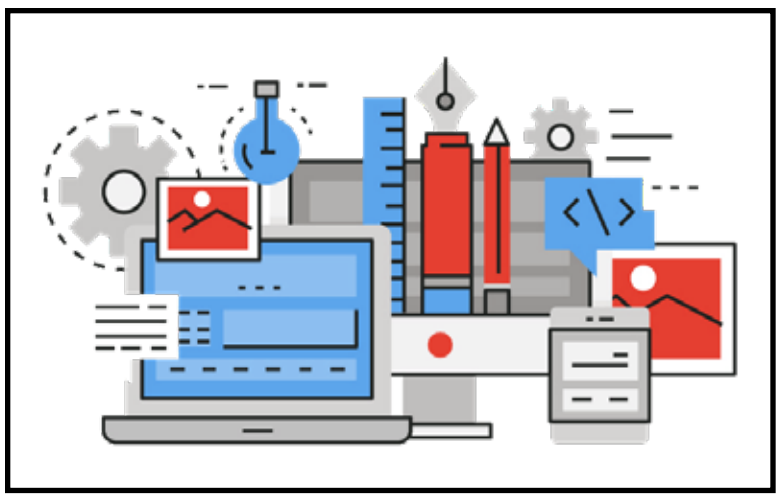
Chippewa Valley Schools

Career and Technical Education



DESIGN TECHNOLOGY

The Design Technology Program is a planned series of three career preparation courses. These courses provide students with an in depth, sequenced educational experience in mechanical design. Beginning with a course in Technical Design, students learn the basics of visualization and design. This course is followed by Mechanical Design and Engineering Design. A fourth year course of Research and Development allows for in depth hands Project Based Learning (PBL) with state of the art manufacturing equipment. All courses and methods are progressive, concurrent with energy and green industry, and relevant to CTE standards. The Mechanical Design Pathway is part of the cluster called Science, Technology, Engineering, and Mathematics (STEM).

Examples of Careers:

- Aerospace Industrial Designer
- Application Developer
- Architect
- Architectural and Civil Drafters
- Automotive Industrial Designer
- CAD Designer
- CAD Technician
- Civil Engineer
- Electrical / Electronics Drafter
- Electrical / Electronics Engineers
- Electrical Engineer
- Industrial Design Engineer
- Industrial Designer
- Industrial Engineer
- Industrial Packaging Designer
- Injection Mold Designer
- Interior Designer
- Manufacturing Sales Service
- Mechanical Drafter
- Mechanical Engineer
- Mobile Developer
- Packaging Science Engineer
- Product Development Manager
- Project Architect / Engineer
- Project Manager
- Small Business Entrepreneur
- Urban Designer / Planner

Examples of Degrees, Certificates and/or Certifications

- Associate of Applied Science
  – Product Development
- Bachelor of Science
  – Engineering
  – Automotive Engineering
  – Electrical Engineering
  – Mechanical Engineering
- Bachelor of Science
  – Architecture
- Bachelor of Science
  – Industrial Design
- Masters of Engineering

<u>Classes can meet the following graduation requirements:</u>

Visual and Performing Arts Credit World Language Credit Senior Math–Related Credit

<u>Articulation — Earn College Credits</u>

Students successfully completing the CTE State–approved program may be eligible for tuition free credit.

Instructors:

Mr. David Powell
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Learning that works for Michigan CTE™

NOTICE OF NONDISCRIMINATION It is the policy of Chippewa Valley Schools not to discriminate on the basis of race, color, religion, national origin or ancestry, gender, age, disability, height, weight or marital status in its programs, services, activities, or employment. Inquiries related to nondiscrimination policies should be directed to: Civil Rights Coordinator, Assistant Superintendent of Human Resources, Chippewa Valley Schools Administration, 19120 Cass Avenue, Clinton Township, MI 48038 Phone: 586–723–2090 / Nondiscrimination inquiries related to disability should be directed to: Section 504 Coordinator, Director of Special Services, (same address) Phone: 586–723–2180

EXAMPLES OF CAREERS:

- Aerospace Industrial Designer
- Application Developer
- Architect
- Architectural and Civil Drafters
- Automotive Industrial Designer
- CAD Designer
- CAD Technician
- Civil Engineer
- Electrical and Electronics Drafter /
- Electrical and Electronics Engineers
- Electrical Engineer
- Industrial Design Engineer
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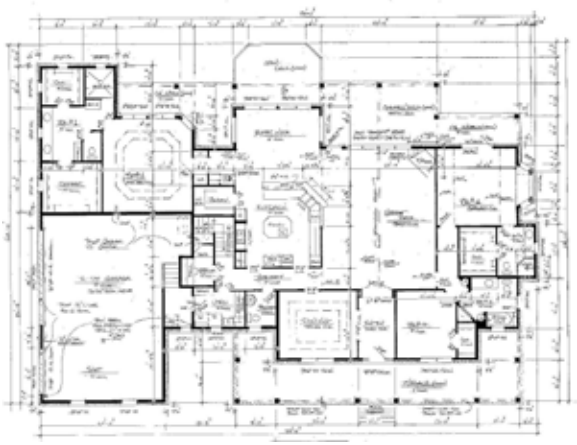

EXAMPLES OF DEGREES, CERTIFICATES AND/OR CERTIFICATIONS

- Associate of Applied Science
  – Product Development
- Bachelor of Science (B.S.) Engineering
  – Electrical Engineering
  – Mechanical Engineering
  – Automotive Engineering
- Bachelor of Science
  – Industrial Design
- Bachelor of Science
  – Architecture
- Masters of Engineering

DESIGN PROGRAM FOCUS AREAS

- 3D Solid Modeling
- Computer Aided Design (CAD)
- Hydraulic Powered Robotics
- LEGO Robotics
- Measuring & Lettering
- Mechanical Design
- Projects and Fabrication
- Prototyping
- Technical Sketching

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DON'T JUST CHOOSE A CLASS ~ CHOOSE A CAREER

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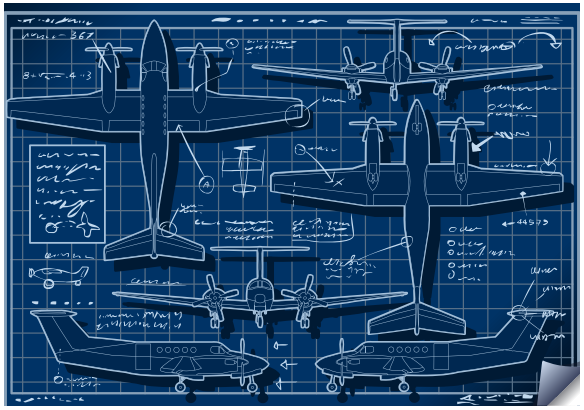

CLASSES CAN MEET THE FOLLOWING GRADUATION REQUIREMENTS:

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9501/9502 TECHNICAL DESIGN 1A/1B **1 hour**
Grades 9–12 ***0.5/0.5 credit***
Prerequisite: None.
Students will be introduced to methods of Computer Aided Design (CAD), drafting, free–hand design and electronic digital media to develop professional drawing, design and visualization skills. Students will learn engineering and architecturally–based innovative techniques of free–hand sketching, lettering, measuring, geometric construction, pictorial techniques, orthographic projection and 3D modeling basics. Projects will include a focus on "green" technologies, alternative/renewable energy, and related innovations used by today's designers, engineers, installation/service technicians, and architects.

9507/9508 MECHANICAL DESIGN 1A/1B **1 hour**
Grades 10–12 ***0.5/0.5 credit***
Prerequisite: Technical Design 1A/1B.
Students are introduced to the concepts of design techniques including 3D parametric modeling, solid modeling, surface modeling, rendering and mechanical assemblies in a technical design environment. In addition students will be introduced to fabrication lab safety through the construction of small design and build projects.

9511/9512 ENGINEERING DESIGN 1YA/1YB **1 hour**
9513/9514 ENGINEERING DESIGN 1YC/1YD **1 hour**
Grades 11–12 ***0.5/0.5 credit***
Prerequisite: Mechanical Design 1A/1B and one year of AutoCAD experience.
Students will be introduced to design theory of basic machine elements through the introduction of dies, jigs and other industrial applications. Students will accomplish typical industry design practices including the preparation of complete production tool designs using the CAD system. Understanding the theory of detail design procedures will be explained through the latest design methods, technical skills, industrial applications, and practices of mechanical assembly. Topical areas may include: bill of materials, subassemblies, standard parts, fasteners, dimensioning, visualization and advanced 3–dimensional CAD techniques. Students will incorporate rapid prototyping technology for model design, analysis and verification of a fully defined new part. The building of simple projects will be included in the course experience while maintaining personal safety in the fabrication lab.

9509/9510 ENGINEERING DESIGN 1A/1B * **2 hour**
Grades 11–12 ***1.0/1.0 credits***
Prerequisite: Mechanical Design 1A/1B and one year of AutoCAD experience.
Students will be introduced to design theory of basic machine elements through the introduction of dies, jigs and other industrial applications. Students will accomplish typical industry design practices including the preparation of complete production tool designs using the CAD system. The theory of detail design procedures will be the focus by means of the latest design methods, technical skills, industrial applications, and practices of mechanical assembly. Topical areas may include: bill of materials, subassemblies, standard parts, fasteners, dimensioning, visualization and advanced 3–dimensional CAD techniques. Students will incorporate rapid prototyping technology for model design, analysis and verification of a fully defined new part. The building of simple projects will be included in the course experience while maintaining personal safety in the fabrication lab.

9465/9466 RESEARCH AND DEVELOPMENT 1A/1B **2 hour**
Grade 12 ***1.0/1.0 credit***
Prerequisite: Engineering Design 1A/1B with two or more years of AutoCAD and/or Inventor experience (3D Solids).
Students will focus on 3–D solid part design and analysis using the CAD system. Results from the applications of various digital electronic media may include; Photo–Realistic Rendering, Animation, Finite Element Analysis (FEA) and Plastic Rapid Prototyping of 3–D solids. Special emphasis is placed on the Research and Development of fully defined new products. Students will use all essential metal and woodworking tools in the DHS fabrication lab to manufacture and assemble their final projects. Students will be required to give a final portfolio presentation of their research and will depart the class with a greater understanding of the development of tangible industry processes, methods, new product development and equipment.

9605/9606 DESIGN INTERNSHIP 1/2 ***2 hour***
9607/9608 DESIGN INTERNSHIP 1A/1B ***1 hour***
Grade 12 ***1.0/1.0 (2 hour) or 0.5/0.5 (1 hour) credit***
Prerequisite: Mechanical Design 1A/1B and concurrently enrolled in Engineering Design 1A BC/1B BC or Research and Development.
Available to Juniors and Seniors, this course may be taken for one or two hours. An Individual Educational Training Plan and Training Agreement are developed for each student–trainee detailing his/her specific learning activities. *Note: A student who chooses the Internship course for either one or two hours is expected to meet 200 hours of work per semester and provide their own transportation.*