



ANKENY
COMMUNITY SCHOOL DISTRICT

Department of Academic Services

Industrial Technology Curriculum Review

(Includes Project Lead the Way)

(Updated April, 2018)

Board approved August, 2018

Career and Technical Education (CTE) Mission Statement

The mission statement was written collaboratively by representatives of the Family and Consumer Sciences, Industrial Technology, Automotive, Business, and Project Lead the Way teachers, Instructional Coaches and Administrators. The mission statement is a commitment by teachers across the district ensuring a guaranteed and viable curriculum.

Students will learn employability skills by being engaged in relevant, authentic experiences that will prepare them for a lifetime of career success.

Industrial Technology Mission Statement

The mission statement was written collaboratively by representatives of the Family and Consumer Sciences teachers, Instructional Coaches and Administrators. The mission statement is a commitment by teachers across the district ensuring a guaranteed and viable curriculum.

Students will be engaged in relevant learning experiences (designing, building, repairing) to develop problem-solving and critical thinking skills to prepare them for a lifetime of career success.

Course Purposes

The following course purposes describe what students will know and demonstrate by the end of the grade or course. Each Grade Level Standard and the Components directly align to this statement, or promise, regarding the guaranteed and viable curriculum.

Exploring Tech (7th Grade)

Students will explore a variety of mediums in order to problem solve and practically apply the use of emerging technologies while critically refining their 21st century skills. (Exploring Tech is one of four exploratory rotation classes for seventh grade students).

Intro To Construction

Students will explore the construction industry through activities where students will experience the areas of finish carpentry (furniture, trim, and cabinetry), general construction, and basic tool and jobsite safety.

Technology Modeling (formerly Design and Modeling)

Students are introduced to and use the design process to solve problems and understand the influence that creative and innovative design has on our lives. Students use industry standard 3D modeling software to create a virtual image of their designs.

Introduction to Architecture (formerly Into to Architectural Design)

Students will experience the elements of the architectural design process with real-world constraints, focusing on functional and marketable features of basic home design.

Advanced Trim and Finish

Students will trim and finish various parts of a house using many different techniques. Students will also learn and practice other fine woodworking skills to demonstrate their accuracy in cuts and layout.

Architectural Drafting

Students will design many different structures. Students are responsible for making professional looking presentations. In this course emphasis is put on the technical side of Architecture.

Beginning House Design

Students will learn the basics of Architecture by understanding how houses are built and design structures that reflect current building techniques.

Cabinetry

Students will learn how to build different cabinet components. Students will also be learning different joinery techniques and advanced tool usage.

CAD 1

Students will learn the basics of Computer-Aided Drafting. Students will learn the basic commands and operations of the software to create 2D and 3D products.

Industrial CAD 1 (non-DMACC)

Students will use current industry software to design and engineer parts. The software will require students to work in both 2D and 3D models. Students will use problem solving skills and work in groups to complete design projects. Reproducing drawings and learning the basic drafting skills will also be taught. Many of the skills used in Mechanical Engineering and Manufacturing will be taught in this course.

CAD 2

Students will learn advanced CAD operations and commands. Students will also use collaboration with other students to problem-solve various situations using software and manufacturing methods.

Industrial CAD 2 (non DMAACC)

Students will use current industry software to design and engineer parts. The focus in this course will be designing parts that can be produced and tested. Students will then have to use data to re-engineer parts to make them better. Students will use simulations, 3D printers, and CNC machines to produce parts to be actually tested. Cost analysis as well as material limits will also be covered in this course. Many of the skill used in Mechanical Engineering and Manufacturing will be taught in this course.

CAD Architecture

Students will study past and current architectural trends. Students will learn about concepts and processes of construction. Students will demonstrate understanding of the stages of floor plan design. Students will create a presentation of architectural drawings to industry standards.

Architectural Design and Construction (non-DMAACC)

Students will take what they have learned in Beginning House Design and apply it to current industry software. Students will work with both 2D and 3D models. More of a focus will be put on how houses are built and the construction process behind it. Students will work their way up to designing a house where they are required to produce drawings that could actually be used by contractors and also have the ability to calculate the cost of materials for the house. Students will also work with current local building codes in their designs. Many of the skill used in Architecture, Engineering, and Construction will be taught in this course

VREP (new course for 2019-2020)

Students will use computer graphics software to produce 2D and 3D models. The focus will be on making photorealistic models. Students will also beginning animating models to create short scenes. Students will work with cameras and materials to create realistic backgrounds and scenes. They will also learn different modeling techniques to create figures and objects. Simulations will also be used for calculating actions of fluids and particles. Students with an interest in Computer Graphics, Computer Animation, and Video Game Design are encouraged to take this course.

Consumer Automotive

Students will develop the minor skills and understandings that are beneficial to students as current or future owners of automobiles. Students will get the opportunity to learn about the automotive systems of vehicle frame members, wheels/tires, automotive electrical systems, engine system, and the braking system. Students will learn how to use tools and skills to perform minor services within these automotive systems.

Automotive Mechanics and Systems

Students will further develop the minor skills and understandings students attained in consumer automotive. Students will get the opportunity to learn about the automotive systems of brakes, suspension,

engine, drivetrain, wheels/tires, automotive electrical, and body work by performing services to these systems. The services in this course will be more in depth than the minor services covered in consumer automotive. Safety, tool usage, automotive system understanding, performing automotive services, and finding necessary automotive information will be covered in this course.

Automotive Capstone

Automotive Capstone is a very hands-on competency based course. In Automotive Capstone students will choose an area of automotive they want to gain competency in by working on vehicles. This course is great for students with a high interest in the automotive field and can help students focus on the area of automotive they want to pursue.

Grade Level Standards and Components

The Grade Level Standards and Components represent the guaranteed and viable curriculum for all secondary students in Ankeny. Prioritized through a collaborative process, the Grade Level Standards and Components represent the most critical concepts and skills required to be successful learners in school and beyond high school.

The code in parenthesis represents the standards from the Iowa Career and Technical Education Standards - the original document used for the prioritization process. Any Grade Level Standard (Bold and Underlined) labeled as a “Focus” area will have evidence in Infinite Campus’ gradebook and student performance will be reported on a report card. Those Grade Level Standards are the most critical to student success and, as a result, have been designated as focus areas.

Those Grade Level Standards (Bold and underlined) labeled as “Foundational” or “Introductory” have been designated as agreed upon areas for instruction, but will not have performance reported in Infinite Campus or on a report card. The difference between the levels is the amount of direct instruction and/or experiences students have with the skill during that grade or course.

Any Components (not bold or underlined) under the Grade Level Standard labeled as “Focus” are the critical formative skills required to demonstrate the Grade Level Standard and evidence of learning will be recorded in Infinite Campus. The preponderance of evidence on each Grade Level Standard will determine the performance level on each Grade Level Standard.

The prioritization process allows teachers to target instruction on the skills required for that grade or course. This allows students to focus on only a few grade level standards and dive deeper into the learning. By having multiple and varied opportunities to demonstrate their learning, reporting on the performance of grade level standards is more accurate.

Exploring Tech

Course Purpose

Students will explore a variety of mediums in order to problem solve and practically apply the use of emerging technologies while critically refining their 21st century skills. (Exploring Tech is one of four exploratory rotation classes for seventh grade students).

IT.TL.01 Students will demonstrate creative thinking in the design and development of innovative technology products and problem solving. (Focus)

IT.TL.01.01 Students will design, develop, create, and/or test digital technology products. (Focus)

IT.TL.01.02 Students will design and develop projects by breaking them down into stages and assessing throughout (Focus).

IT.TL.02 Students will adapt and adjust to various roles and responsibilities in an environment of change. (Focus)

IT.TL.02.01 Students will work well independently and with a team (Focus).

IT.TL.02.02 Students will accept and own mistakes as a part of learning (Foundational).

IT.TL.02.03 Students will carry out tasks and projects to completion.(Focus)

IT.TL.02.04 Students will identify effective strategies to improve project or task (Focus).

Technology Modeling

Course Purpose

Students are introduced to and use the design process to solve problems and understand the influence that creative and innovative design has on our lives. Students use industry standard 3D modeling software to create a virtual image of their designs

Grade Level Standards

IT.DM.08.01 Students will be able to communicate the design process by creating a CAD and physical model. (Focus)

IT.DM.08.01.01 Create a testable Physical model. (Focus)

IT.DM.08.01.02 Use 3D modeling software (Inventor) to create and dimension models. (Focus)

IT.DM.08.01.03 Use the engineering design process to clarify a problem and design a solution. (Foundational)

IT.DM.08.01.04 Communicate individually or with a group the design process in a digital or written format. (Foundational)

IT.DM.08.02 Students will measure accurately with the standard measuring system. (Focus)

IT.DM.08.02.01 Students will demonstrate the ability to measure accurately with different devices and scales. (Focus)

IT.DM.08.02.02 Make two-dimensional and three-dimensional representations with appropriate symbols and measurements. (Focus)

IT.DM.08.03 Students will develop an understanding of careers and fields of study. (Foundational)

IT.DM.08.03.01 Explain different careers and education required. (Foundational)

Introduction to Architecture

Course Purpose

Students will experience the elements of the architectural design process with real-world constraints, focusing on functional and marketable features of basic home design.

Grade Level Standards

IT.IA.01 Students will experience the elements of the design process with real-world constraints. (Focus)

IT.IA.01.01 Students will demonstrate basic navigation of design software to construct a basic house. (Focus)

IT.IA.01.02 Students will design a house that is functional and marketable for real-world use, exhibiting both creativity and attention to detail. (Focus)

IT.IA.01.03 Students will utilize the design software (toolbars, selection tools, etc.) efficiently. (Foundational)

IT.IA.01.04 Students will navigate the design program to create a real product for consumers. (Foundational)

IT.IA.01.05 Students will use basic computer skills (keyboard, opening, saving and naming files appropriately, copy/paste, shortcut tools, navigating drives/folders, etc). (Introductory)

Intro To Construction

Course Purpose

Students will explore the construction industry through activities where students will experience the areas of finish carpentry (furniture, trim, and cabinetry), general construction, and basic tool and jobsite safety.

Grade Level Standards

IT.INCON.01 Students will identify and demonstrate how to use hand and power tools.

(Focus)

IT.INCON.01.01 Students will demonstrate the ability to use the proper hand/power tool for the application/process. (Focus)

IT.INCON.01.02 Students will identify common hand/power tools and describe their uses. (Focus)

IT.INCON.01.03 Students will apply the appropriate hand/power tools in a safe and appropriate manner

IT.INCON.01.04 Students will visually inspect hand/power tools to determine if they are safe to use. (Foundational)

IT.INCON.02 Students will identify building materials and fasteners used in building projects. (Focus)

IT.INCON.02.01 Describe the fasteners, anchors, and adhesives used in construction work and explain their uses. (Focus)

IT.INCON.02.02 Identify various types of building materials and their uses. (Foundational)

IT.INCON.03 Students will utilize standard measurement and mathematics to solve construction problems and build projects. (Focus)

IT.INCON.03.01 Use a standard ruler and a measuring tape to measure. (Focus)

IT.INCON.03.02 Utilize a combination of measurement and mathematical processes to solve construction-related problems. (Focus)

IT.INCON.03.03 Interpret and use drawing dimensions. (Focus)

IT.INCON.03.04 Calculate the quantities of lumber and wood products using industry-standard methods. (Focus)

IT.INCON.04 Students will maintain a safe and orderly work environment. (Foundational)

IT.INCON.04.01 Explain the idea of a safety culture and its importance in the construction crafts. (Foundational)

IT.INCON.04.02 Clean and maintain work area and leave in safe condition.(Foundational)

IT.INCON.04.03 Follow tool checkout and check in. (Foundational)

IT.INCON.04.04 Identify methods for productive workplace relations. (Introductory)

Advanced Trim and Finish

Course Purpose

Students will trim and finish various parts of a house using many different techniques. Students will also learn and practice other fine woodworking skills to demonstrate their accuracy in cuts and layout.

Grade Level Standards

IT.ATF.01 Demonstrate knowledge regarding the construction trades and industry.

(Focus)

IT.ATF.01.01 Identify methods for productive workplace relations. (Focus)

IT.ATF.02 Demonstrate knowledge of building materials, fasteners, and adhesives. (Focus)

IT.ATF.02.01 Identify various types of building materials and their uses. (Focus)

IT.ATF.02.02 State the uses of various types of hardwoods and softwoods. (Focus)

IT.ATF.02.03 Calculate the quantities of lumber and wood products using industry-standard methods.
(Focus)

IT.ATF.02.04 Describe the fasteners, anchors, and adhesives used in construction work and explain their uses. (Focus)

IT.ATF.03 Demonstrate knowledge and ability to install interior door units. (Focus)

IT.ATF.03.01 Demonstrate the procedure for placing and hanging a selected door. (Focus)

IT.ATF.03.02 Identify different types of interior doors. (Introductory)

IT.ATF.04 Demonstrate knowledge and ability to install window, door, floor, and ceiling trim. (Focus)

IT.ATF.04.01 Make square and miter cuts using a miter box or power miter saw. (Focus)

IT.ATF.04.02 Select and properly use fasteners to install trim. (Focus)

IT.ATF.04.03 Install interior trim, including; door trim, window trim, base trim, ceiling trim. (Focus)

IT.ATF.04.04 Estimate the quantities of different trim materials required for selected rooms.
(Foundational)

IT.ATF.04.05 Identify the different types of standard moldings and describe their uses. (Introductory)

IT.ATF.04.06 Make coped joint cuts using a coping saw. (Introductory)

IT.ATF.05 Demonstrate knowledge and ability to install cabinets. (Focus)

IT.ATF.05.01 Identify the cabinet components and hardware and describe their purposes. (Focus)

IT.ATF.05.02 State the classes and sizes of typical base and wall kitchen cabinets. (Foundational)

IT.ATF.05.03 Layout factory-made cabinets, countertops, and backsplashes. (Foundational)

IT.ATF.05.04 Explain the installation of an island base. (Introductory)

Architectural Drafting

Course Purpose

Students will design many different structures. Students are responsible for making professional looking presentations. In this course emphasis is put on the technical side of Architecture.

Grade Level Standards

IT.ATF.01 Students will demonstrate knowledge regarding the construction trades and industry. (Focus)

IT.ATF.01.01 Students will identify methods for productive workplace relations. (Focus)

IT.ATF.02 Students will demonstrate knowledge of building materials, fasteners, and adhesives. (Focus)

IT.ATF.02.01 Students will identify various types of building materials and their uses.

IT.ATF.02.02 Students will state the uses of various types of hardwoods and softwoods.

IT.ATF.02.03 Students will calculate the quantities of lumber and wood products using industry-standard methods.

IT.ATF.02.04 Students will describe the fasteners, anchors, and adhesives used in construction work and explain their uses.

IT.ATF.03 Students will demonstrate knowledge and ability to install interior door units. (Focus)

IT.ATF.03.01 Students will demonstrate the procedure for placing and hanging a selected door. (Focus)

IT.ATF.03.02 Students will identify different types of interior doors. (Introductory)

IT.ATF.04 Students will demonstrate knowledge and ability to install window, door, floor, and ceiling trim.(Focus)

IT.ATF.04.01 Students will make square and miter cuts using a miter box or power miter saw. (Focus)

IT.ATF.04.02 Students will select and properly use fasteners to install trim.(Focus)

IT.ATF.04.03 Students will install interior trim, including; door trim, window trim, base trim, ceiling trim. (Focus)

IT.ATF.04.04 Students will estimate the quantities of different trim materials required for selected rooms. (Foundational)

IT.ATF.04.05 Students will identify the different types of standard moldings and describe their uses.(Introductory)

IT.ATF.04.06 Students will make coped joint cuts using a coping saw. (Introductory)

IT.ATF.05 Students will demonstrate knowledge and ability to install cabinets. (Focus)

IT.ATF.05.01 Students will identify the cabinet components and hardware and describe their purposes.
(Focus)

IT.ATF.05.02 Students will state the classes and sizes of typical base and wall kitchen cabinets.(Foundational)

IT.ATF.05.03 Students will layout factory-made cabinets, countertops, and backsplashes. (Foundational)

IT.ATF.05.04 Students will explain the installation of an island base. (Introductory)

Beginning House Design

Course Purpose

Students will learn the basics of Architecture by understanding how houses are built and design structures that reflect current building techniques.

Grade Level Standards

IT.BEGHOU.01 Students will demonstrate knowledge of the drafting and design industry.

(Focus)

IT.BEGHOU.01.01 Students will identify and describe the training, qualifications, and advancement opportunities in the drafting and design industry. (Focus)

IT.BEGHOU.01.02 Students will describe the job outlook, projections, and earnings for workers in the design and drafting occupations. (Focus)

IT.BEGHOU.02 Students will demonstrate knowledge regarding the essential components of sustainable design and construction.(Focus)

IT.BEGHOU.02.01 Students will define the key principles of Green Building. (Focus)

IT.BEGHOU.02.02 Students will define various components of energy consumption in your home design. (Focus)

IT.BEGHOU.02.03 Students will identify the key benefits of Green Building. (Focus)

IT.BEGHOU.02.04 Students will explore AIA standards used for design and construction of your home. (Focus)

IT.BEGHOU.02.05 Students will describe the basic physical principles that apply to the built environment. (Focus)

IT.BEGHOU.02.06 Students will identify local geographical climatic, and meteorological data. (Foundational)

IT.BEGHOU.02.07 Students will develop a site plan for your home that protects trees and manages water and erosion. (Introductory)

IT.BEGHOU.03 Students will demonstrate knowledge regarding the interpretation of information from drawings. (Focus)

IT.BEGHOU.03.01 Students will utilize a combination of measurement and mathematical processes to solve linear and solid shape problems related to drafting and design. (Focus)

IT.BEGHOU.03.02 Students will describe the impact of globalization on drafting and design. (Foundational)

IT.BEGHOU.04 Students will understand and use basic drafting techniques. (Focus)

IT.BEGHOU.04.01 Students will reproduce drawings (e.g., blueprints and plots).(Focus)

IT.BEGHOU.04.02 Students will perform basic geometric constructions.(Focus)

IT.BEGHOU.04.03 Students will apply basic dimensioning techniques.(Focus)
IT.BEGHOU.04.04 Students will identify common manufacturing and construction materials. (Focus)
IT.BEGHOU.04.05 Students will use architectural, metric, civil, and mechanical engineer's scales and demonstrate scaling techniques. (Foundational)
IT.BEGHOU.04.06 Students will identify and draw the various line types. (Foundational)
IT.BEGHOU.04.07 Students will demonstrate correct lettering techniques (freehand or CAD).
(Introductory)

IT.BEGHOU.05 Students will use computer and peripheral devices to aid in the documentation for design projects. (Focus)

IT.BEGHOU.05.01 Students will demonstrate basic CAD operations.
IT.BEGHOU.05.02 Students will demonstrate proficiency in creating two-dimensional and three-dimensional CAD drawings.
IT.BEGHOU.05.03 Students will demonstrate proficiency in creating three-dimensional CAD modeling.
(Focus)
IT.BEGHOU.05.04 Students will demonstrate proper care and maintenance of CAD equipment and software. (Foundational)

IT.BEGHOU.06 Students will apply technical drawing skills to actual projects.(Focus)

IT.BEGHOU.06.01 Students will construct an architectural presentation drawing with site plan (i.e., landscape symbols), floor plans, building elevations, and wall sections. (Focus)
IT.BEGHOU.06.02 Students will construct various section and detail drawings (i.e., stairs, walls, roofs).
(Focus)
IT.BEGHOU.06.03 Students will construct interior and exterior elevation drawings. (Focus)
IT.BEGHOU.06.04 Students will develop, construct, and dimension a residential floor plan layout.
(Focus)
IT.BEGHOU.06.05 Students will construct foundation/basement plans. (Focus)
IT.BEGHOU.06.06 Students will prepare window, door, and finish schedules. (Focus)
IT.BEGHOU.06.07 Students will construct a building perspective drawing (Focus)

Cabinetry

Course Purpose

Students will learn how to build different cabinet components. Students will also be learning different joinery techniques and advanced tool usage.

Grade Level Standards

IT.CAB.01 Students will demonstrate knowledge of building materials, fasteners, and adhesives. (Focus)

IT.CAB.01.01 Students will identify various types of building materials and their uses. (Focus)

IT.CAB.01.02 Students will state the uses of various types of hardwoods and softwoods. (Focus)

IT.CAB.01.03 Students will calculate the quantities of lumber and wood products using industry-standard methods. (Focus)

IT.CAB.01.04 Students will describe the fasteners, anchors, and adhesives used in construction work and explain their uses. (Focus)

IT.CAB.02 Students will demonstrate knowledge and ability to install cabinets.(Focus)

IT.CAB.02.01 Students will identify the cabinet components and hardware and describe their purposes. (Focus)

IT.CAB.02.02 Students will state the classes and sizes of typical base and wall kitchen cabinets. (Foundational)

IT.CAB.03 Students will demonstrate knowledge and ability to fabricate cabinets.(Focus)

IT.CAB.03.01 Students will identify and cut the various types of joints used in cabinetmaking. (Focus)

IT.CAB.03.02 Students will build a cabinet from a set of drawings. (Focus)

IT.CAB.03.03 Students will recognize the common types of woods used to make cabinets. (Foundational)

CAD I

Course Purpose

Students will learn the basics of Computer-Aided Drafting. Students will learn the basic commands and operations of the software to create 2D and 3D products.

Grade Level Standards

IT.CAD1.01 Students will demonstrate knowledge of the drafting and design industry.

(Focus)

IT.CAD1.01.01 Students will identify and describe the training, qualifications, and advancement opportunities in the drafting and design industry.

IT.CAD1.01.02 Students will describe the job outlook, projections, and earnings for workers in the design and drafting occupations. (Focus)

IT.CAD1.02 Students will demonstrate knowledge regarding the interpretation of information from drawings.(Focus)

IT.CAD1.02.01 Students will utilize a combination of measurement and mathematical processes to solve linear and solid shape problems related to drafting and design. (Focus)

IT.CAD1.02.02 Students will describe the impact of globalization on drafting and design. (Foundational)

IT.CAD1.03 Students will understand and use basic drafting techniques.(Focus)

IT.CAD1.03.01 Students will reproduce drawings (e.g., blueprints and plots).(Focus)

IT.CAD1.03.02 Students will perform basic geometric constructions.(Focus)

IT.CAD1.03.03 Students will draw orthographic views and transfer features.(Focus)

IT.CAD1.03.04 Students will apply basic dimensioning techniques.(Focus)

IT.CAD1.03.05 Students will create specialty drawings.(Focus)

IT.CAD1.03.06 Students will use architectural, metric, civil, and mechanical engineer's scales and demonstrate scaling techniques.(Foundational)

IT.CAD1.03.07 Students will identify and draw the various line types. (Foundational)

IT.CAD1.03.08 Students will demonstrate correct lettering techniques (freehand or CAD).(Introductory)

IT.CAD1.04 Students will use computer and peripheral devices to aid in the documentation for design projects. (Focus)

IT.CAD1.04.01 Students will demonstrate basic CAD operations. (Focus)

IT.CAD1.04.02 Students will demonstrate proficiency in creating two-dimensional and three-dimensional CAD drawings. (Focus)

IT.CAD1.04.03 Students will follow National CAD Standards for CAD layers, organization of drawing sets, drawing sheets, and schedules, drafting conventions, terms and abbreviations, graphic symbols, notations, code conventions, and plotting. (Focus)

IT.CAD1.04.04 Students will demonstrate proper care and maintenance of CAD equipment and software.
(Foundational)

IT.CAD1.05 Apply technical drawing skills to actual projects. (Focus)

IT.CAD1.05.01 Students will construct keyway and keyseat drawings.(Focus)

IT.CAD1.05.02 Students will construct spline and gear drawings.(Focus)

IT.CAD1.05.03 Students will construct cam and follower drawings.(Focus)

IT.CAD1.05.04 Students will construct fastener head drawings.(Focus)

IT.CAD1.05.05 Students will construct drawings of molded plastic parts.(Focus)

IT.CAD1.05.06 Students will construct exploded and orthographic assembly drawings.(Focus)

Industrial CAD 1

(non-DMACC)

Course Purpose

Students will use current industry software to design and engineer parts. The software will require students to work in both 2D and 3D models. Students will use problem solving skills and work in groups to complete design projects. Reproducing drawings and learning the basic drafting skills will also be taught. Many of the skills used in Mechanical Engineering and Manufacturing will be taught in this course.

Grade Level Standards and Components

IT.ICAD1.01 Students will demonstrate knowledge of the drafting and design industry.

(Focus)

IT.ICAD1.01.01 Students will identify and describe the training, qualifications, and advancement opportunities in the drafting and design industry.

IT.ICAD1.01.02 Students will describe the job outlook, projections, and earnings for workers in the design and drafting occupations. (Focus)

IT.ICAD1.02 Students will demonstrate knowledge regarding the interpretation of information from drawings.(Focus)

IT.ICAD1.02.01 Students will utilize a combination of measurement and mathematical processes to solve linear and solid shape problems related to drafting and design. (Focus)

IT.ICAD1.02.02 Students will describe the impact of globalization on drafting and design. (Foundational)

IT.ICAD1.03 Students will understand and use basic drafting techniques.(Focus)

IT.ICAD1.03.01 Students will reproduce drawings (e.g., blueprints and plots).(Focus)

IT.ICAD1.03.02 Students will perform basic geometric constructions.(Focus)

IT.ICAD1.03.03 Students will draw orthographic views and transfer features.(Focus)

IT.ICAD1.03.04 Students will apply basic dimensioning techniques.(Focus)

IT.ICAD1.03.05 Students will create specialty drawings.(Focus)

IT.ICAD1.03.06 Students will use architectural, metric, civil, and mechanical engineer's scales and demonstrate scaling techniques.(Foundational)

IT.ICAD1.03.07 Students will identify and draw the various line types. (Foundational)

IT.ICAD1.03.08 Students will demonstrate correct lettering techniques (freehand or CAD).(Introductory)

IT.ICAD1.04 Students will use computer and peripheral devices to aid in the documentation for design projects. (Focus)

IT.ICAD1.04.01 Students will demonstrate basic CAD operations. (Focus)

IT.ICAD1.04.02 Students will demonstrate proficiency in creating two-dimensional and three-dimensional CAD drawings. (Focus)

IT.ICAD1.04.03 Students will follow National CAD Standards for CAD layers, organization of drawing sets, drawing sheets, and schedules, drafting conventions, terms and abbreviations, graphic symbols, notations, code conventions, and plotting. (Focus)

IT.ICAD1.04.04 Students will demonstrate proper care and maintenance of CAD equipment and software. (Foundational)

IT.ICAD1.05 Apply technical drawing skills to actual projects. (Focus)

IT.ICAD1.05.01 Students will construct keyway and keyseat drawings.(Focus)

IT.ICAD1.05.02 Students will construct spline and gear drawings.(Focus)

IT.ICAD1.05.03 Students will construct cam and follower drawings.(Focus)

IT.ICAD1.05.04 Students will construct fastener head drawings.(Focus)

IT.ICAD1.05.05 Students will construct drawings of molded plastic parts.(Focus)

IT.ICAD1.05.06 Students will construct exploded and orthographic assembly drawings.(Focus)

CAD 2

Course Purpose

Students will learn advanced CAD operations and commands. Students will also use collaboration with other students to problem-solve various situations using software and manufacturing methods.

Grade Level Standards

IT.CAD2.01 Students will demonstrate knowledge of the drafting and design industry.

(Focus)

IT.CAD2.01.01 Students will identify and describe the training, qualifications, and advancement opportunities in the drafting and design industry.

IT.CAD2.01.02 Students will describe the job outlook, projections, and earnings for workers in the design and drafting occupations. (Focus)

IT.CAD2.02 Students will demonstrate knowledge regarding the interpretation of information from drawings. (Focus)

IT.CAD2.02.01 Students will utilize a combination of measurement and mathematical processes to solve linear and solid shape problems related to drafting and design. (Focus)

IT.CAD2.02.02 Students will describe the impact of globalization on drafting and design. (Foundational)

IT.CAD2.03 Students will understand and use basic drafting techniques.(Focus)

IT.CAD2.03.01 Students will reproduce drawings (e.g., blueprints and plots).(Focus)

IT.CAD2.03.02 Students will perform basic geometric constructions.(Focus)

IT.CAD2.03.03 Students will draw orthographic views and transfer features.(Focus)

IT.CAD2.03.04 Students will apply basic dimensioning techniques.(Focus)

IT.CAD2.03.05 Students will create specialty drawings.(Focus)

IT.CAD2.03.06 Students will use architectural, metric, civil, and mechanical engineer's scales and demonstrate scaling techniques. (Foundational)

IT.CAD2.03.07 Students will identify and draw the various line types. (Foundational)

IT.CAD2.03.08 Students will demonstrate correct lettering techniques (freehand or CAD). (Introductory)

IT.CAD2.04 Students will use computer and peripheral devices to aid in the documentation for design projects. (Focus)

IT.CAD2.04.01 Students will demonstrate basic CAD operations.

IT.CAD2.04.02 Students will demonstrate proficiency in creating two-dimensional and three-dimensional CAD drawings.

IT.CAD2.04.03 Students will follow National CAD Standards for CAD layers, organization of drawing

sets, drawing sheets, and schedules, drafting conventions, terms and abbreviations, graphic symbols, notations, code conventions, and plotting. (Focus)

IT.CAD2.04.04 Students will demonstrate proper care and maintenance of CAD equipment and software. Foundational)

IT.CAD2.05 Students will apply technical drawing skills to actual projects. (Focus)

IT.CAD2.05.01 Students will construct keyway and keyseat drawings.(Focus)

IT.CAD2.05.02 Students will construct spline and gear drawings.(Focus)

IT.CAD2.05.03 Students will construct cam and follower drawings.(Focus)

IT.CAD2.05.04 Students will construct fastener head drawings.(Focus)

IT.CAD2.05.05 Students will construct drawings of molded plastic parts.(Focus)

IT.CAD2.05.06 Students will construct exploded and orthographic assembly drawings. (Focus)

Industrial CAD 2

(non DMACC)

Course Purpose

Students will use current industry software to design and engineer parts. The focus in this course will be designing parts that can be produced and tested. Students will then have to use data to re-engineer parts to make them better. Students will use simulations, 3D printers, and CNC machines to produce parts to be actually tested. Cost analysis as well as material limits will also be covered in this course. Many of the skill used in Mechanical Engineering and Manufacturing will be taught in this course.

Grade Level Standards and Components

IT.ICAD2.01 Students will demonstrate knowledge of the drafting and design industry.

(Focus)

IT.ICAD2.01.01 Students will identify and describe the training, qualifications, and advancement opportunities in the drafting and design industry.

IT.ICAD2.01.02 Students will describe the job outlook, projections, and earnings for workers in the design and drafting occupations. (Focus)

IT.ICAD2.02 Students will demonstrate knowledge regarding the interpretation of information from drawings. (Focus)

IT.ICAD2.02.01 Students will utilize a combination of measurement and mathematical processes to solve linear and solid shape problems related to drafting and design. (Focus)

IT.ICAD2.02.02 Students will describe the impact of globalization on drafting and design. (Foundational)

IT.ICAD2.03 Students will understand and use basic drafting techniques.(Focus)

IT.ICAD2.03.01 Students will reproduce drawings (e.g., blueprints and plots).(Focus)

IT.ICAD2.03.02 Students will perform basic geometric constructions.(Focus)

IT.ICAD2.03.03 Students will draw orthographic views and transfer features.(Focus)

IT.ICAD2.03.04 Students will apply basic dimensioning techniques.(Focus)

IT.ICAD2.03.05 Students will create specialty drawings.(Focus)

IT.ICAD2.03.06 Students will use architectural, metric, civil, and mechanical engineer's scales and demonstrate scaling techniques. (Foundational)

IT.ICAD2.03.07 Students will identify and draw the various line types. (Foundational)

IT.ICAD2.03.08 Students will demonstrate correct lettering techniques (freehand or CAD). (Introductory)

IT.ICAD2.04 Students will use computer and peripheral devices to aid in the documentation for design projects. (Focus)

IT.ICAD2.04.01 Students will demonstrate basic CAD operations.

IT.ICAD2.04.02 Students will demonstrate proficiency in creating two-dimensional and

three-dimensional CAD drawings.

IT.ICAD2.04.03 Students will follow National CAD Standards for CAD layers, organization of drawing sets, drawing sheets, and schedules, drafting conventions, terms and abbreviations, graphic symbols, notations, code conventions, and plotting. (Focus)

IT.ICAD2.04.04 Students will demonstrate proper care and maintenance of CAD equipment and software. Foundational)

IT.ICAD2.05 Students will apply technical drawing skills to actual projects. (Focus)

IT.ICAD2.05.01 Students will construct keyway and keyseat drawings.(Focus)

IT.ICAD2.05.02 Students will construct spline and gear drawings.(Focus)

IT.ICAD2.05.03 Students will construct cam and follower drawings.(Focus)

IT.ICAD2.05.04 Students will construct fastener head drawings.(Focus)

IT.ICAD2.05.05 Students will construct drawings of molded plastic parts.(Focus)

IT.ICAD2.05.06 Students will construct exploded and orthographic assembly drawings. (Focus)

CAD Architecture

Course Purpose

Students will study past and current architectural trends. Students will learn about concepts and processes of construction. Students will demonstrate understanding of the stages of floor plan design. Students will create a presentation of architectural drawings to industry standards.

Grade Level Standards and Components

Architectural Design and Construction **(non-DMACC)**

Course Purpose

Students will take what they have learned in Beginning House Design and apply it to current industry software. Students will work with both 2D and 3D models. More of a focus will be put on how houses are built and the construction process behind it. Students will work their way up to designing a house where they are required to produce drawings that could actually be used by contractors and also have the ability to calculate the cost of materials for the house. Students will also work with current local building codes in their designs. Many of the skill used in Architecture, Engineering, and Construction will be taught in this course

Grade Level Standards and Components

VREP

(new course for 2019-2020)

Course Purpose

Students will use computer graphics software to produce 2D and 3D models. The focus will be on making photorealistic models. Students will also begin animating models to create short scenes. Students will work with cameras and materials to create realistic backgrounds and scenes. They will also learn different modeling techniques to create figures and objects. Simulations will also be used for calculating actions of fluids and particles. Students with an interest in Computer Graphics, Computer Animation, and Video Game Design are encouraged to take this course.

Grade Level Standards and Components

Consumer Automotive

Course Purpose

Students will develop the minor skills and understandings that are beneficial to students as current or future owners of automobiles. Students will get the opportunity to learn about the automotive systems of vehicle frame members, wheels/tires, automotive electrical systems, engine system, and the braking system. Students will learn how to use tools and skills to perform minor services within these automotive systems.

Grade Level Standards and Components

CTE.CA.01 - Students will understand necessary automotive information needed to service a vehicle (Focus)

CTE.CA.02 - Students will analyze and apply with tools, fasteners, and measurement (Focus)

CTE.CA.03 - Students understand automotive systems (Focus)

CTE.CA.04 - Students apply knowledge about the automotive system to service it (Focus)

CTE.CA.05 - Students apply safe and efficient practices in the automotive environment (Focus)

Automotive Mechanics and Systems

Course Purpose

Students will further develop the minor skills and understandings students attained in consumer automotive. Students will get the opportunity to learn about the automotive systems of brakes, suspension, engine, drivetrain, wheels/tires, automotive electrical, and body work by performing services to these systems. The services in this course will be more in depth than the minor services covered in consumer automotive. Safety, tool usage, automotive system understanding, performing automotive services, and finding necessary automotive information will be covered in this course.

Grade Level Standards and Components

CTE.AMS.01 - Students will understand necessary automotive information needed to service a vehicle (Focus)

CTE.AMS.02 - Students will analyze and apply with tools, fasteners, and measurement (Focus)

CTE.AMS.03 - Students understand automotive systems (Focus)

CTE.AMS.04 - Students apply knowledge about the automotive system to service it (Focus)

CTE.AMS.05 - Students apply safe and efficient practices in the automotive environment (Focus)

Automotive Capstone

Course Purpose

Automotive Capstone is a very hands-on competency based course. In Automotive Capstone students will choose an area of automotive they want to gain competency in by working on vehicles. This course is great for students with a high interest in the automotive field and can help students focus on the area of automotive they want to pursue.

Grade Level Standards and Components

CTE.AC.01 - Students will understand necessary automotive information needed to service a vehicle (Focus)

CTE.AC.02 - Students will analyze and apply with tools, fasteners, and measurement (Focus)

CTE.AC.03 - Students understand automotive systems (Focus)

CTE.AC.04 - Students apply knowledge about the automotive system to service it (Focus)

CTE.AC.05 - Students apply safe and efficient practices in the automotive environment (Focus)

Project Lead the Way

Project Lead the Way Mission Statement

The mission statement was written collaboratively by representatives of the Family and Consumer Sciences teachers, Instructional Coaches and Administrators. The mission statement is a commitment by teachers across the district ensuring a guaranteed and viable curriculum.

Students will be engaged in relevant learning experiences centered around designing and building that develop the problem-solving and critical thinking skills needed to prepare them for a lifetime of career success.

Course Purposes

The following course purposes describe what students will know and demonstrate by the end of the grade or course. Each Grade Level Standard and the Components directly align to this statement, or promise, regarding the guaranteed and viable curriculum.

PLTW - Introduction to Engineering Design (IED)

Students will engage in engineering design principles to solve problems, document the design process, apply their knowledge to explore solutions in 2d and 3d representations and gain experience in different engineering professions.

PLTW - Principles of Engineering (POE)

Students will engage in learning about a variety of relevant science and engineering topics in order to collaboratively apply this learning to design and document both hardware and software solutions to problems

Grade Level Standards and Components

The Grade Level Standards and Components represent the guaranteed and viable curriculum for all secondary students in Ankeny. Prioritized through a collaborative process, the Grade Level Standards and Components represent the most critical concepts and skills required to be successful learners in school and beyond high school.

The code in parenthesis represents the standards from the Iowa Career and Technical Education Standards - the original document used for the prioritization process. Any Grade Level Standard (Bold and Underlined) labeled as a “Focus” area will have evidence in Infinite Campus’ gradebook and student performance will be reported on a report card. Those Grade Level Standards are the most critical to student success and, as a result, have been designated as focus areas.

Those Grade Level Standards (Bold and underlined) labeled as “Foundational” or “Introductory” have been designated as agreed upon areas for instruction, but will not have performance reported in Infinite Campus or on a report card. The difference between the levels is the amount of direct instruction and/or experiences students have with the skill during that grade or course.

Any Components (not bold or underlined) under the Grade Level Standard labeled as “Focus” are the critical formative skills required to demonstrate the Grade Level Standard and evidence of learning will be recorded in Infinite Campus. The preponderance of evidence on each Grade Level Standard will determine the performance level on each Grade Level Standard.

The prioritization process allows teachers to target instruction on the skills required for that grade or course. This allows students to focus on only a few grade level standards and dive deeper into the learning. By having multiple and varied opportunities to demonstrate their learning, reporting on the performance of grade level standards is more accurate.

PLTW - Introduction to Engineering Design (IED)

Course Purpose

Students will engage in engineering design principles to solve problems, document the design process, apply their knowledge to explore solutions in 2d and 3d representations and gain experience in different engineering professions.

Grade Level Standards and Components

PLTW.IED.01 Students will explore different fields of engineering and engage in and communicate the components of the engineering design process to effectively solve problems. (FOCUS AREA)

PLTW.IED.01.01 Students will define and apply the engineering design process. (Focus)

PLTW.IED.01.02 Students will document their design work in an engineering notebook and e-portfolio using standard engineering protocols. (Focus)

PLTW.IED.01.03 Students will identify major fields of engineering and ethical engineering behaviors. (Focus)

PLTW.IED.02 The student will use 2D and 3D processes and techniques to design, model, and fully communicate a part for manufacture. (Focus)

PLTW.IED.02.01 Students will identify and produce different styles of 2D sketches. (Focus)

PLTW.IED.02.02 Students will fully dimension different parts using standard dimensioning rules and different styles of dimensioning. (Focus)

PLTW.IED.02.03 Students will use efficient modeling techniques to produce, assemble, and present 3D parts. (Focus)

PLTW.IED.03 The student will perform an analysis of a product and utilize the reverse engineering process to improve the product. (Focus)

PLTW.IED.03.01 Students will identify visual, functional, and structural features of a product. (Focus)

PLTW.IED.03.02 Students will identify a needed improvement to a product and then reverse engineer the product to make the improvement. (Focus)

PLTW.IED.04 The student will mathematically analyze parts and situations. (Focus)

PLTW.IED.04.01 Students will use and convert physical measurements in both SI and US measurement systems. (Focus)

PLTW.IED.04.02 Students will calculate appropriate physical measurements for a product, such as volume, surface area, weight, and density. (Focus)

PLTW.IED.04.03 Students will calculate relevant statistics of parts to make manufacturing decisions. (Focus)

PLTW - Principles of Engineering (POE)

Course Purpose

Students will engage in learning about a variety of relevant science and engineering topics in order to collaboratively apply this learning to design and document both hardware and software solutions to problems.

Grade Level Standards and Components

PLTW.POE.01 Students will explore different fields of engineering and engage in and communicate the components of the engineering design process to effectively solve problems. (FOCUS AREA)

PLTW.POE.01.01 Students will understand and effectively utilize the design process to solve problems. (Focus)

PLTW.POE.01.02 Students will engage in and clearly document all aspects of the design process and communicate group's design work to an audience of peers. (Focus)

PLTW.POE.01.03 Students will compare and contrast different careers / fields of engineering) (Focus)

PLTW.POE.02 Students will apply the principles of machines and drive trains to solve problems. (FOCUS AREA)

PLTW.POE.02.01 Students will calculate the actual and ideal mechanical advantages and efficiencies of all types of mechanisms. (Focus)

PLTW.POE.02.02 Students will identify the 6 types of simple machines. Explain how the simple machines redirect energy within a system and make work easier by manipulating force and distance.

PLTW.POE.02.03 Students will identify the 3 types of drivetrain elements. Explain how each of the drivetrain elements redirect energy within a system and manipulate torque and angular velocity to produce a drive ratio. (Focus)

PLTW.POE.02.04 Students will analyze theoretical compound machines to identify components and calculate AMA, IMA, and efficiencies. (Focus)

PLTW.POE.02.05 Students will apply mathematical principles (algebra and trigonometry) to solve problems. (Foundational)

PLTW.POE.03 Students will apply understanding of energy principles to electrical and thermodynamic systems. (FOCUS AREA)

PLTW.POE.03.01 Students will compare different energy types/sources. (Focus)

PLTW.POE.03.02 Students will explain the meaning and relationship between various electrical properties (voltage, current, resistance). (Focus)

PLTW.POE.03.03 Students will analyze a variety of circuits (series, parallel, and combination) and explain current flow and factors that affect it. Calculate (using Ohm's Law and Kirchoff's Laws) and measure electrical properties at different points within a circuit. (Focus)

PLTW.POE.03.04 Students will identify thermodynamic systems and explain how and why energy is transferred within or into/out of the system using the 3 Laws of Thermodynamics. (Focus)

PLTW.POE.03.05 Students will identify given information and calculate the amount of heat and the rate

at which heat is transferred via various methods of heat transfer (conduction, convection, radiation).
(Focus)

PLTW.POE.03.06 Students will apply mathematical principles (algebra) to solve problems.

(Foundational)

PLTW.POE.04 Students will analyze systems using force and static equilibrium principles
(FOCUS AREA)

PLTW.POE.04.01 Students will use the beam deflection equation to determine unknown quantities (deflection, load, beam length, etc.). (Focus)

PLTW.POE.04.02 Students will resolve vectors into their components and solve problems in multiple dimensions (ex: adding non-perpendicular force vectors, projectiles, etc.). (Focus)

PLTW.POE.04.03 Students will calculate moments and apply an understanding of moments to analyze static equilibrium situations.(Focus)

PLTW.POE.04.04 Students will solve for all external and internal forces in a given truss using the static equilibrium equations (forces and moments) and the method of joints.

PLTW.POE.04.05 Students will apply mathematical principles (algebra and trigonometry) to solve problems. (Foundational)

PLTW.POE.04.06 Students will apply the principles of fluid power to solve hydraulic and pneumatic problems (Foundational)

PLTW.POE.04.07 Students will apply 2-dimensional kinematics principles to solve projectile motion problems (INTRODUCTORY AREA)

PLTW.POE.05 Students will generate and troubleshoot computer code to automate mechanical processes (FOCUS)

PLTW.POE.05.01 Students will plan and write both linear code and code for complex multi-step non-linear tasks using if-else structures, while loops, variables, and functions using appropriate syntax, analyze and predict the behavior of an algorithm (represented as programming code) and identify and correct bugs in a program.(Focus)

PLTW.POE.05.02 Students will design and create a hardware solution to a given problem. Improve the performance of a prototype by modifying hardware. (Focus)

PLTW.POE.05.03 Students will design and create a complex hardware solution to a given problem and write code to automate it. Improve the performance of a prototype by modifying hardware and code. (Focus)

PLTW.POE.05.04 Students will design and create an automated device that will sort marbles into various bins based on their physical properties. (Focus)