<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
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</table>
| MATH1019    | Math I                             | 60.00 | This course offers an introduction to basic mathematics, including operations with whole numbers, fractions, and decimals, as well as proportions, averages and percentages. Students are prepared for more advanced mathematics. Competencies:  
  • Perform different operations with whole numbers  
  • Perform different operations with fractions  
  • Perform different operations with decimals  
  • Solve simple problems with proportions, percentages and averages |
| MATH1070    | Applied Technical Math             | 90.00 | A course designed to teach practical problems in mathematics for drafting and CAD. The course will cover topics such as: applied geometry, applied algebra, applied trigonometry, graphs, ratio and proportion, measurement, and other applied math skills relating to design. Competencies:  
  • Demonstrate mastery of basic arithmetic  
  • Solve problems using geometry  
  • Solve problems using algebra  
  • Solve problems using trigonometry  
  • Apply math skills to solve design problems |
| WKSK0900    | Critical Workplace Skills          | 50.00 | Students in this course will develop professionalism skills that are vital for success in the workplace. Students will learn to incorporate self- and time-management skills for workplace preparedness. Students will also learn how management of personal finances affects workplace performance. Students will further develop workplace etiquette, dress, accountability, and workplace relationships; to include, but not limited to: ethics, politics, and diversity. Students will be introduced to a broad aspect of general human resources as they pertain to workplace success. |
| CADT1110    | Basic Computer Aided Design        | 120.00| A course to introduce the use of 2-dimensional (2D) computer aided design software and CAD techniques. Students will explore geometric construction techniques and tools used to develop technical design solutions for industry related Science, Technology, Engineering & Mathematics (STEM) fields. Topics include: CAD software interface, coordinate systems, drawing commands, editing commands, layers, orthographic views, auxiliary views, section views, dimensioning, and plotting. Students will use CAD standards to create working drawings. Additionally, students will development and adhere to custom CAD templates, styles, and standards. Students will learn proper and efficient response to redline critiques and design changes. Competencies:  
  • Uses of industry standard 2D CAD software  
  • Utilize cartesian and polar coordinate systems  
  • Develop CAD Drawings  
  • Modify CAD drawings  
  • Create orthographic projections and correct view layout  
  • Create Dimensioning and tolerancing  
  • Plot CAD Drawings  
  • Understand redlining, drawing review, and design changes |
| CADT1002    | Portfolio Creations                | 30.00 | This course, which will be completed after finishing all training classes, will provide instruction on the organization and creation of a portfolio. The CADT students will organize their drawing projects from the entire training program in this portfolio. This portfolio will be included when presenting examples of drawing work to future employers during a job interview. Proper presentation of these work examples is crucial for a successful interview experience. |

**Elective Courses (690 hours required)**

<table>
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<tr>
<th>Course Title</th>
<th>Hours</th>
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<tr>
<td>Architecture Design Track (690 hours required)</td>
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</table>
### CADT2311 Architectural Design

This class teaches the basic theory for architectural drafting and includes techniques such as: sketching, block creation, room design, sections, elevations, foundation design, details, and the hardware and software used in 2D architectural computer aided drafting.

**Competencies:**
- Demonstrate correct sketching techniques
- Create reusable architectural blocks and symbols
- Demonstrate room planning
- Construct site plan drawings
- Construct foundation plans
- Construct floor plans
- Construct stair detail drawings
- Construct elevation drawings
- Apply principles of residential architectural drafting
- Demonstrate use of a 2D CAD system

### CADT2331 Architectural CAD

In this course students will learn about the development of working drawings for a general architectural project using the computer, current industry standards, and 3D architectural CAD software. The class includes creation of architectural 3D models and the use of associated software tools. Students will be introduced to BIM (Building Information Modeling). Students will develop a set of architectural plans. Students will conclude this course with a hands on project to demonstrate architectural drafting skills.

**Competencies:**
- Understand grids and levels
- Understand the difference between 3D models, various views, and sheets
- Construct Site Plans
- Construct Floor, Roof, and Ceiling Plans
- Create Elevations
- Construct building sections and details
- Create various schedules
- Understand basic BIM
- Create Sheet Sets
- Create Renderings

### CADT2350 Architectural Standards

This course provides the basic information necessary for development of residential and light commercial (Type IV and V buildings) architectural design and construction documents. This course will also serve as a reference for design and construction principles and methods. It is intended to help build the necessary technical skills to communicate architectural ideas in an understandable, efficient, and accurate manner. Students will be assessed through a series of quizzes, visual identification exercises, and comprehensive assessments.

**Competencies:**
- Explore careers in Architecture, Engineering, or Construction (AEC)
- Demonstrate the application of various guidelines and codes
- Apply ADA requirements
- Understand floor plan requirements
- Determine plot plan needs and requirements
- Understand footing and foundation requirements
- Understand sill, floor, wall and ceiling construction
- Understand door, window and stair construction
- Understand roof details and elevation views
- Understand electrical, plumbing and climate control requirements
- Understand building materials and specifications

### CADT1216 Architectural CAD Modeling Interior Design

This course trains students to create and manipulate architectural entities through simple but effective 3D modeling. Students are instructed how to model many elements within the architectural world.

**Competencies:**
- Design every element in a room
- Create from simple to complex architectural structures
- Acquire furniture and accessories from database
- Model furniture from scratch
- Apply colors, textures and materials
### CADT2340  Residential Architectural Design  
120.00

This course explores family housing, drafting standards, construction principles, and space planning. Students will create a single family residence using 3D architectural CAD software. The following topics will be explored: floor plans, elevations, roof design, sections, details, interior design, schedules, rendering, site plans, and sheet sets. Additionally, the course will cover interface usage, linework, 2D drawing tools, symbols, annotations, and sheet layout. Students will design their own house with all the elements covered in the course.

**Competencies:**
- Draw floor plans
- Draw exterior and interior elevations
- Draw sections and details
- Develop site plans
- Apply building code principles
- Develop complete set of construction drawings

### CADT2510  Structural Design Applications I  
90.00

This course covers commercial and structural design techniques using 3D parametric CAD software. Students will be introduced to the interface and the basic building components of the software. They will create levels, grids systems, and various views. The structural project will be linked to an architectural model allowing efficient project updates between design teams. Students will focus on structural columns, walls, foundations, reinforcement, beams, and framing systems. Students will learn basic Building Information Modeling (BIM) practices and applications.

**Competencies:**
- Demonstrate basic drawing and editing tools
- Understand levels and grids
- Create the necessary views
- Link an architectural model to a structural project
- Adding structural columns and walls
- Adding foundations and structural slabs
- Create structural reinforcement
- Create beams and framing systems
- Create construction documents
- Annotate construction documents
- Understand detailing
- Understand scheduling

### CADT2361  Architectural Rendering  
60.00

This course provides basic information about creating interior and exterior designs of architectural models. Students will learn how to view and navigate within the provided 3D architectural model, managing and creating materials and develop spaces with walls, doors and windows. Students will be able to model floor finishes, ceilings with soffits, casework, custom furniture, restrooms, and light fixtures. Students will create projects utilizing advanced 3D architectural software, photorealistic rendering, and physical models using advanced manufacturing equipment (laser cut materials and 3D printers).

**Competencies:**
- Understand materials and their usage
- Create floor and wall finishes
- Create ceilings with soffits
- Work with curtain walls
- Design stairs and railings
- Create casework
- Use furniture and lighting fixtures
- Create real and artificial lighting
- Creating advanced building models
- Building laser cut and 3D printed models

### Structural Design Track (690 hours required)
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CADT2331</td>
<td>Architectural CAD</td>
<td>120.00</td>
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</tbody>
</table>
|             | In this course students will learn about the development of working drawings for a general architectural project using the computer, current industry standards, and 3D architectural CAD software. The class includes creation of architectural 3D models and the use of associated software tools. Students will be introduced to BIM (Building Information Modeling). Students will develop a set of architectural plans. Students will conclude this course with a hands on project to demonstrate architectural drafting skills. Competencies:  
• Understand grids and levels  
• Understand the difference between 3D models, various views, and sheets  
• Construct Site Plans  
• Construct Floor, Roof, and Ceiling Plans  
• Create Elevations  
• Construct building sections and details  
• Create various schedules  
• Understand basic BIM  
• Create Sheet Sets  
• Create Renderings |
| CADT2510    | Structural Design Applications I      | 90.00 |
|             | This course covers commercial and structural design techniques using 3D parametric CAD software. Students will be introduced to the interface and the basic building components of the software. They will create levels, grids systems, and various views. The structural project will be linked to an architectural model allowing efficient project updates between design teams. Students will focus on structural columns, walls, foundations, reinforcement, beams, and framing systems. Students will learn basic Building Information Modeling (BIM) practices and applications. Competencies:  
• Demonstrate basic drawing and editing tools  
• Understand levels and grids  
• Create the necessary views  
• Link an architectural model to a structural project  
• Adding structural columns and walls  
• Adding foundations and structural slabs  
• Create structural reinforcement  
• Create beams and framing systems  
• Create construction documents  
• Annotate construction documents  
• Understand detailing  
• Understand scheduling |
| CADT2520    | Commercial Standards                 | 120.00 |
|             | This course provides the basic information necessary for development of commercial architectural design and construction documents. This course will also serve as a reference for design and construction principles and methods. It is intended to help build the necessary technical skills to communicate architectural ideas in an understandable, efficient, and accurate manner. Students will be assessed through a series of quizzes, visual identification exercises, and comprehensive assessments. Competencies:  
• Explore careers in Architecture, Engineering, or Construction (AEC)  
• Demonstrate the application of various guidelines and codes  
• Apply ADA requirements  
• Understand floor plan requirements  
• Determine plot plan needs and requirements  
• Understand footing and foundation requirements  
• Understand sill, floor, wall and ceiling construction  
• Understand door, window and stair construction  
• Understand roof details and elevation views  
• Understand electrical, plumbing and climate control requirements  
• Understand building materials and specifications |
| CADT2530    | Introduction to BIM                  | 60.00 |
|             | This course covers a broad overview of the Building Information Modeling (BIM) process. Topics cover the design integration of most of the building disciplines: Architectural, Interior Design, Structural, Mechanical, Plumbing and Electrical. Students will start with the floor plans and develop all the way to photo-realistic rendering. Along the way the building’s structure, ductwork, plumbing and electrical (power and lighting) are modeled. Competencies:  
• Create a commercial building  
• Model plumbing, electrical, and mechanical systems  
• Create floor, roof, and ceiling plans  
• Create elevations, sections, and details  
• Work with schedules and BIM systems  
• Construct mechanical and electrical systems  
• Create renderings  
• Develop construction documents sets |
### CADT2540  Structural Steel Detailing  
**90.00**  
A course covering topics such as: the fundamentals of structural design, structural steel detailing of beams, columns, braces, marking and numbering systems, bill of materials, welding symbols, and construction drawings to AISC standards. Students will use CAD software to create both parametric 3D models and drafted 2D drawings.  
**Competencies:**  
- Learn steel and concrete construction techniques  
- Create structural steel detailing and concrete detailing  
- Understand steel shapes and applications  
- Identify connection types  
- Create structural steel manufacturing drawings  
- Create a bill of materials (BOM) and various schedules  
- Identify job specifications  
- Identify and use industry standards  

### CADT2550  Structural Design Applications II  
**90.00**  
A course that teaches the concepts and principles of building design through parametric 3D models and construction documentation. Students will learn the tools necessary to create, document, and print parametric structural models. Building Information Modeling (BIM) is integrated into all processes the student studies.  
**Competencies:**  
- Create levels, grids and views  
- Edit and modify elements  
- Create columns, walls and foundations  
- Understand structural reinforcement  
- Create beams, bracing and framing  
- Create floors, shafts and stairs  
- Apply annotation, details and schedules  

### CADT2560  Advanced BIM  
**120.00**  
Building Information Modeling (BIM) is an approach to the entire building life cycle. Systems need to coordinate, update, and share design data with team members throughout the design construction and management phases of a building's life. Students will create a company foundation for BIM focused designs by developing standard templates and custom elements. Models will include architectural specific families, MEP specific families, and structural specific families. These models will be used in a commercial project utilizing all aspects of development and design.  
**Competencies:**  
- Understand Building Information Modeling (BIM)  
- Creating custom templates that include annotation styles, preset views, sheets, and schedules  
- Create schedules and understand their relation to BIM  
- Create material takeoff schedules  
- Create custom wall, roof, and floor types  
- Create custom system families  
- Create industry specific families  
- Use parametric family geometry, profiles, and annotations  

### Manufacturing Design Track (690 hours required)  
**Hours**  

### CADT1010  Introduction to Engineering and Technical Design  
**120.00**  
This introductory course provides an opportunity for students to explore engineering and technical design solutions using critical thinking in Science, Technology, Engineering & Mathematics (STEM) fields. The course includes: Design Professions & Teams using the Engineering Design Process; Documenting the Design Process through Sketching & the Engineering Notebook; Design Measuring; Design Visualization; Geometric Construction & Computer Aided Design (CAD); Assembly Drawings & Fasteners; Multi-View Drawings; Dimensioning & Tolerancing; and Presentation of a final team design project.  
**Competencies:**  
- Understand the role of design in society, related professions and the engineering design process.  
- Understand and apply mathematics, measuring conventions and scales using scale factors.  
- Develop the ability to visualize a design solution in 2D and 3D as well as manipulate it.  
- Document the design process and apply drawing standards in solving technological problems.  
- Understand and demonstrate the use of geometric and numeric construction constraints.  
- Understand and develop multi view drawings that include all necessary views.  
- Fully describe the size, shape, location, and manufacturing required to produce a part.  
- Fully define the allowable variation of the geometric size, shape, location, and manufacturing required to produce a part.  
- Document a full assembly to completely describe each part to be manufactured.
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<th>Course Code</th>
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<tbody>
<tr>
<td>CADT2110</td>
<td>3D Parametric Solid Modeling</td>
<td>120.00</td>
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</table>
|             | This course introduces parametric solid modeling in industry standard CAD software. Parametric modeling uses editable dimensions to control the model, not the model controlling the dimensions. This modeling style allows for efficient design changes, use of rule based constraints, and integration of history based construction. This training will teach the creation of parts, assemblies, and drawings. Drawings will be fully dimensioned and annotated. Competencies:  
  • Develop efficient sketches that create proper models  
  • Understate efficient basic part modeling using extrusions, revolves, cuts, patterns, drafts, shell, symmetry, ribs, etc.  
  • Manipulate design changes, repairs and configurations  
  • Create drawing and assemblies from modeled parts  
  • Create annotated drawings | |
| CADT2170    | Engineering Drawings     | 90.00 |
|             | A course providing the basic information necessary for creating professional drawings in the engineering world. It presents basic instruction in preparing working drawings using 3D CAD methods. It is intended to help build the necessary technical skills to communicate engineering drawing ideas in an understandable, efficient, and accurate manner. Geometric Dimensioning & Tolerancing is introduced. Competencies:  
  • Understand sheets and views  
  • Understand dimensioning methods  
  • Understand annotation application  
  • Understand sheet formats and templates  
  • Develop assembly drawing views  
  • Develop bill of materials and tables  
  • Understand performance and display issues  
  • Understand drawing references and comparison  
  • Understanding basic GD&T processes and symbols  
  • Apply GD&T to working drawings | |
| CADT2121    | Engineering Design       | 90.00 |
|             | Once a good understanding of basic and advanced modeling is developed, the course then moves into development of advanced assemblies. Proper techniques are explored for mating static and moving parts together in assemblies. Students explore the concepts of top-down and bottom-up design. Students learn tools and techniques to streamline and customize a company’s design process. Control over advanced physical and display options are explored. Competencies:  
  • Create and use multibody solids  
  • Create splines, sweeps and curves  
  • Manipulate boundary feature, lofting and other advanced tools  
  • Create assemblies including advanced mating options  
  • Understand top-down verses bottom-up assembly modeling  
  • Use smart fastener, smart components, assembly configurations and display states  
  • Manipulate assemblies, layouts and large assemblies | |
| CADT2175    | Metal Processes          | 60.00 |
|             | A course designed to teach principles and techniques of some of the metal manufacturing processes. The processes introduced are sheet metal and weldments. The first area of focus will be teaching the fundamental skills and concepts used to build sheet metal parts and flat pattern layouts. The second area of focus will be teaching the fundamental skills and concepts used to build weldment parts. Competencies:  
  • Create sheet metal parts using the flange and convert methods  
  • Create multibody sheet metal parts  
  • Produce flat pattern developments  
  • Create sheet metal parts using forming tools  
  • Create structural members using weldments  
  • Create pipes and tubing  
  • Produce working drawings involving weldments |
In this course, students will choose an approved assembly of their choice, disassemble it, measure it and model all the pieces and parts that make up that assembly using Solid Modeling CAD software. Students will be introduced to 3D scanning, practical uses for scanning, and technology limitations associated with scanning. Groups of students, if they so choose, can team up on this project to expand the design beyond the abilities of a single drafter. Students will need to incorporate design changes into their project. The final assembly will utilize both static and moving mates to display the design’s full range of motion. Fully annotated drawings will be produced for each part and a final assembly will be created showing an exploded view with labels and a bill of materials. Product renderings and presentation material will be developed.

Competencies:
- Understand the production of assemblies
- Understand the use of solid modeling software
- Understand measuring using calipers and other measuring devices
- Explore the applicable use of 3D scanners
- Produce fully annotated multi-view drawings of all parts
- Create an assembly with appropriate static and moving mates
- Produce an exploded assembly drawing including part identification and a bill of materials
- Create high quality renderings

A course designed to teach the modeling and principles of motion and power systems. These systems include: gear, sprocket, thread, fastener, bearing, bushing, spring, and cam creation. Students will produce sets of complete working production drawings and moveable assemblies.

Competencies:
- Produce different types and representation of threads in 3D models and on drawings
- Identify different types of fasteners
- Understand gear, cam, and other motion transfer systems.
- Apply industry standard dimensions to drawings
- Apply industry standard tolerances and fits to drawings
- Complete entire set of working drawings including proper dimension techniques
- Create movable assemblies demonstrating full motion of the design

This course introduces parametric solid modeling in an alternative industry standard CAD software. Parametric modeling uses editable dimensions to control the model, not the model controlling the dimensions. This modeling style allows for efficient design changes, use of rule based constraints, and integration of history based construction. This training will teach the creation of parts, assemblies, and drawings. Drawings will be fully dimensioned and annotated.

Competencies:
- Develop efficient sketches that create proper models
- Understand efficient basic part modeling using extrusions, revolves, cuts, etc.
- Manipulate design changes and repairs
- Create drawing and assemblies from modeled parts
- Create annotated drawings

This introductory course provides an opportunity for students to explore engineering and technical design solutions using critical thinking in Science, Technology, Engineering & Mathematics (STEM) fields. The course includes: Design Professions & Teams using the Engineering Design Process; Documenting the Design Process through Sketching & the Engineering Notebook; Design Measuring; Design Visualization; Geometric Construction & Computer Aided Design (CAD); Assembly Drawings & Fasteners; Multi-View Drawings; Dimensioning & Tolerancing; and Presentation of a final team design project.

Competencies:
- Understand the role of design in society, related professions and the engineering design process.
- Understand and apply mathematics, measuring conventions and scales using scale factors.
- Develop the ability to visualize a design solution in 2D and 3D as well as manipulate it.
- Document the design process and apply drawing standards in solving technological problems.
- Understand and demonstrate the use of geometric and numeric construction constraints.
- Understand and develop multi view drawings that include all necessary views.
- Fully describe the size, shape, location, and manufacturing required to produce a part.
- Fully define the allowable variation of the geometric size, shape, location, and manufacturing required to produce a part.
- Document a full assembly to completely describe each part to be manufactured.

This course introduces parametric solid modeling in industry standard CAD software. Parametric modeling uses editable dimensions to control the model, not the model controlling the dimensions. This modeling style allows for efficient design changes, use of rule based constraints, and integration of history based construction. This training will teach the creation of parts, assemblies, and drawings. Drawings will be fully dimensioned and annotated.

Competencies:
- Develop efficient sketches that create proper models
- Understand efficient basic part modeling using extrusions, revolves, cuts, patterns, drafts, shell, symmetry, ribs, etc.
- Manipulate design changes, repairs and configurations
- Create drawing and assemblies from modeled parts
- Create annotated drawings
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<tbody>
<tr>
<td>CADT2121</td>
<td>Engineering Design</td>
<td>90.00</td>
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<td></td>
<td>Once a good understanding of basic and advanced modeling is developed, the course then moves into development of advanced assemblies. Proper techniques are explored for mating static and moving parts together in assemblies. Students explore the concepts of top-down and bottom-up design. Students learn tools and techniques to streamline and customize a company's design process. Control over advanced physical and display options are explored. Competencies: • Create and use multibody solids • Create splines, sweeps and curves • Manipulate boundary feature, lofting and other advanced tools • Create assemblies including advanced mating options • Understand top-down verses bottom-up assembly modeling • Use smart fastener, smart components, assembly configurations and display states • Manipulate assemblies, layouts and large assemblies</td>
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<tr>
<td>CADT2180</td>
<td>Surface Modeling</td>
<td>60.00</td>
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<td>This course teaches students how to build freeform shapes using engineering CAD software. Students will explore the difference between solids and surfaces, appropriate usage of surfaces, continuity, and general workflow. Basic and advanced modeling techniques will be covered. Students will also explore industry applications of surface models. Competencies: • Understand the difference between solids and surfaces • Understand continuity • Demonstrate efficient workflow with surfaces • Create basic surface models • Create hybrid models • Repair surface geometry • Use advanced surface tools • Create blends and patches • Demonstrate use of surfaces in various industries</td>
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<tr>
<td>CADT2185</td>
<td>Mold Design</td>
<td>60.00</td>
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<td>This course teaches several mold creation techniques and how to use CAD software tools to streamline the creation process. Students explore modeling techniques used to create molds, dies, and forms for metal, plastic, and composite parts. Competencies: • Understand the manufacturing processes using molds, dies, and forms • Understand various file types and their suitability • Repair damage to an imported model • Understand analysis tools and drafts • Understand the use of gates and sprues • Demonstrate the effects of wall thickness, drafts, ribs, textures, parting lines, and venting • Create cores, cavities, and parting surfaces • Demonstrate splitting a model • Explore tools for simulating the flow of melted plastic and results of the mold</td>
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<tr>
<td>CADT2190</td>
<td>Freeform Modeling</td>
<td>120.00</td>
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<td>This class covers 3D modeling in a general use (non-engineering) CAD software. Students will learn freeform polygon and surface (NURBS) modeling techniques. Students will explore models ranging from simple geometric shapes to sculptural organic modeling. Basic material application and texturing will add realism to the students models. Additionally, students will learn how to repair damaged polygon meshes in preparation for 3D printing. Competencies: • Understand the suitability of various modeling techniques • Show special navigation in 3D software • Plan the modeling process • Demonstrate proper surface topography • Create reference planes • Understand subdivided surfaces • Understand polygon creation tools • Understand polygon editing tools • Understand surface (NURBS) creation tools • Understand surface (NURBS) editing tools • Create deformers • Demonstrate basic materials, shading, and texturing • Demonstrate various export options</td>
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</table>
This final course explores 3D printing, advanced manufacturing techniques, and modern product design. Various technologies, equipment, model preparation, and general hardware maintenance will be covered. Students will choose an approved assembly of their choice, disassemble it, measure it and model all the pieces and parts that make up that assembly using CAD software. Changes to the design will be required to take advantage of advanced manufacturing techniques. Students will utilize scanned sketches, 3D scanning, and traditional measurement tools. Groups of students, if they so choose, can team up on this project to expand the design beyond the abilities of a single drafter. A design proposal, high quality product renderings, and working drawings will be produced for each part and the full assembly.

Competencies:
- Understand modern advanced manufacturing processes
- Explore possibilities, suitability, and limitations of advanced manufacturing including 3d printing
- Understand the use of solid, surface, and polygon modeling software packages
- Understand the production of assemblies
- Understand measuring using calipers and other measuring devices
- Explore the applicable use of 3D scanners
- Produce a design proposal including high quality rendering, presentational material, and design features
- Produce fully annotated multi-view drawings of all parts
- Produce an exploded assembly drawing including part identification, and a bill of materials

### Civil Design Track (690 hours required)

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<th>Course Code</th>
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<tr>
<td>CADT2331</td>
<td>Architectural CAD</td>
<td>120.00</td>
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</table>

In this course students will learn about the development of working drawings for a general architectural project using the computer, current industry standards, and 3D architectural CAD software. The class includes creation of architectural 3D models and the use of associated software tools. Students will be introduced to BIM (Building Information Modeling). Students will develop a set of architectural plans. Students will conclude this course with a hands on project to demonstrate architectural drafting skills.

Competencies:
- Understand grids and levels
- Understand the difference between 3D models, various views, and sheets
- Construct Site Plans
- Construct Floor, Roof, and Ceiling Plans
- Create Elevations
- Create schedules
- Create basic BIM
- Create Sheet Sets
- Create Renderings

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<tbody>
<tr>
<td>CADT2741</td>
<td>Topographical Design</td>
<td>90.00</td>
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This course provides instruction in the area of topography and civil standards with the intention of providing students with a well-rounded view of civil design and types of drawings and skills associated with this field. Students will learn theories, concepts, and skills that form the fundamentals of the work done by civil engineering companies. Student use generic 2D CAD software to build the necessary technical skills to communicate civil design in an understandable, efficient, and accurate manner.

Competencies:
- Understand land survey
- Create contours, drainage basin, flood plains
- Create road designs, earthwork and site plans
- Create property maps and plot plans
- Introduction to various guidelines and codes
- Apply ADA requirements

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<tbody>
<tr>
<td>CADT2720</td>
<td>Civil Drafting</td>
<td>90.00</td>
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</table>
CADT2725  Civil Design  120.00
A course covering the more advanced concepts needed in civil drafting through the 3D civil design software. It covers the use of the tools, explores a large number of the options and instills the idea of how to use each tool. In its conclusion, students will be able to look at any design task they run across, consider a number of ways to approach it, and develop ideas on how to accomplish it.
Competencies:
- Understand software interface
- Understand survey, points, surfaces, parcels and alignments
- Manipulate profiles, assemblies, and corridors
- Understand super elevation, cross sections, and mass haul
- Create pipe networks and grading
- Understand plan production, advanced workflows and quantity takeoffs

CADT2730  Surveying  60.00
A course covering the steps necessary for importing converted field equipment survey data into a standardized environment in the civil software and to use the automation tools to create an existing condition plan. Data collection, least square analysis, and traverses are also covered.
Competencies:
- Understand software interface
- Manipulate points and coordinate transformations
- Understand survey and traverse information
- Manipulate surfaces

CADT2745  Civil GIS  120.00
This course covers Geographic Information Systems and manipulating related information within industry standard software. This system is designed to capture, analyze, manipulate, manage and present all types of geographical data. Students will work through a project from initial idea to design presentation. Students will develop data driven maps, both digital and printed presentational material, and interactive web maps. Use of GPS and information gathering systems will be explored.
Competencies:
- Evaluate, preview, and study project area
- Create and import data from various information sources
- Edit and analyze data
- Create digital, interactive, and printed map displaying the analysis and information
- Present analysis results
- Use industry GPS and information gathering tools and hardware

CADT2760  Civil Design Final Project  90.00
Students will take an undeveloped area of the OWATC campus and develop a full proposal for roads, buildings, parking lots, green areas, and recreational areas. Based on information gathered from public online sources, a hand sketched design will be proposed and evaluated. When the design is approved, existing geographical information will be gathered by the student using a GPS unit. Gathered information will include: verification of property boundaries, existing structures, roads, elevation points, and notes about various design ideas. Students will use the acquired data to develop an accurate geographical topography and model of the campus. Students will create a fully developed design proposal, working drawings, and maps. Students will need to integrate design changes and respond to evaluations of the project's feasibility.
Competencies:
- Determine the projects requirements, limitations, and expectations
- Create initial idea sketches and evaluate them
- Gather existing geographical information
- Create a development proposal
- Communicate with project owners and team members during all aspects of the project
- Understand implementation of civil data as it is applied into a real-world application
- Develop working documentation and presentational material at all stages of the project

Interior Design Track (690 hours required)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Fee</th>
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</thead>
<tbody>
<tr>
<td>CADT2331</td>
<td>Architectural CAD</td>
<td>120.00</td>
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<tr>
<td></td>
<td>In this course students will learn about the</td>
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<td>development of working drawings for a general</td>
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<td>architectural project using the computer,</td>
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<td></td>
<td>current industry standards, and 3D</td>
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<tr>
<td></td>
<td>architectural CAD software. The class includes</td>
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<td>creation of architectural 3D models and the</td>
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<td></td>
<td>use of associated software tools. Students</td>
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<td></td>
<td>will be introduced to BIM (Building Information</td>
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<td></td>
<td>Modeling). Students will develop a set of</td>
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<td>architectural plans. Students will conclude</td>
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<td>this course with a hands on project to</td>
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<td></td>
<td>demonstrate architectural drafting skills.</td>
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<td>Competencies:</td>
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<tr>
<td></td>
<td>• Understand grids and levels</td>
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<td>• Understand the difference between 3D models,</td>
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<td>various views, and sheets</td>
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<td></td>
<td>• Construct Site Plans</td>
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<td></td>
<td>• Construct Floor, Roof, and Ceiling Plans</td>
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<td>• Create Elevations</td>
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<td>• Construct building sections and details</td>
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<td>• Create various schedules</td>
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<td>• Understand basic BIM</td>
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<td>• Create Sheet Sets</td>
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<td>• Create Renderings</td>
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<tr>
<td>CADT1216</td>
<td>Architectural CAD Modeling Interior Design</td>
<td>120.00</td>
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<td>This course trains students to create and</td>
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<td></td>
<td>manipulate architectural entries through</td>
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<td>simple but effective 3D modeling. Students</td>
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<td>are instructed how to model many elements</td>
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<td>within the architectural world.</td>
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<td>Competencies:</td>
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<td>• Design every element in a room</td>
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<td>• Create from simple to complex architectural</td>
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<td>structures</td>
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<td></td>
<td>• Acquire furniture and accessories from</td>
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<td>database</td>
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<td></td>
<td>• Model furniture from scratch</td>
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<td>• Apply colors, textures and materials</td>
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<tr>
<td>MDT1000</td>
<td>Materials, Lighting, and Texture</td>
<td>120.00</td>
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<td>This course is designed to introduce you to</td>
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<td>the foundation software application for the</td>
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<td>multimedia industry. Photoshop CS6 will</td>
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<td>introduce you to tools that can assist you in</td>
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<td>adding texture and pattern to CAD and SketchUp</td>
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<td>renderings</td>
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<td>Competencies:</td>
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<td>• Understand and demonstrate the knowledge of</td>
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<td>lighting and texture techniques in Photoshop</td>
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<td>CS6</td>
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<td>• Understand the vector art tools in Photoshop</td>
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<td>CS6</td>
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<td>• Understand and demonstrate the implementation</td>
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<td>of images from Photoshop to CAD and SketchUp</td>
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<tr>
<td>CADT2510</td>
<td>Structural Design Applications I</td>
<td>90.00</td>
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<td>This course covers commercial and structural</td>
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<td>design techniques using 3D parametric CAD</td>
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<td>software. Students will be introduced to the</td>
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<td>interface and the basic building</td>
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<td>components of the software. They will create</td>
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<td>levels, grids systems, and various views. The</td>
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<td>structural project will be linked to an</td>
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<td>architectural model allowing efficient project</td>
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<td>updates between design teams. Students will</td>
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<td>focus on structural columns, walls,</td>
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<td>foundations, reinforcement, beams, and</td>
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<td>framing systems. Students will learn basic</td>
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<td></td>
<td>Building Information Modeling (BIM) practices</td>
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<td>and applications.</td>
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<td>Competencies:</td>
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<td></td>
<td>• Demonstrate basic drawing and editing tools</td>
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<td>• Understand levels and grids</td>
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<td>• Create the necessary views</td>
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<td>• Link an architectural model to a structural</td>
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<td>project</td>
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<td>• Adding structural columns and walls</td>
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<td>• Adding foundations and structural slabs</td>
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<td>• Create structural reinforcement</td>
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<td>• Create beams and framing systems</td>
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<td>• Create construction documents</td>
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<td>• Annotate construction documents</td>
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<td>• Understand detailing</td>
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<td>• Understand scheduling</td>
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<td>Course Code</td>
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<tr>
<td>CADT2350</td>
<td>Architectural Standards</td>
<td>120.00</td>
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<td>This course provides the basic information necessary for development of residential and light commercial (Type IV and V buildings) architectural design and construction documents. This course will also serve as a reference for design and construction principles and methods. It is intended to help build the necessary technical skills to communicate architectural ideas in an understandable, efficient, and accurate manner. Students will be assessed through a series of quizzes, visual identification exercises, and comprehensive assessments. Competencies: • Explore careers in Architecture, Engineering, or Construction (AEC) • Demonstrate the application of various guidelines and codes • Apply ADA requirements • Understand floor plan requirements • Determine plot plan needs and requirements • Understand footing and foundation requirements • Understand sill, floor, wall and ceiling construction • Understand door, window and stair construction • Understand roof details and elevation views • Understand electrical, plumbing and climate control requirements • Understand building materials and specifications.</td>
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<tr>
<td>CADT2340</td>
<td>Residential Architectural Design</td>
<td>120.00</td>
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<td>This course explores family housing, drafting standards, construction principles, and space planning. Students will create a single family residence using 3D architectural CAD software. The following topics will be explored: floor plans, elevations, roof design, sections, details, interior design, schedules, rendering, site plans, and sheet sets. Additionally, the course will cover interface usage, linework, 2D drawing tools, symbols, annotations, and sheet layout. Students will design their own house with all the elements covered in the course. Competencies: • Draw floor plans • Draw exterior and interior elevations • Draw sections and details • Develop site plans • Apply building code principles • Develop complete set of construction drawings.</td>
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<td>Additional Electives (160 hours required)</td>
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<td>Additional Electives (160 hours required) Hours</td>
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<tr>
<td>CADT2160</td>
<td>Production Drafting (GD&amp;T)</td>
<td>90.00</td>
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<td>This course is designed to teach students about the concepts of Geometric Dimensioning &amp; Tolerancing based on the standard ASME y14.5-2009 Competencies: • Understand Dimensioning and Tolerancing • Understand symbols and terms • Understand datums, material condition, and material boundary • Create Form Tolerances • Create Orientation Tolerances • Create Location Tolerances • Create Profile Tolerances.</td>
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<tr>
<td>CADT2210</td>
<td>Building Information Modeling (BIM) Coordination</td>
<td>90.00</td>
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<td>Building Information Modeling (BIM) encompasses the entire building life cycle. BIM includes all phases of the design process, from model creation to construction and ending at operations and maintenance. Using a BIM workflow, you will learn how a design changes throughout the BIM process, and how the changes affect the BIM model. Over the course of this training, you will learn how to consolidate civil, architectural, structural, and MEP models into one BIM model. Next, you will use review and markup tools for communicating issues across disciplines. Finally, you will be instructed on how to simulate construction and find constructability issues and on-site clashes.</td>
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<tr>
<td>CADT2220</td>
<td>Structural Design Applications III</td>
<td>90.00</td>
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<td>This course will introduce you to some basic miscellaneous modeling tasks that you need to know when detailing projects with miscellaneous assemblies. Many of the basic modeling functions that you learned in previous training will be used here. After the model is completed we will create the necessary drawings for shop fabrication of these assemblies.</td>
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<tr>
<td>CADT2235</td>
<td>Pictorial Design</td>
<td>30.00</td>
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<td>A course in pictorial drawing representation, which includes isometric sketching and CAD 2D isometric drawings. Students will focus on creating architectural isometric drawings. These drawings will allow students to present their designs in a pseudo 3-dimensional drawing yet continue working in 2D CAD software. Competencies: • Construct isometric sketches • Apply 2D isometric CAD drawing tools • Construct dimensionally accurate isometric drawings • Apply interior, exterior, and landscape design elements.</td>
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</table>

05/12/2020 Powered by Northstar
A course designed to teach principles and techniques of manufacturing processes and material specification such as: finishes, casting, forging, plastics, welding, symbols, jigs, and fixtures as well as the use of tools and equipment for measuring and material specification.

Competencies:
- Identify welding processes
- Draw welding representations
- Define and describe various manufacturing materials, material terminology, numbering systems, and material treatment
- Discuss casting processes and terminology
- Explain the forging process and terminology
- Describe manufacturing processes
- Define and draw the representation of various machined features
- Explain tool design and drafting practices
- Discuss the statistical process quality control assurance system
- Evaluate the results of an engineering and manufacturing problem
- Explain the use of computer aided manufacturing (CAM) in today's industry
- Discuss robotics in industry
- Describe plastic manufacturing processes

This course is a simplified, tutorial based approach at introducing 2D CAD along with introducing interior design focused Architectural design. These 2D techniques are taught through the creation of a hotel suite.

Competencies:
- Understand 2D design
- Create floor plan and furniture blocks
- Create dimensions for floor plans and elevations
- Create simple renderings

This course focuses on both learning the basics and providing the fundamental training in a hands-on environment to provide the needed skills to move into the advanced composite workplace. Areas of focus for the technician are developing composite lay-up skills and composite vacuum bagging training. This course provides simple and clear training for the person seeking the technical skills needed to enter the aerospace, or aircraft, or any industry using advanced composites.

The Construction Core course introduces the student to basic safety practices, construction math, communication skills, and employability skills. Basic concepts from each area are covered in preparation for entering into the construction technology program and construction career field.

Competencies:
- Explain the role that safety plays in the construction field
- Demonstrate safe practices and precautions
- Explain the importance of Hazard Communications (HazCom) and material safety data sheets (MSDSs)
- Describe fire preventions, firefighting techniques, safe work procedures to use when around electrical hazards
- Demonstrate addition, subtraction, multiplication, and division for
  - Whole numbers
  - Fractions
  - Decimals
- Demonstrate converting fractions to decimals and decimals to fractions
- Demonstrate the use of standard ruler and metric ruler to measure
- Recognize and use metric units of length, weight, volume, and temperature
- Demonstrate the ability to interpret information and instructions presented in both written and verbal form
- Demonstrate the ability to communicate effectively in on-the-job situations using written and verbal skills
- Explain the construction industry, the role of companies that make up the industry, and the role of individual professions in the industry
- Demonstrate problem solving skills for on-the-job incidents
- Demonstrate the ability to work with a team and be a positive contributor to the team
- Be aware of workplace issues such as sexual harassment, stress, and substance abuse

This course will introduce the student to read and interpreting common drawings used in construction

This is an introductory class into the basic of concrete. Modules include Introduction to concrete, Safety, Properties of Concrete, Tools and equipment, Preparing for placement, Placing, finishing, and trouble shooting. NCCER Core is a prerequisite.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Fee</th>
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</thead>
<tbody>
<tr>
<td>CONS1092</td>
<td>Masonry Basics</td>
<td>60.00</td>
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<tr>
<td>ELTT1037</td>
<td>Electrical Drafting Concepts</td>
<td>40.00</td>
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<tr>
<td>IAMT1270</td>
<td>Electronic Assembly and Soldering</td>
<td>60.00</td>
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<tr>
<td>MACH1750</td>
<td>Machining Basics</td>
<td>90.00</td>
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<tr>
<td>WELD1050</td>
<td>Welding Overview</td>
<td>90.00</td>
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<tr>
<td>WKJS1005</td>
<td>Job Seeking Skills Basics-5 hrs</td>
<td>5.00</td>
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<tr>
<td>WKJS1010</td>
<td>Job Seeking Skills Specialized-10 hrs</td>
<td>10.00</td>
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</tbody>
</table>

This is an introduction to Masonry, this will include in Introduction to Masonry, Masonry tools and equipment, Measurements and Drawing, and Installation techniques. NCCER Core is a prerequisite.

Students in this course will learn to identify electrical symbols using printed electrical floor plans per electrical code. Student will also learn to apply practical receptacle and switch install practices. Student will also become familiar with electrical riser diagrams.

Develops the ability to solder and de-solder connectors, components, and printed circuit boards using industry standards. Topics include: component identification, safety practices, soldering, de-soldering, anti-static grounding, and surface mount techniques.

This is a course to instruct basic machining concepts. It gives students a working overview of conventional machining practices. This course is designed to provide students with basic measuring equipment, blueprint reading skills, conventional lathe, conventional milling and basic Digital read out skills so they can make basic machine parts.

This course is designed to provide students with the basic knowledge and experience to perform oxyacetylene welding, brazing, and cutting. It will teach fundamentals in shielded metal arc (SMAW) and gas metal arc process (MIG) welding. Students will learn to run beads and fillet welds in butt, tee, and lap joints.

This course will focus on helping the student explore job opportunities in their choice of occupation. If the student has employment experience but is changing career fields, this course includes targeted networking, acquiring information about related employers and positions, and preparation of the tools and paperwork necessary to apply and interview for jobs.

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<tr>
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<td>MACH1750</td>
<td>Machining Basics</td>
<td>90.00</td>
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<tr>
<td>WELD1050</td>
<td>Welding Overview</td>
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<tr>
<td>WKJS1005</td>
<td>Job Seeking Skills Basics-5 hrs</td>
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<tr>
<td>WKJS1010</td>
<td>Job Seeking Skills Specialized-10 hrs</td>
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<td>Course Code</td>
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<tr>
<td>WKJS1015</td>
<td>Job Seeking Skills Complete-15 hrs</td>
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</table>
|            | This course is in-depth for students who have never had a job or never had a job in their field of training and is designed for students unfamiliar with creating the tools and knowing the best practices for a successful job search and job interview. Competencies:  
|            | • Identify your skills and attributes  
|            | • Conduct targeted company research  
|            | • Conduct an informational interview with someone working in the field.  
|            | • Establish a network of job contacts  
|            | • Complete a master job application form  
|            | • Create a current resume  
|            | • Create a cover letter of application  
|            | • Create a references page  
|            | • Demonstrate competency in a job interview  
|            | • Understand the components of a portfolio  
|            | • Learn and practice follow-up with prospective employers |         |
| WKS1107    | Introduction to Computers         | 30.00   |
|            | Introduction to Computers introduces basic computer tasks using Windows, typing with a word processor, navigating the web, and working with email. |         |