

Technology Education

COURSES OFFERED —

Grade 9, 10 – Electives

CADD 1 ¹ (Computer-Aided Drawing & Design 1) – (Semester/FT)	# 9806
CADD 1 ¹ (Computer-Aided Drawing & Design 1) – (FY/FT)	# 9706
CADD 2 ¹ (Computer-Aided Drawing & Design 2) – (Semester/FT)	# 9410
CADD 2 ¹ (Computer-Aided Drawing & Design 2) – (FY/FT)	# 9906
Manufacturing 1 (Semester/FT)	# 9503
Manufacturing 1 (FY/FT)	# 9403
Manufacturing 2 (Semester/FT)	# 9604
Manufacturing 2 (FY/FT)	# 9603
Electricity and Electronics 1 ¹ (Semester/FT)	# 9805
Electricity and Electronics 1 ¹ (FY/PT)	# 9808
Electricity and Electronics 2 ¹ (Second Semester Only/FT)	# 9905
Engineering and Design ¹ (FY/FT)	# 9704
Engine Service and Car Care (Semester/FT)	# 9705
Robotics 1 ¹ (Semester/FT)	# 9506
Robotics 1 ¹ (FY/PT)	# 9509
Robotics 2 ¹ (Semester/FT)	# 9507
Inside Your Computer ¹ (FY/FT)	# 9508

Grade 10 Only – Elective

Television Production (Semester/FT)	# 1910
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Grades 11, 12 – Electives

Materials - Wood, Metal, and Plastic (Semester/FT)	# 9504
Materials - Wood, Metal, and Plastic (FY/FT)	# 9404
CADD 1 ¹ (Computer-Aided Drawing & Design 1) (Semester/FT)	# 9806
CADD 2 ¹ (Computer-Aided Drawing & Design 2) (Semester/FT)	# 9410
Construction Systems (Semester/FT)	# 9608
CADD 3 ¹ (Computer-Aided Drawing & Design 3) (FY/FT)	# 9411
Networking ¹ (Semester/FT)	# 9907
Tech Design & Application ¹ (FY/FT)	# 9408

Grade 12 Only - Elective

CADD 4 ¹ (Computer-Aided Drawing & Design 4) (FY/FT)	# 9412
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¹For students in the Classes of 2015 and 2016, this course may be used toward satisfying the one credit S.T.E.M. requirement (details on pages 10 and 11).

ENGINEERING & DESIGN **No. 9704**
Full Year/Full Time
Grades 9, 10 **Credit 1.0**

In this course, students will develop solutions to given situations using problem-solving models. Activities will utilize Math and Science concepts combined with the operation of tools and machines to create hands-on based solutions. Students will research, design, prototype, manufacture, and test products that they have created themselves. Students will discover how to apply engineering design, scientific principles, and engineering analysis to solve structured and unstructured problems. Individual and team work will be emphasized through the design loop problem-solving process based on inputs, processes, output, and feedback. The class content will prepare students for the challenges of today and the future's dynamic world by promoting technological literacy, leadership, and problem-solving skills through spirited competition. Activities will include, but are not limited to: Technology Student Association (TSA) and GOAL based events.

Criteria for Selection – None.

CADD 1 (Computer-Aided Drawing & Design 1) **No. 9706**
Full Year/Full Time
Grades 9, 10 **Credit 1.0**

This course is an introduction to drafting and design for students interested in learning how engineering is done using CADD to communicate technical information. Autodesk software will be utilized on the PC platform. Programs used will include AutoCAD, Inventor, and REVIT. Students will learn techniques of drawing, dimensioning, modeling, and symbol use. Areas of engineering addressed will include mechanical, architectural and structural. Both 2D and 3D modeling will be taught, including rendering (color and shadowing of drawings). Students will learn about the materials used in manufacturing, the machines and methods of manufacturing, and related careers.

Criteria for Selection – None.

CADD 1 (Computer-Aided Drawing & Design 1) **No. 9806**
Semester/Full Time
Grades 9, 10, 11, 12 **Credit .5**

This course is a semester version of Course #9706.

Criteria for Selection – None.

MANUFACTURING 1 **No. 9403**
Full Year/Full Time
Grades 9, 10 **Credit 1.0**

This is a hands-on course where students will become proficient in the use of power and hand tools while working with woods, plywood, veneers, laminates, and plastics. After constructing several individual projects, the class will then study and be involved with current techniques in manufacturing and engineering. They will use jigs and fixtures to assist in rapidly producing parts, mass-producing projects, organizing, and running an assembly line. Problem-solving activities will be stressed with Math and Science principles applied to the solutions. Students will be incorporating newer technologies related to manufacturing processes, engineering, and construction.

Students will enjoy designing, manufacturing, and testing product parts utilizing an automated piece of equipment called a CNC (Computer Numerical Controlled) router. Students design parts on a computer using a CADD package, the computer figures how to make the part from the drawing, and makes it!

Criteria for Selection – None.

MANUFACTURING 1 **No. 9503**
Semester/Full Time
Grades 9, 10 **Credit .5**

This course is the semester version of Course #9403.

Criteria for Selection – None.

ELECTRICITY & ELECTRONICS 1 **No. 9805**
Semester/Full Time
Grades 9, 10 **Credit .5**

This course is an introduction to electricity/electronics designed for students interested in learning how electricity can be safe and exciting. Students learn about electronic components and how they are used to design and assemble light and sound controlled circuits. Students will then construct a continuity tester, color organ, and alien attack game which will enhance students understanding of electronic design. Soldering wires, solid state components, using digital meters, and operating power supplies for testing circuits are just a few of the hands-on activities in this course. How electricity is used in the home will be explored through residential wiring, electrical planning, and concepts of the digital home. S.T.E.M. (Science, Technology, Engineering, and Math) concepts will be addressed throughout the course.

Criteria for Selection – None.

ELECTRICITY & ELECTRONICS 1 **No. 9808**
Full Year/Part Time
Grades 9, 10 **Credit .5**

This part-time version of Electricity & Electronics 1 is designed for those students who are unable to take the full-time version because of scheduling constraints. This part-time course provides flexibility in that it can be scheduled back-to-back with science labs or physical education courses for the whole year. For the description, refer to course #9805.

ELECTRICITY & ELECTRONICS 2 **No. 9905**
Second Semester Only/Full Time
Grades 9, 10 **Credit .5**

This level two course is the next step toward providing a solid foundation for students interested in more areas of electronics. This is a hands-on project based course. Classroom and lab experiences will include the designing, building and troubleshooting of digital components, printed circuits, digital and electronic games, radio control, computer, and communications systems.

Criteria for Selection – Successful completion of Electricity & Electronics 1 (#9805).

ENGINE SERVICE & CAR CARE **No. 9705**
Semester/Full Time
Grades 9, 10 **Credit .5**

This course will provide hands-on experience with small gasoline engines. Students will study the operation of 2-cycle engine, chainsaw engine, 4-cycle lawn mower engines and 4, 6 or 8 cylinder car engines. Good mechanical practices are stressed through the disassembly and reassembly of each. General car maintenance along with simple auto body repair finishing and the Racing Industry are included.

Criteria for Selection – None.

INSIDE YOUR COMPUTER No. 9508
Full Year/Full Time
Grade 9, 10 **Credit 1.0**

Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. The students, through hands-on activities and labs, learn to assemble and configure a computer, install operating systems and software, and troubleshoot hardware and software problems. In addition, this course includes an introduction to networking. This course helps students prepare for the CompTIA A+ certification.

Criteria for Selection – None.

ROBOTICS 1 No. 9506
Semester/Full Time
Grades 9, 10 **Credit .5**

Students will acquire a basic understanding of types of robots, how they operate, and their application in manufacturing and entertainment. This is a hands-on project based course introduces the student to generations of robots through a unique curriculum collaboration with Carnegie Mellon University. Classroom and lab activities will include assembling and operating pneumatic (air) components and programming electric jointed arm robots and building robots using LEGO NXT Mindstorm® and Vex Robotics® systems. Models of robots and assembly lines will be designed using a LEGO Digital Designer® program. Furthermore students will design and build various robots to complete many challenges including walled maze, obstacle course, sumo battle and mech battle. Students will design and produce a marble maze utilizing a CNC router and etching a design using a laser engraver. Students are also encouraged to design custom components for their robots utilizing the CNC router and laser engraver. S.T.E.M. (Science, Technology, Engineering, and Math) concepts and TSA (Technology Student Association) problems will be addressed throughout the course.

Criteria for Selection – Electricity & Electronics 1 and 2 are recommended, but not required.

ROBOTICS 1 No. 9509
Full Year/Part Time
Grades 9, 10 **Credit .5**

This part-time version of Robotics 1 is designed for those students who are unable to take the full-time version because of scheduling constraints. This part-time course provides flexibility in that it can be scheduled back-to-back with science labs or physical education courses for the whole year. Refer to course #9506 for the description.

ROBOTICS 2 No. 9507
Semester/Full Time
Grades 9, 10 **Credit .5**

The level II Robotics course will provide students the opportunity to continue the study of robots and automated control systems gained through work in the level one course. Classroom and lab activities will include, using computers and programmable logic controllers to control pneumatic (air) mechanical systems used in manufacturing, product testing, and amusement, building mobile robots using LEGO NXT Mindstorm® and Vex Robotics® systems with vision and radio control will also be experienced in this course. Students are also encouraged to design custom components for their robots utilizing the CNC router and laser engraver. S.T.E.M. (Science, Technology, Engineering, and Math) concepts and TSA (Technology Student Association) problems will also be addressed throughout the course.

Criteria for Selection – Robotics 1 required and Electricity & Electronics 1 recommended, but not required.

CADD 2 (Computer-Aided Drawing & Design 2) No. 9906
Full Year/Full Time
Grade 10 **Credit 1.0**

This advanced study of CADD will focus on drawing with advanced tools, to create more complex designs, advanced solid modeling, and assembly drawings. Portfolio development will be a focus, with the following Autodesk software being used: AutoCAD, Inventor, and REVIT. Areas of engineering addressed will include mechanical, architecture and structural.

Criteria for Selection – Successful completion of CADD 1 (#9706 or #9806).

CADD 2 (Computer-Aided Drawing & Design) No. 9410
Semester/Full Time
Grades 10, 11, 12 **Credit .5**

This course is the semester version of Course #9906.

Criteria for Selection – Successful completion of CADD 1 (#9706 or #9806).

MANUFACTURING 2 No. 9603
Full Year/Full Time
Grades 9, 10 **Credit 1.0**

This course continues the study of hard woods, plywood, veneers, laminates, and plastics at a more sophisticated level. Students will be more responsible for developing, problem-solving, engineering and constructing individual and group projects. Additional areas related to custom manufacturing processes and advanced jig and fixture development will be covered. Students will be challenged to design and manufacture and test product parts utilizing an automated CNC (Computer Numerical Controlled) router.

Criteria for Selection – Successful completion of Manufacturing 1 (#9403 or #9503).

MANUFACTURING 2 No. 9604
Semester/Full Time
Grade 9, 10 **Credit .5**

This course is the semester version of Course #9603.

Criteria for Selection – Successful completion of Manufacturing 1 (#9403 or #9503).

TELEVISION PRODUCTION No. 1910
Semester/Full Time
Grade 10 **Credit .5**

Students will have the opportunity to explore TV Production in this course. They will learn the basic aspects of production including script writing, story board preparation, audio production, directing, editing, camera techniques, and special effects. The class is open to any student interested in communications, public relations, acting, or technical production.

Criteria for Selection – Application/interview process due to limited class size.

MATERIALS - Wood, Metal, and Plastic **No. 9404**
Full Year/Full Time
Grades 11, 12 **Credit 1.0**

This full-year course provides an opportunity to improve and advance knowledge and skills in using a variety of materials and processes. Although wood is the primary material for the course, plastic and metal are explored and can be utilized in the student engineered projects. Students will design, produce, and test products that will improve their skills, understanding, and knowledge of material processes and systems related to solving problems applying Math and Science principles. More advanced techniques in the use of machines, tools, manufacturing processes, and finishing procedures related to various materials will be included. Careers to which this study could lead include all types of manufacturing, engineering, construction, materials design, cabinetmaking, and carpentry.

Criteria for Selection – None.

MATERIALS - Wood, Metal, and Plastic **No. 9504**
Semester/Full Time
Grades 11, 12 **Credit .5**

This course is the semester version of course #9404.

Criteria for Selection – None.

CONSTRUCTION SYSTEMS **No. 9608**
Semester/Full Time
Grades 11, 12 **Credit .5**

This course is designed to acquaint the student with the characteristics of constructed structures. Architectural plans, site layout/preparation, building codes, permits, specifications, and materials estimating are included. Instruction will be given in masonry, mechanical aspects (electrical, plumbing, heating), roofing, and interior/exterior finishing. Building (framing) a scale model of part of a house is part of the hands-on experience provided by taking this course. Along with residential construction, the student will develop, produce, use, and assess structures while studying architectural design, structural engineering, and community planning concepts. This course will provide a good background for students interested in pursuing careers in architecture, construction, and building trades. It will also allow the students to become a more knowledgeable homeowner.

Criteria for Selection – None.

TECH DESIGN & APPLICATION **No. 9408**
Full Year/Full Time
Grades 11, 12 **Credit 1.0**

This course will allow students to design and build solutions to technological problems. Students will develop problem-solving skills while designing and physically creating solutions to problems engineers are faced with. This course is designed to be the hands-on application of many academic disciplines such as math, science, physics, history, and language arts. Units of study will include, but are not limited to the following areas: aerospace, flight, automotive, transportation, hydrodynamics, catapults, power transfer, industrial design, structural, and prototyping.

Criteria for Selection – None.

CADD 3 (Computer-Aided Drawing & Design 3) **No. 9411**
Full Year/Full Time
Grades 11, 12 **Credit 1.0**

The course involves the development of advanced drafting techniques. Areas of study include surface development, auxiliary views, modeling, working drawings, assembly drawings, architectural design, and architectural structures. Advanced 3D model techniques will be used, and animations will be generated from the CADD files. The Internet will also be used extensively for reference work and component application. Portfolio development will be a focus.

Autodesk products will be used on the PC including AUTOCAD, Inventor, REVIT.

Criteria for Selection – CADD 2 (#9906 or #9410).

CADD 4 (Computer-Aided Drawing & Design 4) **No. 9412**
Full Year/Full Time
Grades 12 **Credit 1.0**

The majority of course work will be made up of independent projects tailored to the student's area of interest, i.e. architecture, mechanical engineering, and structural engineering. Portfolio development will be a major focus of this course.

Criteria for Selection – Successful completion of CADD 3 (#9411).

NETWORKING **No. 9907**
Semester/Full Time
Grades 11, 12 **Credit .5**

This course provides the technical foundation for those interested in IT networking. The history of voice, data and video networks will be covered. The focus of the course will be on two main areas of networking, VoIP (Voice over Internet Protocol) and wireless LANs. This hands-on course will show how telephone calls can be sent over a data network. Students will work on residential and small business VoIP implementations. Wireless networks give us freedom and flexibility. Within this course, wireless networks for home, office and business will be setup and used. Students will be taught to select, install, configure, secure, troubleshoot and maintain the wireless components of a network.

Criteria for Selection – None.