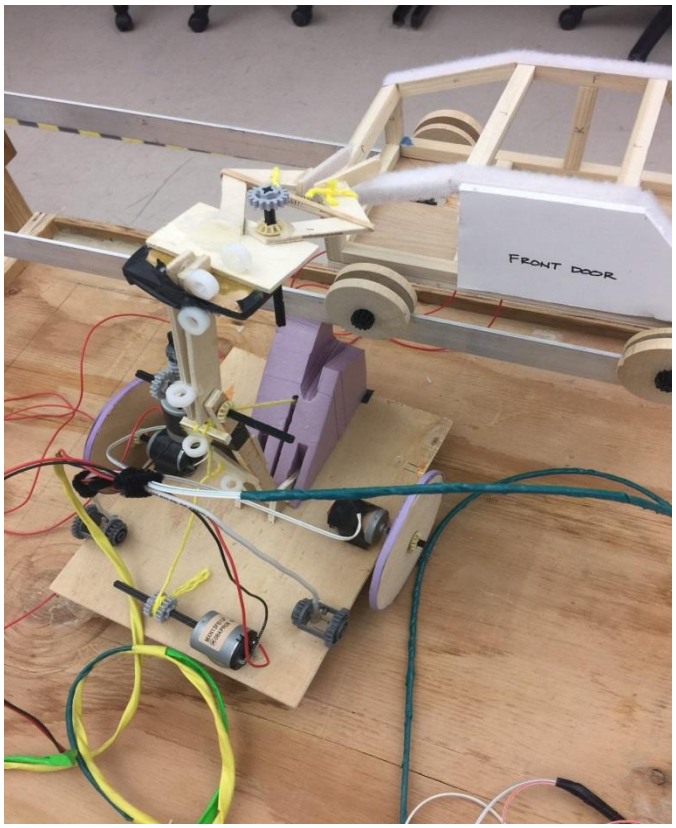
Boonton High School

STEM Pathway



Mission

To prepare every student to graduate through instructional conversations as well as interactive activities that stimulate curiosity, discovery, critical thinking, problem solving, cooperation and collaboration. This will lead to college and career readiness in the Science, Technology, Engineering, or Mathematics professions.

Vision

To create an environment that provides opportunities to motivate and encourage all our students to become lifelong learners. In addition, our program will prepare and guide future STEM professionals in an increasingly complex and technological society to actively contribute to their community.

BHS STEM Pathways

COMPUTER SCIENCE
PRODUCT DESIGN
ENGINEERING DESIGN
ARCHITECTURE & CONSTRUCTION
BIOTECHNOLOGY/BIOMEDICAL
MULTIMEDIA

Computer Science

9th Grade	10th Grade	11th Grade	12th Grade
ROBOTICS PROGRAMING GAMING TECHNOLOGY COMPUTER APPLICATIONS GEOMETRY	GAMING TECHNOLOGY ROBOTICS PROGRAMING ALGEBRA II	AP COMP SCIENCE PRE-CALCULUS	SENIOR CAPSTONE CALCULUS

Product Design

9th Grade	10th Grade	11th Grade	12th Grade
STEM WOODWORKING	WEB & GRAPHIC CARPENTRY	PRODUCT DESIGN PHYSICS	SENIOR CAPSTONE

Engineering Design

9th Grade	10th Grade	11th Grade	12th Grade
STEM TECH DESIGN GEOMETRY	ROBOTICS PROGRAMING PRODUCT DESIGN ALGEBRA II	INTRO TO ENG DESIGN PRE-CALCULUS PHYSICS	SENIOR CAPSTONE CALCULUS

Architecture & Construction

9th Grade	10th Grade	11th Grade	12th Grade
TECH DESIGN WOODWORKING ALGEBRA I OR GEOMETRY	PRODUCT DESIGN CARPENTRY GEOMETRY OR ALGEBRA II	INTRO TO ARCHITECTURE PRE-CALCULUS	SENIOR CAPSTONE PHYSICS

Biotechnology/Biomedical

9th Grade	10th Grade	11th Grade	12th Grade
STEM BIOLOGY	CHEMISTRY WORLD WIDE MEDICAL TREND/HUMAN GROWTH & DEVELOPMENT FORENSICS	AP BIOLOGY HUMAN ANATOMY	SENIOR CAPSTONE

Multimedia

9th Grade	10th Grade	11th Grade	12th Grade
STEM ART I OR II	WEB & GRAPHIC DESIGN PHOTOGRAPHY	ADVANCED PHOTOGRAPHY	SENIOR CAPSTONE

SENIOR CAPSTONE (Beginning with class of 2023)

PATHWAY-SPECIFIC THESIS PROJECT

PORTFOLIO / RESUME WORKSHOP

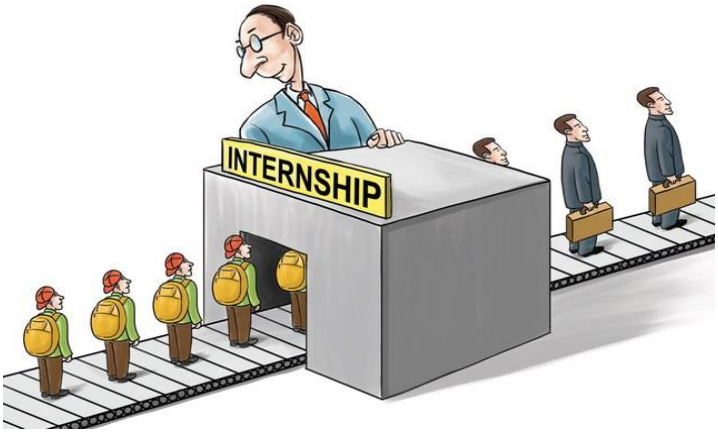
PROFESSIONAL LECTURE SERIES

INTERNSHIP COMPONENT

WORK COMPLETED WITH TEACHER-MENTOR

BHS INTERNSHIP PROGRAM

The Career Internship Program gives high school seniors the opportunity to intern with local companies, organizations or other community entities. These career internships are designed to provide senior students with diversified learning experiences that bridge the gap between school and employment or higher education and training. Students will be placed in reliable, appropriate and pre-approved internship sites.



Advanced Placement Courses	Honors & Dual Enrollment Courses	Elective Courses
AP Calculus *AP Statistics* *AP Computer Science* *AP Biology* *AP Chemistry* *AP Physics*	*Algebra I Honors* *Geometry Honors* *Algebra II Honors* *Precalculus Honors* *Calculus Honors* *Biology Honors* *Chemistry Honors* *Intro To Engineering H/D** *Intro to Architecture H/D** *Human Anatomy H/D** * *Dual Credit through Fairleigh Dickinson University*	*Computer Applications* *Web & Graphic Design* *Technology Design* *Robotics Programing* *STEM* *Product Design* *Gaming Technology* *Woodworking* *Carpentry* *Forensics* *Worldwide Medical Trends* *Human Growth and Development*

** In order to accommodate all students, a modified course list is also available.

Course Description

STEM (0814) **5 Credits**
Prerequisites: None **Full Year**
Grade 9-12

This course will leverage and utilize student centered, hands on, and real world experiential learning to develop critical thinking and problem solving in STEM subjects and connections across the curriculum. Students will have the opportunity to explore STEM related careers and identify interest areas for further development in STEM related curriculum and courses. Exposure to various STEM fields will be accomplished through hands on projects and research. This will allow students to identify areas of interest for future in-depth exploration. Topics examined during the course include communications technology, graphic design, web design, programming, gaming, robotics, environmental technology, biotechnology, biomedical technology, product design, manufacturing, architecture, computer aided design (CAD), sustainability, robotics. Students will be encouraged to compete in the Technology Student Association (TSA) club with projects developed.

Technology Design (0845) **5 Credits**
Prerequisites: None **Full Year**
Grade 9-12

The purpose of this course is to explore modules of technological concepts in basic technology design with the next level of complexity and independent study project assignments. Also, this course is a study of alternate energy sources, nuclear energy, and relating concepts. As with all technology department based courses, problem solving and design are an integral part of all aspects of the lab, to stimulate the student's ability to comprehend and cultivate the student's capacity to be self-reliant.

Web and Graphic Design (0890) **5 Credits**
Prerequisites: None **Full Year**
Grade 9-12

In this course, students will learn how to critically evaluate website quality, learn how to create and maintain quality web pages, and learn to create and manipulate images through the use of Photoshop. The course progresses from introductory work on web design and image engineering towards a culminating project in which students design and develop a functional website including student-designed images.

Gaming Technology (0889) **5 Credits**
Prerequisites: Computer Language Programming 1, Tech Design, **Full Year**
Product Design and Development or Teacher Recommendation **Grades 10-12**

This course provides an introduction to the fundamental technologies behind computer games as well as hands-on experience in the design and development of a computer game. Students will learn basics of programming to create their own games in Java, Flash, or other platforms at the instructor's discretion.

Product Design and Development (0891) **5 Credits**
Prerequisites: Any Technology Course or Teacher Recommendation **Full Year**
Grade 10-12

Product Design and Development is a project-based course that covers modern tools and methods for product design and development. This includes Design Sketching, 3D Modeling, Digital Rendering, Digital Fabrication, and Prototyping. Class sessions balance between learning about current design trends or methods and hands-on exercises to reinforce key ideas. Topics include identifying customer needs, concept generation, product design, design-for-manufacturing, prototyping, and marketing. Throughout the course students will conceive, design and prototype physical products.

Introduction to Architecture Honors/Dual Credit (0892) **5 Credits**
Prerequisites: Any Technology Course or Teacher Recommendation **Full Year**
Grades 11-12

This college level course introduces design studio instruction to students contemplating architecture as a field of study or career. Students will learn basic design drawing and model making as well as the importance of aesthetic elements and designing with real-world constraints.

Introduction to Engineering Design Honors/Dual Credit (0893) **5 Credits**
Prerequisites: Any Tech Course or Teacher Recommendation **Full Year**
Grades 11-12

This college level course introduces students to the practice of engineering design. Students will use hand tools, reverse engineering, the creative process, and the various career paths within engineering. This course is intended for any student interested in understanding the basics of engineering design and learning about engineering as a possible career.

Computer Applications (0701) **5 Credits**
Prerequisite: None **Full Year**
Grades 9-10

Students in this course receive in-depth training in the Microsoft Office (Word, Excel, PowerPoint, and Publisher) and Google Suite (Docs, Sheets, and Slides) by developing comprehensive projects that depict real-world functionality. Through hands-on experience, students will apply these software packages to analyze business problems and to practice simulations.

This full year course covers the basic and advanced features of software applications using Microsoft Office. Students will learn Word/Docs (word processing), Excel/Sheets (spreadsheet), PowerPoint/Slides (presentation graphics) and Publisher. Students will apply their knowledge to create a research paper, and various documents including a business letter, resume, forms, and tables in Word. Using Excel/Sheets students will create worksheets, manage workbooks, create charts and tables, and utilize formulas, functions, and formatting features. During the course students will utilize PowerPoint/Slides to develop slide content, insert and format shapes, create organization charts, apply transitions, animations, and sound to create a multi-media presentation. Students will also utilize the Publisher program to produce personal and business-oriented products.

Robotics Programing (0888) **5 Credits**
Prerequisites: None **Full Year**
Grades 10-12

This course is aimed at students with little or no programming/ robotics experience. The goal is to provide students with an understanding of multiple programming languages as well as robot mechanisms and basic fabricating. Students will begin by building basic robots and learning essential programming to control them. As the year progresses, students will focus on designing and programming robots to solve real world problems. Specific program languages/ tools will be at the discretion of the teacher and will be based on the robot needs, but may include: C++, EV3, Java, MIT App Inventor, and Scratch.

AP Computer Science (0390) **5 Credits**
Prerequisite: Any Technology Course **Full Year**
Grades 11-12

The AP Computer Science course is an introductory course in computer science. Because the design and implementation of computer programs to solve problems involve skills that are fundamental to the study of computer science, a large part of the course is built around the development of computer programs that correctly solve a given problem. These programs should be understandable, adaptable, and, when appropriate, reusable. At the same time, the design and implementation of computer programs is used as a context for introducing other important aspects of computer science, including the development and analysis of algorithms, the development and use of fundamental data structures, the study of standard algorithms and typical applications, and the use of logic and formal methods. In addition, the responsible use of these systems is an integral part of the course.

Human Anatomy Honors/Dual Credit (0134) **5 Credits**
Prerequisite: Biology (any) & Teacher Recommendation **Full Year**
Grades 9-12

The human anatomy course is an introduction to the study of the structure and functions of the human body. It is a lab science course designed for students who are interested in furthering their understanding of the human body. The course will enable students to survey the structure of the body on a systematic basis. Discussions of the systems and organs will incorporate the cellular and tissue levels of the body. This is a full year course and animal dissections are a significant part of the coursework.

Forensic Science (0150) **2.5 Credits**
Prerequisite: Biology (any); Co-requisite: Chemistry (any) **Semester**
Grades 10- 12

The Forensic Science course applies biology, chemistry, physical science, and technology to the analysis of criminal acts and law enforcement. Forensic Science is offered as a half-year elective course to students who have successfully completed biology and chemistry or have a comparable science background. Students will apply scientific methods and employ related science disciplines to consider aspects of evidence relevant to crime scenes. The course will involve presentations, discussions, projects, laboratory investigations, use of technology, and readings. In addition, the student will be exposed to career opportunities in the area of criminalistics and forensic science.

Human Growth and Development (2000) **2.5 Credits**
Prerequisite: Biology (any) **Semester**
Grades 11-12

In this course, students will examine theories of human development and milestones of physical, socio-emotional, and cognitive development. Students will describe genetic and physical development of children and adolescents, understand the effects of a wide range of influences on development, examine the brain's development during adolescence, and consider how external factors affect physical and cognitive development.

World Wide Medical Trends (0135) **2.5 Credits**
Prerequisite: Biology (any) **Semester**
Grades 11-12

This current events course will track the development of emerging medical issues throughout the world. Students will research and discuss the impact of real world disease, research, testing, and treatment issues. Ethics and scientific merit will play a major role in these discussions as students form and defend opinions on the behaviors of the medical professionals involved. Presentations, discussions, research, analysis, and debates will form the primary format of the class.