Technology Education

COURSES OFFERED

Grade 9, 10
(Semester)

CADD 1 (Computer-Aided Drawing & Design 1)	# 9806
CADD 2 (Computer-Aided Drawing & Design 2)	# 9410
Manufacturing 1	# 9503
Manufacturing 2	# 9604
Electricity and Electronics 1	# 9805
Electricity and Electronics 2	# 9905
Engine Service and Car Care	# 9705
Robotics 1	# 9506
Robotics 2	# 9507

(Full Year)

Engineering & Design	# 9704
CADD 1 (Computer-Aided Drawing & Design 1)	# 9706
Manufacturing 1	# 9403
Manufacturing 2	# 9603
Inside Your Computer	# 9508

(Full Year - Part Time)

Electricity and Electronics 1	# 9808
Robotics 1	# 9509

Grade 10
(Semester)

Television Production	# 1910

(Full Year)

CADD 2 (Computer-Aided Drawing & Design 2)	# 9906

Grades 11 & 12
(Semester)

Materials - Wood, Metal, and Plastic	# 9504
CADD 1 (Computer-Aided Drawing & Design 1)	# 9806
CADD 2 (Computer-Aided Drawing & Design 2)	# 9410
Construction Systems	# 9608

(Full Year)

Materials - Wood, Metal, and Plastic	# 9404
CADD 3 (Computer-Aided Drawing & Design 3)	# 9411
Network Certification	# 9907
Tech Design & Application	# 9408

Grade 12
(Full Year)

CADD 4 (Computer-Aided Drawing & Design 4)	# 9412

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. Students 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 technology 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, architecture, structural, and civil. Both 2D and 3D modeling will be taught, including rendering (color, shadowing and animation of drawings). Students will learn about the materials used in manufacturing, the machines and methods of manufacturing, and related careers.

TSA (Technology Student Association) membership and activities will be promoted and time will be allotted to preparing for competition.

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 all 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. They will use jigs and fixtures to assist in rapidly producing parts, mass-producing projects, organizing and running an assembly line. Problem solving activities are stressed. Students will be incorporating newer technologies related to mass production including pneumatic clamps and air nailing.

Students will enjoy designing and manufacturing project parts utilizing an automated piece of equipment called a CNC router. Students design parts on a computer screen using a CAD package. The computer figures how to make that 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 their own printed circuit board of a burglar alarm with different sensor switches. 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 introduced through floor plans and the wiring of basic house circuits.

Criteria for Selection – None.

ELECTRICITY & ELECTRONICS 1 **No. 9808**
Full Year/PartTime
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 flexibiltiy in that it can be scheduled back-to-back with science labs or physical education courses for the whole year. For the course descrition, see 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 hardward 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. Classroom and lab activities will include assembling and operating pneumatic (air) components and programming electric jointed arm robots using LEGO Control System® and Mind Storm®. Models of robots and assembly lines will be designed using a LEGO Bricks® program. Designing and building a small hydraulic battlebot and battle their opponent for points. Students will design and produce a marble maze utilizing a CNC router and etching a design using a laser engraver.

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

ROBOTICS 1 **No. 9509**
Full Year/PartTime
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 flexibiltiy in that it can be scheduled back-to-back with science labs or physical education courses for the whole year. For the course description, see corse #9506.

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. Using computers and programmable logic controllers, students will control pneumatic (air) and hydraulic (fluid) mechanical systems used in manufacturing, product testing and amusement. Use of a mobile robot using radio control with vision will be experienced in this course.

Criteria for Selection – Robotics I 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, structural, and civil engineering.

TSA (Technology Student Association) membership and activities will be promoted and time will be allotted to prepare for competition.

This course is part of the Cal U in the High School program at NASH. Students can receive 3 college credits per course from California University of PA by taking any combination of CADD 2, 3, or 4 during their 2 years at NASH. There is a 6 credit maximum (2 courses) at a cost of $75 per course. Juniors must have a QPA of 3.2 or better, seniors a QPA of 3.0 or better to participate in the program. Students must achieve a C or better in the North Allegheny course to receive the credits. Credits are transferable to any College or University that will accept credits from California University of PA.

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 1.0**

This course is the semester version of Course #9906. The course is part of the Cal U in the High School program at NASH. Students can receive 3 college credits per course from California University of PA by taking any combination of CADD 2, 3, or 4 during their 2 years at NASH. There is a 6 credit maximum (2 courses) at a cost of $75 per course. Juniors must have a QPA of 3.2 or better, seniors a QPA of 3.0 or better to participate in the program. Students must achieve a 'C' or better in the North Allegheny course to receive the credits. Credits are transferable to any College or University that will accept credits from California University of PA.

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

MANUFACTURING 2 **No. 9603**
Full Year/Full Time
Grades 9, 10 **Credit .5**

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, and constructing individual projects. Additional areas related to custom manufacturing, and mass production, including pneumatic clamps, air nailing, and advanced jigs and fixtures. Students will be challenged to design and manufacture project parts utilizing an automated CNC 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. Although wood is the primary material for the course, plastic and metal are explored and can be utilized in the student designed projects. Students will design and produce projects that will improve their skills, understanding and knowledge of material processes. 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 1.0**

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, movies will be generated from the CADD files, and file exchanges will be made with other schools using the Internet. 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, and VIZ .

This course is part of the Cal U in the High School program at NASH. Students can receive 3 college credits per course from California University of PA by taking any combination of CADD 2, 3, or 4 during their 2 years at NASH. There is a 6 credit maximum (2 courses) at a cost of $75 per course. Juniors must have a QPA of 3.2 or better, seniors a QPA of 3.0 or better to participate in the program. Students must achieve a 'C' or better in the North Allegheny course to receive the credits. Credits are transferable to any College or University that will accept credits from California University of PA.

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, civil, and structural engineering. Portfolio development will be a major focus of this course.

TSA (Technology Student Association) guidelines will be used so students may compete in regional, state, and national levels of competition, if interested.

This course is part of the Cal U in the High School program at NASH. Students can receive 3 college credits per course from California University of PA by taking any combination of CADD 2, 3, or 4 during their 2 years at NASH. There is a 6 credit maximum (2 courses) at a cost of $75 per course. Juniors must have a QPA of 3.2 or better, seniors a QPA of 3.0 or better to participate in the program. Students must achieve a 'C' or better in the North Allegheny course to receive the credits. Credits are transferable to any College or University that will accept credits from California University of PA.

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

NETWORK CERTIFICATION **No. 9907**
Full Year/Full Time
Grades 11, 12 **Credit 1.0**

This course provides the necessary technical foundation for those interested in the IT networking profession as a career choice. The course covers theory and application of the key internetworking technologies required to design, setup, operate, and maintain different types of networks. Networks covered include voice and data. Topics include the history of different types of networks; telephone (voice) networks, LAN theory and technologies including bridging, routing, and ATM, theory of radio and convergence.

Certification testing will be administered at the conclusion of both semesters to qualify passing students for a certificate in networking fundamentals to aide in either beginning a career in networking or continuing education in the field.

Criteria for Selection – None.