



Computer Aided Design Technology

Program of Studies
2016-2017



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Computer Aided Design Technology

| Program Area Course Title | Post- Secondary Connection | Valid Course Code | Recommended Grade Level | | | | Recommended Credit |
|---|----------------------------------|-------------------------|----------------------------|----|----|----|-----------------------|
| | | | 9 | 10 | 11 | 12 | |
| Architectural Design | CAD 220 | 480116 | | X | X | X | 1 |
| Advanced Dimensioning and Measurement | CAD 240 | 470924 | | X | X | X | 1 |
| Construction Drafting (Techniques) | CAD 230 | 480119 | | X | X | X | 1 |
| Co-op I (CAD) | CAD 299 | 480142 | | | X | X | 1 |
| Engineering Graphics | CAD 112 | 480113 | X | X | X | X | 1 |
| Industrial Drafting Processes | CAD 212 | 480127 | | X | X | X | 1 |
| Intermediate Computer Aided Drafting | CAD 200 | 480112 | X | X | X | X | 1 |
| Internship (CAD) | CAD 298 | 480145 | | | X | X | 1-3 |
| Introduction to Architecture | CAD 120 | 480117 | | X | X | X | 1 |
| Introduction to Computer Aided Drafting | CAD 100 | 480110 | X | X | X | X | 1 |
| Introduction to Surveying (for CAD) | CAD 108 | 480104 | X | X | X | X | .5 - 1 |
| Mechanical Design | CAD 222 | 480135 | | X | X | X | 1 |
| Parametric Modeling | CAD 201 | 480136 | | X | X | X | 1 |
| Special Problems (CAD) | CAD 293 | 480179 | | X | X | X | 1 |

| |
|---|
| COMPLEMENTARY OR ADVANCED COURSEWORK BEYOND CAD PATHWAY(s) |
|---|

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| Upon completion of a pathway, additional coursework to enhance student learning is encouraged. Credits earned in Advanced or Complementary Coursework “Beyond the Pathway” may not be substituted for pathway courses in order to achieve Preparatory or Completer status. |
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|---|
| <ul style="list-style-type: none">• Career Options |
| <ul style="list-style-type: none">• JAG Courses |
| <ul style="list-style-type: none">• 480179 Special Problems (CAD) |
| <ul style="list-style-type: none">• 480199 Special Topics-CAD |

Overview of Computer Aided Design Technology Education

Purpose

The vision of Computer Aided Design Technology Education is to promote safety and performance standards, enhance leadership skills, and provide relevant curriculum 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 adapt to changes in the industry.
- Integrate academic skills to insure that students develop written and verbal communications skills, computational skills, and scientific/math problem-solving skills.

Career Pathways

- *Civil Designer*
- *Mechanical Designer*
- *Architectural Designer*
- *CAD Manufacturing TRACK*

Standards Based Curriculum

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

Alignment of the CAD curriculum with nationally recognized industry standards and the state 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 describe 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.

Link to KOSSA Skill Standards documents via:

<http://education.ky.gov/CTE/kossa/Pages/KOSSAStandardsDocs.aspx>

Valid KOSSA and Industry Certification for Career Readiness

The Valid List of KOSSA and Industry Certifications for Career Readiness can be viewed via the following link: <http://education.ky.gov/CTE/kossa/Pages/ValidKOSSAList.aspx>. The valid list is reviewed annually through the established process and publishes by June 1 for the corresponding academic year.

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 Based Learning Manual is available on the KDE webpage:

<http://education.ky.gov/CTE/cter/Pages/WBL.aspx>

Student Organizations and Competitions

Participation in SkillsUSA competitions provides a vehicle for students to employ higher order thinking skills, interact with high-level industry representatives and enhance leadership skills through participation in regional, state and national competitive events and activities.

**COMPUTER AIDED DESIGN (CAD)
CAREER PATHWAYS
2016-2017**

**CIVIL DESIGNER
CIP 15.1301.01**

PATHWAY DESCRIPTION: Civil Designers apply technical knowledge and skills to develop working drawing and electronic simulations in support of civil engineers, geological engineers, and related professionals. Includes instruction in basic civil engineering principles, geological and seismographic mapping, machine drafting, computer-aided drafting (CAD), pipe drafting, survey interpretation, and blueprint reading.

BEST PRACTICE COURSES

**EXAMPLE
ILP-RELATED
CAREER TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (3) **THREE CREDITS:***

- 480110 Introduction to Computer Aided Drafting
- 480112 Intermediate Computer Aided Drafting
- 480104 Introduction to Surveying OR
480113 Engineering Graphics

*Choose (1) **ONE CREDIT** from the following:*

- 480127 Industrial Drafting Process
- 480136 Parametric Modeling
- 480145 Internship I
- 480135 Mechanical Design
- 480142 Cooperative Education I (CAD)
- 480179 Special Problems (CAD)
- 219901 Introduction to Engineering Design (**PLTW**)

Note: (PLTW) courses require an agreement between
Project Lead the Way and the Local School District.

Engineer Technician
Architectural Engineer
Electrical Engineer
Industrial Engineer
Mechanical Engineer
Civil Engineer

**COMPUTER AIDED DESIGN (CAD)
CAREER PATHWAYS
2016-2017**

**MECHANICAL DESIGNER
CIP 15.1301.02**

PATHWAY DESCRIPTION: Mechanical designers have a working knowledge of mechanical parts as well as computer-aided design (CAD) software, such as AutoCAD and SolidWorks. Mechanical designers work with project managers, engineers, and clients to understand the needs and requirements for a new product or mechanical system. For example, designers working on a project to create an automobile engine may consult engineers regarding which structural materials to use or clients regarding engine efficiency requirements. Once materials and specifications have been determined, designers begin using CAD software to plan and develop models.

| BEST PRACTICE COURSES | EXAMPLE ILP-RELATED CAREER TITLES |
|---|---|
| <p><i>Foundational Skills Necessary for Career-Ready Measure: (KOSSA/Industry Certification)</i></p> <p><i>Complete (3) THREE CREDITS:</i></p> <ul style="list-style-type: none"> • 480110 Introduction to Computer Aided Drafting • 480136 Parametric Modeling • 480113 Engineering Graphics <p><i>Choose (1) ONE CREDIT from the following:</i></p> <ul style="list-style-type: none"> • 480135 Mechanical Design • 480127 Industrial Drafting Process • 470924 Advanced Dimensioning and Measurement • 480112 Intermediate Computer Aided Drafting • 480145 Internship I (CAD) <u>OR</u> 480142 Cooperative Education I (CAD) • 480179 Special Problems (CAD) • 219901 Introduction to Engineering Design (<i>PLTW</i>) <p style="text-align: center;">Note: (PLTW) courses require an agreement between Project Lead the Way and the Local School District.</p> | <p>Engineer Technician</p> <p>Electrical Engineer</p> <p>Industrial Engineer</p> <p>Mechanical Engineer</p> <p>Civil Engineer</p> |

**COMPUTER AIDED DESIGN (CAD)
CAREER PATHWAYS
2016-2017**

**ARCHITECTURAL DESIGNER
CIP 15.1301.03**

PATHWAY DESCRIPTION: Architectural Designers apply mathematical and scientific principles to building design, concentrating on structural demands and functionality while taking into account economic and safety factors. Architectural Designers need to be able to diagram designs manually as well through computer-aided drafting (CAD). Design systems are created for a building pertaining to, for instance, heating and air conditioning, lighting and plumbing. Also included are concerns and detail to landscape architecture and crossovers such as environmental design.

| BEST PRACTICE COURSES | EXAMPLE ILP-RELATED CAREER TITLES |
|---|---|
| <p><i>Foundational Skills Necessary for Career-Ready Measure: (KOSSA/Industry Certification)</i></p> <p><i>Complete (3) THREE CREDITS:</i></p> <ul style="list-style-type: none"> • 480110 Introduction to Computer Aided Drafting • 480117 Introduction to Architecture • 480116 Architectural Design <p><i>Choose (1) ONE CREDIT from the following:</i></p> <ul style="list-style-type: none"> • 480127 Industrial Drafting Process • 480113 Engineering Graphics • 470924 Advanced Dimensioning and Measurement • 480179 Special Problems (CAD) • 480112 Intermediate Computer Aided Drafting • 219901 Introduction to Engineering Design (PLTW) • 480145 Internship I (CAD) <u>OR</u> 480142 Cooperative Education I (CAD) <p style="text-align: center;">Note: (PLTW) courses require an agreement between Project Lead the Way and the Local School District.</p> | <p>Engineer Technician</p> <p>Architectural Engineer</p> <p>Electrical Engineer</p> <p>Civil Engineer</p> |

**COMPUTER AIDED DESIGN (CAD)
CAREER PATHWAYS
2016-2017**

**CAD MANUFACTURING TRACK
CIP 48.0500.99**

PATHWAY DESCRIPTION:

The Tech Ready Apprentices for Careers in Kentucky (TRACK) youth pre-apprenticeship program is a partnership between the Kentucky Department of Education’s Office of Career and Technical Education and the Kentucky Labor Cabinet to provide secondary students with career pathway opportunities into employers who offer Registered Apprenticeship programs.

Employers are able to tailor the program for their specific needs and select the Career and Technical Education courses and students for their apprenticeship pathway. Employers benefit by gaining future employees that have a good foundation and an interest in that occupation. Additionally, it enables students to receive a nationally recognized credential.

Successful completion is determined by the employer and the student will be awarded an industry certification through The Kentucky Labor Cabinet and all on-the-job hours worked will be counted towards the registered apprenticeship.

BEST PRACTICE COURSES

**EXAMPLE
ILP-RELATED
CAREER TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (4) **FOUR CREDITS:***

- A minimum of four (4) courses chosen from the partnering technical center’s manufacturing course offerings. These courses are chosen by the employer sponsoring the Registered Apprenticeship. The employer must provide a student co-op opportunity.

Engineer Technician
Architectural Engineer
Electrical Engineer
Industrial Engineer
Mechanical Engineer
Civil Engineer

The specifics of the TRACK program vary and interested parties will need to confer with the Office of Career and Technical Education for the implementation process. There are no costs involved in the TRACK program except for student employee wages. For more information, please refer to: <http://education.ky.gov/CTE/cter/Pages/TRACK.aspx>

| COLLEGE/UNIVERSITY: | Kentucky Technical College or University | | CLUSTER: | Manufacturing Technology | | | |
|---|---|--|---|--|---|--|---|
| HIGH SCHOOL (S): | KY County High School | | PATHWAY: | Computer Aided Design Engineer | | | |
| PROGRAM: | Computer Aided Design Technology | | PROGRAM: | Computer Aided Design Technology | | | |
| GRADE | ENGLISH | MATH | SCIENCE | SOCIAL STUDIES | REQUIRED COURSES RECOMMENDED ELECTIVE COURSES OTHER TECHNICAL EDUCATION COURSES | CREDENTIAL DIPLOMA DEGREE | Occupations |
| 9 | English 1 | Algebra I - Part 1 | Earth Space Science | ROTC I or World Geography | Health and PE History and Appreciation of Fine Arts 480110 Intro to CAD, KCTCS CAD 100 480112 Intermediate CAD, KCTCS CAD 200 480113 Engineering Graphics (Invert or Certified User) AutoDesk Revit | 480136 Parametric Modeling 480117 Intro to Architecture, KCTCS CAD120 480136 Parametric Modeling, KCTCS CAD 200 480113 Engineering Graphics (Invert or Certified User) AutoDesk Revit | (Civil Designer) (Mechanical Designer) Architectural Designer |
| 10 | English II | Algebra I - Part II | Biology I Physics or Chemistry | World Civics US History | 480116 Architectural Design, KCTCS CAD 220 DFT 293 Special Problems (CAD) | HS Diploma: TRACK-Pre-Apprenticeship | |
| 11 | English III | Algebra II | Chemistry | US History | 480116 Architectural Design, KCTCS CAD 220 DFT 293 Special Problems (CAD) | HS Diploma: TRACK-Pre-Apprenticeship | |
| 12 | English IV | Pre-Calculus | Elective | Elective | 480116 Architectural Design, KCTCS CAD 220 DFT 293 Special Problems (CAD) | HS Diploma: TRACK-Pre-Apprenticeship | |
| Year 13 | ENG 101 Writing I | Humanities | Math | Social Science 3 Science | Oral Communications DFT 130 Descriptive Geometry DFT 240 Advanced Dimensioning | Ashland Community & Technical College AAS Degree | Computer Aided Drafter, |
| Year 14 | Electives 6 hrs | DFT 292 Industrial Applications Physical Science 6 hrs | ADFT 282 Commercial Detailing Computer Science 3 hrs | ADFT 282 Working Drawings Social Science 3 3 hrs | DFT 222 Mechanical Design Electives 3 hrs | | |
| Year 15 | 4 hrs LET 303 3hrs LET 310 3hrs LET 317 3hrs | Applications Physical Science 3 hrs | Lean Systems Quality Control Facilities Management 3 hrs | Industrial Management Senior Project 3 hrs | Industrial Design Electives 3 hrs | University | |
| Year 15 & 16 | Materials Science LET 371 1hr Seminar | Economics Engineering Management Industrial Safety | Lean Systems Quality Control Facilities Management 3 hrs | Project Management Design of Experiments 3 hrs | Industrial Design Electives 3 hrs | | |
| POSTSECONDARY | | | | | | | |
| SECONDARY | | | | | | | |
| Required Courses | | | | | | | |
| Recommended Elective Courses | | | | | | | |
| Other Elective Courses | | | | | | | |
| Career and Technical Education Courses | | | | | | | |
| Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2) | | | | | | | |
| High School to Comm. College (e-Com. College to 4-Yr Institution) (e = Opportunity to test out) | | | | | | | |
| Mandatory Assessments, Advising, and Additional Preparation | | | | | | | |
| Note: Categories of courses (e.g. Required, Recommended Electives, other Electives and career and technical education) apply to both secondary and postsecondary levels. | | | | | | | |



Funded by the U. S. Department of Education (V051920001)
Revised Jan. 2005

October, 2006-CTE/Kentucky

Architectural Design
Valid Course Code: 480116

Course Description: 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.

Prerequisites: Introduction to Architecture - [480117](#)

Content/Process

Students will:

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

Connections

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 220
- CTSO - SkillsUSA

Advanced Dimensioning and Measurement
Valid Course Code: 470924

Course Description: 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.

Prerequisites: Engineering Graphics - [480113](#)

Content/Process

Students will:

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

Connections

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 240
- CTSO - SkillsUSA

Construction Drafting (Techniques)

Valid Course Code: 480119

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](#)

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

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 230
- CTSO - SkillsUSA

Co-op I
Valid Course Code: 480142

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. This course can be repeated.

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

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 299
- CTSO - SkillsUSA

Engineering Graphics
Valid Course Code: 480113

Course Description: This course includes exploration of lines and planes as they relate to orthographic projection to show the size and shape of objects. Instruction 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.

Content/Process

Students will:

1. Demonstrate and practice safe work habits in the lab area.
2. Construct drawings of basic sectional views.
3. Apply dimensioning techniques.
4. Construct title blocks, revision blocks, materials list, and tolerancing blocks.
5. Freehand sketch orthographic and pictorial views.
6. Construct axonometric drawings.
7. Construct oblique drawings.
8. Construct one-point perspective.
9. Construct two-point perspective.

Connections

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 112
- CTSO - SkillsUSA

Industrial Drafting Processes
Valid Course Code: 480127

Course Description: This course 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, and screw-thread design and related fastening concepts as they relate to manufactured items and construction are also included.

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

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 100
- CTSO - SkillsUSA

Intermediate Computer Aided Drafting
Valid Course Code: 480112

Course Description: Students will use 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 all areas at all times.
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

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 200
- CTSO - SkillsUSA

Internship (CAD)
Valid Course Code: 480145

Course Description: Internship provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Internship 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

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 298
- CTSO - SkillsUSA

Introduction to Architecture
Valid Course Code: 480117

Course Description: This course provides a practical approach to architectural drafting through 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

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 120
- CTSO - SkillsUSA

Introduction to Computer Aided Drafting

Valid Course Code: 480110

Course Description: Students will use a 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 will be provided.

Content/Process

Students will:

1. Demonstrate and practice safe work habits in the lab area.
2. Demonstrate an understanding of orthographic projection, section, auxiliary, and pictorial views as they relate to three-dimensional objects.
3. Identify the alphabet of lines and name each lines use.
4. Use architect's, metric, civil, and mechanical drafter's scales.
5. Understand the use and purpose of a title block.
6. Demonstrate a basic understanding of dimensions and their uses.
7. Describe, using correct computer terminology, basic computer functions, uses of computers in society, and different types of software.
8. Discuss ethical computing issues, such as copyright, privacy, security, and property.
9. Use graphical user interface.
10. Use computer application programs.
11. Access information sources found on networks such as the Internet and utilize web browsers, search sources, and sources of information related to his or her own field.
12. Demonstrate an awareness of different types of software applications.
13. Produce line entities using various coordinate techniques.
14. Construct geometric shapes in two-dimensional space.
15. Develop detailed orthographic views as required.
16. Construct cross sections of various designs with cross-hatching incorporated as desired.
17. Apply dimensions and annotations to drawings.
18. Move, copy, delete, and save drawings or portions of drawings.
19. Use CAD to manipulate drawings by means of translation, rotation, scaling, zooming, panning, and windowing.
20. Explore 3-D drawing techniques.

Connections

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 100
- CTSO - SkillsUSA

Introduction to Surveying (for CAD)
Valid Course Code: 480104

Course Description: Students are introduced to 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.

Content/Process

Students will:

1. Demonstrate and practice safe work habits in the lab area.
2. Identify surveying methods and notations of measurements.
3. Analyze correction of error.
4. Identify surveying instruments.
5. Identify various methods of leveling.
6. Explain methods of traverse calculations and area computation.
7. Analyze computer calculations and omitted measurements.
8. Identify various types of surveys.
9. Explain Global Positioning System and Geographic Information Systems.
10. Identify volumes and horizontal and vertical curves.
11. Demonstrate and practice safe work habits in the lab area.
12. Identify surveying methods and notations of measurements.
13. Analyze correction of error.
14. Identify surveying instruments.

Connections

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 108
- CTSO - SkillsUSA

Mechanical Design
Valid Course Code: 480135

Course Description: Students will explore 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; and shop processes involved in these mechanical designs.

Prerequisite: Introduction to Computer Aided Drafting - [480110](#)

Content/Process

Students will:

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

Connections

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 222
- CTSO - SkillsUSA

Parametric Modeling
Valid Course Code: 480136

Course Description: This course 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.

Prerequisite: Introduction to Computer Aided Drafting - [480110](#) or Intermediate Computer Aided Drafting - [480112](#)

Content/Process

Students will:

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

Connections

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 201
- CTSO - SkillsUSA

Special Problems (CAD)
Valid Course Code: 480179

Course Description: This course 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 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.

Prerequisite: 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

- State Standards
- KOSSA
- State Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- KCTCS Course: CAD 293
- CTSO - SkillsUSA