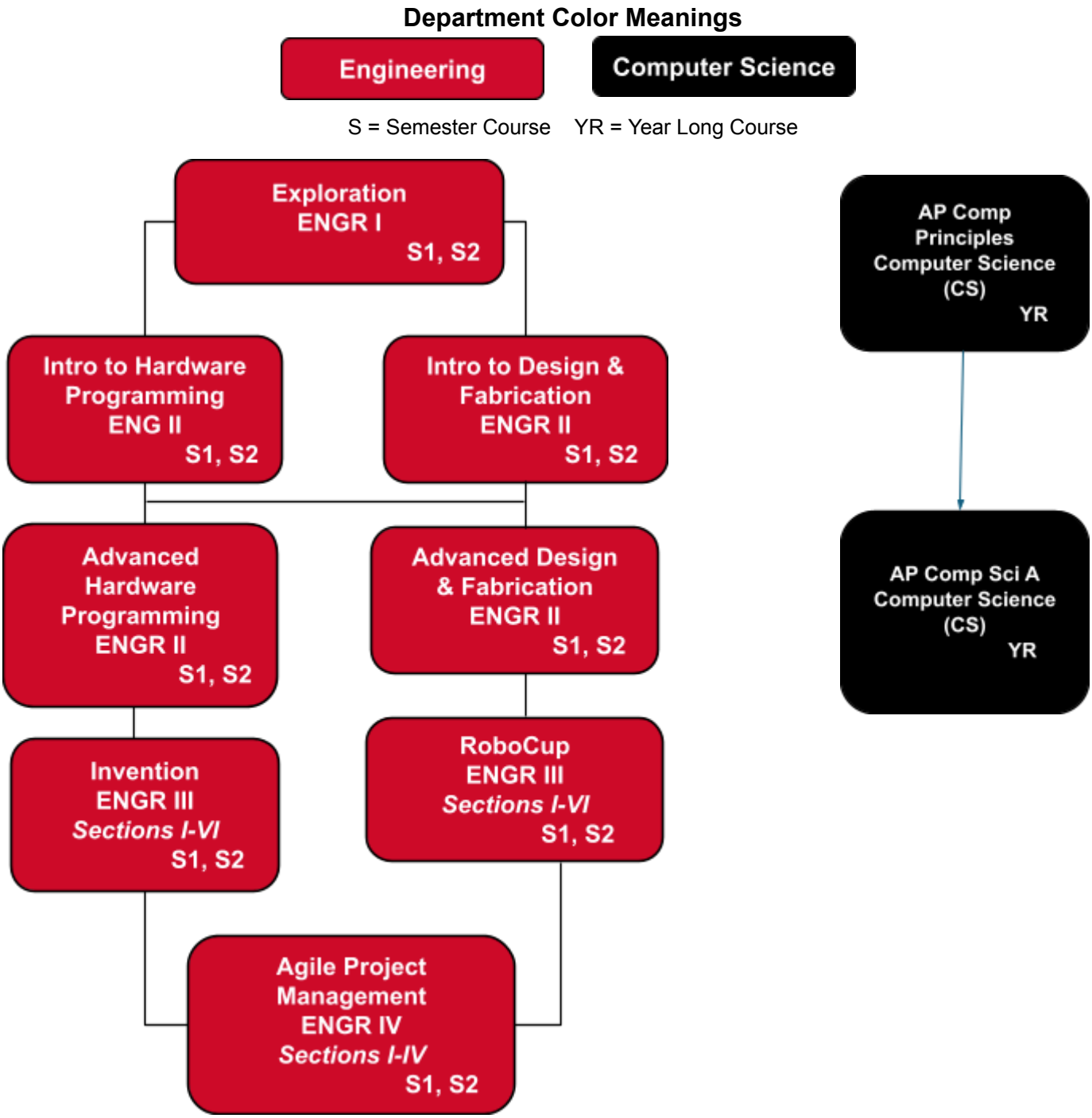
Engineering & Computer Science

Engineering courses provide a unique learning environment where students build creative confidence to inspire others, take risks, and persevere through iteration and failure. Students engage in real-world engineering processes, use of real engineering tools, and strive to solve real problems.

Engineering expands student development toward invention and entrepreneurism by exploring mechanical and electrical systems through fabrication and assemblies. Students utilize 3D modeling tools, learn relevant programming languages, and work through projects using Agile and Design Thinking. Contact your counselor with any questions on courses.

Department Chair: Charles Nepomuceno cnepomuceno@bsmschool.org



Engineering & Computer Science

Engineering I: Exploration (S1) or (S2)

One semester, one credit, open to freshmen

Engineering Exploration expands student development toward invention and creativity by giving students the freedom to choose a project for the semester that will help them learn some basic concepts of any of the following Engineering II classes (CAD modeling, fabrication, electronics, programming, etc.). This creates a natural project-based, just-in-time learning structure by giving them confidence and ownership of their learning of real engineering skills.

Engineering II: Introduction to Design and Fabrication (S1) or (S2)

One semester, one credit, open to sophomores, juniors and seniors

This course can be taken sequentially with a semester of Fine Arts: Product Design
Almost every professional product offered in the market today began with prototypes, basic designs, and fabrication before they were the well-tuned products we trust and use in our everyday lives. This class will help students learn the basics of the iterative design process through an introduction of CAD modeling (with Onshape) and rapid manufacturing techniques such as 3D printing and laser cutting. With these skills, students can start making effective prototypes of possible future inventions.

Engineering II: Advanced Design and Fabrication (S1) or (S2)

Prerequisite: Introduction to Design and Fabrication, or Exploration

One semester, one credit, open to sophomores, juniors and seniors

This project-focused class helps students build upon their introductory CAD and fabrication skills by providing modules that challenge their current set of skills as well as assembly-based modeling and fabrication methods. Once students have a grasp on both the CAD design and fabrication, they are free to pursue an original invention that will continue to build on the mixture of those skills.

Engineering II: Introduction to Hardware Programming (S1) or (S2)

One semester, one credit, open to sophomores, juniors and seniors

Want to create your own electronics, or learn how to fix electronics around your house? Want to write code that interfaces with the physical world around you? The Introduction to Hardware Programming course will introduce many applications of practical electronics and programming using a microcontroller (i.e. the Raspberry PI). Students will learn the basics of microcontrollers and how to program them using different programming languages. Emphasis is placed on programming the microcontroller to utilize external sensors, motors, relays, and actuators to gain information and make data-driven decisions.

Engineering II: Advanced Hardware Programming (S1) or (S2)

Prerequisite: Introduction to Hardware Programming, or Exploration

One semester, one credit, open to sophomores, juniors and seniors

The advanced levels of any Engineering II course are exploratory and provide students with freedom and independence to learn unique skills in the world of engineering they wish to pursue. In Advanced Hardware Programming, students expand upon the skills they learned in the previous semester and create a functional project consisting of hardware and software that puts their skills to the test.

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Engineering III: Invention (S1) and/or (S2)

One or Two semesters, one credit per semester open to sophomores, juniors and seniors

Prerequisite: Two semesters of Engineering II classes
There are up to 6 sections available for this class, allowing students to take up to 3 years of Invention.
Our Invention Teams work to create technological solutions to real-world problems of their own choosing. Students rely on inquiry and hands-on problem solving as they integrate lessons from science, technology, engineering, and math (STEM) to develop invention prototypes. Interactive, self-directed learning coupled with STEM curricula are essential for experiencing invention. Students learn to work in teams, while collaborating with intended users of their inventions.

Engineering III: RoboCup (S1) and/or (S2)

One or Two semesters, one credit per semester, open to juniors and seniors

Prerequisite: Two semesters of Engineering II classes
There are up to 6 sections available for this class, allowing students to take up to 2 years of RoboCup
Once you've mastered some practical engineering skills, you can join our RoboCup team. The RoboCupRescue League is an international league of teams with one objective: Develop and demonstrate advanced robotic capabilities for emergency responders using annual competitions to evaluate, and teaching camps to disseminate best-in-class robotic solutions. In this class, you'll be utilizing the skills you've learned in previous years to create a robot to compete in this unique international robotics competition.

Engineering IV: Agile Project Management (S1) and/or (S2)

One or Two semesters, one credit per semester open to seniors

Prerequisite: Two semesters of Engineering III classes
Students who have made it through the rest of our engineering track can take their technical learning from a new perspective, leading a technical team. This class is for students who are interested in leadership, but also have the technical skills required to properly guide their peers to successful and meaningful solutions to their projects. Students will also be learning the basics of Agile project management, which is a collaboration and team management tool used in many industries today.

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Computer Science

Computer Science courses focus on coding and technology projects, such as computer simulation, programming languages, microcontrollers, scientific applications, and web development. Additionally, students may take the skills they've learned from these courses into later engineering courses.

AP Computer Science Principles (YR)

Two semesters, two credits, open to all grade levels.

AP Computer Science Principles (i.e. 'CSP') introduces students to the breadth of the field of computer science. In this course, students will learn to design and evaluate solutions and to apply computer science to solve problems through the development of algorithms and programs. They will incorporate abstraction into programs and use data to discover new knowledge. Students will also be able to explain how computing innovations systems work, including the internet, and their potential impacts on society. Finally, students will contribute to a computing culture that is collaborative and ethical.

AP Computer Science A (YR)

Two semesters, two credits, open to sophomores, juniors and seniors

The AP Computer Science 'A' course developed by the College Board is equivalent to a first-semester, college-level CS1 course in computer science. The course introduces students to computer science with fundamental topics that include problem solving, design strategies and methodologies, organization of data (data structures), approaches to processing data (algorithms), analysis of potential solutions, and the ethical and social implications of computing. The course emphasizes both object-oriented and imperative problem solving and design using the Java programming language. These techniques represent proven approaches for developing solutions that can scale up from small, simple problems to large, complex problems.