

## TECHNOLOGY EDUCATION

Technology education includes the study of transportation, communication, manufacturing, construction, and engineering. The curriculum provides students with an opportunity to develop their career and vocational interests. Technological literacy will be stressed while the students are engaged in activity-based learning. Students will develop critical thinking and problem solving skills through interdisciplinary learning activities involving math, science, language arts, and technology. Teamwork is emphasized whenever possible. The environmental, social, and economic impacts of technology will be considered in all courses. Critical thinking skills learned in technology education are vital to all students, no matter what level of education they intend to pursue.

### TECHNOLOGY EDUCATION COURSE DESCRIPTIONS

#### **EXPLORING TECHNOLOGY (6201)**

Full Year

Credit 1.00

Weight 1.02

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12.

Description: This course serves as an introduction to all technology education programs offered at RHS and builds on systems model concepts learned from technology classes taken at Vernon Center Middle School. The social, cultural, environmental, and economic impacts of technology are covered. The career cluster areas of transportation, construction, manufacturing, and communications are explored in this activity-based course. It involves interesting, hands-on, minds-on technology learning activities (TLAs). In transportation systems (land, sea, air, and space), activities may involve building working models of rockets, gliders, boats, and magnetic levitation (MagLev) vehicles. In communication systems, students will design custom ads and memos on computers, learn about basic drafting and computer-aided design (CAD). In construction systems, students will use simulation software to design, build, and test bridges on the computer. Students will also apply CAD drafting technology in engineering design of products. Basic electrical utility wiring may be experienced. In manufacturing systems, students will apply basic drafting and layout principles to fabricating products. Other activities may include *SimCity*, GPS, Internet research, and more.

#### **ENGINEERING DRAFTING (6304)**

Full Year

Credit 1.00

Weight 1.04

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12.

Description: Engineering Drafting is an accelerated course for the college bound engineering or technical student. The course introduces graphic language, the language of industry. Graphic communication, the visual expression of information and ideas, will be explored using both hand drafting techniques and computer-aided drafting (CAD). The student's ability to visualize, think in three dimensions, and communicate effectively using the graphic language will be developed. This is a comprehensive program for developing engineering drawings and technical communication skills. Team problem solving skills will be applied to the solution of practical engineering design problems.

**ARCHITECTURAL DRAFTING (6305)**

Full Year

Credit 1.00

Weight 1.04

Prerequisites: This course is open to students in Grades 10, 11, and 12. Prior successful completion of Exploring Technology or Engineering Drafting is recommended.

Description: This “real world” course will place emphasis on interior home design. Students will study the design process with the use of the latest versions of computer-aided design (CAD) software to produce 2D, 3D perspective, and photo-realistic renderings of interior and exterior architectural designs. The intent of this course is to provide the knowledge and experience needed to develop and complete plans for a single family home including site plans, landscape plans, and elevations. Scale models of student designs may be constructed. He or she will be exposed to a study of architectural styles and types, functional room planning, designing with interior decor, color theory, lighting, energy planning, and landscaping techniques. Team problem solving skills will be applied to the solution of realistic design problems. The content of this course can be customized to meet the needs and interests of individual students. Students will have the opportunity to enter their model structures for awards given at the annual Hartford Home Show.

**ADVANCED DRAFTING (6306)**

Full Year

Credit 1.00

Weight 1.04

Prerequisites: This course is open to students in Grade 12. A grade of 75 or higher in Architectural Drafting is recommended. Teacher approval is required.

Description: This course is designed to meet the individual needs of those students wishing to specialize in a specific field of drafting and design, within the career cluster areas of communications, engineering, manufacturing, or transportation. Independent study and problem solving will be stressed. Each student will be encouraged to initiate, develop and complete a major project within his or her specific field of interest. When possible, students will communicate with experts in their field, both in person and via the Internet. He or she will shadow a mentor on a job site to learn about the career opportunities available to them. Students will learn about educational opportunities and the career planning process, how to complete an application, how to produce a professional resume, and how to prepare for a personal interview.

**POWER/AUTO TECHNOLOGY I (6219)**

Full Year

Credit 1.00

Weight 1.02

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12. It is strongly suggested that students have previously completed or are currently taking Electronics I & II.

Description: This introductory course will familiarize students with the basic tools, materials, machines, and procedures used by the general automotive technician. The “systems approach” to learning (engines, cooling, lubrication, electrical, fuel systems, and starting and changing circuits) will be emphasized. The students will earn the opportunity to work on their own vehicles, automotive program vehicles and equipment to apply the theories learned in the classroom as they progress through the basic skills content. Alternative power and transportation will also be topics of discussion.

**POWER/AUTO TECHNOLOGY II (6220)**

Full Year

Credit 1.00

Weight 1.02

Prerequisites: This course is open to students in Grades 10, 11 and 12. Prior successful completion of Power/Auto Technology I is required.

Description: Students assume the responsibility of advanced automotive repair, rebuilding work, diagnostic troubleshooting, and light auto body work. Typical service problems in each system are identified, along with symptoms, probable causes, and recommended service procedures. Students work in groups, apply problem solving skills, and utilize the three C's (complaint, cause, and correction) to diagnose and repair a vehicle. The eight ASE content areas (brakes, engine repair, engine performance, suspension, HVAC, electrical, and manual and automatic transmissions) and testing procedures are stressed for those students who display an interest in pursuing an automotive-related career.

**GRAPHIC ARTS I – MULTIMEDIA & DESKTOP PUBLISHING (6215)**

One Semester

Credit 0.50

Weight 1.02

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12.

Description: This course introduces students to most aspects of the communications industry. Printing, publishing, and multimedia designing will be stressed through the use of programs such as Adobe Photoshop, Illustrator, In Design, and Acrobat. Individual and team based projects will help students understand the future direction of the industry and prepare them for careers in Graphic Design. Skills such as scanning, copying, layout, graphic creation, color usage, and large scale designing will be stressed. This course is part of the Communications Career Cluster.

**GRAPHIC ARTS II – WEB DESIGN (6216)**

One Semester

Credit 0.50

Weight 1.04

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12 who have successfully completed Graphic Arts 1.

Description: This course is the companion sequence to Graphic Arts 1. It will focus on the current Internet usage of graphics, multimedia, web page creation, and web management. This course continues to use the latest industry software including Adobe Photoshop, Dreamweaver, Fireworks, and Flash. Website creation and management will be stressed, preparing students for careers in web design. Learning the basics of HTML and Java will also be stressed, as will programming in Flash for web applications like video games and photo albums. This course is part of the Communications Career Cluster.

**WOODWORKING I / MANUFACTURING (6204)**

Full Year

Credit 1.00

Weight 1.02

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12.

Description: This course uses wood as a medium to teach manufacturing concepts. Material processing technology is emphasized. Safe and proper hand tool and machine use is stressed throughout the year. Projects will be completed using different types of manufacturing techniques. Managerial technology is also stressed. This involves planning, developing, organizing, actualizing (directing), and control while developing a variety of products. For students with special interests, individual and more traditional type projects are allowed after the completion of the required projects.

**WOODWORKING II / CONSTRUCTION (6205)**

Full Year

Credit 1.00

Weight 1.02

Prerequisites: This course is open to students in Grades 10, 11, and 12. Prior successful completion of Woodworking I / Manufacturing is required.

Description: This course will provide students with an introduction to construction technology. Emphasis is placed on information relating to tools, materials, equipment, and processes used in the construction field. Practical application is sought through the construction of scale models and/or outbuildings. A student enterprise designed to develop basic building skills will be formed. Additional content includes the business of construction, administration, financing, various construction projects, design, engineering, and information on construction industry careers. Safe work habits are stressed. The course will combine the practical and theoretical approaches to learning and will place emphasis on technology's impact on society and the environment, group problem solving skills, and the integration of math and science concepts. It is highly recommended for students interested in a career in construction. It is intended for the general level student, two-year technical, or four-year college-bound student with an interest in the field of construction engineering.

**ELECTRONICS I (College Career Pathways) (6208)**

Fall Semester

Credit 0.50

Weight 1.04

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12. Prior successful completion of Algebra 1A and Algebra 1B is recommended.

Description: This is a basic electricity/electronics communications course. It involves both theory and hands-on coverage of direct current (DC) with computer-aided instruction. Topics covered include electron theory, voltage, current, resistance, switches, circuit breakers, relays, robotics, Ohm's Law, electric circuits, magnetism, motors, and DC generators. Interesting group projects to be constructed in class may include building multimeters, MagLev or solar powered model race cars, light, sound and motion detector devices, and voice amplifiers. This course is both interesting and preparatory for the student who wishes to continue on in the field of electricity, electronics, automotive, mechanical or electrical engineering. It is also beneficial for students concerned with improving their technological literacy in today's high tech world.

This course qualifies for the College Career Pathways program with Asnuntuck Community College in Enfield. Students can earn three college credits with Asnuntuck under their Manufacturing Electronics & Controls Technology or Manufacturing Electronics Fundamentals program options. The equivalent course is listed as MFG137, Circuit Theory.

This course also qualifies for Physical Science cross-credit. See the Cross-Credit Options in the Program of Studies booklet for more information.

**ELECTRONICS II (6209)**

Spring Semester

Credit 0.50

Weight 1.04

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12. Prior successful completion of Algebra 1A and Algebra 1B or higher level Math course and Electronics I is strongly recommended.

Description: This is a basic electricity/electronics communications course that involves both theory and hands-on learning with computer-aided instruction (CAI). Topics covered include generation of AC electricity, sine waves, AC resistance, inductance, capacitance, and transformers. Students will study the basic concepts, systems, and subsystems of electronic technology including robotics. Students will experience problem solving with the aid of meters and test equipment used in industry. Interesting group projects to be constructed in class may include power supplies, sound and motion detection devices, amplifiers, magnetic levitation vehicles, radios, robots, and computer controlled devices. This course is both interesting and preparatory for the student who wishes to continue on in the field of electricity, electronics, automotive, mechanical or electrical engineering. It is also beneficial for students concerned with improving their technological literacy.

This course qualifies for Physical Science cross-credit. See the Cross Credit Options in the Program of Studies booklet for more information.

**MECHANICAL ENGINEERING (6221)**

Full Year

Credit 1.00

Weight 1.02

Prerequisites: This course is open to students in grades 11 and 12. Prior successful completion of Algebra 1A and Algebra 1B is required.

Description: This course will focus on the development and study of problem solving techniques in the field of engineering. Students will examine successes and failures of engineering designs. Emphasis will be on mechanical engineering and machining processes. It will involve the use of tools, materials, machines, processes, resources, and technical skills. Interesting hands-on applications involve design concepts including Mastercam CAD/CAM software, CNC machining, charts, graphs, measuring tools, hand and power tools, and general shop machinery. Activities may include material fabrication, welding, machining, electronics, pneumatics, hydraulics, and systems assembly. The capstone project of this class involves engineering, designing, fabrication, testing and operating a hovercraft. Work will be completed both individually and in a group atmosphere where teamwork will be emphasized. Great career opportunities in engineering and the career pathway needed to get there will be discussed throughout the course.

**COMPUTER REPAIR – HARDWARE (6311)**

Fall Semester

Credit 0.50

Weight 1.04

Prerequisites: This course is open to students in Grades 9, 10, 11, and 12.

Description: This is a hands-on application course which will study computer hardware, computer repair, non-destructive troubleshooting methods, and basic networking. Students will study the hardware operation of the personal computer and troubleshoot an operational computer in the process. This includes how to upgrade the hardware if it is cost effective to do so. Successful completion of this course can lead to CompTIA A+ Computer Repair Certification required by most companies that hire computer technicians. Successful completion of both semester courses (Computer Repair Hardware and Software) is looked at very favorably when applying to any college, technical school, or university.

A component of Rockville High School's College Career Pathways program, this course (when taken with Computer Repair-Software-Operating Systems) is the equivalent of Manchester Community College's CST 141 (Computer Hardware). Students completing Computer Repair-Hardware and Computer Repair-Software-Operating Systems with a grade of 75% or higher in each course will receive credit for CST 141 (Computer Hardware) at MCC.

**COMPUTER REPAIR - SOFTWARE - OPERATING SYSTEMS (6312)**

Spring Semester

Credit 0.50

Weight 1.04

Prerequisites: Prior successful completion of the Computer Repair - Hardware course is recommended. This course is open to students in Grades 9, 10, 11, and 12.

Description: This is a hands-on application course which will study computer operating systems, software configurations, computer repair, non-destructive troubleshooting methods, and basic network configuration. Students will study multiple operating systems of the personal computer and learn how to diagnose and troubleshoot them in the process. Successful completion of the course can lead to CompTIA A+ Computer Repair Certification required by most companies that hire computer technicians. Successful completion of both semester courses (Computer Repair Hardware and Software) is looked at very favorably when applying to any college, technical school, or university.

A component of Rockville High School's College Career Pathways program, this course (when taken with Computer Repair-Hardware) is the equivalent of Manchester Community College's CST 141 (Computer Hardware). Students completing Computer Repair-Hardware and Computer Repair-Software-Operating Systems with a grade of 75% or higher in each course will receive credit for CST 141 (Computer Hardware) at MCC.

**FIRE TECHNOLOGY (College Career Pathways) (6310)**

Full Year

Credit 1.00

Weight 1.04

Prerequisites: This course is open to students in Grades 11 and 12.

Description: This course will introduce students to firefighting and public safety. It will familiarize students with all aspects of firefighting including cooperation with police and emergency medical technicians. The course will also raise the level of career awareness and prepare students for entry-level employment in this area. The course is part of the College Career Pathways program and will include guest speakers and field trips to the police and fire departments as well as other selected training facilities. This course can accommodate eighteen (18) students. Seniors will be given preference in the scheduling of the course. If necessary, a lottery will be held to determine the eighteen students who may participate in the course.

This course qualifies for the College Career Pathways program with Three Rivers Community College in Norwich. Students can earn three college credits with Three Rivers under their Fire Technology & Administration program. The equivalent course is listed as FTA K290, FTA Cooperative Work.

**VIDEO PRODUCTION I (College Career Pathways) (6307)**

Fall Semester

Credit 0.50

Weight 1.04

Prerequisites: None. This course is open to students in Grades 10, 11, and 12.

Description: Students are offered the opportunity to learn to communicate with video. The course content emphasizes, promotes, and instructs in the importance of both technical and creative skills to produce quality videos. Instruction is provided through an activity-based approach to learning the fundamentals of video production. Students will learn to operate video cameras, graphics and editing computer software, lighting techniques, composition and creative methods for special effects by designing and producing video projects. Through the preproduction and postproduction process, students will have the opportunity to write scripts, act, use camera tricks, and edit their own videos using Adobe Premiere. Students may select either Fine Arts or Vocational Education credit for this course.

A component of Rockville High School's College Career Pathways program, this course (when taken with Video Production II) is the equivalent of Manchester Community College's COM 166 (Video/Filmmaking). Students completing Video Production I and Video Production II with a grade of 75% or higher in each course will receive credit for COM 166 (Video/Filmmaking) at MCC.

**VIDEO PRODUCTION II (College Career Pathways) (6313)**

Spring Semester

Credit 0.50

Weight 1.04

Prerequisites: Prior successful completion of Video Production I is required. This course is open to students in Grades 10, 11, and 12.

Description: Using technical and creative skills and knowledge gained in Video Production I, students will further explore creative approaches to video as they continue to practice and refine its uses as a powerful communication medium. Advertising, broadcast journalism, and documentary techniques will be introduced to further advance video projects. Students may select either Fine Arts or Vocational Education credit for this course.

A component of Rockville High School's College Career Pathways program, this course (when taken with Video Production I) is the equivalent of Manchester Community College's COM 166 (Video/Filmmaking). Students completing Video Production I and Video Production II with a grade of 75% or higher in each course will receive credit for COM 166 (Video/Filmmaking) at MCC.

**VIDEO PRODUCTION III (6314)**

Fall Semester

Credit 0.50

Weight 1.04

Prerequisites: Prior successful completion of Video Production I and II is required. This course is open to students in Grades 11 and 12.

Description: This course is an advanced level of Video Production for those students who would like to apply the knowledge and skills gained from Video Production I and II to an applied career focus. The advancement of media communications will be emphasized with efforts to produce videos with special effects through Adobe After Effects. Students will also be involved in taping of community events for archiving and airing on the Community Voice Channel and cafeteria TVs. Students will receive Vocational Education credit for this course.

**VIDEO PRODUCTION IV (6315)**

Spring Semester

Credit 0.50

Weight 1.04

Prerequisites: Prior successful completion of Video Production III is required. This course is open to students in Grades 11 and 12.

Description: This course will continue to provide opportunities for students to advance their media communications knowledge and skills. Broadcast journalism will be emphasized through an RHS News Program. Students will be expected to apply their advanced technical and creative skills to recorded segments with plans for a live production to evolve. Students will receive Vocational Education credit for this course.

**TENTATIVE COURSES**

The following courses have been proposed for the Technology Education Department for the 2011-2012 school year and are pending approval by the Vernon Board of Education.

**PRINCIPLES OF ENGINEERING I (6316)**

Fall semester

Credit 0.50

Weight 1.04

Prerequisites: Prior successful completion of Algebra 1A and Algebra 1B or Algebra 1-College is required. This course is open to students in Grades 10, 11, and 12.

Description: This is a hands-on lab course. Concepts taught will revolve around the four kinds of energy systems that make up the simplest and most complex technological devices and equipment including mechanical, fluid, electrical, and thermal systems. Activities will include a multitude of hands-on labs based on the principle units of force, work, rate, and resistance. Principles of Engineering I will focus on "Green Energy" conservation concepts based on our nation's movement toward energy independence, 21<sup>st</sup> century skills, and the great new career opportunities associated with it. Science, technology, engineering, and math (STEM) applications are combined to show the relevance of each used in engineering design with real world problem solving activities.

**PRINCIPLES OF ENGINEERING II (6317)**

Spring semester

Credit 0.50

Weight 1.04

Prerequisites: Prior successful completion of Principles of Engineering I and either Algebra 1-College or Algebra 1A and Algebra 1B are recommended. This course is open to students in Grades 10, 11, and 12.

Description: This is a hands-on lab course. It is a continuation of the concepts taught in Principles of Engineering I revolving around the four kinds of energy including mechanical, fluid, electrical, and thermal systems. In this course, activities will include a multitude of hands-on labs based on the advanced principle units of energy and power. Project work in Principles of Engineering II will focus on "Alternative Energy" concepts such as solar, wind, and geothermal energy based on our nation's movement toward energy independence and 21<sup>st</sup> century skills and the new career opportunities associated with it. Students will either design or assemble from scratch an alternate energy device like a scale model domestic solar hot water system, wind turbine, solar panels, or they will work with actual donated equipment from the manufacturer. Science, technology, engineering, and math (STEM) applications will be combined to show the relevance of each used in engineering design with real world problem solving activities.