

Engineering and Technologies Across the Curriculum Courses

Technology and Engineering connects a STEM focus with a strong academic foundation rooted in the knowledge used to solve complex problems. One goal of the courses within this department is to provide an opportunity for students to utilize their knowledge across all disciplines both inside and outside of the scientific, technological, engineering and mathematical realms. Students will gain experience to intuitively leverage existing resources to accomplish tasks independently using STEM techniques. A focus of the courses will be to emphasize independent thinking and problem solving while integrating real world issues with theories.

NOTE: Students may help by supporting a consumable materials fund for project supplies that are not reusable.

Computer Lab Area			
<i>-Information & Communications-</i>			
Multimedia A: Graphic Design	Multimedia B: Video Production	Multimedia C: Audio/Animation	Multimedia D: Web Design
Advanced Multimedia A	Advanced Multimedia B	Advanced Multimedia C	Advanced Multimedia D

Fabrication Shop Area		
<i>-Power & Energy-</i>	<i>-Transportation-</i>	<i>-Manufacturing-</i>
Design and Problem Solving (Catapult)	Transportation Technology (Maglev/Glider)	Applied Manufacturing (Wood Pallet Project)
Mechanical Systems (Monster Truck)	Aviation/Aerospace (CO2 Plane)	Sports Equipment & Graphics (Paddle/Longboard with Logo)
Lifting Principles (Hovercraft)	Robotics (BattleBot)	Hydraulics & Pneumatics (Hydraulic Arm)
Alternative Energy (Wind Turbine)	Vehicle Design (Speed Boat)	Machine Design (Tower Crane)
Structures & Forces (Rollercoaster)	College Prep Engineering	Rube Goldberg Challenge (Crazy Contraption)
Technologies Across the Curriculum		
Broadcast Journalism	The 4Cast	The Flash
Keyboarding 1 & 2	AP: Computer Science	Technology Support Services

COURSES OFFERED TO STUDENTS IN GRADES 9, 10, 11, and 12

1501 Design and Problem Solving (Catapult) Grades 9-12
Prerequisite: None

This course introduces students to the principals of solving technological problems as they relate to real world situations. Students will generate an understanding of technological design and problem solving and will brainstorm and design solutions to a variety of chosen tasks. Modeling, rendering, sketching and drawing will be utilized to communicate design ideas and create working prototypes.

Projects: Catapults, Projectile launcher, Marble machine, and other devices using mechanical advantage.

1502 Sports Equipment and Graphics (Longboard) Grades 9-12
Prerequisite: None

This course will focus on the basic principles of communicating technological design solutions. Students will create working wood sports equipment that includes a self-designed logo. Students will be asked to use documentation, rendering, sketching, computer applications and manufacturing processes.

Projects: Canoe Paddle, Ping Pong Set, or Longboard.

1503 Transportation Technology (Maglev/Glider) Grades 9-12
Prerequisite: None

This course introduces the student to the technology used to harness energy, convert it to useful power and apply it to a transportation system. Students will examine propulsion, guidance, control and material processing as they relate to transportation.

Projects: Magnetic levitation vehicle and glider.

1504 Applied Manufacturing (Woodworking) Grades 9-12
Prerequisite: None

This course provides students with an introductory experience in the area of wood manufacturing. In addition, students will examine the evolution of manufacturing techniques from modeling to mass production. Students will design and make prototypes for a variety of products. Areas such as quality control, and production layout will be emphasized. Laboratory activities will include problem solving, material processing and marketing the final products.

Projects: Wood pallet project using manufacturing tools and machines.

1505 Robotics (Battlebot) Grades 9-12
Prerequisite: None

This course is an introduction to technology in today's industrial environment, with hands-on experience in the areas of robotics and design, as well as an introduction to the technological problem solving system. This course will address how robotic systems operate and are used in our manufacturing and industrial society. Students will create an engineering portfolio using documentation skills for all projects. In addition, students will design and build a robotic device to test. **Projects: Mechanical robot competition wherein students design, build and compete with their robot.**

1511 Basics of Aviation and Aerospace (CO₂ Plane) Grades 9-12
Prerequisite: None

This survey course introduces the student to the technology used to operate and control aeronautic modes of transportation. Students will examine propulsion, guidance, control and material processing as they relate to the projects being constructed. In addition, students will design, construct and test a variety of transportation vehicles. The content areas of aviation, aerospace, "lighter than air" crafts, and aerodynamics will be discussed.

Projects: Power pole aircraft & CO₂ plane.

1528 Machine Design (Tower Crane)

Grades 9-12

Prerequisite: None

This course is a study of how simple machines linked together make up a more complex system. Machine structure as well as function will be discussed in addition to purpose-driven design. Great emphasis will be placed on technological problem solving skills. Students will create an engineering portfolio using documentation skills for all projects that they design and create.

Projects: Tower Crane

1529 Vehicle Design (Speed Boat)

Grades 9-12

Prerequisite: None

This course introduces the student to the area of styling and body design. Through the study of aerodynamics and streamlining, students will learn about the properties of multiple materials as they design their own vehicle. Great emphasis will be placed on technological problem solving skills. Students will create an engineering portfolio using documentation skills for all projects that they design and create.

Projects: Speed Boat and Future Car

1530 Hydraulics & Pneumatics (Hydraulic Arm)

Grades 9-12

Prerequisite: None

This course focuses on the fundamentals of hydraulics and pneumatics and the differences between them. Mechanical advantage and forces will also be discussed. Great emphasis will be placed on technological problem solving skills. Students will create an engineering portfolio using documentation skills for all projects that they design and create.

Projects: Hydraulic Arm

1531 Structures & Forces (Rollercoaster)

Grades 9-12

Prerequisite: None

This course introduces students to the fundamentals of structural engineering and strength in addition to understanding the forces that act on objects both in motion and at rest. Great emphasis will be placed on technological problem solving skills. Students will create an engineering portfolio using documentation skills for all projects that they design and create.

Projects: Rollercoaster

1532 Alternative Energy (Wind Turbine)

Grades 9-12

Prerequisite: None

This class will introduce students to alternative energy and how it is used in many realms of our day to day lives. Wind, solar, hydro, and other emerging technologies will be covered. Great emphasis will be placed on technological problem solving skills. Students will create an engineering portfolio using documentation skills for all projects that they design and create.

Projects: Wind Turbine Pump

1533 Lifting Principles (Hovercraft)

Grades 9-12

Prerequisite: None

This class introduces students to the concept of engineered lift as it relates to friction and movement. Great emphasis will be placed on technological problem solving skills. Students will create an engineering portfolio using documentation skills for all projects that they design and create.

Projects: Hovercraft

1534 Mechanical Systems (Monster Truck)

Grades 9-12

Prerequisite: None

This course introduces students to the area of mechanical engineering. Concepts such as mechanical advantage through gearing and torque will be discussed. Great emphasis will be placed on technological problem solving skills. Students will create an engineering portfolio using documentation skills for all projects that they design and create.

Projects: Monster Truck

1535 Rube Goldberg Challenge (Crazy Contraption)

Grades 9-12

Prerequisite: None

This course is designed around the famous designer and over-thinker, Rube Goldberg. Rube's inventions connected multiple simple machines into one gigantic system that was designed to complete an amazingly easy task. For example, use no less than a series of ten simple actions to blow out a candle. This is the ultimate design challenge!

Projects: Rube Gold Mechanism

1507 Keyboarding A/Microsoft Word Essentials

Grades 9, 10, 11, 12

Prerequisite: None

Students who take Keyboarding/Computer Applications A-D have the opportunity to receive three credits from Inver Hills Community College as well as from their own high school. The college credits for this course may be transferred to another college or university that the student chooses to attend in the future. Keyboarding A includes instruction in the touch method on the alphabetic and numeric keyboard. Students will learn to format memorandums, letters and reports as they apply proofreading and correction techniques. Keyboarding is a valuable skill for everyone, regardless of his or her future plans. **This course is also listed in the Business and Marketing Department.**

**1508 Keyboarding B/Advanced Microsoft Word,
and Adobe Photoshop Fun**

Grades 9, 10, 11, 12

Prerequisite: Keyboarding A/MS Word Essentials

Students who take Keyboarding/Computer Applications A-D have the opportunity to receive three credits from Inver Hills Community College as well as from their own high school. The college credits for this course may be transferred to another college or university that the student chooses to attend in the future. Create professional document such as brochures, business cards, flyers, invitations and newsletters to make every school project a breeze. Utilize Adobe Photoshop to add pizzazz to any project. This course will be very helpful for students who have an interest in advertising or journalism, enjoy using the computer, or plan a career in graphics or business. A basic understanding of computer hardware and components is included. **This course teaches internet basics, safety and responsibility.** **This course is also listed in the Business and Marketing Department.**

**1509 Keyboarding C /Microsoft PowerPoint Extras
and Microsoft Excel Essentials**

Grades 9, 10, 11, 12

Prerequisite: Keyboarding A/MS Word Essentials

Students who take Keyboarding/Computer Applications A-D have the opportunity to receive three credits from Inver Hills Community College as well as from their own high school. The college credits for this course may be transferred to another college or university that the student chooses to attend in the future. Learn the tips and tricks in PowerPoint to impress every audience. Microsoft Excel has quickly become the primary tool used to record and analyze data. Knowledge of this powerful program is a must for math and science courses and is one of the most utilized tools in the business environment. Microsoft Excel will be emphasized throughout this course along with the integration of this tools with other programs. **This course is also listed in the Business and Marketing Department.**

1510 Keyboarding D /Microsoft Office Integration, Microsoft Access Basics, Cloud Computing and Web 2.0 Tools

Grades 9, 10, 11, 12

Prerequisite: Keyboarding A/MS Word Essentials

Students who take Keyboarding/Computer Applications A-D have the opportunity to receive three credits from Inver Hills Community College as well as from their own high school. The college credits for this course may be transferred to another college or university that the student chooses to attend in the future. The ability to understand and create databases is in high demand in today's businesses world. Students will utilize Microsoft Access to explore the world of maintaining, querying and reporting data. A capstone project will allow students to integrate several software packages to create professional documents for their own business. Recommended for all students who wish to truly understand the power of the software packages utilized in today's technology oriented business world. **This course is also listed in the Business and Marketing Department.**

COURSES OFFERED TO STUDENTS IN GRADES 10, 11 and 12

Both the Multimedia and Advanced Multimedia courses meet the "Minnesota Arts Standard."

1544 Multimedia A: Graphic Design

Grades 10, 11, 12

Prerequisite: None

Students will use Adobe Photoshop, an industry standard in still image manipulation, to create graphic designs. Students will learn fundamental operations and techniques of Photoshop to create professional images and alter existing photographs.

Projects: Letterform Logo, Magazine Cover and Text Effects

***All multimedia courses meet the "Minnesota Arts Standard."**

***You may register for multimedia courses out of sequence.**

1545 Multimedia B: Video Production

Grades 10, 11, 12

Prerequisite: None

Students will use Adobe Premiere, an industry standard in video production, to create digital video and audio productions. Students will shoot video using digital camcorders, capture the video into a computer, edit the video and audio on the computer, and create videos finalized as a DVD, podcast, or digital tape.

***All multimedia courses meet the "Minnesota Arts Standard."**

***You may register for multimedia courses out of sequence.**

1546 Multimedia C: Animation and Audio

Grades 10, 11, 12

Prerequisite: None

Students will use 3D Studio Max, an industry standard in 3D animation, to create their own 3D models and animated movies. 3D Studio Max has been used to create several popular animated pictures, special effects for movies, and video games.

***All multimedia courses meet the "Minnesota Arts Standard."**

***You may register for multimedia courses out of sequence.**

1547 Multimedia D: Web Design

Grades 10, 11, 12

Prerequisite: None

Students will use Macromedia Dreamweaver and Macromedia Flash, the industry standards in web design, to create their own professional web pages and web animations. Students will publish their work as an electronic portfolio on the Internet.

***All multimedia courses meet the "Minnesota Arts Standard."**

***You may register for multimedia courses out of sequence.**

**0354 Introduction to Broadcast Journalism
& Mass Media A**

Grades 10, 11, 12

Prerequisite: None

**0355 Introduction to Broadcast Journalism
& Mass Media B**

Prerequisite: Introduction to Broadcast Journalism A

Students will be introduced to a number of technical and non-technical skills, including script writing, directing, and hands-on camera and studio skills such as lighting, sound and editing. This course will also examine the history of video, radio, television, advertising and future trends in mass media. Class projects will include news-oriented material, creative assignments as well as the delivery of school announcements. **This course is an English elective credit and does not meet the English requirement for grades 10 and 11.**

COURSES OFFERED TO STUDENTS IN GRADES 11 and 12

1551 College Prep Engineering

Grades **11-12 ONLY**

Prerequisite: **Concurrent enrollment or completion of
Algebra 2 and Chemistry**

This class is designed for those students who are considering pursuing a degree in engineering after high school. The class will combine science, technology, engineering and math (STEM) concepts to design and implement engineering projects. In a lab setting, students will be required to design, build, and test various engineering challenges. Students will be required to analyze design challenges, determine appropriate options to affect change and synthesize test data to determine solutions to complex initiatives.

NOTE: For students intending to register for Physics/AP Physics and Precalc/Hon Precal or AP: Calc AB/BC.

**1552 Technologies Support Service:
Network/Hardware Engineering**

Grades 11, 12

Prerequisite: Instructor Permission

This course provides student independent and team opportunities to be involved in a technologies area of choice, supervised, trained and supported by a technologies instructor. This course will provide opportunity for leadership and service in the area of computer and multimedia technologies.

It is strongly recommended that all students enroll in a year of typewriting instruction in order to develop a lifelong skill at the keyboard. The rapid growth of computer keyboards in classrooms, in virtually all professions, and in the home, make it more important than ever to prepare for use of the computer keyboard.

Both the Multimedia and Advanced Multimedia courses meet the “Minnesota Arts Standard.”

1553 Advanced Multimedia Production A

Grades 11, 12

Prerequisite: Multimedia A or teacher permission

Students will continue their exploration of Adobe Photoshop. Through a business partnership, they will create professional graphic projects for outside companies. Students will also continue their exploration of web design and are responsible for all updates of the Eastview web page.

***All advanced multimedia courses meet the “Minnesota Arts Standard.”**

***Students may receive college credit for this course through Dakota County Technical College.**

1554 Advanced Multimedia Production B

Grades 11, 12

Prerequisite: Multimedia B or teacher permission

Students will continue their exploration of Adobe Premiere. They will create short commercials, films and videos for national film contests and festivals. Students will also continue their exploration of web design and are responsible for all updates of the Eastview web page.

***All advanced multimedia courses meet the “Minnesota Arts Standard.”**

***Students may receive college credit for this course through Dakota County Technical College.**

1555 Advanced Multimedia Production C

Grades 11, 12

Prerequisite: Multimedia C or teacher permission

Students will continue their exploration of 3D Studio Max. They will create 3D models and animated videos for national film contests and festivals. Students will also continue their exploration of web design and are responsible for all updates of the Eastview web page.

***All advanced multimedia courses meet the “Minnesota Arts Standard.”**

***Students may receive college credit for this course through Dakota County Technical College.**

1556 Advanced Multimedia Production D

Grades 11, 12

Prerequisite: Multimedia D or teacher permission

Students will continue their exploration of Macromedia Dreamweaver and Flash. They will create complex Flash animations and learn other dynamic web languages and software. Students will also be responsible for all updates of the Eastview web page.

***All advanced multimedia courses meet the “Minnesota Arts Standard.”**

***Students may receive college credit for this course through Dakota County Technical College.**

0330 THE 4CAST A

Grade 11

0331 THE 4CAST B

Prerequisite: Introduction to

0332 THE 4CAST C

Broadcast Journalism A or

0333 THE 4CAST D

Department Recommendation

This course is designed for students who have a strong interest in television broadcasting. Our mission is to create a daily announcements student newscast that airs live throughout Eastview High School and the Internet. Students will learn every aspect of a live television production: how to write a script; conduct interviews; storyboard ideas; videotape footage; edit stories together with footage; anchoring; reporting; producing; directing; operating a professional video camera; and audio mastering. Students at Eastview will work in a state-of-the-art video production studio, complete with analog and digital editing equipment. To stay in touch with what is happening in our television market, we will tour television facilities and frequently entertain guest speakers. This course will also examine the history of video, use of video today and future trends. **This course is an English elective credit and does not meet the English requirement for grade 11. A maximum of two quarters can be taken for an English elective credit.**

0376 THE FLASH A
0377 THE FLASH B
0378 THE FLASH C
0379 THE FLASH D

Grade 12

Prerequisite: Introduction to Broadcast Journalism A
Department Recommendation

This course is designed for students who have a strong interest in television broadcasting. Our mission is to create a weekly student newscast that airs live throughout Eastview High School, on the Internet, and on local cable access television. Students will learn every aspect of a live television production: how to write a script; conduct interviews; storyboard ideas; videotape footage; edit stories together with footage; anchoring; reporting; producing; directing; operating a professional video camera; and audio mastering. Students at Eastview will work in a state-of-the-art video production studio, complete with analog and digital editing equipment. To stay in touch with what is happening in our television market, we will tour television facilities and frequently entertain guest speakers. This course will also examine the history of video, use of video today and future trends. **This course is an English elective credit and does not meet the English requirement for grade 12. A maximum of two quarters can be taken for an English elective credit requirement for grade 12. A maximum of two quarters can be taken for an English elective credit.**

1565 Advanced Placement: Computer Science A
1566 Advanced Placement: Computer Science B
1567 Advanced Placement: Computer Science C
1568 Advanced Placement: Computer Science D

Grades 11, 12

Prerequisite: Algebra 2 or Honors Algebra 2
or Instructor Recommendation

This course is designed for college-bound students who will be significantly involved with computers. Using the Java language, emphasis will be on gaining knowledge of computer systems-variables, expressions, input-output, conditionals, loops, modular programming, arrays, parameters, simple recursion, and editing. Major topics will include: searching, sorting, data structures, strings, and text files. Application projects will be assigned. Major emphasis will focus on: linked lists, queues, binary search trees, stacks, and advanced programming methodology. This course will help prepare students for the advanced placement test in the computer language Java. This is a year-long course. Students should register for all courses A, B, C, D. **NOTE: This course is an elective credit and does not qualify as one of the eight quarter courses in math required for graduation.**