Computer Aided Design Technology
Program of Studies
2014-2015
## Computer Aided Design Technology

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Post-Secondary Connection</th>
<th>Valid Course Code</th>
<th>Recommended Grade Level</th>
<th>Recommended Credit</th>
</tr>
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<tbody>
<tr>
<td>Architectural Design</td>
<td>CAD 220</td>
<td>480116</td>
<td>x x</td>
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<tr>
<td>Advanced Dimensioning and Measurement</td>
<td>CAD 240</td>
<td>470924</td>
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<tr>
<td>Construction Drafting (Techniques)</td>
<td>CAD 230</td>
<td>480119</td>
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<tr>
<td>*Cooperative Education I</td>
<td>CAD 199</td>
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<td>x x</td>
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<td>*Cooperative Education II</td>
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<tr>
<td>*Cooperative Education III</td>
<td>CAD 199 &amp; 299</td>
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<td>Drafting Fundamentals</td>
<td>CAD 102</td>
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<td>x x x x</td>
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<tr>
<td>Engineering Graphics</td>
<td>CAD 112</td>
<td>480113</td>
<td>x x</td>
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<tr>
<td>Industrial Drafting Processes</td>
<td>CAD 212</td>
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<tr>
<td>Intermediate Computer Aided Drafting</td>
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<td>x x x x</td>
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<td>*Internship I</td>
<td>CAD 198</td>
<td>480145</td>
<td>x x</td>
<td>1-3</td>
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<tr>
<td>Introduction to Architecture</td>
<td>CAD 120</td>
<td>480115</td>
<td>x x</td>
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<tr>
<td>Introduction to Computer Aided Drafting</td>
<td>CAD 100</td>
<td>480110</td>
<td>x x x x</td>
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<tr>
<td>Introduction to Surveying</td>
<td>CAD 108</td>
<td>480104</td>
<td>x X x x</td>
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<tr>
<td>Mechanical Design</td>
<td>CAD 222</td>
<td>480135</td>
<td>x x</td>
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<tr>
<td>Parametric Modeling</td>
<td>CAD 201</td>
<td>480136</td>
<td>x x</td>
<td>1</td>
</tr>
<tr>
<td>*Special Problems (CADD)</td>
<td>CAD 293</td>
<td>480179</td>
<td>x x</td>
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</tbody>
</table>
Computer Aided Design Technology Education

Overview of Computer Aided Design Technology Education

Purpose:
The vision of Computer Aided Design Technology Education is to promote safety standards, performance standards, enhance leadership, provide relevant curriculum, and to be vital to the education of all students.

Computer Aided Design Technology Education will:

- Operate as the venue for nationally recognized industry standard training.
- Provide a critical link in school to employment or postsecondary education.
- Develop stronger relationships with the community in terms of mutual advocacy, cooperative field experiences, employment placement, and support for relevant student organizations and competitions
- Represent an important component in the education of all students.
- Require and promote critical thinking and problem solving.
- Offer an up to date curriculum based on standards that adapts to changes in the industry.
- Integrate academic skills into the Computer Aided Design Technology Curriculum in order to insure that students develop written & verbal communications skills, computational skills, and scientific/math problem-solving skills.

Career Pathways:

- Design Technician
- Mechanical Designer
- Architectural Designer

Standard Based Curriculum

The CAD curriculum is composed of standards based competencies. All CAD programs incorporate industry and common core standards thus increasing the student’s qualifications toward successful employment.

Alignment of the CAD curriculum with nationally recognized industry standards and the common core standards provides optimal preparation for students to acquire an industry certification.

Communities understand that this preparation provides better career opportunities for students and the demands of today’s workforce for the 21st century.
Kentucky Occupational Skill Standards
The Kentucky Occupational Skill Standards are the performance specifications that identify the
knowledge, skills, and abilities an individual needs to succeed in the workplace. Identifying the
necessary skills is critical to preparing students for entry into employment or postsecondary
education. These standards described the necessary occupational, academic, and employability
skills needed to enter the workforce or post-secondary education in specific career areas. There
is an ongoing effort to continue to refine these standards by which exemplary Career and
Technical Education Programs are evaluated and certified. This helps insure that curriculum
meets industry specifications.

Work Based Learning
Cooperative experience, internships, shadowing and mentoring opportunities provide depth and
breadth of learning in the instructional program and allow students to apply the concepts learned
in the classroom. The Work Base Learning Guide is available on the KDE webpage:
www.education.ky.gov.

Student Organizations and Competitions
Participation in Skills USA Competition provides a vehicle for students to employ higher order
thinking skills, to interact with high-level industry people and to further enhance their leadership
skill through their participation in regional, state and national competitive events and local
activities.
<table>
<thead>
<tr>
<th>Career Pathway</th>
<th>Core Courses</th>
<th>Elective Courses</th>
</tr>
</thead>
</table>
| **Design Technician**  
CIP Code-15.1301.01  
Tests for Certification  
* Certiport AutoCAD Certified User  
TRACK Pre-Apprenticeship  
* KOSSA-Manufacturing Test  
| - CAD 100- Introduction to Computer Aided Drafting-480110  
- CAD 102-Drafting Fundamentals-480111  
- CAD 112-Engineering Graphics-480113  
- CAD 212-Industrial Drafting Process-480127  
| - CAD 201 Parametric Modeling-480136  
- CAD 200 Intermediate Computer Aided Drafting-480112  
- CAD-198-Internship I - 480145  
- CAD 222-Mechanical Design-480135  
- CAD 199-Cooperative Education I -480142  
- CAD 299-Cooperative Education II -480143  
- CAD 199+299-Cooperative Education III-480144  
- CAD-293-Special Problems (CADD) - 480179  
- PLTW IED-Introduction to Engineering Design-219901  

| Mechanical Designer  
CIP Code-15.1301.02  
Tests for Certification  
* Certiport AutoCAD Certified User  
* Certiport Autodesk Inventor Certified User  
* Solid Works Certified Associate  
TRACK Pre-Apprenticeship  
* KOSSA-Manufacturing Test  
| - CAD 100- Introduction to Computer Aided Drafting-480110  
- CAD 102-Drafting Fundamentals-480111  
- CAD 201-Parametric Modeling-480136  
- CAD 222-Mechanical Design  
| - CAD 112 - Engineering Graphics  
- CAD-198-Internship I - 480145  
- CAD 200- Intermediate Computer Aided Drafting  
- CAD 212-Industrial Drafting Processes-480127  
- CAD 240-Advanced Dimensioning and Measurement – 470924  
- CAD 199-Cooperative Education I -480142  
- CAD 299-Cooperative Education II -480143  
- CAD 199+299-Cooperative Education III-480144  
- CAD-293-Special Problems (CADD) - 480179  
- PLTW IED-Introduction to Engineering Design-219901 |
### Architectural Designer

**CIP Code-15.1301.03**

**Tests for Certification**
- * Certiport AutoCAD Certified User
- * Certiport Autodesk Revit Certified User

**TRACK Pre-Apprenticeship**
- * KOSSA-Manufacturing Test

- CAD 100- Introduction to Computer Aided Drafting-480110
- CAD 102-Drafting Fundamentals-480111
- CAD 120- Introduction to Architecture-480115
- CAD 220-Architectural Design-480116
- CAD 230-Construction Techniques-480119
- CAD-198-Internship I - 480145
- CAD 199-Cooperative Education I -480142
- CAD 299-Cooperative Education II -480143
- CAD 199+299-Cooperative Education III-480144
- CAD-293-Special Problems (CADD) - 480179
- CAD-108-Introduction to Surveying - 480104
- PLTW IED-Introduction to Engineering Design-219901

### CAD Manufacturing TRACK

**CIP Code-15.1301.99**

**Tests for Certification**
- * Certiport AutoCAD Certified User
- * Certiport Autodesk Revit Certified User

**TRACK Pre-Apprenticeship**
- * KOSSA-Manufacturing Test

- (4)- Core courses
- Chosen from CAD valid course list.
- By Company sponsoring State Registered Apprenticeship.
- (4)- Core courses
- Chosen from CAD valid course list.
- By Company sponsoring State Registered Apprenticeship.
## Kentucky Career Pathway/Program of Study

### COLLEGE/UNIVERSITY:
**Kentucky Technical College or University**

### CLUSTER:
**Manufacturing Technology**

### PATHWAY:
**Computer Aided Design**

### HIGH SCHOOL (S):
**KY County High School**

### PROGRAM:
**Computer Aided Design Technology**

### GRADE ENGLISH MATH SCIENCE SOCIAL STUDIES

<table>
<thead>
<tr>
<th>Year</th>
<th>English</th>
<th>Math</th>
<th>Science</th>
<th>Social Studies</th>
</tr>
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<tbody>
<tr>
<td>13</td>
<td>HS Diploma/TRAC</td>
<td>3 hr's</td>
<td>3 hr's</td>
<td>3 hr's</td>
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<tr>
<td>14</td>
<td>Electives</td>
<td>6 hr's</td>
<td>4 hr's</td>
<td>3 hr's</td>
</tr>
<tr>
<td>15</td>
<td>English I</td>
<td>1 hr</td>
<td>3 hr's</td>
<td>3 hr's</td>
</tr>
<tr>
<td>16</td>
<td>Electives</td>
<td>3 hr's</td>
<td>3 hr's</td>
<td>3 hr's</td>
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### POSTSECONDARY

<table>
<thead>
<tr>
<th>Year</th>
<th>English</th>
<th>Math</th>
<th>Science</th>
<th>Social Studies</th>
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<tbody>
<tr>
<td>15 &amp; 16</td>
<td>IET 303</td>
<td>3 hrs</td>
<td>IET 310</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Materials Science</td>
<td>4 hr's</td>
<td>Engineering Economics</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>IET 317</td>
<td>3 hrs</td>
<td>Lean Systems</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>IET 319</td>
<td>3 hrs</td>
<td>Quality Control</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>IET 320</td>
<td>3 hrs</td>
<td>Project Management</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>IET 327</td>
<td>3 hrs</td>
<td>Applied Industrial Management</td>
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</tr>
<tr>
<td></td>
<td>IET 330</td>
<td>3 hrs</td>
<td>Industrial Design</td>
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<td></td>
<td>IET 371</td>
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<td>Seminar</td>
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<tr>
<td></td>
<td>IET 419</td>
<td>3 hrs</td>
<td>Total Quality Management</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>IET 422</td>
<td>3 hrs</td>
<td>Industrial Safety</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>IET 430</td>
<td>3 hrs</td>
<td>Facilities Management</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>IET 519</td>
<td>3 hrs</td>
<td>Design of Experiments</td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>Senior Project</td>
<td>3 hr's</td>
<td>Electives</td>
<td>3 hr's</td>
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### CAREER AND TECHNICAL EDUCATION COURSES

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Recommended Elective Courses</th>
<th>Other Elective Courses</th>
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<tbody>
<tr>
<td>Computer Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drafting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Science</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Occupations

- Computer Aided Design Technology
- Computer Aided Design Drafting
- Computer Aided Design Drafts
- Computer Aided Design Engineer
- Computer Aided Design Technician

### Certificates

- Computer Aided Design Certificate
- Drafting Certificate
- Engineering Certificate
- Physical Science Certificate
- Social Science Certificate

### Diploma

- Computer Aided Design Diploma
- Drafting Diploma
- Engineering Diploma
- Physical Science Diploma
- Social Science Diploma

### Degree

- Bachelor of Science in Engineering Technology
- Bachelor of Computer Science
# Computer Aided Design Technology Courses/Tasks

**CAD 220**  
**Architectural Design**  
**480116**

<table>
<thead>
<tr>
<th>Course Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combines the elements and fundamentals of architectural design with the theory and application of presentation techniques. Deals with site selection, use of materials in design, spatial relationships, and aesthetics. Traditional and contemporary design, designers, processes, and historical milestones are explored. Board and computer techniques are used in illustrating interiors of student designs.</td>
</tr>
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</table>

Prerequisites: Introduction to Architecture-480115

<table>
<thead>
<tr>
<th>Content/ Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students Will:</td>
</tr>
<tr>
<td>1 Demonstrate and practice safe work habits in the lab area.</td>
</tr>
<tr>
<td>2 Identify symbols and materials used with the floor plan.</td>
</tr>
<tr>
<td>3 Draw a residential floor plan.</td>
</tr>
<tr>
<td>4 Use appropriate dimensioning techniques for architectural drawing standards.</td>
</tr>
<tr>
<td>5 Use drafting references and vendor product catalogs.</td>
</tr>
<tr>
<td>6 Draw residential elevation drawing.</td>
</tr>
<tr>
<td>7 Draw and dimension presentation elevations.</td>
</tr>
<tr>
<td>8 Construct accompanying drawings to the floor plan, including foundation, framing, electrical, plumbing, heating, ventilation and air conditioning.</td>
</tr>
<tr>
<td>9 Identify material representations in plan and section views.</td>
</tr>
</tbody>
</table>

Connections:

*Common Core Standards*  
*KOSSA*  
*Common Core Technical Standards*  
*New Generation Science Standards*  
*AutoDesk Industry Standards*  
*SolidWorks Industry Standards*  
*Post-Secondary Education*  
*CTSO’s-Skills USA*
### CAD 240
**Advanced Dimensioning and Measurement**
470924

<table>
<thead>
<tr>
<th>Course Description:</th>
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</thead>
<tbody>
<tr>
<td>Presents an in-depth study of advanced industrial dimensioning principles, tolerances, fits, and A.N.S.I standards. Exploration of the shape and geometric characteristics of parts through geometric tolerance.</td>
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</table>

*Prerequisites: Engineering Graphics-480113*

<table>
<thead>
<tr>
<th>Content /Process</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Students Will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demonstrate and practice safe work habits in the lab area.</td>
</tr>
<tr>
<td>2 Define terms and principles used in advanced dimensioning.</td>
</tr>
<tr>
<td>3 Apply using drawing practices, tolerance dimensioning on mating parts.</td>
</tr>
<tr>
<td>4 Explain and work with A.N.S.I. standards.</td>
</tr>
<tr>
<td>5 Demonstrate surface texture symbols and surface finish.</td>
</tr>
<tr>
<td>6 Compare conventional tolerancing with Geometric Dimensioning and Tolerancing.</td>
</tr>
<tr>
<td>7 Establish a basic understanding of Geometric Dimensioning and Tolerancing.</td>
</tr>
<tr>
<td>8 Analyze specific graphic designs and determine the proper location for dimensions.</td>
</tr>
<tr>
<td>9 Define terms and principles relating to Dimensional Metrology.</td>
</tr>
<tr>
<td>10 Demonstrate a working knowledge of basic hand held measuring instruments.</td>
</tr>
<tr>
<td>11 Measure with basic hand held measuring instruments.</td>
</tr>
<tr>
<td>12 Explain the relationship of precision measurement to manufacturing and design.</td>
</tr>
<tr>
<td>13 Demonstrate a working understanding of one-tenth of an inch or one-thousandth of an inch.</td>
</tr>
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</table>

### Connections:
- *Common Core Standards*
- *KOSSA*
- *Common Core Technical Standards*
- *New Generation Science Standards*
- *AutoDesk Industry Standards*
- *SolidWorks Industry Standards*
- *Post-Secondary Education*
- *CTSO’s-Skills USA*
**Course Description:**
This lecture and lab course covers the elements for constructing standard residential and commercial buildings. Wood frame, solid masonry veneer, concrete, and steel construction details are explored. Students will learn essentials of standard construction details, which illustrate the various construction methods and will develop a portfolio for those techniques.

*Prerequisites: Introduction to Computer Aided Drafting-480110
Drafting Fundamentals-480111*

**Content /Process**

**Students Will:**
1. Demonstrate and practice safe work habits in the lab area.
2. Construct residential foundation plans
3. Construct residential floor framing plans
4. Construct residential wall framing plans
5. Construct residential roof framing plans
6. Construct detailed drawings of reinforced concrete
7. Construct detailed drawings of typical wood frame sections
8. Construct detailed drawings of concrete blocks and masonry units
9. Draw stair plans and details
10. Draw fireplace plans and sections
11. Construct Cross Section for residential plan
12. Construct section drawings of roofs with parapets

**Connections:**
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description: Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.

Prerequisite: Permission of Instructor

Content /Process

Students Will:
1. Demonstrate and practice safe work habits in the lab area.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests prior to graduation
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential after graduation
7. Earn funds to help finance education expenses

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description:
Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.

Prerequisites: Consent of the Instructor

Content Process

Students Will:
1. Demonstrate and practice safe work habits in the lab area.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests prior to graduation
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential after graduation
7. Earn funds to help finance education expenses
8. Demonstrate and practice safe work habits in the lab area.

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
### CAD 199+299
Cooperative Education III
480144

<table>
<thead>
<tr>
<th>Course Description:</th>
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</thead>
<tbody>
<tr>
<td>Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.</td>
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</table>

*Prerequisites: Consent of the Instructor*

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<thead>
<tr>
<th>Content Process</th>
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<tbody>
<tr>
<td>Students Will:</td>
</tr>
<tr>
<td>1. Demonstrate and practice safe work habits in the lab area.</td>
</tr>
<tr>
<td>2. Gain career awareness and the opportunity to test career choice(s)</td>
</tr>
<tr>
<td>3. Receive work experience related to career interests prior to graduation</td>
</tr>
<tr>
<td>4. Integrate classroom studies with work experience</td>
</tr>
<tr>
<td>5. Receive exposure to facilities and equipment unavailable in a classroom setting</td>
</tr>
<tr>
<td>6. Increase employability potential after graduation</td>
</tr>
<tr>
<td>7. Earn funds to help finance education expenses</td>
</tr>
<tr>
<td>8. Demonstrate and practice safe work habits in the lab area.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Connections:</th>
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<tbody>
<tr>
<td><em>Common Core Standards</em></td>
</tr>
<tr>
<td><em>KOSSA</em></td>
</tr>
<tr>
<td><em>Common Core Technical Standards</em></td>
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<td><em>New Generation Science Standards</em></td>
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<tr>
<td><em>AutoDesk Industry Standards</em></td>
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<tr>
<td><em>SolidWorks Industry Standards</em></td>
</tr>
<tr>
<td><em>Post-Secondary Education</em></td>
</tr>
<tr>
<td><em>CTSO’s-Skills USA</em></td>
</tr>
</tbody>
</table>
**CAD 102**  
**Drafting Fundamentals**  
**480111**

**Course Description:**  
Explores drafting and its processes: use and maintain equipment and supplies; determine line weights; measure and read line lengths with drafting scales; measure angles; and draw lines, circles, arcs, and irregular curves. Freehand and mechanical lettering, geometric construction, freehand sketching, and beginning orthographic projection. Characteristics of lines and planes in orthographic projection and the principles applied to show the size and shapes of projects. Dimensioning techniques for orthographic drawings.

*Prerequisites: None*

**Content Process**

Students will:
1. Demonstrate and practice safe work habits in the lab area.
2. Use and maintain basic drafting equipment and machines.
3. Use architect's, metric, civil, and mechanical engineer's scales.
4. Identify and draw the alphabet of lines.
5. Demonstrate correct lettering techniques.
6. Construct one-view drawing.
7. Reproduce drawings.
8. Utilize proper drawing setup procedures.
9. Demonstrate geometric construction techniques.
10. Draw orthographic views and transfer features.
11. Freehand sketch orthographic and pictorial views.
12. Construct Multiview drawings from pictorial sketches.
13. Apply basic dimensioning techniques.
14. Solve mathematical problems related to drafting.
15. Understand title blocks.

**Connections:**

*Common Core Standards*  
*KOSSA*  
*Common Core Technical Standards*  
*New Generation Science Standards*  
*AutoDesk Industry Standards*  
*SolidWorks Industry Standards*  
*Post-Secondary Education*  
*CTSO’s-Skills USA*
Course Description:
Includes exploration of lines and planes as they relate to orthographic projection to show the size and shape of objects. Includes application of principles and graphic elements of sectioning to show interior detail; the techniques involved in creating oblique projections, axonometric projections, and perspective drawings; and the dimensioning techniques and symbol usage common to all drafting disciplines.

Prerequisites: Drafting Fundamentals-480111

<table>
<thead>
<tr>
<th>Content Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students Will:</strong></td>
</tr>
<tr>
<td>1. Demonstrate and practice safe work habits in the lab area.</td>
</tr>
<tr>
<td>2. Construct advanced orthographic drawings from pictorial views.</td>
</tr>
<tr>
<td>3. Construct drawings of basic sectional views.</td>
</tr>
<tr>
<td>4. Apply dimensioning techniques.</td>
</tr>
<tr>
<td>5. Construct title blocks, revision blocks, materials list, and tolerancing blocks.</td>
</tr>
<tr>
<td>6. Freehand sketch orthographic and pictorial views.</td>
</tr>
<tr>
<td>7. Construct axonometric drawings.</td>
</tr>
<tr>
<td>8. Construct oblique drawings.</td>
</tr>
<tr>
<td>9. Construct one-point perspective.</td>
</tr>
<tr>
<td>10. Construct two-point perspective.</td>
</tr>
</tbody>
</table>

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
CAD 212  
Industrial Drafting Processes  
480127

Course Description:  
Explores weldment design, welding symbols, welding processes, and fabrication techniques, tool and die, and jig and fixture drawings. Design specifications, pattern drawings, casting, forming processes, and mechanical drawing principles in relation to the manufacturing industry. Screw-thread design and related fastening concepts as they relate to manufactured items and construction.

Prerequisite: Introduction to Computer Aided Drafting-480110

Content/ Process

Students Will:
1. Demonstrate and practice safe work habits in the lab area.
2. Identify and use welding symbols on fabrication drawings
3. Construct welding assembly drawings
4. Construct casting drawings
5. Construct forging drawings
6. Construct jig and fixture drawings
7. Construct tool and die drawings
8. Identify, specify, and construct drawings of fasteners
9. Construct and dimension keyway and keyseat drawings
10. Construct detailed, schematic and simplified thread drawings
11. Construct spring drawings

Connections:
*Common Core Standards  
*KOSSA  
*Common Core Technical Standards  
*New Generation Science Standards  
*AutoDesk Industry Standards  
*SolidWorks Industry Standards  
*Post-Secondary Education  
*CTSO’s-Skills USA
CAD 200
Intermediate Computer Aided Drafting
480112

Course Description:
Uses CAD software to produce advanced two-and three-dimensional object drawings. Advanced techniques of drafting, layering, and symbols associated with one or more design applications. Calculations of perimeters, areas, and mass associated with the drawings. (PROJECT LEAD THE WAY COMPONENT).

Prerequisite: Introduction to Computer Aided Drafting-480110

Content Process

Students Will:
1. Demonstrate and practice safe work habits in the lab area.
2. Demonstrate, through practice and communications, a comprehensive working knowledge of CAD drafting and the drafting symbols associated with one or more design applications.
3. Produce complex drawings through use of CAD techniques.
4. Use CAD to calculate perimeters and areas for design features.
5. Construct three-dimensional models using various techniques.
6. Project two-dimensional orthographic and axonometric views and sections off of the three-dimensional models.
7. Use advanced CAD operations.
8. Demonstrate and practice safe work habits in the lab area.

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description:
Internship provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Practicum do not receive compensation.

Prerequisites: Permission of Instructor

Content Process

Students Will:
1. Demonstrate and practice safe work habits in the lab area.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests prior to graduation
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential after graduation
7. Demonstrate and practice safe work habits in the lab area.
8. Gain career awareness and the opportunity to test career choice(s)

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description:
Provides a practical approach to architectural drafting. An introduction to board and computer aided drafting as it relates to residential and commercial architecture, specifications, and structural systems including wood, masonry, concrete, and steel.

Prerequisite: Introduction to Computer Aided Drafting-480110

Content Process

Students Will:
1. Demonstrate and practice safe work habits in the lab area.
2. Use proper drawing setup for architectural scales
3. Relate the design with site considerations.
4. Sketch a residential floor plan.
5. Identify floor plan symbols.
6. Identify material representations in plan and section views.
7. Apply basic dimensioning techniques.
8. Construct accompanying drawings to the floor plan - i.e. elevations and electrical plans.

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description:
Uses computer graphic workstation in the application of fundamental principles and capabilities of CAD, basic drafting conventions, and operations. An in-depth study of computer aided drafting commands, terminology, command utilization, and skill development.

Prerequisite: None

Content Process

Students Will:
1. Demonstrate and practice safe work habits in the lab area.
2. Describe, using correct computer terminology, basic computer functions, uses of computers in society and different types of software.
3. Discuss ethical computing issues, such as copyright, privacy, security, and property.
4. Use graphical user interface.
5. Use computer application programs.
6. Access information sources found on networks such as the Internet and be familiar with Web browsers, search sources, and sources of information related to his or her own field.
7. Demonstrate an awareness of different types of software applications.
8. Produce line entities using various coordinate techniques.
9. Construct geometric shapes in two-dimensional space.
10. Develop detailed orthographic views as required.
11. Construct cross sections of various designs, with cross-hatching incorporated as desired.
12. Apply dimensions and annotations to drawings.
13. Move, copy, delete, and save drawings or portions of drawings.
14. Use CAD to manipulate drawings by means of translation, rotation, scaling, zooming, panning, and windowing.
15. Explore 3-D drawing techniques.

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description:
Introduces the elements of surveying including measurements, distance corrections, leveling, angles, area computation, computer calculations, topographic surveying, and electronic distance measuring instruments, construction surveying, GPS, and GIS.

*Prerequisite: None*

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Content Process

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. Demonstrate and practice safe work habits in the lab area.</td>
</tr>
<tr>
<td>2. Identify surveying methods and notations of measurements.</td>
</tr>
<tr>
<td>3. Analyze correction of error.</td>
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<tr>
<td>4. Identify surveying instruments.</td>
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<tr>
<td>5. Identify various methods of leveling.</td>
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<tr>
<td>6. Explain methods of traverse calculations and area computation.</td>
</tr>
<tr>
<td>7. Analyze computer calculations and omitted measurements.</td>
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<tr>
<td>8. Identify various types of surveys.</td>
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<tr>
<td>10. Identify volumes and horizontal and vertical curves.</td>
</tr>
<tr>
<td>11. Demonstrate and practice safe work habits in the lab area.</td>
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<td>12. Identify surveying methods and notations of measurements.</td>
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<td>13. Analyze correction of error.</td>
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Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description:
Explores the design process involved in the development of mechanical working drawings and the design principles in various manufacturing disciplines; gear drawing and design, and cam and follower drawing and design. Design principles, mechanical adaptation, and their drawing practices. Mechanical assemblies, machine design, power transmission, bearings, and seals in assemblies. Shop processes involved in these mechanical designs.

Prerequisite: Introduction to Computer Aided Drafting-480110

<table>
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<tr>
<td>Students Will:</td>
</tr>
<tr>
<td>1   Demonstrate and practice safe work habits in the lab area.</td>
</tr>
<tr>
<td>2   Construct mechanical working drawings</td>
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<tr>
<td>3   Construct gear drawing</td>
</tr>
<tr>
<td>4   Construct cam and follower drawings</td>
</tr>
<tr>
<td>5   Solve mechanical problems related to gears and cams.</td>
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<tr>
<td>6   Select appropriate gears from vendor catalogs.</td>
</tr>
<tr>
<td>7   Construct mechanical power transmission drawings</td>
</tr>
<tr>
<td>8   Construct assembly drawings using bearings and seals</td>
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<tr>
<td>9   Demonstrate knowledge of shop processes</td>
</tr>
</tbody>
</table>

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA
Course Description:
Introduces Parametric Modeling and Design of a CAD workstation in exploring the techniques associated with drafting and design using Parametric modeling software. Introduces creation of parametric models and explores associative function and flexibility of concurrent part design.

CAD 100 or CAD 200
Prerequisite: Introduction to Computer Aided Drafting-480110 or Intermediate Computer Aided Drafting-480112

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<td>Students will:</td>
</tr>
<tr>
<td>1. Demonstrate and practice safe work habits in the lab area.</td>
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<tr>
<td>2. Demonstrate an awareness of the terminology and concepts of Parametric Modeling</td>
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<tr>
<td>3. Demonstrate basic parametric modeling procedures</td>
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<td>4. Demonstrate the ability to create parametric sketches</td>
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<tr>
<td>5. Create fully constrained sketches</td>
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<tr>
<td>6. Apply/modify geometric constraints and dimensions to capture and alter the design geometry of the part</td>
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<tr>
<td>7. Demonstrate through practice, the construction of simple parametric solid models</td>
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<td>8. Demonstrate the ability to perform feature-based modeling operations on parts</td>
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<td>9. Perform analyses on the model</td>
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<tr>
<td>10. Perform simple assembly modeling</td>
</tr>
<tr>
<td>11. Create desired working drawing layouts and dimensioned views from parametric solids</td>
</tr>
</tbody>
</table>

Connections:
- Common Core Standards
- KOSSA
- Common Core Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- Post-Secondary Education
- CTSO’s-Skills USA
Course Description:
Allows the student to gain intermediate experience in their perspective fields through projects and tasks assigned by the instructor and based on applications the student may one day experience as a professional. Sets the foundation for more in-depth projects that will be included in the student's future portfolio. Focuses on various assignments and curriculum as determined by the program instructor.

Permission of Instructor

Content /Process

Students Will:
1 Demonstrate and practice safe work habits in the lab area.
2 Expand their portfolio of CAD drawings to enhance career opportunities
3 Discuss occupation opportunities

Connections:
*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA