

INDUSTRIAL TECHNOLOGY DEPARTMENT



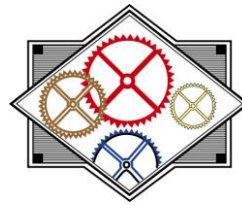
Arts & Communications



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

SMR – Senior Math Related

WLII – Meets World Language II Requirement

<u>MACHINE SHOP I – CNC</u> (VPAA) (OLE) (SMR) – I050	10, 11, 12	1.0 credit
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SHARED TIME: May require travel to Stevenson High School

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.

<u>MACHINE SHOP II - CAD, CAM, CNC</u> (VPAA) (SMR) (WLII) – I060	11, 12	1.0 credit
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PREREQUISITE: Machine Shop I
SHARED TIME: May require travel to Stevenson High School

This 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 (V410) course except for depth and time on task. However, the instruction will focus on the development of the technical, entry level job skills.

<u>CTE MACHINE SHOP - CAD, CAM, CNC</u> (VPAA) (SMR) (WLII) – V410	11, 12	2.0 credits
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PREREQUISITE: Machine Shop I
SHARED TIME: May require travel to Stevenson High School

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.

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 semiconductors 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) (WLII) – V400 10, 11, 12 2.0 credits

SHARED TIME: May require travel to Eisenhower or Henry Ford II High School

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

SHARED TIME: May require travel to Stevenson High School

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) (WLII) – V430 11, 12 2.0 credits

PREREQUISITE: CTE Welding I

SHARED TIME: May require travel to Stevenson High School

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.

AUTO I (VPAA) (SMR) – V435

10, 11, 12

1.0 credit

SHARED TIME: May require travel to another building

This 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. This course is designed to expose students to all phases of automotive maintenance and light repair. Auto 1 introduces the student to skills covered in all eight areas of ASE and State licensing. This is done through a series of ASE related tasks: demonstrations, observations, labs, and basic 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. It is highly recommended that students follow this course with CTE Auto in order to obtain industry certification.

CTE AUTO (VPAA) (OLE) (SMR) (WLII) – V440

11, 12

2.0 credits

PREREQUISITE: Auto I

SHARED TIME: May require travel to another building

CTE Auto integrates classroom theory and laboratory applications in order to further develop the technical skills introduced in Auto I. Students are required to complete advanced performance objectives, keep a notebook, and take exams to prepare for success in future automotive training programs. Students will further their understanding of safety concepts, equipment operation, tool usage, and precision measurement. This advanced two hour course focuses on the hands-on application of skills included in all eight areas of ASE and State of Michigan Certification. These eight areas include Engine Repair, Automatic Transmission/Transaxle, Manual Drivetrain and Axles, Steering and Suspension, Brakes, Electrical/Electronic Systems, Heating and Air Conditioning and Engine Performance. These eight areas are all encompassed in ASE's Maintenance and Light Repair Certification. All students enrolled in CTE auto are provided the opportunity to earn ASE Student Certification in MLR free of charge. The skills taught in this course are designed to prepare students for both entry level positions and more other post-secondary options.

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.

SMALL ENGINE REPAIR I (VPAA) (SMR) – V485

9, 10, 11, 12

1.0 credit

SHARED TIME: May require travel to Henry Ford II High School

This is a comprehensive course for students interested in learning how to repair small internal combustion engines. Students are 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.

CTE SMALL ENGINE REPAIR (VPAA) (SMR) (WLII) – V490

11, 12

2.0 credits

PREREQUISITE: Small Engine Repair I

SHARED TIME: May require travel to Henry Ford II High School

This course is 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.

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

This two hour block course is designed for students with a strong interest in design, engineering, manufacturing, and/or industrial technology as a career. Students will learn how to create and interpret industry drawings using common terms and symbols. Students will develop skills in line control, lettering, sketching and manipulating drawing tools. Geometrical construction, orthographic projections, sectioning, and dimensioning techniques are taught along with an introduction to CAD programs in the first semester and more advanced projects in the second semester using industry level CAD software programs, such as; Solidworks and A+CAD. Students will have the opportunity to visit business partners and colleges/universities to help them explore the employment possibilities in the field of design and engineering. Every student will have the opportunity to be **certified as a Certified Solidworks Associate (CSWA)** nearing the completion of the course. Students enrolled in this course may qualify for internship opportunities through the School-to-Work program. This course is articulated with Davenport University.

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

This one hour course is designed for students with a strong interest in design, engineering, manufacturing, and/or industrial technology as a career but are not able to enroll in the CTE 2 hour block. Students will learn how to create and interpret industry drawings using common terms and symbols. Students will develop skills in line control, lettering, sketching and manipulating drawing tools. Geometrical construction, orthographic projections, sectioning, and dimensioning techniques are taught along with an introduction to CAD programs, such as; Solidworks and A+CAD. Students may visit business partners and colleges/universities to help them explore opportunities in design and engineering. Students are encourage to follow this course with Design & Engineering II in order to further their skill level and sit for the Certified Solidworks Associate exam.

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

PREREQUISITE: Successful completion of Design & Engineering I – CAD

This course primarily requires the use of industry level CAD software programs, such as; Solidworks and A+CAD in the design of machine production drawings, project assemblies, technical illustration, and auxiliary views along with auto body design and related skills. During the year, occupations related to engineering are investigated and discussed. Students will visit business partners and/or colleges/universities to help students explore the opportunities available in the design and engineering profession. Every student enrolled in this course will have the opportunity to be **certified as a Certified Solidworks Associate (CSWA)** nearing the completion of this course. Students enrolled in this course may qualify for internship opportunities through the School-to-Work program. This course is articulated with Davenport University.

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

PREREQUISITE: Successful completion of Design & Engineering II (V620) or CTE Design & Engineering (V500)

This course is available to students who have successfully completed DE I & II, or CTE Design Engineering (block) and have a strong interest in the area of design and engineering. This course is designed to teach students occupational skills and how to work in a project based environment where students work independently as well as collaboratively. Students are required to follow performance objectives, compile a portfolio, and complete required CAD assignments using industry level CAD software programs, such as; Solidworks and A+CAD. Students enrolled in this course may qualify for internship opportunities as well as have another opportunity to sit for the Certified Solidworks Associate (CSWA) exam.

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

This is a 2-hour block course designed for students who are interested in architecture as a career. This course will take an in-depth look at the field of architecture while teaching the students the technical skills necessary to be successful in the field. CTE Architecture will cover the content and use the same software as Architecture I and II, however, students will be able to develop projects in more depth with an uninterrupted two hour block. This course has an articulation agreement with Davenport University.

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

This course is designed to teach students basic knowledge and develop specific skills in the Architecture and Construction field. Common terms and symbols are learned in interpreting drawings. Line control, lettering, sketching and manipulating drawing tools are the skills developed. Sketching, floor plans, acceptable design within local building codes, sectioning, and dimensioning techniques are taught along with an introduction to CAD programs such as; Archi-CAD and A+CAD. Students may visit business partners and colleges/universities to help students explore the possibilities in Architecture and Construction. This course is for anyone who has an interest in pursuing a career in Architecture, Interior Design or Construction.

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

PREREQUISITE: Successful completion of Architectural I - CAD

This course builds upon Architecture I. Students will primarily use CAD software, such as ArchiCad and A+CAD, to design working site drawings, project assemblies, technical illustration, home/commercial design and other related skills. During the year, occupations related to Architecture are investigated and discussed. Students will visit business partners and/or colleges/universities to help students explore the opportunities available in the Design and Architecture profession. This course is for anyone who has an interest in pursuing a career in the Interior Design, Architecture or the Construction field. Students in this course may qualify for an internship placement through the School to Work program. This course has an articulation agreement with Davenport University.

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

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

This course is available to students who have reached an adequate level of skill obtained from I & II, or CTE and have a strong interest in the area of Architecture. Course is designed to teach students occupational skills. This course is project based that requires students to work independently and in a team oriented setting. Students are required to follow performance objectives, compile a portfolio, and complete required CAD assignments using ArchiCAD and A+CAD. This course is for anyone who has an interest in pursuing a career in Interior Design, Architecture or Construction field.

CTE WOODWORKING (VPAA) – V700 9*, 10, 11, 12 1.0 credit

SHARED TIME: May require travel to another building; *9th grade students enrolled at Henry Ford II High School.

This course is designed to safely teach students the 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.

CTE FURNITURE AND CABINET CONSTRUCTION (VPAA) (WLII) – V710 10, 11, 12 1.0 credit

PREREQUISITE: CTE Woodworking

SHARED TIME: May require travel to another building

This course is designed safely teach students 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.

CTE ADVANCED WOODWORKING (VPAA) (WLII) – V720 10, 11, 12 1.0 credit

PREREQUISITE: CTE Woodworking

SHARED TIME: May require travel to another building

This 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.