

TECHNOLOGY

STEAM STUDIO 1

FULL YEAR – 1 CREDIT

This interdisciplinary course incorporates topics from the former introductory courses in computer science, engineering, architecture, and design. The main goal of STEAM Studio is to develop the mindset required for students to be innovators, critical thinkers, problem solvers, and entrepreneurs; in a collaborative setting that reflects the real world. STEAM Studio introduces students to a variety of topics including: the design-thinking process, collaborative group work, think tank brainstorming, research, hands-on fabrication, rapid prototyping techniques, coding, and design analysis. Activities are designed to bridge together multiple disciplines, thereby creating connections between the aforementioned topics. Students in this course will also be introduced to the high-tech prototyping equipment in the new MHS CoLab. In this course, students will rotate through the following courses: Architecture, Computer Science, Engineering and Design.

Link to watch Architecture video:

<https://drive.google.com/file/d/16tUjrMc1ZgbeelaovjXODxHnJwat5c-/view>

Concentration in Architecture

ARCHITECTURAL DRAWING 2

FULL YEAR – 1 CREDIT

PREREQUISITE: STEAM STUDIO 1; GRADES 10-12

Architecture 2 reinforces the concepts introduced in the Architecture portion of Steam Studio 1. The courses will take an indepth look at 3D design, drafting and computer design as well as scaled model making and precision creations. Examinations of classical and contemporary architecture will provide students with information to launch designs using both drafting and computer aided design. The course focuses on manual technical drawing in which the students learn about scale and isometric and orthographic projections before using CAD software to design creations.

ARCHITECTURAL DRAWING 3

FULL YEAR – 1 CREDIT

PREREQUISITE: ARCHITECTUAL DRAWING 2; GRADES 10-12

The Architecture 3 course is designed to allow students to use the skills they have developed in the first 2 architecture courses to create their own designs. There will be a focus on interior design and the use of AutoCAD Architecture software. In-depth studies in architectural styles, complex models and drawings in order to solve problems will be the focus of this course.

ARCHITECTURAL DRAWING 4

FULL YEAR – 1 CREDIT

PREREQUISITE: ARCHITECTUAL DRAWING 3; GRADES 12

Architectural Drawing 4 is a capstone course for all of the Architecture courses. The course will focus on quality portfolio building and college preparation. In depth problem solving will take place in the course with a concentration on real-world prototyping.

Concentration in Computer Science

AP COMPUTER SCIENCE PRINCIPLES &

COLLEGE COMPUTER SCIENCE WITH PYTHON

FULL YEAR – 1 CREDIT

PREREQUISITE: SUCCESSFUL COMPLETION OF STEAM STUDIO 1, GEOMETRY/GEOMETRY HONORS, OR INSTRUCTOR APPROVAL; GRADES 10-12

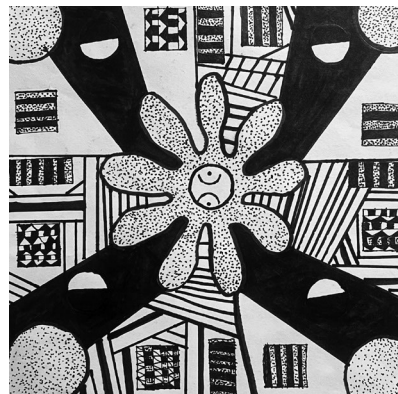
This course provides a broad introduction to computer science through a contemporary theme, such as multimedia programming with Python, while covering fundamental topics like abstraction, algorithmic problem-solving, and data representation. Students design and evaluate solutions, develop programs, and explore the impact of computing innovations, ethics, and the history of computing. They also gain insight into computer organization, the internet, and collaborative computing, building a strong foundation in both theoretical and applied aspects of the field.

AP COMPUTER SCIENCE A

FULL YEAR – 1 CREDIT

PREREQUISITE: SUCCESSFUL COMPLETION OF COMPUTER SCIENCE WITH PYTHON.

AP Computer Science A introduces students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data and discover new information, the analysis of potential solutions, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design using the Java programming language.



Shanden Brown

AP CYBERSECURITY

FULL YEAR – 1 CREDIT

PREREQUISITE: GRADES 11-12

AP Cybersecurity is a yearlong high school course that offers a broad introduction to the field and aligns closely with a college-level, introductory cybersecurity course. Students learn about common threats and vulnerabilities and how they combine to create risk. Students study how individuals and organizations manage risk and how risk can be mitigated through a defense-in-depth strategy. Students explore specific vulnerabilities, attacks, mitigations, and detection measures across a variety of domains including physical spaces, computer networks, devices, and data and applications. Throughout the course, students consider the impact of cybersecurity on individuals, organizations, societies, and governments. Content and skills taught in the course align with the professional skills outlined in the National Initiative for Cybersecurity Education Workforce Framework.

COLLEGE WEB DESIGN

FULL YEAR – 1 CREDIT

GRADES: 11-12

PREREQUISITE: Successful completion of AP CS Principles & College CS with Python preferred, though not required.

This Siena College dual-enrollment course is a hands-on course covering the history and development of the Internet, the Web and the core technologies used to implement modern websites. Students will design and implement websites using semantic markup languages, style sheets, and various software tools and applications. The course will include techniques for integrating a wide range of media formats, and design fundamentals needed in implementing effective, user-friendly websites. Students taking this course at the high school can earn 3 university credits for a fee. (Tuition is waived for students qualifying for free or reduced lunch.)

Concentration in Engineering**ENGINEERING DESIGN AND MODELING**

FULL YEAR – 1 CREDIT

PREREQUISITE: ENGINEERING 1, GRADES 10-12

Engineering Design and Modeling builds on many of the concepts introduced in the Engineering 1 course. Students will complete projects with a focus on conceptualization, analysis, synthesis, testing and documentation of engineering systems. Many design elements will be explored, including modularity, testability, reliability and economy. There will be concentration on CAD tools and associated technology. Students will create prototypes using stereolithography and other rapid prototyping techniques.



Sarah Cox

ENGINEERING PROJECT MANAGEMENT

FULL YEAR – 1 CREDIT

PREREQUISITE: ENGINEERING 1, GRADES 10-12

Engineering Project Management focuses on the arc of the engineering project, starting with client needs and ultimately finishing with a deliverable. Particular emphasis is placed on the planning, scheduling and costing aspects of project management. This class will also cover production planning, high performance manufacturing, construction management and material selection. Basics of transportation engineering and related project management will be covered. These concepts will guide a series of in class projects.

ENGINEERING 4: MECHATRONICS

FULL YEAR – 1 CREDIT

PREREQUISITE: 2 YEARS OF ENGINEERING OR COMPUTER SCIENCE
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Mechatronics Engineering is a hands-on course that combines mechanical, electrical, and computer engineering principles. Students will explore how modern automated systems work by learning the fundamental components that make up robots, smart devices, and automated manufacturing equipment. Throughout this year-long course, students will develop skills in mechanical design, CAD modeling, tool-path generation, basic electronics, programming, and system integration. They will work with industry-standard tools and technologies including microcontrollers, sensors, motors, and various fabrication equipment. Projects will progress from basic circuit design and mechanical assemblies to creating fully functional automated systems that can sense and respond to their environment. The course emphasizes experiential learning through project-based assignments that simulate real-world engineering challenges. Students will work both individually and in teams, developing critical thinking, problem-solving, and collaboration skills essential for careers in engineering and technology. By the end of this course, students will understand core mechatronics principles and be able to design, build, and program basic automated systems. This course provides excellent preparation for further study in engineering, robotics, or related technical fields.