

Technology and Engineering Education (Industrial)

Technology Education

(7th Grade – Nine Week Rotation)

Focus: Career Exploration

Modular rotation used for 45 days – Orientation, Research & Development, Robots, Engineering Towers, Flight Technology, Forensic Science, Electricity, Practical Skills, Creative Solutions, Alternative Energy, Engineering Bridges, Music & Sound, Plastics & Polymers, Video Production, and Rocket Science

Purpose: In pairs, students will use computer applications, external components, and teamwork to explore different types of technologies.

Outcome: **TE.1** Students will demonstrate the importance of technologies.

Components: **TE.1.1** – Research, identify and apply the knowledge of various technologies used in industry. 1.B.3a, 1.B.3d, 12.C.3a, 12.C.3b, 12.D.3a, 12.D.3b, 13.B.3d, 13.B.3e, 15.A.3a, 15.A.3c, 15.C.3, 17.A.3a, 17.A.3b, 17.C.3a, 17.C.3b, 17.D.3b, 60.A.1b, 60.A.2a, 60.A.3a, 60.A.3b, 60.C.3, 61.C.1

TE.1.2 – Formulate questions and hypotheses to help bridge the gap between prior knowledge and knowledge gained. 1.C.3a, 1.C.3c, 6.C.3b, 10.A.3c, 10.C.3b, 11.A.3a, 11.A.3c, 11.A.3f, 11.B.3a, 11.B.3b, 11.B.3e

TE.1.3 – Explain the differences between types of technologies.

Outcome: **TE.2** Students will produce examples in each module's activities using construction components.

Components: **TE.2.1** – Identify equipment and materials used in the module. 60.A.4e

TE.2.2 – Explain the safety in using the equipment and material in each module. 61.C.1

TE.2.3 – Use knowledge base to brainstorm and create construction components using proper procedures and materials. 7.A.3a, 7.B.3, 7.C.3a, 9.A.3a, 11.B.3d, 60.A.4c, 62.B.4

TE.2.4 – Apply basic skills at each module for application. 3.C.3b, 4.B.3b, 7.A.3b, 9.A.3c, 9.B.3

Outcome: **TE.3** Students will test and demonstrate knowledge and skills in a given module.

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Components: **TE.3.1** – Demonstrate knowledge regarding information about specific technologies. 5.A.3a, 65.A.1

TE.3.2 – Present knowledge through daily quizzes—Research, Challenge, Application question—and cumulative post tests. 1.A.3b, 6.A.3, 6.B.3a, 6.B.3b, 6.B.3c, 6.C.3a, 8.D.3a, 8.D.3b, 8.D.3c, 9.C.3b, 9.D.3

TE.3.3 – Use graphing skills to read and discern information from a variety of graphs [e.g. bar graph, line graph, pie graph, chart]. 1.C.3f, 10.A.3a

TE.3.4 – Discuss content intelligently with educator using Verbal Performance Assessments.

TE.3.5 – Complete student created projects. (i.e.—Silly Putty, balsa tower/bridge, plastic injected golf tee, and etc.) 65.A.2

Outcome: **TE.4** Students will summarize occupations and careers related to various technologies.

Components: **TE.4.1** – Research and explore occupations and careers related to interests with an emphasis on technologies. 65.B.2

TE.4.2 – Identify skills, practices, and other important and specific information required for careers using technologies. 61.A.1, 61.A.2, 65.B.1

TE.4.3 – Create project based on the information about selected occupation/career. 3.B.3b, 5.A.3b

TE.4.4 – Evaluate project based on rubric.

Technology and Engineering Education (Industrial)

Technology Education

(8th Grade –Semester Elective)

Focus: Career Exploration

Modular Rotation—Research & Development, Robots, Engineering Towers, Flight Technology, Forensic Science, Electricity, Practical Skills, Creative Solutions, Alternative Energy, Engineering Bridges, Music & Sound, Plastics & Polymers, Video Production, Rocket Science.

Purpose: In pairs, students will use computer applications, external components, and teamwork to explore different types of technologies.

Outcome: **TE.1** Students will demonstrate the importance of technologies.

Components: **TE.1.1** – Research, identify and apply the knowledge of various technologies used in industry. 1.B.3a, 1.B.3d, 12.C.3a, 12.C.3b, 12.D.3a, 12.D.3b, 13.B.3d, 13.B.3e, 15.A.3a, 15.A.3c, 15.C.3, 17.A.3a, 17.A.3b, 17.C.3a, 17.C.3b, 17.D.3b, 60.A.1b, 60.A.2a, 60.A.3a, 60.A.3b, 60.C.3, 61.C.1

TE.1.2 – Formulate questions and hypotheses to help bridge the gap between prior knowledge and knowledge gained. 1.C.3a, 1.C.3c, 6.C.3b, 10.A.3c, 10.C.3b, 11.A.3a, 11.A.3c, 11.A.3f, 11.B.3a, 11.B.3b, 11.B.3e

TE.1.3 – Explain the differences between types of technologies.

Outcome: **TE.2** Students will produce examples in each module's activities using construction components.

Components: **TE.2.1** – Identify equipment and materials used in the module. 60.A.4e

TE.2.2 – Explain the safety in using the equipment and material in each module. 61.C.1

TE.2.3 – Use knowledge base to brainstorm and create construction components using proper procedures and materials. 7.A.3a, 7.B.3, 7.C.3a, 9.A.3a, 11.B.3d, 60.A.4c, 62.B.4

TE.2.4 – Apply basic skills at each module for application. 3.C.3b, 4.B.3b, 7.A.3b, 9.A.3c, 9.B.3

Outcome: **TE.3** Students will test and demonstrate knowledge and skills in a given module.

Components: **TE.3.1** – Demonstrate knowledge regarding information about specific technologies. 5.A.3a, 65.A.1

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TE.3.2 –Present knowledge through daily quizzes—Research, Challenge, Application question—and cumulative post tests. 1.A.3b, 6.A.3, 6.B.3a, 6.B.3b, 6.B.3c, 6.C.3a, 8.D.3a, 8.D.3b, 8.D.3c, 9.C.3b, 9.D.3

TE.3.3 – Use graphing skills to read and discern information from a variety of graphs [e.g. bar graph, line graph, pie graph, chart]. 1.C.3f, 10.A.3a

TE.3.4– Discuss content intelligently with educator using Verbal Performance Assessments.

TE.3.5 – Complete student created projects. (i.e.—Silly Putty, balsa tower/bridge, plastic injected golf tee, and etc.) 65.A.2

Outcome: **TE.4** Students will summarize occupations and careers related to various technologies.

Components: **TE.4.1** –Research and explore occupations and careers related to interests with an emphasis on technologies. 65.B.2

TE.4.2 – Identify skills, practices, and other important and specific information required for careers using technologies. 61.A.1, 61.A.2, 65.B.1

TE.4.3 – Create project based on the information about selected occupation/career. 3.B.3b, 5.A.3b

TE.4.4 – Evaluate project based on rubric.

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Construction Technology

8th Grade (Semester – Elective)

- Focus: Introduction to building trades and architecture.
- Purpose: Students will apply architectural drawing skills and cooperative learning skills in order to construct a reduced-scale model and learn about other aspects building construction.
- Outcome: **CT.1** Students will demonstrate their understanding of architectural design and how it impacts society and the environment.
- Components: **CT.1.1** – Distinguish between bearing wall construction and skeleton-framing construction. 1.C.3a
CT.1.2 – Analyze historical architectural designs and famous architects. 13.A.3b
CT.1.3 – Explain how materials affect building designs.
- Outcome: **CT.2** -Students will use drafting tools to create a freehand architectural drawing.
- Components: **CT.2.1** – Compare and contrast the different types of architectural drawings and their uses. 9.B.3
CT.2.2-Identify the various line types, symbols, and materials used in a floor plan.
CT.2.3 – Interpret an architectural scale to a ¼ scale.
CT.2.4 – Use an architectural scale draw to a ¼ scale house 4.A.3c, 7.A.3a, 7.B.3, 7.C.3a
CT.2.5 – Produce a floor plan, an elevation drawing, and a sectional drawing. 7.A.3b
- Outcome: **CT.3** Students will compare and contrast different framing construction methods used in home construction. 11.B.3b
- Components: **CT.3.1** – Differentiate between platform-frame construction, balloon-frame construction, post-and-beam, and timber framing. 13.B.3b
CT.3.2 – List advantages of structural insulated panels.
CT.3.3 – Explain how the use of engineered lumber helps conserve wood resources. 13.B.3c
- Outcome: **CT.4** Students will build scale models of buildings. 4.A.3d

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Components: **CT.4.1** – Design full scale model or mock up wall section and label its parts.

CT.4.2 – Produce a foam board ¼ scale model home. 9.A.3a, 9.A.3b

CT.4.3 – Produce ¼ scale model building from a kit.

Outcome: **CT.5** Students will demonstrate basic roof framing construction.

Components: **CT.5.1** – Identify the basic roof styles.

CT.5.2 – Develop framing plan for a gable roof, hip roof, and variations that include valleys.

CT.5.3 – Lay out common rafters and corner posts. 9.A.3c, 9.D.3

CT.5.4 – List the advantages of wood as a roof framing material. 13.B.3e

Outcome: **CT.6** Students will research common house wiring circuits with different types of switches.

Components: **CT.6.1** – Explain why wearing eye protection prevents injuries. 11.B.3c

CT.6.2 – Identify the purposes of two and three way switches in the home.

CT.6.3 – Explain how a GFCI is used to prevent shock.

CT.6.4 – Constructing a project, students will demonstrate how circuits should be grounded properly.

CT.6.5- Evaluate their project based on a rubric.

Outcome: **CT.8** Students will summarize careers related to Construction Technology.

Components: **CT.8.1** – Explore careers related to interests with an emphasis on architectural drawing and the construction trades. 5.A.3b

CT.8.2 – Identify skills and education required for careers in construction technology.

Outcome: **CT.9** Students will use a drafting application to apply their knowledge and learn about current drafting techniques.

Components: **CT.9.1**-Develop an understanding of the virtual drafting world. 60.A.3e, 65.B.1, 65.B.2

CT.9.2 – Explain how Auto Cad is a design and drawing tool. 60.A.4b

CT.9.3- Apply knowledge to aid in creation of different virtual projects. 4B.3b

CT.9.4-Evaluate projects.

Technology and Engineering Education (Industrial)

Pre-Engineering 1

(Grades 9 – 12 semester)

- Focus: Technology / Pre-Engineering 1 emphasizes teamwork, engineering design process, communications, along with energy and power.
- Purpose: In this course students will explore the nature of technology, technology systems, and the history, evolution, and characteristics of technology as well as its impact on our society, culture, economy, politics, and environment. Technology / Pre-Engineering 1 covers teamwork and the engineering process, communications, energy and power.
- Outcome: **PENG.1** Students will demonstrate knowledge of the concept of technology and its role in society. They will also be able to identify the seven resources of technological systems and the impacts of technology on society.
- Components: **PENG.1.1** – Explain why studying technology is beneficial. 1.C.4a
PENG.1.2 – Give examples of ways in which technology evolves.
PENG.1.3 – Describe technology systems.
PENG.1.4 – Describe impacts of various technologies. 15.C.4b
PENG.1.5 – Explore ways in which ethics influence technology. 14.F.5
- Outcome: **PENG.2** Students will know the worth of teamwork, employability skills, and choosing a career.
- Components: **PENG.2.1** – Explain the value of teamwork.
PENG.2.2 – Describe work done by engineering and design teams. 1.C.4d
PENG.2.3 – Identify the four main teamwork skills and give examples.
PENG.2.4 – List important employability skills. 3.C.5b
PENG.2.5 – Identify steps to take in choosing a career.
- Outcome: **PENG.3** Students will demonstrate knowledge of the important factors of engineering design, the human factors effecting engineering, the ten steps of the engineering design process, and other problem-solving methods including the scientific method.
- Components: **PENG.3.1** – List and discuss important concepts of engineering design. 11.B.5e
PENG.3.2 – Define and explain the importance of human factors engineering.

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PENG.3.3 – Identify the ten steps in the engineering design process.
11.B.5b

PENG.3.4 – Compare and contrast the problem-solving process and the scientific method. 11.B.4a

Outcome: **PENG.4** The student will define and discuss communication technology and communication systems.

Components: **PENG.4.1** – Identify the six purposes of communication technology.
11.B.5b

PENG.4.2 – Describe the components and function of a communication system. 1.C.4b

PENG.4.3 – Describe the elements of electronic communication.

PENG.4.4 – Describe the four modes of communication.

Outcome: **PENG.5** The student will be able to identify the various functions of the parts of a computer system and be able to use the binary system in electronics.

Components: **PENG.5.1** – Describe the basic parts of a computer system and explain how computers work. 13.B.5b

PENG.5.2 – Explain how binary code works.

PENG.5.3 – Identify and describe ways in which computers use and manage information. 13.B.5b

PENG.5.4 – Discuss the role of the Internet in accessing information.
13.B.5e

Outcome: **PENG.6** Students will be able to identify various transmission channels used in electronic communication and link these channels to the various electronic devices that use them in electronic information transfer.

Components: **PENG.6.1** – Identify and describe four types of transmission channels.
11.B.4c

PENG.6.2 – Explain how signals are transmitted and received.

PENG.6.3 – Describe how telephones, radios, and televisions operate.
5.A.4b

PENG.6.4 – Explain and give examples of radio frequency identification systems.

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Outcome: **PENG.7** The student will explore printed communication, photography, and drafting as means of communication. They will have the opportunity to create their own design in each area.

Components: **PENG.7.1** – List the principles of design.

PENG.7.2 – Describe the different printing processes. 1.C.4b

PENG.7.3 – Compare and contrast film and digital photography. 1.C.4d

PENG.7.4 – Explain why drafting is referred to as the universal language. 4.B.5c

Outcome: **PENG.8** The students will explore the different types and forms of energy and power. Controlling power and the impacts of power and energy is also discussed.

Components: **PENG.8.1** – Identify the forms of energy and power. 12.E.4a

PENG.8.2 – Explain why energy must be controlled. 11.B.5a

PENG.8.3 – List impacts of energy and power technology. 13.B.5e

PENG.8.4 – Explain how to measure different forms of energy and power.

Outcome: **PENG.9** The student will be able to identify energy resources – as exhaustible, renewable, and inexhaustible. The student will also be able to describe methods of energy conversion in the positive and negative effects of various energy sources.

Components: **PENG.9.1** – Identify and discuss exhaustible, renewable, and inexhaustible energy sources. 4.B.5b

PENG.9.2 – Describe the methods of conversion for several energy sources.

PENG.9.3 – Discuss the negative and positive effects of several energy sources. 1.C.5c

Outcome: **PENG.10** The students will demonstrate knowledge of mechanical, fluid, and electrical power systems.

Components: **PENG.10.1** – Name and discuss six simple machines.

PENG.10.2 – Describe several devices used to transmit mechanical power. 11.B.4b

PENG.10.3 – Compare and contrast hydraulic and pneumatic systems. 1.C.4d

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PENG.10.4 – Explain the differences between alternating and direct current.

Outcome: **PENG.11** The student will be able to explain the purpose and makeup of a manufacturing system, A brief history of manufacturing and the various types of production systems. The student will also participate in producing a simple product using mass production techniques.

Components: **PENG.11.1** – Explain the importance of manufacturing. 15.C.4b

PENG.11.2 – Name the three basic types of production.

PENG.11.3 – Explain how companies compete in the global market. 15.A.4a

PENG.11.4 – Discuss several manufacturing processes. 4.B.5b

PENG.11.5 – Name some of the areas on which manufacturing has an impact. 15.A.5a

Outcome: **PENG.12** The student will understand product development, manufacturability, types of product analysis, and marketing.

Components: **PENG.12.1** – Explain where product ideas come from. 15.C.4b

PENG.12.2 – Name two important factors that must be considered in the engineering of a product.

PENG.12.3 – Describe the three types of engineering analysis. 11.B.4b

PENG.12.4 – Summarize the steps taken to market and distribute a product. 4.B.4b

PENG.12.5 – Explain the stages in a product's life cycle.

Outcome: **PENG.13** Students will understand the various factors that comprise planning for production, planning, plant facilities, and putting the production plan into action.

Components: **PENG.13.1** – Describe planning procedures used to achieve production efficiency.

PENG.13.2 – Name the three questions that need to be asked in a make-or-buy decision.

PENG.13.3 – Explain how the layout of a manufacturing facility is developed. 4.B.5b

PENG.13.4 – List the advantages of making a pilot run. 1.C.5b

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Outcome: **PENG.14** The student will understand process of producing a product, including procedures such as inventory control and quality assurance.

Components: **PENG.14.1** – Explain the difference between components and assemblies. 1.B.4a

PENG.14.2 – List the purposes of packaging. 1.C.5b

PENG.14.3 – Describe how production and product quality are controlled.

PENG.14.4 – Explain how inventory is controlled.

Outcome: **PENG.15** The student will explore the practices of high technology as used in the manufacturing environment.

Components: **PENG.15.1** – Explain what “high performance” means to manufacturing. 1.B.4b

PENG.15.2 – Give examples of smart planning, smart production, and smart control methods. 1.A.4b

PENG.15.3 – Identify advanced systems.

PENG.15.4 – Compare and contrast automatic factories to traditional ones. 1.C.4d

Technology and Engineering Education (Industrial)

Pre-Engineering 2

(Grades 9 – 12 semester)

Focus: Technology / Pre-Engineering 2 emphasizes construction, Transportation, and Bio-related applications.

Purpose: In this course students will explore the nature of technology, technology systems, and the history, evolution, and characteristics of technology as well as its impact on our society, culture, economy, politics, and environment. Technology / Pre-Engineering 2 covers Construction, Transportation, and Bio-related Engineering applications.

Outcome: **PENG2.1** Students will demonstrate knowledge of the four major types of construction and types of structures they are used in.

Component: **PENG2.1.1** – Define and give examples of the four major types of construction. 1.C.4b

PENG2.1.2 – Name and describe six types of structures. 11.B.4b

PENG2.1.3 – Name and describe the three types of tunnels. 11.B.4b

PENG2.1.4 – Explain the reasons for building a canal.

PENG2.1.5 – List the seven types of bridges.

Outcome: **PENG2.2** Students will demonstrate knowledge of the planning that goes into construction projects.

Component: **PENG2.2.1** – Explain how construction projects are planned.

PENG2.2.2 – Discuss regulations that apply to construction. 15.E.4b

PENG2.2.3 – Identify factors to consider when selecting a site.

PENG2.2.4 – Describe architectural working drawings. 9.A.4b

Outcome: **PENG2.3** Students will demonstrate knowledge of how construction projects are managed.

Component: **PENG2.3.1** – Identify the responsibilities of a contractor.

PENG2.3.2 – Explain how the amount of a construction bid is figured. 6.C.4

PENG2.3.3 – Describe the three types of schedules.

PENG2.3.4 – List the three main concerns of inspectors when monitoring construction. 13.A.5a

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Outcome: **PENG2.4** Students will demonstrate knowledge of the materials and the construction practices of that are involved in residential construction.

Component: **PENG2.4.1** – Compare and contrast the ways to clear a site for construction. . 1.C.4d

PENG2.4.2 – Explain how foundations and superstructures are constructed.

PENG2.4.3 – Describe how interiors are finished.

PENG2.4.4 – Identify post-construction tasks. 11.B.4a

Outcome: **PENG2.5** Students will demonstrate knowledge about large scale construction projects.

Component: **PENG2.5.1** – Identify the stress forces that are exerted on structures. 11.B.4a

PENG2.5.2 – Explain how roads, dams, canals, tunnels, pipelines, and bridges are built.

PENG2.5.3 – Describe the seven types of bridges. 11.B.5c

PENG2.5.4 – Explain the challenges of construction in space.

Outcome: **PENG2.6** Students will be able to describe a basic transportation system.

Component: **PENG2.6.1** – Describe a basic transportation system. 1.C.5c

PENG2.6.2 – Explain how GPS works. 13.B.5b

PENG2.6.3 – Describe time and place utility.

PENG2.6.4 – List several positive and negative impacts of transportation systems. 13.B.5e

Outcome: **PENG2.7** Students will be able to identify the five modes of transportation.

Component: **PENG2.7.1** – Name examples of vehicles in each mode of transportation.

PENG2.7.2 – Identify facilities needed for each mode. 11.B.4c

PENG2.7.3 – Describe intermodal transportation. 1.C.5c

PENG2.7.4 – Explain containerization and list its advantages. 1.A.5a

Outcome: **PENG2.8** Students will demonstrate the knowledge of how various transportation systems are powered.

Component: **PENG2.8.1** – Identify the three main types of motion. 12.D.5a

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PENG2.8.2 – Describe the two main types of engines.

PENG2.8.3 – Discuss electric and fluid-powered motors.

PENG2.8.4 – List several alternative energy sources for transportation.
13.A.4c

PENG2.8.5 – Explain how design affects vehicle performance. 13.B.4d

Outcome: **PENG2.9** Students will demonstrate knowledge of the influences that affect transportation safety.

Component: **PENG2.9.1** – Identify the five main areas of influence in transportation safety and security. 14.F.5

PENG2.9.2 – Explain how government regulation affects the use of different modes of transportation. 14.D5

PENG2.9.3 – Describe individual responsibility in using various modes of transportation.

Outcome: **PENG2.10** Students will be able to identify technologies that have a relationship to living organisms.

Component: **PENG2.10.1** – Define bio-related technology.

PENG2.10.2 – List seven common bio-related processes. 13.B.4a

PENG2.10.3 – Discuss bioethics.

PENG2.10.4 – Identify impacts and effects of bio-related technologies.
15.C.4b

Outcome: **PENG2.11** Students will demonstrate knowledge of how technologies interact with human health.

Component: **PENG2.11.1** – Discuss technologies used for the prevention, diagnosis, and treatment of disease. 13.B.5b

PENG2.11.2 – Explain the purpose of human factors engineering. 1.B.5c

PENG2.11.3 – Give examples of how environmental engineering is used to prevent disease and protect the environment.

Outcome: **PENG2.12** Students will demonstrate knowledge of how technologies interact with the production of food.

Component: **PENG2.12.1** – Describe technologies related to food production. 12.C.5a

PENG2.12.2 Explain ways in which agricultural technologies play a part in medical treatments, energy production, and bio-warfare. 13.B.4b

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PENG2.12.3 – Describe how agricultural technologies contribute to the health of the environment. 12.C.5a

Technology and Engineering Education (Industrial)

Woods Technology 1

(Grades 9-12 year long class)

Focus: Woods Technology emphasizes safety, supervised practice with tools and machinery.

Purpose: Topics include safety, planning, designing, and building assigned and personal projects. The course provides instruction and supervised practice with a variety of tools and machinery.

Outcome: **WT1.1** Students will be able to apply general shop safety rules.

Components: **WT1.1.1** – Define a “safety attitude”. 1.C.4b

WT1.1.2 – List three types of personal safety equipment. 13.A.5a

WT1.1.3 – Identify where the fire extinguishers are located in the shop.

WT1.1.4 – Describe how clutter creates an unsafe condition.

WT1.1.5 – List four safety rules specific to each machine in the woodshop. 13.A.5a

Outcome: **WT1.2** Students will be able to identify and select the appropriate material for a given project.

Components: **WT1.2.1** – Identify various softwood, hardwood, and exotic species of wood samples. 1.C.4e

WT1.2.2 – List the factors that influence the grade of a particular piece of wood.

WT1.2.3 – Define and explain the use of veneers. 1.A.5a

WT1.2.4 – Identify and describe the use of several types of plywood and other sheet stock.

WT1.2.5 – Describe the uses of several types of trim moldings. 1.C.4b

Outcome: **WT1.3** Students will be able to read and draw plans as related to a woodworking project.

Components: **WT1.3.1** – List three keys to good design.

WT1.3.2 – List three basic principles of good design. 1.C.5d

WT1.3.3 – Describe two types of drawings commonly used in woods. 9.A.4b

WT1.3.4 – List the views shown in a three-view drawing. 9.A.4a

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WT1.3.5 – Explain the information listed in a bill of materials.

WT1.3.6 – Determine how board foot measurement is calculated. 7.A.4b

WT1.3.7 – Briefly outline the main steps in designing, planning, and completing a project.

Outcome: **WT1.4** Students will be able to measure and layout all of our required projects in preparation for cutting.

Components: **WT1.4.1** – Find given measurements on a customary ruler. 7.B.4

WT1.4.2 – Find given measurements on a metric ruler. 7.B.4

WT1.4.3 – Layout right angles using a framing square.

WT1.4.4 – Layout circles and arcs.

WT1.4.5 – Layout irregular shapes using 1” squares.

Outcome: **WT1.5** Students will be able to identify, assemble and strengthen several different types of wood joints.

Components: **WT1.5.1** – Identify a butt joint and describe how it can be strengthened. 4.B.5a

WT1.5.2 – List the steps in making a doveled butt joint. 4.A.4c

WT1.5.3 – Lay out a rabbet joint.

WT1.5.4 – Cut a rabbet joint using the radial arm saw.

WT1.5.5 – Cut a rabbet joint using the table saw.

WT1.5.6 – Lay out and cut a dado joint.

WT1.5.7 – List the major types of lap joints. 4.A.4c

WT1.5.8 – Lay out and cut a cross-lap joint with the radial arm saw.

WT1.5.9 – Describe the benefits and drawbacks of the miter joint.

WT1.5.10 – Build a project using miter joints.

WT1.5.11 – Describe the mortise-and-tenon joint and list where it might be applied.

Outcome: **WT1.6** Students will be able to build a project which has at least one drawer and one door (this will be constructed by the student).

Components: **WT1.6.1** – Determine which type of door/drawer construction to use: flush mount, overlay, or lipped. 6.C.4

WT1.6.2 – Select the appropriate hardware to install the door and drawer.

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WT1.6.3 – Draft examples of three different ways in which a drawer can be constructed. 9.C.4a

Outcome: **WT1.7** Students will be able to build required projects as planned, described, and demonstrated by the instructor.

Components:

Outcome: **WT1.8** Students will be able to prepare a project for a finish. Then select and apply a finish.

Components: **WT1.8.1** – Use a hand plane, jointer or surfacer to remove saw marks.

WT1.8.2 – Properly use a variety of power sanders.

WT1.8.3 – List the steps in sanding a project.

WT1.8.4 – Determine the best type of finish for a project. 13.A.5a

WT1.8.5 – Explain how to repair a variety of imperfections in a wood surface. 4.A.4c

WT1.8.6 – Demonstrate the proper use of wood fillers.

WT1.8.7 – Describe the procedure for staining and varnishing a project.

WT1.8.8 – Compare oil finishes to varnishes and lacquers.

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Woods Technology 2

(Grades 9 – 12 year long class)

Focus: Woods Technology 2 will work independently on more advanced projects and will continue to incorporate safety in the lab at all times.

Purpose: Each student will be able to independently use each woodworking machine safely and efficiently.

Outcome: **WT2.1** The students will be able to:

Components: **WT2.1.1** – List 4 safety rules for each piece of machinery. 13.A.5a

WT2.1.2 – Cross-cut a board to length with the radial arm saw.

WT2.1.3 – Rip a board on width with the table saw.

WT2.1.4 – Smooth an edge with the jointer.

WT2.1.5 – Surface a face with the planer.

WT2.1.6 – Cut a curved line with the band saw.

WT2.1.7 – Sand an outside curve with the disc sander.

WT2.1.8 – Sand an inside curve with the spindle sander.

WT2.1.9 – Turn a piece of wood on the lathe.

WT2.1.10 – Drill a hole with the drill press.

WT2.1.11 – Make an angled cut with the power miter box.

WT2.1.12 – Cut intricate curves with the scroll saw.

WT2.1.13 – Shape an edge with the router.

WT2.1.14 – Cut large over-sized stock with the portable circular saw.

Outcome: **WT2.2** Each student will be able to build a box using dove-tail joints on the corners.

Components: **WT2.2.1** – Design and dimension a jewelry box. 7.C.4c

WT2.2.2 – Rough-cut selected materials for sides.

WT2.2.3 – Lay out the dove-tail joints.

WT2.2.4 – Cut dove-tail joints with the band saw.

WT2.2.5 – Assemble the sides of the box.

WT2.2.6 – Put a bottom on the box.

WT2.2.7 – Build and assemble a lid for the box.

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WT2.2.8 – Put on a desired finish.

WT2.2.9 – Evaluate the project. 11.B.4f

Outcome: **WT2.3** Each student will be able to build a nightstand with shaped legs and top.

Components: **WT2.3.1** – Select appropriate materials to build table.

WT2.3.2 – Rough-cut legs, shelf and top to dimension.

WT2.3.3 – Lay out and cut shaped legs.

WT2.3.4 – Cut shelf and top to finished size.

WT2.3.5 – Round-over legs with a router.

WT2.3.6 – Use a classical bit to shape top.

WT2.3.7 – Sand all pieces with appropriate sanders.

WT2.3.8 – Follow assembly instructions. 4.A.4c

WT2.3.9 – Apply desired finish.

WT2.3.10 – Evaluate project. 11.B.4f

Outcome: **WT2.4** Each student will be able to read and follow a working drawing to build an Adirondack chair.

Components: **WT2.4.1** – Select appropriate materials to build an Adirondack chair.

WT2.4.2 – Using forms provided and lay out pieces of chair.

WT2.4.3 – Cut out each piece according to dimension and shape.

WT2.4.4 – Router and sand edges to be finished.

WT2.4.5 – Assemble the chair following the plan of procedure. 4.A.4c

WT2.4.6 – Evaluate project. 11.B.4f

Outcome: **WT2.5** Each student will be able to design, plan, and build a project of his/her choosing.

Components: **WT2.5.1** – Apply good design features to an idea.

WT2.5.2 – Determine if the project serves a purpose, is structurally sound and has visual appeal. 11.B.4b

WT2.5.3 – Accurately draw a set of plans for the project. 7.A.4a

WT2.5.4 – List building steps on a “plan of procedure”.

WT2.5.5 – Develop a bill of materials and estimate costs. 6.C.4

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WT2.5.6 – Using appropriate tools and techniques, cut out and assemble the project.

WT2.5.7 – Apply appropriate finish.

WT2.5.8 – Evaluate the finished project by comparing it to the plans.
11.B.4f

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CADD 1

(Grades 9-12) Year Long Course

Focus: 2-D and 3-D Computerized Drafting

Purpose: The students will analyze, and interpret basic 2 and 3-dimensional drawings as applied to mechanical drawings relative to drafting standards.

Outcome: **CADD1.1** Students will demonstrate the basic geometry concepts necessary for the use with AutoCad. 7.C.4a , 9.B.4

Components: **CADD1.1.1** – Manipulate AutoCad using basic 2D Geometric commands 7.B.4

CADD1.1.2 – Manipulate AutoCad using basic 3D Geometric commands 7.B.5

CADD1.1.3 – Draw using the correct geometric concepts.

CADD1.1.4 – Assess coordinate plane drawings for correctness 5.B.5a

Outcome: **CADD1.2** Students will demonstrate proficiency in the use of the basic working system of AutoCad. 65.A.2, 4.A.4c

Components: **CADD1.2.1** – Demonstrate general orientation of AutoCad. 64.C, 11.B.5b

CADD1.2.2 – Demonstrate basic drawing and editing commands. 62.B.3, 11.B.5b

CADD1.2.3 – Modify and maneuver drawings in AutoCad. 62.B.3, 11.B.5.b

CADD1.2.4 – List and explain status bar, toolbar, and command line functions. 11.B.5b

Outcome: **CADD1.3** Students will demonstrate proficiency in drawing Geometric Constructions using AutoCad commands and toolbars. 4.A.4c, 7.C.3a

Components: **CADD1.3.1** – Draw with precision in AutoCad using snap functions. 7.C.3a

CADD1.3.2 – Edit in AutoCad. 7.C.5b

CADD1.3.3 – Organize drawings with layers. 7.C.5a

CADD1.3.4 – Convert two or more object types. 7.C.4c

CADD1.3.5 – Measure geometric shapes using AutoCad. 7.C.4a

CADD1.3.6 – Inset blocks. 9.B.4

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CADD1.3.7 – Refine drawings for intended audience. 1.C.5d , 26.A.4e

Outcome: **CADD1.4** Students will demonstrate proficiency in drafting dimensions practices and creating 2D drawings including dimensions using AutoCad. 9.C.4a

Components: **CADD1.4.1** – Demonstrate basic dimensioning techniques. 60.C.2, 9.B.5

CADD1.4.2 – Complete 2D mechanical drawing using AutoCad. 9.C.4a

CADD1.4.3 – Annotate dimensions and text using basic dimensional techniques. 9.B.4

CADD1.4.4 – Apply basic measurements including fractions, decimals in both English and metric systems. 7.C.4c

CADD1.4.5 – Demonstrate competency in analyzing and correcting drafting errors. 7.B.4

Outcome: **CADD1.5** Students will demonstrate proficiency in creating “Multi-view” drawings using AutoCad. 7.C.4b, 9.B.5

Components: **CADD1.5.1** – Complete multi-view mechanical drawings using AutoCad. 7.C.4b, 9.B.5

CADD1.5.2 – Select the appropriate view for the drawing with regards to being user friendly. 9.B.4

CADD1.5.3 – Demonstrate competency with analyzing and correcting drafting errors. 7.B.4

Outcome: **CADD1.6** Students will demonstrate proficiency in creating development drawings using AutoCad. 9.C.5b

Components: **CADD1.6.1** – Create a Development Drawing of a prismatic object. 9.C.5b

CADD1.6.2 – Create a scaled stretched-out representation of the development drawing using a template. 9.C.5b

Outcome: **CADD1.7** Students will demonstrate proficiency in creating simple 3D solids using AutoCad. 9.B.5, 4.A.4c

Components: **CADD1.7.1** – Define and explain 3D commands.

CADD1.7.2 – Draw and edit 3D solids.

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CADD1.7.3 – Complete 3D solids in AutoCad with the view placed onto a PowerPoint slide. 9.B.5, 26.B.5

Outcome: **CADD1.8** Students will demonstrate proficiency in creating Auxiliary and Sectional Views using simple solids in AutoCad. 9.C.5a

Components: **CADD1.8.1** – Identify and draw Auxiliary Views.

CADD1.8.2 – Identify and draw all Sectional Views: full, and half. 9.B.4

CADD1.8.3 – Apply projection techniques.

CADD1.8.4 – Complete Mechanical drawing with Auxiliary Views and Sectional Views in AutoCad. 9.C.5a

Outcome: **CADD1.9** Students will demonstrate communication skills required for success in the workplace. 3.C.4a

Components: **CADD1.9.1** – Research careers in the AutoCad field. 5.A.4b

CADD1.9.2 – Create a 2D & 3D drawing portfolio which is easy to understand, edit, analyze, and interpret for potential employers. 5.A.4b, 26.A.5, 26.B.5

CADD1.9.3 – Role-play explanation of above drawings as a potential employee. 4.B.4a

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CADD 2

(Grades 10-12) Year Long Course

- Focus: 2-D and 3-D computerized drafting with the addition of architectural applications.
- Purpose: The students will analyze, and interpret both intermediate 2 and 3-dimensional drawings including 2-D and 3-D constructions, 3-D solid modeling and renderings using drafting standards.
- Outcome: **CADD2.1** Students will demonstrate the applicable math skills necessary for the use with AutoCad and demonstrate understanding of the intermediate working system of AutoCad. 7.C.4a, 9.B.4
- Components: **CADD2.1.1** – Convert fractions and decimals as commonly used in AutoCad. 7.C.4c
CADD2.1.2 – Determine 3-D measurements. 7.C.5a
CADD1.1.3 – Manipulate and explain AutoCad intermediate 3-D operations: Align, extrude, face operations, and rendering. 7.C.5b
- Outcome: **CADD2.2** Students will demonstrate proficiency in drafting dimension practices and creating 2D drawings with and without dimensions using AutoCad. 7.A.3a,B, 9.C.4a
- Components: **CADD2.2.1** – Draw a 2D drawing without dimensions. 7.C.3a,9.B.5.
CADD2.2.2 – Draw a 2D drawing with dimensions.7.C.3a,9.B.5
CADD2.2.3 – Annotate dimensions and text using basic dimensional techniques.9.B.4
CADD2.2.4 – Apply basic measurements including fractions and decimals in both English and metric systems.7.C.4c
CADD2.2.5 – Demonstrate competency in analyzing and correcting drafting errors.7.B.4.7.C.5a
- Outcome: **CADD2.3** Students will demonstrate proficiency in creating “Multi-view” drawings using intermediate AutoCad. 7.C.4b,9.B.5
- Components: **CADD2.3.1** – Draw a 3D solid using a multi-view approach.9.A.4b
CADD2.3.2 – Construct hidden lines.9.B.4
CADD2.3.3 – Utilize spacing and alignment in drawings. 9.B.4
CADD2.3.4 – Select the appropriate user-friendly view for the drawing.

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Outcome: **CADD2.4** Students will demonstrate proficiency in creating pictorial drawings using Isometric, Oblique and One-point features.9.A.4b

Components: **CADD2.4.1** – Demonstrate understanding of isometric, oblique and one-point features.9.A.4b

CADD2.4.2 – Construct proper angle alignment.9.B.4

CADD2.4.3 – Construct proper offset.9.B.4

CADD2.4.4 – Define pictorial drawing and explain its use.9.B.5

CADD2.4.5 – Complete “3D Solids” in AutoCad with the view placed onto a PowerPoint slide.9.B.5,2b.B.5

Outcome: **CADD2.5** Students will demonstrate proficiency in creating and interpreting Auxiliary and Sectional Views of solids using Intermediate AutoCad.9.C.5a

Components: **CADD2.5.1** – Identify and draw Auxiliary Views.9.B.4

CADD2.5.2 – Identify and draw all Sectional Views: full and half.9.B.4

CADD2.5.3 – Apply projection techniques.9.B.4

CADD2.5.4 – Complete Mechanical drawing with Auxiliary Views + Sectional Views in AutoCad.9.C.5a

Outcome: **CADD2.6** Student will demonstrate proficiency in creating “Working drawing” using AutoCad.9.B.5

Components: **CADD2.6.1** – Define cutting plane.

CADD2.6.2 – Draw 2D “working drawing”.9.B.5

CADD2.6.3 – Differentiate between full and half section views when drawing and choose appropriate section.

CADD2.6.4 – Complete Working drawing using AutoCad.9.B.5

Outcome: **CADD2.7** Student will demonstrate proficiency in creating “Architectural drawing” using AutoCad.

Components: **CADD2.7.1** – Define and describe architectural styles.

CADD2.7.2 – Orient a structure on a site appropriately.

CADD2.7.3 – Identify dimensioning standards.9.B.5

CADD2.7.4 – Create a floor plan.9.B.5

CADD2.7.5 – Show various elevations.9.B.5

CADD2.7.6 – Complete “Architectural drawing” using AutoCad.

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Outcome: **CADD2.8** Students will demonstrate analytical skills required for success in the workplace.11.B.4c

Components: **CADD2.8.1** – Create 3D drawings which are easy to understand, edit, analyze and interpret.9.B.5

CADD2.8.2 – Analyze workplace needs.3.C.4b,2b.A.5,2b.B.5

CADD2.8.3 – Construct project as requested by potential employer.9.B.5,2b.B.5

CADD2.8.4 – Role play an interview situation.4.B.4a

CADD2.8.5 – Use problem solving techniques to solve a problem posed by a potential employer.1.C5f,3.A.5,3.B.5

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CADD 3

(Grades 11-12) Year Long Class

- Focus: 2-D and 3-D Computerized Drafting and Design Cycle.
- Purpose: The students will analyze and interpret advanced 2 and 3-dimensional drawings incorporating the design cycle, which satisfies drafting standards.
- Outcome: **CADD3.1** Student will demonstrate the advanced math skills necessary for the use with AutoCad.
- Components: **CADD3.1.1** – Correctly add, subtract, multiply and divide fractions and decimals as commonly used in AutoCad.
CADD3.1.2 – Correctly convert fractions to decimals and vice versa.
CADD3.1.3 – Correctly compute area, volume and cubic measure of various figures.
- Outcome: **CADD3.2** Student will demonstrate proficiency in drawing “2D” with and without dimensions using advanced AutoCad commands and toolbars.
- Components: **CADD3.2.1** – Demonstrate: draw, edit, modify, and maneuver commands.
CADD3.2.2 – Draw 2D mechanical renderings.
CADD3.2.3 – Define and explain the dimension practices.
CADD3.2.4 – Annotate dimensions and text using basic dimensional techniques.
CADD3.2.5 – Apply basic measurements including fractions, decimals in both English and metric systems.
CADD3.2.6 – Demonstrate competency in analysis and correction of drafting errors.
- Outcome: **CADD3.3** Student will demonstrate proficiency in creating “Multi-view” drawings using AutoCad.
- Components: **CADD3.3.1** – Complete multi-view mechanical drawings using AutoCad.
CADD3.3.2 – Select the appropriate view for the drawing **needs more**.
- Outcome: **CADD3.4** Student will demonstrate proficiency in creating “3D Solids” with auxiliary drawing techniques using AutoCad.

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Components: **CADD3.4.1** – Advance rendering.

CADD3.4.2 – Create 3D Solids in AutoCad with the view placed onto a PowerPoint slide.

CADD3.4.3 – Utilize full Assemblies.

CADD3.4.4 – Utilize exploded Assemblies.

Outcome: **CADD3.5** Students will demonstrate proficiency in creating a sectional drawing using AutoCad.

Components: **CADD3.5.1** – Create “Sectional drawing” using specification.

CADD3.5.2 – Create “Working drawing” using specifications.

Outcome: **CADD3.6** Students will demonstrate proficiency in creating “Architectural drawing” using AutoCad.

Components: **CADD3.6.1** – Compare and contrast architectural styles.

CADD3.6.2 – Carry out appropriate planning steps necessary for architectural drawing.

CADD3.6.3 – Create a floor plan according to specifications.

CADD3.6.4 – Apply dimensioning standards to the plan.

CADD3.6.5 – Create a basement plan.

CADD3.6.6 – Illustrate all elevations.

CADD3.6.7 – Illustrate wall sections.

CADD3.6.8 – Create drawing notes and tables.

Outcome: **CADD3.7** Student will demonstrate skills required for success in the workplace.

Components: **CADD3.7.1** – Define commonly used terms and materials used in the career field.

CADD3.7.2 – Describe the workplace environment.

CADD3.7.3 – Create and maintain a portfolio of 2 and 3D renderings and a resume.

CADD3.7.4 – Demonstrate trouble shooting skills in the workplace.

CADD3.7.5 – Describe the variety of careers available to CADD experts.