

INDUSTRIAL TECHNOLOGY DEPARTMENT



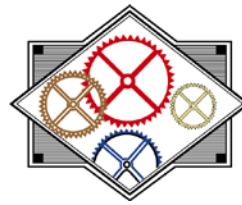
Arts & Communications



Business, Management Marketing & Technology



Health Science



Engineering/Manufacturing & Industrial Technology



Human Services



Natural Resources & Agriscience

VPAA – Meets Visual, Performing & Applied Arts Requirement

OLE – Meets Online Learning Experience Requirement

GR/MMC – Meets Graduation Requirements based on Michigan Merit Curriculum

SMR – Senior Math Related

WOODWORKING (VPAA) – I010 9, 10, 11, 12 1.0 credit

SHARED TIME: May require travel to another building

This co-ed course is designed to safely teach basic skills in the use of woodworking/construction trades materials, tools and processes with multiple skill levels. Hand tools, portable power tools, and industrial woodworking machines will be used to develop and create prototypes.

FURNITURE AND CABINET CONSTRUCTION (VPAA) – I020 10, 11, 12 1.0 credit

PREREQUISITE: Woodworking

SHARED TIME: May require travel to another building

This co-ed course is designed to safely teach the applications of wood technology, such as millwork and furniture construction. It focuses on the final aspects of building such as constructing kitchen cabinets, counters, and built-in units. Included is the study of joinery, frames, doors, drawers, finishes, and installations. Floor plans, blueprints, and exterior house design will also be examined as resources. Students will be exposed to career opportunities in the construction and woodworking trades.

ADVANCED WOODWORKING (VPAA) – I030 10, 11, 12 1.0 credit

PREREQUISITE: Woodworking

SHARED TIME: May require travel to another building

This co-ed course is designed for students interested in the woodworking field. Students design their own projects and/or explore other related areas of wood fabrication. Students can design, cost account, and construct prototypes in such areas as residential construction, cabinet-making, furniture making, pattern making, millwork, or plastic laminates. Study guide, projects and exams will be used to evaluate progress.

MACHINE SHOP I – CNC (VPAA) (OLE) (SMR) – I050 10, 11, 12 1.0 credit

SHARED TIME: May require travel to another building

This course is designed to introduce simple fundamentals and skills of machine tool operation in a hands-on, project-based environment. Precision measurements, working properties of metals and the principles of science and mathematics are applied to machine shop practices. Students will learn to operate basic power machines found in industry (i.e. vertical mills, horizontal mills, grinders, and lathes). They will also perform operations on CAD, CAM, and CNC computer-controlled milling and turning machines. Foundry, as well as arc and acetylene welding, will be included.

MACHINE SHOP II - CAD, CAM, CNC (VPAA) (SMR) – I060 11, 12 1.0 credit

PREREQUISITE: Machine Shop I

SHARED TIME: May require travel to another building

This co-educational course is designed for students who wish to continue in the machine shop program, but who do not elect the CTE Machine program. The course objectives are similar to the CTE Machine Shop course except for depth and time on task. However, the instruction will focus on the development of the technical, entry level job skills.

AUTO I (VPAA) (SMR) – I070 10, 11, 12 1.0 credit

SHARED TIME: May require travel to another building

This co-ed course integrates classroom theory and laboratory applications in order to develop in students the highly technical skills sought after in the automotive service and repair field. Students will gain competency in safety concepts, equipment operation, tool usage, and precision measurement. While this course is designed to train students in all phases of automotive maintenance and repair, special emphasis is given to the principles and theory of both disc and drum brake systems, including fundamentals and diagnosis of anti-lock brake systems (ABS). This is done through a series of brake related tasks: demonstrations, observations, labs, and performance based evaluations. Students are required to complete performance objectives, keep a notebook, and take exams to prepare for success in future automotive training programs.

AUTO II (VPAA) (SMR) – I080 11, 12 1.0 credit

This co-ed course is designed for students who wish to continue studying automotive technology, but do not elect the two credit CTE Auto course. The objectives of this class are similar to CTE Auto, but laboratory application of classroom theory is limited. This course does not qualify a student for the School-to-Work program or for articulated college credit.

SMALL ENGINE REPAIR I (VPAA) (SMR) – I090 9, 10, 11, 12 1.0 credit

SHARED TIME: May require travel to another building

This is a comprehensive course for both male and female students to learn how to repair small internal combustion engines. The student is taught the use of basic hand tools, engine maintenance (both two and four-cycle), valve grinding, burnishing, theory of compression, carburetion, and magneto electrical system. Engine tear-down, rebuilding, and trouble-shooting are done using industrial manuals as guides.

DRAFTING I (VPAA) – I115

9

1.0 credit

This is a co-educational course designed to teach basic knowledge and develop specific skills in the drafting field. Print reading, line control, lettering, sketching and manipulation of drawing tools and technical terminology are practiced. Geometrical construction, orthographic projections, sectioning, dimensioning techniques and computer-aided design are taught.

INTRODUCTION TO ELECTRICITY AND ELECTRONICS (VPAA) (SMR) – I180

9, 10, 11, 12

1.0 credit

SHARED TIME: May require travel to another building

This course is designed to be an introduction for male and female students who are interested in exploring the fields of electricity and electronics. The theory of electron flow, sources of electricity, Ohm's Law and Power Law as applied to various types of circuits, magnetism, motors, generators, component operation in DC and AC circuits, and residential house wiring are studied.

Demonstration, discussion, project construction, and student experimentation are used to ensure understanding of electrical principles by the students. Emphasis is placed upon the use of meters and other test equipment, soldering, and safety when working with electrical circuits. Students will be taught to assemble various circuits using wiring diagrams, to test the circuit for proper operation, to measure various electrical quantities present in the circuit, and to explain the obtained results. Career-related information and terminology are also taught.

ADVANCED ELECTRONICS (VPAA) (SMR) – I190

10, 11, 12

1.0 credit

PREREQUISITE: Introduction to Electricity and Electronics

SHARED TIME: May require travel to another building

This course is designed to give male and female students an introduction to the principles of electronics and electronic circuits. Alternating current, regulated power supplies, power amplifiers, oscillators, radio waves and their detection, and AM, FM, and Stereo radio receivers are studied.

Special semiconductor devices, microwave theory, ultrasonic, opto-electronics, and various types of transducers are also taught. The theory and circuit construction will provide students with an insight into the procedures and techniques used in industry. Time is also provided for students to complete projects and repair work of their choice.

ENGINEERING/ MANUFACTURING AND INDUSTRIAL TECHNOLOGY (EMIT) INTERNSHIP – N306-N307 11, 12 1.0 credit

PREREQUISITE: Teacher-Coordinator recommendation and enrollment in a related CTE class.

This course offers students the opportunity to spend a portion of their school day working at an E.M.I.T. related training site in the community. This employment experience is related to the career goals of the student and is supervised by a school-to-work coordinator. The student will develop workplace skills and leadership traits in their chosen area of specialty. Evaluation of job performance and assessment of coursework is the responsibility of the STW Coordinator with input from the training site supervisor. This program adheres to all federal and state labor laws.

CTE CONSTRUCTION TRADES (VPAA) (SMR) – V400 10, 11, 12 2.0 credits

SHARED TIME: May require travel to another building

This co-ed course is designed to provide insight and experience in the Construction trades industry. Residential construction is integrated with commercial construction techniques and materials. Students will participate in several aspects of the construction process.

Examples include:

- Safety
- Site layout
- Concrete
- Floor Framing
- Rough Frame
- Roofing
- Siding and windows
- Electrical
- Plumbing
- Insulation
- Drywall
- Painting
- Finish Carpentry

Benefits for College Bound Students

Upon successful completion of this program, students can qualify for paid internship training as well as articulated college credit through the Macomb Community College-UCS partnership.

CTE MACHINE SHOP - CAD, CAM, CNC (VPAA) (SMR) – V410 11, 12 2.0 credits

PREREQUISITE: Machine Shop I

SHARED TIME: May require travel to another building

This is a co-educational course focused on the development of technical skills for students interested in a career in machining trades. Students work from blueprints, keeping industrial standards in operations, safety, and quality (tolerance). Students perform operations using CAD, CAM, and CNC computer-controlled milling and turning machines. Performance objectives are followed, notebooks are kept, and exams written. Students who successfully complete this program may qualify for articulated college credit.

CTE WELDING I (VPAA) (SMR) – V420 10, 11, 12 1.0 credit

SHARED TIME: May require travel to another building

This course is designed to provide students with technical skills in the areas of welding and cutting. This course is intended to develop safe, competent, welders according to the accepted standards of the industry. This program teaches the basic techniques required to perform ARC and MIG welding in all positions. Gas cutting, manual and automatic, is included. Students will also develop the basic skills in blueprint reading, welding symbols and fabrication.

CTE WELDING II (VPAA) (SMR) – V430 11, 12 2.0 credits

PREREQUISITE: CTE Welding I

SHARED TIME: May require travel to another building

This course is designed to enhance the technical skills that are demanded in the welding industry. Students electing this class will advance their knowledge of welding codes, blueprint reading, welding symbols, and testing of welds (both destructive and non-destructive). Students will also become familiar with machine maintenance procedures. This program will teach the advanced techniques required to perform ARC, GAS, TIG, and MIG welding in all positions. Students will be required to design and fabricate a product of their choice to gain fabrication training. Successful completion of this course may qualify the student for articulated college credit.

CTE AUTO (VPAA) (OLE) (SMR) – V440 11, 12 2.0 credits

PREREQUISITE: CTE Automotive Technology I-Brakes

SHARED TIME: May require travel to another building

This co-ed course builds upon the foundation laid in CTE Automotive Technology I-Brakes. This advanced course focuses primarily on the electrical systems of the automobile. Included are: safety procedures, tool usage, industry specific diagnostic and testing equipment operation, wiring systems, electronic components, and procedures to inspect, diagnose, and repair these systems professionally. Today's vehicles make use of electronics in every major sub-system including: brakes, engines, engine performance, suspension, HVAC, after-market accessories, and automatic/ manual transmissions. Students are required to complete performance objectives, keep a notebook, and take exams to prepare for success in future automotive training programs.

Benefits for College Bound Students

Upon successful completion of this program, the students can qualify for articulated college credit. Cooperating colleges include Macomb Community College, Ohio Technical College, University of Northwest Ohio, and Universal Technical Institute.

ENGINEERING TECHNOLOGY I (VPAA) (SMR) – V460 11, 12 1.0 credit

SHARED TIME: May require travel to another building

The purpose of this Career and Technical Education course is to increase students' knowledge of the different engineering disciplines. This course will be delivered over two semesters, and will introduce high school students to some of the tools and methods used by engineers in industry. The cornerstone of the course is a semester design project, which will be completed during the second semester of the course. Successful completion of this course may qualify students for articulated college credit.

ENGINEERING TECHNOLOGY II (VPAA) (SMR) - V462 12 1.0 credit

PREREQUISITE: Engineering Technology I

SHARED TIME: May require travel to another building

The purpose of this Career and Technical Education course is to increase students' knowledge in a specific Engineering discipline that was learned in Engineering and Technology 1. This course will emphasize the development of research skills, along with allowing for students to use other specific tools and methods that are a part of a specific engineering field. Engineering and Technology 2 focuses on a capstone project that is designed and developed by the student over the entire school year. Successful completers of this course may qualify for articulated college credit.

CTE SMALL ENGINE REPAIR (VPAA) (SMR) – V490 11, 12 2.0 credits

PREREQUISITE: Small Engine Repair I and teacher recommendation

SHARED TIME: May require travel to another building

This is a co-educational course designed to teach job entry skills in the repair of both two and four-stroke small engine equipment and recreational vehicles. The electronic electrical system is studied and compared to the magneto electrical system. Students are put in service-type situation where they are responsible for repair jobs from beginning to end. Students are required to complete performance objectives, keep a notebook and take exams.

DESIGN & ENGINEERING ADVANCED CTE - CAD (VPAA) (SMR) – V500 11, 12 2.0 credits

PREREQUISITE: Successful completion of Design & Engineering Basics I – CAD and Design & Engineering II - CAD

This CTE course is available to those students who have reached a skill level and/or interest in a design/engineering career. Class work involves machine detailing, jigs and fixtures, specification writing, precision gauge reading and dimensioning, mechanical mechanisms, and metal stamp design. Advanced computer-aided design (CAD) skills are taught using the Autodesk Design Academy software suite. Students use CAD software to incorporate solid and surface techniques in producing finished assembly and detail prints. Students may be required to compile a notebook, develop a portfolio of their work, produce project history folders, and complete CAD drawing assignments. This course also helps develop teamwork, communication, project managing and problem solving skills that are vital in a design/engineering environment. Successful completion of this course may qualify the student for articulated college credit.

ARCHITECTURE CTE - CAD (VPAA) (SMR) – V510 11, 12 2.0 credits

PREREQUISITE: Successful completion of Architecture I – CAD and Architecture II-CAD

This is a 2-hour block course designed for students who are interested in architecture as a career. Conventional, pre-cut, panelized and unitized construction techniques and their application to the residential, multi-family, commercial, industrial and public works aspects of architecture design are taught. Students learn new construction products, architectural media, landscape architecture, structural calculations, structural detailing, civil engineering, and the interpretation of local building codes and ordinances. Course requirements include: a completed design notebook, completed written reports and study guides, examinations and drawings, and/or problem-solving assignments. Advanced computer drawing techniques are taught. Students use the Autodesk Design Academy software suite to complete their drawings. Successful completion of this course may qualify the student for articulated college credit.

CTE MECHATRONICS (VPAA) (SMR) – V525 11, 12 2.0 credits

SHARED TIME: May require travel to another building

This Career & Technical Education course is designed to be an introduction for male and female students who are interested in exploring the field of automated technologies. Various disciplines explored include: robotics, sensor technology, AC and DC electronics, pneumatics, programmable logic control, and computer logic. Students will receive hands on training using state-of-the-industry trainers coupled with computer-based curriculum. The class contains numerous projects that integrate these various disciplines. Successful completion of this program may qualify student for articulated college credit.

CTE COMPUTER NETWORKING AND REPAIR (VPAA) – V544 11, 12 1.0 credit

SHARED TIME: May require travel to another building

In this course, students begin by learning to identify, install, configure, upgrade, trouble-shoot and repair computers and peripherals. The curriculum covers a broad range of topics, such as basic PC systems servicing techniques, controlling boot processes, using multi-meters, managing/modifying directories, creating and executing .BAT, .COM, and .EXE files, mapping memory and utilizing the Microsoft diagnostic (MSD) utility. The course then transitions to the designing, building, and maintaining computer networks. The curriculum covers a broad range of topics, from basic networking skills such as pulling cable to more complex concepts. Students will gain hands on experience with installation, configuration, and troubleshooting basic networking hardware, protocols and services. Much of the content for this course is delivered in an on-line format. This course prepares students to take the following CompTia certification exams:

- A+ Essential
- A+ IT Technician
- Network+

DESIGN & ENGINEERING I – CAD (VPAA) (SMR) – V610 9, 10, 11, 12 1.0 credit

This is a co-educational course designed to teach basic knowledge and develop specific skills in the drafting field. Print reading, line control, lettering, sketching and manipulation of drawing tools and technical terminology are practiced. Geometrical construction, orthographic projections, sectioning, dimensioning techniques and computer-aided design are taught. The Autodesk Design Academy software is used in this high school design course.

DESIGN & ENGINEERING II – CAD (VPAA) (SMR) – V620 10, 11, 12 1.0 credit

PREREQUISITE: Successful completion of Design & Engineering I – CAD

This is a course that covers machine production drawings, project design, technical illustration, auxiliary views, and cast parts along with stamped metal design and related skills. During the year, occupations related to design and engineering are investigated and discussed. Students may be required to compile a notebook and complete assigned project drawings. Students are required to use computer-aided design software from the Autodesk Design Academy suite to develop their drawings.

DESIGN & ENGINEERING III – CAD (VPAA) (SMR) – V630 11, 12 1.0 credit

PREREQUISITE: Successful completion of Design & Engineering I and Design & Engineering II – CAD

This course is designed for students who are interested in a design/engineering career but are unable to take advantage of the Advanced CTE 2-hour block. Advanced computer-aided design (CAD) skills are taught using the Autodesk Design Academy software suite. Students use CAD software to incorporate solid and surface techniques in creating their drawings. Students may be required to compile a notebook, develop a portfolio of their work, produce project history folders, and complete CAD drawing assignments. Successful completion of this course may qualify the student for articulated college credit.

DESIGN & ENGINEERING IV – CAD (VPAA) (SMR) – V640 12 1.0 credit

PREREQUISITE: Successful completion of Design & Engineering III – CAD or CTE Design & Engineering- CAD

This course is designed for students who are interested in a design/engineering career but are unable to take advantage of the Advanced CTE 2-hour block. Advanced computer-aided design (CAD) skills are taught using the Autodesk Design Academy software suite. Students use CAD software to incorporate solid and surface techniques in creating their drawings. Students may be required to compile a notebook, develop a portfolio of their work, produce project history folders, and complete CAD drawing assignments. This course also helps students develop teamwork, communication, project managing and problem solving skills that are vital in a design/engineering environment. Successful completion of this course may qualify the student for articulated college credit.

ARCHITECTURE I – CAD (VPAA) (SMR) – V650 9, 10, 11, 12 1.0 credit

This course is for the student who likes to draw, create individual designs and is interested in the basic fundamentals of architectural design. Students learn to draw a plot plan, floor plan, foundation plan, elevations, sections and kitchen details. Architecture I include the study of residential designs, conventional and modular construction techniques, estimating labor and materials, and occupational information related to architectural design. Both tabletop and computer drawing techniques are taught. Students use the computer-aided design (CAD) software from the Autodesk Design Academy suite to complete their drawings.

ARCHITECTURE II – CAD (VPAA) (SMR) – V660 10, 11, 12 1.0 credit

PREREQUISITE: Successful completion of Architectural I - CAD

This course further develops the student's occupational competency in architecture. Conventional, pre-cut, panelized and unitized construction techniques and their applications to the residential, multi-family, commercial, industrial and public works aspects of architecture design are taught. Both tabletop and intermediate computer drawing techniques are taught. Students use the Autodesk Design Academy suite to complete the majority of their drawings.

ARCHITECTURE III – CAD (VPAA) (SMR) – V670 11, 12 1.0 credit

PREREQUISITE: Successful completion of Architecture II-CAD or CTE Architecture-CAD

This course is designed for students who are interested in architecture as a career but are unable to take advantage of the 2-hour CTE Architecture -CAD block. Conventional, pre-cut, panelized and unitized construction techniques and their applications to the residential, multi-family, commercial, industrial and public works aspects of architecture design are taught. Advanced computer drawing techniques are taught. Students use the Autodesk Design Academy software suite to complete their drawings. Successful completion of this course may qualify the student for articulated college credit.

LAW ENFORCEMENT – V900 11, 12 2.0 credits

PREREQUISITE: Application process, including two letters of recommendation and copy of student grade transcript

SHARED TIME: May require travel to another building

This course introduces students to a career in law enforcement. A wide range of topics associated with law enforcement and public safety will be covered. Topics will include the application process and requirements to become a police officer. In addition, students will acquire the necessary skills and behaviors associated with all law enforcement and public safety activities, such as monitoring, enforcement, apprehension, conflict resolution, and "due process". Curriculum, laws and police procedures will be updated through partnership with local police departments and academies.