. Students learn each material's correct function and purpose by compiling industry standard specification sheets and researching requirements for installation and maintenance. Students also learn how to source materials available for the residential and commercial markets, so that they can gain a greater understanding of labor costs and trending products. Covers how to calculate product costs using specific formulas. Students who complete this course are able to acquire materials for clients and employers.

Objectives:

- Research and identify the best materials and sources for finish materials and products in residential and commercial interior/exterior projects.
- Identify new products, techniques, finishes, and innovations in the design market.
- Evaluate price and quality differences between interior and exterior finishes.
- Determine how fabrication, installation, and other specifications impact material selection.

- Apply correct measurement and calculation formulas to specific products for accurate quantities.

Textiles and Pattern Development **1 Credit/30 Clock-Hours**

The Textiles and Pattern Development course helps students learn the history of textiles and the influences cultures had on the construction and application of textiles in interior design. Students also identify the role of fibers and weaves in fabric construction and the use of various types of fabrics and patterns best used in projects. The students apply product development to design a textile pattern, manufacture their own textile sample, render their textile design in a way that best showcases their product line, and publicly present their vision and findings. Students who complete this course can assist employers and clients with textile selection and development.

Objectives:

- Identify the correct construction and application of textiles used for residential and commercial designs.
- Select different types of weaves and construction of fabrics to be used for the correct applications for furniture, window coverings, upholstery, accent pillows, and bedding.
- Create a textile pattern that can be developed into a product line and render the product into an interior design of choice.
- Present the project in a professional manner publicly.

Building Codes **1 Credit/30 Clock-Hours**

The Building Codes course helps students learn the process of finish material estimating and ordering procedures for installation. Students become proficient in estimating and ordering finishes, including flooring, window and wall coverings, draperies, paint, and upholstery. They also gain an understanding of building codes as they relate to finish materials and project installation. Students demonstrate mastery of calculating estimates and identifying building code violations through mock-client scenarios. Students who complete this course understand how to apply building codes, which is an essential skill as a designer.

Objectives:

- Calculate material estimates for a variety of finishes based on mock-client scenarios.
- Apply appropriate building codes while placing finish materials on floor plans.
- Analyze and effectively plan for finish materials within a client's budget.
- Identify areas of concern on floor plans.
- Use building codes to correct building violations.

Space Planning and AutoCAD **5 Credits/150 Clock-Hours**

The Space Planning and AutoCAD course helps students learn space planning rules to organize unique and creative spaces and design layouts of interior residential and commercial projects. Building codes, ADA accessibility requirements, environmental concerns, and occupancy standards are used to organize residential and commercial interior spaces and ensure those spaces are both accessible and safe to use. Students se problem-solving, sketching, and schematic design development to address the needs of clients to effectively organize and design new construction as well as to renovate projects. Students who complete this course are prepared to use AutoCAD for employers.

Objectives:

- Use current building codes and ADA requirements to organize residential and commercial interior spaces based on the client specifications.

- Use current building codes and ADA requirements to organize commercial interior spaces based on the client specifications.
- Organize furniture plans that meet code requirements for clear, easy access and function.
- Apply problem-solving skills during the design phase for resolving problematic floor plans and/or existing spaces.
- Use AutoCAD to draft basic and advanced residential and commercial floor plans with project documents and schedules.

SketchUp Pro **3 Credits/90 Clock-Hours**

The SketchUp Pro course teaches students to use SketchUp Pro to import AutoCAD files and create 3D BIM (Building Information Modeling) models of existing floor plans, create new floor plans, and learn to use the software's main modeling features for custom architecture and furniture designs. Students learn to navigate the SketchUp Pro warehouse for products and materials used to develop 3D renderings. They use the 3D walk-through presentation features used for client meetings and present their efforts publicly in a mock-client scenario. Students who complete this course are prepared to use SketchUp Pro for employers.

Objectives:

- Import design files from other software programs to be edited or added to using SketchUp Pro software.
- Apply knowledge of architecture and design elements to new build designs and create new floor plans.
- Create custom architecture and furniture using the SketchUp Pro BIM modeling software.
- Apply product materials to final renderings.
- Navigate multiple presentation modes for client presentations.

REVIT Basics **4 Credits/120 Clock-Hours**

The REVIT Basics course helps students learn how to use Autodesk 3D design software, Revit, to draft a large commercial office design. Basic Revit software is instructed so that students can apply advanced space planning concepts and commercial building codes to their projects. Students learn how to apply Revit materials and create schedules for the project. Students learn to render their projects in Revit for professional, visual presentations. Students who complete this course are prepared for more advanced Revit training introduced in a later course.

Objectives:

- Use Revit 3D software to design and draft floor plans using current building codes.
- Apply materials and products effectively to the project.
- Create schedule and design drawings for a set of professional construction documents.
- Present projects in a professional manner publicly.

Architectural Detailing **5 Credits/150 Clock-Hours**

The Architectural Detailing course helps students use Revit to draft architectural detailed drawings and build mechanical, electrical, plumbing (HVAC, Electrical, and Plumbing) systems for commercial projects. They draft working documents to include footings/foundations, sills, floors, walls, ceilings, windows, doors, roofs, electrical, plumbing, and climate control HVAC systems with their appropriate architectural symbols. Students draft detailed drawings and elevations for architectural features such as stairs, fireplaces, and custom cabinets. Students who complete this course are prepared to draw detailed architectural drawings, giving them valuable industry skills.

Objectives:

- Design and draft working construction documents based on industry standards using 3D Revit software, and current building codes.
- Label and specify all details and dimensions needed for furniture and other systems located in each space of a floor plan.
- Apply correct architectural symbols and dimensions to construction systems, detail drawings, interior and exterior elevation drawings, and working construction documents.
- Read, understand, and communicate the architectural details, systems, and codes on working drawings for residential designs.
- Present projects in a professional manner publicly.

Capstone Project **5 Credits/150 Clock-Hours**

The Capstone Project course allows students to demonstrate mastery of all skills developed throughout the program. The senior project includes a large residential project using Revit. This final project must incorporate all the elements and principles of design, color theory, rapid sketching, materials and sources, textiles, building codes, space planning, architectural detailing, and product development. This final project determines whether the student has learned the necessary skills and techniques required by industry leaders to be an interior designer. Students who complete this course show that they have all the basic skills to be an interior designer.

Objectives:

- Provide research and inspiration for design, development, and refinement using the design process.
- Communicate the design process from rapid sketches and preliminary drawings to technical drawings and 3D renderings.
- Develop floor plans, elevations, construction plans, and final design renderings based on current code restrictions and applications in detailed construction plans.
- Manage budgets through calculations of square footages and material cost estimates.
- Source samples of products and provide construction and installation schedules and specifications.
- Use Revit to create professional design plans and documents.
- Create a professional presentation of the design process and final product for a class critique with project branding.
- Communicate the design concepts and elements of final design projects professionally, visually, and verbally.

Product Development and Portfolio **1 Credit/30 Clock-Hours**

The Product Development and Portfolio course helps students use Adobe InDesign to compile their best product development designs and organize their approved portfolio assignments in a physical portfolio and on a web E-portfolio platform. Advanced graphic design skills are used to design both the physical portfolio and the E-portfolio. Students use professional, personal branding, and marketing skills to promote both portfolios and to organize bodies of work. Students who complete this course have a professional grade portfolio to show potential employers or clients.

Objectives:

- Apply graphic design skills and training to market and promote product designs and design concepts.
- Develop professional portfolios and magazine spreads using Adobe InDesign.

- Build an easy-to-use, online web E-portfolio with an E-commerce option that can be added to and/or edited.
- Create a professional resume and promote it on social media platforms for future employment opportunities.
- Communicate the design concepts and elements of the portfolio and resume professionally, visually, and verbally.

Business Practices **1 Credit/30 Clock-Hours**

The Business Practices course helps students learn the business aspects of interior design. Students learn how to apply professional best practices in social media management, interview and employment strategies, freelance work, collaboration with vendors, building and leading a design team, ethical business procedures, industry safety, client relationships, and personal branding. Students practice effective interviewing techniques in mock interviews as they shadow a designer or specific business, create reports on vendors, and develop a business plan. Students will create professional business documents, such as a list of services, contracts, and invoices. Students who complete this course are prepared to start their own business.

Objectives:

- Perform proper interviewing techniques.
- Identify best practices in social media usage.
- Identify the different ways of building a business or clientele.
- Identify key ethical and industry-standard business practices.
- Create a personal or business brand.
- Create a vendor/trades list and project management schedules.

Interior Design Externship **2 Credits/90 Clock-Hours**

The Interior Design Externship course allows students to research potential internship opportunities based on their preference for employment and arrange a minimum of 90 hours to work as an extern. This hands-on training is an opportunity for students to secure a position or future employment at a workplace of their choice. The department head must approve all externships prior to the students arranging the externship. Students check in with an instructor each week of their externship to ensure that the objectives are met and to allow for any mentoring. Students who complete the externship receive real-world experience and are able to demonstrate to employers the knowledge and skills acquired through the program.

Objectives:

- Contact potential employers to promote themselves as future employees.
- Provide professional portfolios and resumes for internships and job interviews.
- Demonstrate competency in all industry design software, attention to detail, problem-solving and time management.
- Apply design training, creative innovation, and technical design concepts to projects and/or assist on projects.
- Apply all required employment skills to each day of the internship.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Software Development
FY2026 / 21 Credits (630 Clock-Hours)

Software Development

Institutions: Bridgerland, Davis, Ogden-Weber, Southwest, Tooele

Technical Certificate (Catalog Year: 2026, 21 Credits/630 Clock-Hours Required, CIP: 15.1204)

Foundational Courses (21 Credits/630 Clock-Hours)		**Credits**	**Clock-Hours**
TESD 1400	Computer Programming	4	120
TESD 1800	Software Development	4	120
TESD 1100	Client-side Web Development	4	120
TESD 1500	Database Development	4	120
TESD 1700	Server-side Web Development	4	120
TESD 1050	Job Seeking Skills	1	30
Supplemental Courses			
Bridgerland (9 Credits/270 Clock-Hours)			
TESD 1000	Frontend Framework	3	90
TESD 1010	Backend Framework	3	90
TESD 1900	Fullstack Integration	3	90
TESD 1110	Prototyping and Design	3	90
TESD 1510	Content Management Systems Fundamentals	3	90
TESD 2835	Software Development Capstone	3	90
TEDA 1030	Python Programming	3	90
Davis (9 Credits/270 Clock-Hours)			
TESD 1640	Mobile Development	4	120
TESD 1930	Introduction to DevOps	1	30
TESD 1410	C++ Programming I	4	120
TESD 1411	C++ Programming II	3	90
TESD 2840	Capstone Project	4	120
TESD 2914	Software Development Externship	4	180
TESD 2851	Special Project I	1	30
TESD 2852	Special Project II	2	60
TESD 2853	Special Project III	3	90
Ogden-Weber (9 Credits/270 Clock-Hours)			
TESD 1030	Foundations of Computing	4	120
TESD 1040	Software Development Math	1	30
TESD 1136	JavaScript	2	60
TESD 2830	Capstone Project	2	60
Southwest (9 Credits/270 Clock-Hours)			
TESD 1180	Advanced Web Development	4	120
TESD 1600	Android App Programming	4	120
TESD 1610	IOS App Programming	4	120
TESD 1420	Advanced Java Programming	4	120
TESD 1430	Python Programming	4	120
TESD 1620	Computer Game Programming	4	120
TESD 2860	Final Advanced Project	1	30
Tooele (9 Credits/270 Clock-Hours)			
TESD 1810	Unit Testing and DevOps	2	60
TESD 2870	Capstone Project	2	60
TESD 1020	Cloud Computing	3	90
TESD 1440	C# Programming I	3	90
TESD 1441	C# Programming II	3	90

Revised: January 09, 2025

Utah System of Higher Education
Software Development
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PROGRAM DESCRIPTION

The Software Development program provides students with the opportunity to learn the languages and tools needed to start a career as a Software Developer. Languages and technologies taught will cover the spectrum from the front-end user interface to the back-end server, both desktop and mobile. Students will learn technologies and skills like Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), JavaScript, User interface and User Experience (UI/UX), Application Programming Interfaces (API), Developer Operations (DevOps), Cloud Computing, Version Control, Leadership, and Soft Skills. Students will learn code documenting, testing, and debugging to create and maintain software applications.

Objectives:

- Explore modern software development.
- Deliver software applications using current project management practices.
- Demonstrate problem-solving skills with computer programming.
- Practice workplace professionalism.
- Demonstrate the use of techniques and tools necessary for Software Development.

FOUNDATIONAL COURSE DESCRIPTIONS

Computer Programming **4 Credits/120 Clock-Hours**

In Computer Programming, students will use critical thinking, and problem-solving skills as they practice basic programming constructs including selection, repetition, classes and methods, string processing, and array structures. Students will be introduced to version control on their code projects.

Objectives:

- Describe object-oriented programming.
- Practice using procedures, methods, and functions.
- Create and use classes.
- Apply structured programming techniques.
- Utilize Version Control.

Software Development **4 Credits/120 Clock-Hours**

In this course, students will explore the Software Development Life Cycle. Students will test code, practice searching, sorting, building data structures, using generic objects and collections, and asynchronous processing. Students will be exposed to modern project management styles.

Objectives:

- Practice project management techniques.
- Design feature specification for software.
- Apply Code Design patterns.
- Design code using common data structures.
- Explore the Software Development Lifecycle.

Utah System of Higher Education
Software Development
FY2026 / 21 Credits (630 Clock-Hours)

Client-side Web Development — 4 Credits/120 Clock-Hours

Client-Side Web Development provides experience developing websites using current standards and technologies. Students will be exposed to modern scripting and the Document Object Model (DOM) of web pages. Students will create functional websites, making them interactive and dynamic.

Objectives:

- Implement common HTML tags in a functional coding format to create a Web site using current standards and technologies.
- Demonstrate the ability to upload and publish a web page on a web server.
- Investigate web scripting and the HTML DOM / Manipulate the DOM using web scripts.
- Use web hosting service to deploy a website.
- Explore best practices in modern responsive website design.

Database Development — 4 Credits/120 Clock-Hours

Database Development provides students a fundamental introduction to database concepts and query languages used in database management systems. Students will design and implement simple databases, and utilize queries to retrieve, store, and update data in these databases.

Objectives:

- Recognize core database concepts.
- Describe database objects: data types, views, and stored procedures.
- Utilize basic SQL to interact with databases.
- Explain data storage concepts: normalization; primary, foreign, and composite keys; and indexes.
- Use basic information assurance and database security concepts.

Server-side Web Development — 4 Credits/120 Clock-Hours

Server-side programming explores delivering a customized user experience. This course combines the skills of programming, client-side development, and relational database management to create and manage dynamic web-based content. Students will be exposed to using, creating, and testing web APIs.

Objectives:

- Implement server-side programming to serve the client-side development.
- Demonstrate proper syntax, patterns, data structures, and functional usage of server-side language.
- Connect and utilize database.
- Develop controls and event-handling procedures.
- Apply server-side concepts and techniques to create, manage, and use dynamic web pages.
- Employ API testing and development.

Job Seeking Skills — 1 Credit/30 Clock-Hours

Job Seeking Skills explores how to prepare and successfully apply to potential career opportunities. During this course, you will be presented with essential job-seeking skills needed to find gainful employment.

Objectives:

- Create a professional resume, cover letter and reference sheet.
- Utilize online tools successfully to create an e-portfolio.
- Expand and develop networking skills.

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- Utilize online resources effectively to find job openings.
- Demonstrate the ability to fill out job applications in a professional manner.
- Perform successfully in a job interview.
- Demonstrate appropriate follow-up procedures.

SUPPLEMENTAL COURSE DESCRIPTIONS

Bridgerland

Frontend Framework **3 Credits/90 Clock-Hours**

The Frontend Framework course equips students with the skills and knowledge necessary for proficient development of modern web applications using cutting-edge frontend frameworks. Frontend Framework focuses on empowering students with the tools and techniques essential for building dynamic, responsive, and user-friendly interfaces.

Objectives:

- Identify the role of frontend frameworks in website development.
- Create responsive user interfaces.
- Utilize component-based architecture.
- Demonstrate proper use of state management.
- Implement optimization and security best practices in a frontend framework.

Backend Framework **3 Credits/90 Clock-Hours**

The Backend Framework course empowers students with the expertise required to build robust and scalable server-side applications. This course delves into the intricacies of backend frameworks, providing students with the skills and knowledge needed to architect, implement, and maintain powerful backend systems.

Objectives:

- Identify the role of backend frameworks in website development.
- Integrate and manage databases using a backend framework.
- Create & consume Application Programming Interfaces (APIs).
- Construct authentication and authorization processes to verify users using a backend framework according to industry standards.
- Implement optimization and security best practices in a backend framework.

Fullstack Integration **3 Credits/90 Clock-Hours**

The Fullstack Integration course bridges the gap between frontend and backend development, creating well-rounded fullstack developers. This course empowers students with the expertise to seamlessly integrate frontend and backend components, resulting in cohesive and fully functional web applications.

Objectives:

- Identify the integration of frontend and backend framework's role in website development.
- Integrate and manage databases across the stack.
- Create & consume Application Programming Interfaces (APIs).
- Construct authentication and authorization across the stack.
- Implement optimization and security best practices across the stack.

Prototyping and Design — 3 Credits/90 Clock-Hours

The Prototyping and Design course empowers students with the skills and knowledge needed to create compelling, user-centric designs and functional prototypes. In this course, students learn industry-standard design principles, tools, and methodologies to transform conceptual ideas into visually appealing and interactive software solutions.

Objectives:

- Prototype user experience (UX) for web and mobile development.
- Create a site map for project planning.
- Implement graphic design principles including color, typography, and layout.
- Create a cohesive website design using creative thinking and brainstorming methodologies.
- Utilize industry-standard software used for graphic design to create website mock-ups.

Content Management Systems Essentials — 3 Credits/90 Clock-Hours

The Content Management System Essentials course equips students with the essential skills to create, customize, and manage dynamic websites using a content management system (CMS). From basic website setup to advanced customization, students gain hands-on experience to become proficient CMS users.

Objectives:

- Properly install a content management system program.
- Create a website using a content management system platform.
- Utilize plugins and themes to improve site functionality.
- Secure a website using content management system security features.
- Develop a website using content management system themes.

Software Development Capstone — 3 Credits/90 Clock-Hours

The Software Development Capstone course combines all of the components from the student's chosen track into a capstone project that can be used in their portfolio. Students who complete this course are able to complete a simple project from the proposal stage all the way to presenting their finished product.

Objectives:

- Create a proposal for a project of the student's choice.
- Establish and meet project deadlines.
- Organize and Manage project resources, such as files, media, APIs, or databases.
- Build on previous knowledge by utilizing additional learning resources.
- Develop a project with instructor input.

Python Programming — 3 Credits/90 Clock-Hours

The Python Programming course introduces the Python programming language. Topics include basic Python syntax, procedural programming concepts, data types, decision and control structures, working with data analytics-related Python libraries, and creating and running functions. Students use both command prompt and industry standard integrated development environments (IDEs) to create and run their Python code. Students completing this course are able to perform basic tasks in Python related to the work of the entry-level data practitioner.

Objectives:

- Demonstrate competency using an interactive development environment to write Python code.

- Write basic Python code to structure, clean, and analyze data.
- Demonstrate competency with conditionals for decision and control structures and data modifications.
- Demonstrate proficiency with for loop and while loop coding.
- Demonstrate proficiency with data types and functions for analysis and use of data.

Davis

Mobile Development — 4 Credits/120 Clock-Hours

This course introduces students to programming technologies, design and development related to mobile applications. Topics include accessing device capabilities, industry standards, operating systems, and programming for mobile applications. Students will work on multiple projects producing professional-quality mobile applications.

Objectives:

- Use a modern programming framework to create mobile apps.
- Use navigation between screens in an app.
- Utilize native features like the camera and maps.
- Add style to objects and components on multiple screens in apps.
- Work with local storage and connect with databases for long term storage.

Introduction to DevOps — 1 Credit/30 Clock-Hours

The Introduction to DevOps course will expose students to DevOps's cultural mindset and tools. Students will practice creating containers for software applications to run in for fast deployment and frequent releases. Students will practice managing multiple containers with current industry technology during this course. Students will explore how Continuous Integration and Continuous Delivery are integral parts of the software application life cycle.

Objectives:

- Explore how DevOps (Development Operations) fits in the Software Development Life Cycle.
- Practice creating and using software containers.
- Experience orchestrating multiple containers with container management software.
- Explore Continuous Integration and Continuous Delivery (CI/CD).

C++ Programming I — 4 Credits/120 Clock-Hours

This course introduces students to the C++ language and object-oriented programming. Students will practice critical thinking, problem solving skills, and basic testing processes as they are introduced to basic C++ programming constructs including selection and repetition controls, classes and methods, string processing, array structures, input and output, searching, sorting, and vectors.

Objectives:

- Create and use basic C++ programs.
- Incorporate selection and repetition controls in C++ programs.
- Practice using functions, classes and objects, and vectors.
- Demonstrate searching and sorting algorithms in arrays and vectors.
- Include pointers in C++ programs.
- Demonstrate use of C-strings and strings in C++ programs.

C++ Programming II — 3 Credits/90 Clock-Hours

This course gives students more experience in intermediate C++ programming language and object-oriented programming constructs, such as data abstraction and inheritance. As students complete this course, they will develop competency in pointers, virtual functions, abstract classes, templates, exception handling, recursion, and data structures.

Objectives:

- Create and use classes with inheritance, aggregation, and composition.
- Include virtual functions, abstract classes, and pure virtual functions in C++ programs.
- Practice advanced file and I/O operations with random access files.
- Include recursion in C++ programs.
- Use template functions to handle multiple data types.
- Practice exception handling.
- Include functions in the Standard Template Library in C++ programs.
- Incorporate pointers in C++ programs.
- Demonstrate the use of linked lists, stacks, queues, and binary trees.

Capstone Project — 4 Credits/120 Clock-Hours

The capstone course allows students to demonstrate how the knowledge and skills learned through the Software Development program can be applied to solving real-world business problems. Individually or in a small group, students will find a real-world business problem to solve. Students will research and understand the business case. Creating a scope for the project and setting the timeline for the deliverables. Then develop the solution according to the plan. At the completion of the project, the individual or team will present their capstone project to the Software Development class.

Objectives:

- Demonstrate knowledge and skills learned in the Software Development program.
- Work collaboratively with a team or user to develop a software project.
- Solve a real-world problem.
- Research and understand a business case that software can solve.
- Practice program management.
- Present project to an audience.

Software Development Externship — 4 Credits/180 Clock-Hours

This course provides an opportunity for Software Development students to gain professional exposure to the technologies learned in the program through internship, externship, or job-shadowing, as determined by employer-college relationships.

Objectives:

- Experience real-world software development.
- Practice developing software as a team.
- Report to a project manager with task progress.
- Practice time management.
- Work in a live production environment.

Special Project I **1 Credit/30 Clock-Hours**

This course provides students the opportunity to continue their learning in a specific area, explore an area which is not currently available as part of their current training plan, or otherwise not covered by the ongoing Software Development program course offerings. Coursework will consist of instructional activity and/or a significant professional project that is logically consistent with the content of the student's program of study or a special project guided and evaluated by a member of the Software Development faculty.

Objectives:

- Explore advanced skills used in the Software Development workplace via a special project and instruction related to a student's career goals.

Special Project II **2 Credits/60 Clock-Hours**

This course provides students the opportunity to continue their learning in a specific area, explore an area which is not currently available as part of their current training plan, or otherwise not covered by the ongoing Software Development program course offerings. Coursework will consist of instructional activity and/or a significant professional project that is logically consistent with the content of the student's program of study or a special project guided and evaluated by a member of the Software Development faculty.

Objectives:

- Explore advanced skills used in the Software Development workplace via a special project and instruction related to a student's career goals.

Special Project III **3 Credits/90 Clock-Hours**

This course provides students the opportunity to continue their learning in a specific area, explore an area which is not currently available as part of their current training plan, or otherwise not covered by the ongoing Software Development program course offerings. Coursework will consist of instructional activity and/or a significant professional project that is logically consistent with the content of the student's program of study or a special project guided and evaluated by a member of the Software Development faculty.

Objectives:

- Explore advanced skills used in the Software Development workplace via a special project and instruction related to a student's career goals.

Ogden-Weber

Foundations of Computing **4 Credits/120 Clock-Hours**

This course provides a solid foundation in computer science topics with industry applications. In this course there is no expectation of a computing background. It introduces concepts such as ethical issues in computing, networks, operating systems, databases, problem solving and programming.

Objectives:

- Describe historical implications of computing.
- Describe social implications of computing.
- Explain computing security.
- Explain computing ethics.

- Identify computer architectures.
- Explain networks.
- Describe the internet.
- List database fundamentals.
- Describe numbering systems.
- Explain data representations.
- Identify data structures.
- List operating systems.
- Identify file structures.
- Define the human-computer interface.
- Explain problem solving.
- Describe debugging.
- Explain software engineering.

Software Development Math **1 Credit/30 Clock-Hours**

This course teaches students the essential concepts of mathematics including algebra that Software Developers use. Using the skills developed through this course, students will be able to face the logical and mathematical challenges that programming represents.

Objectives:

- Demonstrate algebra concepts and explain their use in programming.

JavaScript **2 Credits/60 Clock-Hours**

This course covers the basics of JavaScript and concludes with an overview of essential libraries and tools. JavaScript is extensively used in web development for creating interactive content. Throughout this course, students will learn about JavaScript's features and its application in modern web development.

Objectives:

- Demonstrate use of Variables, Conditionals, Arrays, Functions, and objects in JavaScript.
- Use the Document object Model (DOM) to control HTML structures.
- Create applications using Node, Express.
- Demonstrate consuming web Services.

Capstone Project **2 Credits/60 Clock-Hours**

This course provides an opportunity to complete a significant programming project from the design phase through implementation with minimal instructor support. Emphasis is placed on project definition, testing, presentation, and implementation. This course will explore how to complete a project from the definition phase through implementation.

Objectives:

- Demonstrate time management principles.
- Demonstrate the ability to meet deadlines for regular deliverables.
- Demonstrate appropriate customer relations with regard to project changes including scheduled updates, revisions, etc.
- Presentation the capstone project using applicable presentation skills.

UTAH SYSTEM OF HIGHER EDUCATION
Southwest

Utah System of Higher Education
Software Development
FY2026 / 21 Credits (630 Clock-Hours)

Advanced Web Development **4 Credits/120 Clock-Hours**

This course covers advanced web development and helps students understand some common frameworks available to web developers. Advanced layouts and styling will be taught to help websites look more professional. Students will create a few different types of websites to help them understand how these different websites are used by companies worldwide.

Objectives:

- Use advanced CSS to create responsive websites.
- Explain common frameworks used in web development.
- Implement several different types of websites commonly used by companies.
- Practice deploying websites on live web servers.

Android App Programming **4 Credits/120 Clock-Hours**

Android apps are used constantly by mobile users throughout the world. Understanding how these apps work and are programmed is a highly sought-after skill in today's job market. Our Android App Programming course covers core concepts to help students create working Android apps. Building a reliable app that uses several Android App API's will give students the job ready skills they need.

Objectives:

- Develop a user interface using different types of controls.
- Explore user input, variables, and operations.
- Use lists, arrays, and Web browsers in an Android app.
- Include audio such as music in Android apps.
- Create an Android app that requests, stores, and modifies data for multiple activities.

IOS App Programming **4 Credits/120 Clock-Hours**

IOS apps are used by many users throughout the world today. Using Swift and Xcode, students will learn how to build working IOS apps. This course will also help students debug and test their IOS apps as they learn layouts, controllers, and functions that explore the Apple devices these apps will be deployed on.

Objectives:

- Discuss design and color theories.
- Use Sketch to build app designs.
- Navigate Xcode.
- Design in Swift Playground and Xcode Storyboard.
- Explain different controllers and how to use them.

Advanced Java Programming **4 Credits/120 Clock-Hours**

This course covers advanced Java programming concepts such as generics, data structures, search trees, and advanced JavaFX design and implementation. Students will gain a sound understanding of in-depth Java programming and will use their skills to create an advanced JavaFX layout utilizing these concepts.

Objectives:

- Explain generics and how they are used.
- Explore common data structures.

- Work with search trees and common data related to them.
- Build a useful JavaFX layout using advanced Java programming concepts.

Python Programming **4 Credits/120 Clock-Hours**

Python Programming integrates your previous programming experience with the Python syntax. While in this course, you will create programs involving graphics, image manipulation, GUIs, simple networked client/server applications, and stacks.

Objectives:

- Explain procedural abstraction in function definitions.
- Manipulate graphics and image processing.
- Implement networks and client/server programming.
- Use events and event-driven programming.
- Create and apply stacks and lists.

Computer Game Programming **4 Credits/120 Clock-Hours**

Our computer game programming course covers a wide range of skills used by computer game programmers every day. We explore many different aspects of computer games including working with images, using databases in games, animations, and developing an efficient game loop. Students will develop a working game using many programming skills already learned throughout their courses such as objects, functions, and loops.

Objectives:

- Explain game loops and how to efficiently set them up.
- Work with assets such as images and sounds.
- Build effective animations.
- Fine tune the user experience and create a working game.

Final Advanced Project **1 Credit/30 Clock-Hours**

Students will plan out a project of their choosing utilizing their development skills. The project will cover the concepts they have learned throughout their courses. A presentation will be made to a group to show others the finalized project.

Objectives:

- Plan a development project that uses previously taught skills.
- Develop a website/program/app to be used by a user/company.
- Present the finalized project to a group.

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Unit Testing and DevOps **2 Credits/60 Clock-Hours**

The goal of this course is to give the students a basic understanding of how to build, run, and use Jest to test their code. It will also teach students how the life cycle of unit testing works and why we use it in modern code practices today. The other goal is to help them mock and test core business logic in a practical way. This will also include some important material on how to include additional tooling using DevOps.

Objectives:

- Install and run a unit test using Jest.
- Explain the unit test life cycle of unit testing.
- Write good tests and explain what bad tests look like.
- Test the integration of the code.
- Test the DOM and frontend.

Capstone Project **2 Credits/60 Clock-Hours**

The goal of this course is to allow students to demonstrate the skills they have learned from the core content and apply it to a real-world project. This project will give guidelines for students to put together their real-world project. It will have minimal instructor support alongside the emphasis on time management, testing, and presentation.

Objectives:

- Demonstrate programming skills learned.
- Demonstrate time management skills.
- Present a real-world solution to a real-world problem.
- Display schedule planning skills with updates, revisions, versioning and more.

Cloud Computing **3 Credits/90 Clock-Hours**

This course provides an introduction to cloud computing. The course includes best practices for industry standards in cloud computing, understanding the difference between popular cloud platforms including AWS, Microsoft Azure, Google cloud and others, and will describe the different cloud service models.

Objectives:

- Compare the differences between cloud computing and local servers.
- Demonstrate coding for different operating systems.
- Explain emergent trends in cloud computing.
- Recognize differences in hybrid, multi-cloud, and serverless computing.
- Complete an architecture cloud computing final project.

C# Programming I **3 Credits/90 Clock-Hours**

This course introduces students to the C# language and object-oriented programming. Students will practice critical thinking, problem solving skills, and basic testing processes as they are introduced to basic C# programming constructs including selection and repetition controls, classes and methods, string processing, array structures, input and output, searching, sorting, and vectors.

Objectives:

- Create and use basic C# programs.
- Incorporate selection and repetition controls in C# programs.
- Practice using functions, classes and objects, and enums.
- Demonstrate searching and sorting algorithms in arrays.

C# Programming II **3 Credits/90 Clock-Hours**

This course will help students understand more complex uses of the C# language, building their skills in many diverse projects, utilizing frameworks, object-oriented programming, alongside some personal projects that students will build to display competencies in using the C# language.

Utah System of Higher Education
Software Development
FY2026 / 21 Credits (630 Clock-Hours)

Objectives:

- Explain advanced object-oriented programming.
- Build a project using frameworks and software tools.
- Build complex projects with many moving parts.
- Use C# in the web development.
- Create a CRUD application using C#.

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Web Programming and Development
FY2026 / 22 Credits (660 Clock-Hours)

Web Programming and Development			
Institutions: Mountainland, Salt Lake			
Technical Certificate (Catalog Year: 2026, 22 Credits/ 660 Clock-Hours Required, CIP: 11.0801)			
Foundational Courses (22 Credits/660 Clock-Hours)		**Credits**	**Clock-Hours**
TEWP 1000	Introduction to Web Development	2	60
TEWP 1010	JavaScript Programming	4	120
TEWP 1020	React.js	3	90
TEWP 1030	Backend Programming	2	60
TEWP 1040	Deployment and Security	1	30
TEWP 1700	Server-side Web Development	4	120
TEWP 1060	Angular Framework	4	120
TEWP 1080	Capstone	2	60
Supplemental Courses			
Mountainland (5 Credits and 240 Clock-Hours)			
TEWP 1900	Web Programming and Development Externship I	4	180
TEWP 1910	Web Programming and Development Externship II	1	60
Salt Lake (5 Credits and 150 Clock-Hours)			
TEDG 1020	Digital Literacy	1	30
TEWG 1070	Content Management Systems	3	90
TEWP 1800	Portfolio Website Project	1	30

Revised: January 09, 2025

UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Web Programming and Development
FY2026 / 22 Credits (660 Clock-Hours)

PROGRAM DESCRIPTION

This program provides students with the knowledge of computational, problem-solving and practical skills needed to integrate and deploy modern websites and web applications. Students will adapt and use industry-standard tools, including modern client-side and server-side languages and relational and non-relational database structures, to frameworks used in the web industry today.

Experienced web developers and software engineers in the industry provide instruction and share knowledge and skill sets as they mentor the students. This program is designed to give students the skills needed to be a Front-End, Junior-Level, Web Developer or Quality Assurance Technician.

Students will learn basic Front-End Development including Source Control, HTML, CSS, Bootstrap and Sass. Students will then spend the majority of the program learning JavaScript, TypeScript, Angular and React. The remainder of the program will cover Back-End Development as it relates to Back-end servers, Database, Hosting, Deployment, Security and Automated QA. Throughout the program students will complete a series of professional portfolio projects. Finally, students must complete an externship in order to receive a certificate of completion for this program.

Objectives:

- Demonstrate the knowledge and skills necessary for entry-level employment in the Web Programming and Development careers.
- Implement design, authoring, standards, protocols, tools and techniques for development for different Web-based technologies.
- Use industry-standard programming languages and techniques to add user interactivity to Web sites and Web applications. ● Build maintainable and robust React and Angular real-world applications.
- Create real-world web application projects that also involve interacting with databases such as Postgres and NoSQL databases like MongoDB.
- Use Automated QA principles to monitor and ensure increasing improvements for web applications and be able to identify some of the mechanisms used to establish overall health of a product.
- Consider important security concerns when developing websites, and keep servers, software, and data safe from hackers and cyber-attacks.
- Complete a series of professional portfolio projects that they can showcase to potential employers.
- Demonstrate basic understanding of cloud deployment models, and a summary of cloud design principles. Students will be able to create an account and start using the AWS Free Tier to gain hands-on experience with AWS products and services and be prepared to pass the AWS Certified Cloud Foundations exam.
- Develop, implement and evaluate web applications to ensure that it is properly structured, meets industry standards and compatible with browsers and devices using industry cutting-edge technologies for building web applications.

FOUNDATIONAL COURSE DESCRIPTIONS

Introduction to Web Development — 2 Credits/60 Clock-Hours

This course gives students an in-depth understanding of how to build web pages and a solid foundation for your future development or website-building career. Students will learn the basic concepts of the internet, web pages, markup coding and best practices that are applicable in the real-world environment using Git, GitHub, HTML, CSS, Bootstrap, Sass and JavaScript.

Objectives:

- Implement common HTML tags in a functional coding format to create a Web site using current standards and technologies.
- Demonstrate the ability to upload and publish a Web page on a Web server.
- Explore best practices in modern responsive website design.
- Receive common computational problem-solving techniques and training useful to entry-level web developers and programmers.

JavaScript Programming — 4 Credits/120 Clock-Hours

This course introduces students to a great foundation in computer programming using JavaScript. Students will learn to use JavaScript to cover basic programming including arrays, functions, objects, events and the DOM, web API's. JavaScript is a widely used industry programming language that can integrate with other languages and frameworks, providing learners a context in which to learn foundational programming concepts that can easily transfer to other programming languages.

Objectives:

- Learn a high-level overview of JavaScript as a programming language and some of the features that make it different from other programming languages.
- Implement and know how to effectively work with objects and inheritance in JavaScript and know how all this works behind the scenes.
- Create, build and start a basic server using JavaScript and Node.js.
- Know the importance of built-in Object and Array functions which will speed up development time and make code much more readable and concise.

React.js — 3 Credits/90 Clock-Hours

React is one of the web's most popular libraries that is used in production by huge companies like Twitter, Netflix, and Microsoft. React is fun to use and its component architecture makes it faster and easier to build scalable, maintainable and amazing products for the web including native platforms. This course will introduce the fundamentals of React using modern syntax and best practices for creating React components. Students will have hands-on experience with React's core concepts, and explore other concepts like testing, data fetching, routing and much more.

Objectives:

- Demonstrate how to use the fundamental building blocks of creating React components to build small and scalable web applications.
- Build simple and flexible React Components and Hooks using modern react patterns.
- Execute the essential tools and techniques to write, test, and deploy React components and applications with confidence.

Backend Programming — 2 Credits/60 Clock-Hours

This course will help students understand the concept that every great web application begins with the components of user experience and the business impact of delivery, deployment and support that is quick, cost effective, and requires great functionality. Students will learn that the combination of JavaScript, Node, and Express is an ideal choice for web teams that want a powerful, quick-to-deploy technology stack that is widely respected in the development community and large enterprises alike.

Objectives:

- Identify Node.js, core modules, and NPM (Node Package Manager) and how it works behind the scenes with event loop, blocking vs non-blocking code, event-driven architecture, streams, modules, etc.
- Explain the features and functions of Express (Node.js framework) from routing, middleware, to sending responses.
- Create a real-world web application to demonstrate how MVC (Model-View-Controller) architecture is applied.

Deployment and Security — 1 Credit/30 Clock-Hours

This course will provide foundational knowledge and hands-on projects that will teach students theory and practical skill required to install Docker and be aware of critical security risks to web applications. Students will learn to build, run, and deploy applications anywhere using the World's leading software container platform.

Objectives:

- Create, build and manage Docker images and containers effectively.
- Deploy course web application projects using Docker containers.
- Practice how to securely configure your browser to block malicious scripts, cookies, trackers, and so on, as well as maintain good privacy/anonymity on the Internet to safeguard your development environment.
- Learn best practices and fundamentals of confidently managing emails, business files, computers, mobile devices, and internet browsing.
- Understand human emotions, patterns and work on real life cases about how hackers trigger or trick people into providing access to money, personal accounts, systems, and company network.

Server-side Web Development — 4 Credits/120 Clock-Hours

Server-side programming explores delivering a customized user experience. This course combines the skills of programming, client-side development, and relational database management to create and manage dynamic web-based content. Students will be exposed to using, creating, and testing web APIs.

Objectives:

- Implement server-side programming to serve the client-side development.
- Demonstrate proper syntax, patterns, data structures, and functional usage of server-side language.
- Connect and utilize databases.
- Develop controls and event-handling procedures.
- Apply server-side concepts and techniques to create, manage, and use dynamic web pages.
- Employ API testing and development.

Angular Framework **4 Credits/120 Clock-Hours**

Angular is one of the fastest, most popular open-source web app frameworks today, and knowing how to deploy and use it is essential for developers. Angular is a TypeScript-based open-source web application framework led by the Angular Team at Google and by a community of individuals and corporations. Angular allows developers to create beautiful, performant, easily maintainable websites incredibly quickly. Students will learn to be proficient in the use of the Angular framework and produce full scale Angular applications.

Objectives:

- Demonstrate code for a full-scale Angular application.
- Create components and user interfaces, databinding, retrieving data using HTTP, and more.
- Build and deploy this application so that it can be accessed from anywhere.
- Communicate effectively with other Angular developers by knowing the fundamental concepts of Angular.
- Recognize good and bad patterns in Angular code.

Capstone **2 Credits/60 Clock-Hours**

The Capstone course enhances students' employability in the industry as they demonstrate their ability to plan, design and execute a responsive web project using the technology that they have acquired so far. The project must adhere to validation and accessibility standards. Students showcase a complete client project from concept to the final presentation.

Objectives:

- Research and develop a design system (color, typography, and layout) based on research and client information for the project.
- Develop and publish a web project using standards-compliant HTML, CSS, and any other technology stack.
- Conduct and present basic usability testing on the site and correct any issues.
- Design professional-level web page layouts with attention to usability: consistent navigation, clear visual hierarchy, and intuitive interface design.
- Present your project utilizing critical thinking ability, professional presentation skills, and the ability to explain your creative process.
- Create a professional resume, cover letter and reference sheet.
- Expand and develop networking skills.
- Demonstrate the ability to fill out job applications in a professional manner.

SUPPLEMENTAL COURSE DESCRIPTIONS

Mountainland

Web Programming and Development Externship I **4 Credits/180 Clock-Hours**

Upon completion of the classroom portion of program, students will find an externship opportunity to complete 180 hours within a real-world software development environment.

Objectives:

- Use source control principles and technologies to track and manage code.
- Write, review, and edit HTML, CSS, JavaScript libraries or frameworks like React and/or Angular code while completing assigned tasks.

- Collaborate with other team members while working to complete defined project goals.
- Students are embedded into existing development teams or organized into small project groups with other students.
- Students engage in tasks and assignments to support product development and/or other special development projects.

Web Programming and Development Externship II **1 Credit/60 Clock-Hours**

Upon completion of the classroom portion of the program, students will find an externship opportunity to complete 60 hours within a real-world software development environment.

Objectives:

- Use operating system commands and utilities to execute, test, troubleshoot and configure code and web applications.
- Utilize knowledge of back-end (server side) technologies while completing assigned tasks.
- Utilize knowledge of database technologies while completing assigned tasks.
- Students engage in tasks and assignments to support product development and/or other special development projects.

Salt Lake

Digital Literacy **1 Credit/30 Clock-Hours**

In this course, students will learn to effectively use digital technologies, such as computers and the internet, to find, evaluate, create, and communicate information. Students will demonstrate their ability to complete basic computing tasks such as working with an operating system, creating and managing files and folders, and effectively utilizing internet searches and resources. Students will also be introduced to common terminology and file types that they will encounter in various digital media industries.

Objectives:

- Demonstrate proper file management including the use of cloud storage.
- Demonstrate basic knowledge of the operating system.
- Describe important facts about the internet and how it works.
- Demonstrate the ability to use various browsers and their development tools.
- Explain the various languages used for building websites and how they interact.
- Describe the tools used for web design/development.
- Explain the various tools commonly used by web and graphic designers.

Content Management Systems **3 Credits/90 Clock-Hours**

Content Management Systems (CMS) introduces the process for transforming a static site into a dynamic CMS theme. Students will install the CMS locally, modify content, style the site using CSS/JS, and migrate the CMS to a live internet server.

Objectives:

- Setup a development environment.
- Identify the primary components that make up a CMS theme.
- Utilize CSS Preprocessing and JavaScript to add styling and functionality.
- Create a custom child theme.
- Identify and install essential plugins.

- Migrate the site to a live internet server.

Portfolio Website Project **1 Credit/30 Clock-Hours**

In this course, students will design and develop a personal portfolio website using HTML and CSS. This project will allow them to apply the concepts and techniques they have learned in the HTML and CSS courses. The portfolio website will showcase their work, skills, and personal information.

Objectives:

- Plan a website.
- Structure a website with HTML.
- Style a website with CSS.
- Populate a website with relevant content.
- Add interactive features.
- Test and debug a website on various browsers and devices.
- Optimize Images and code for faster loading times.
- Upload a website to a web hosting platform.