Distinguished Pathways and Programs at the O'Bryant

The following pathways and programs are available to all students. Initial enrollment typically occurs at the beginning of a student's first year of high school. While we highlight signature courses for each pathway and program, students must also meet all local and state requirements.

The AP Capstone Diploma Program

"AP Capstone™ is an innovative diploma program from the College Board that equips students with the independent research, collaborative teamwork, and communication skills that are increasingly valued by colleges. AP Capstone is built on the foundation of two AP courses — AP Seminar and AP Research — and is designed to complement and enhance the in-depth, discipline-specific study experienced in other AP courses.

In AP Seminar, students investigate real-world issues from multiple perspectives, gathering and analyzing information from various sources in order to develop credible and valid evidence-based arguments. In AP Research, students cultivate the skills and discipline necessary to conduct independent research in order to produce and defend a scholarly academic paper. Students who earn scores of 3 or higher in AP Seminar and AP Research and on four additional AP Exams of their choosing will receive the AP Capstone Diploma. Students who earn scores of 3 or higher in AP Seminar and AP Research but not on four additional AP Exams will receive the AP Seminar and Research Certificate, (College Board)." Students who enroll in AP Seminar are expected to also take AP Research during their senior year of high school.

Computer Science Pathway

The Computer Science Pathway offers students the opportunity to develop strong programming, design, and computational thinking skills. This program aligns with the Project Lead the Way (PLTW) computer science course curriculum and includes a sequence of computer science courses that students can complete during grades 9-12.

Students in the Computer Science Pathway will enroll in the Exploring Computer Science course during their freshman year. They will develop skills using both block and text-based programming, create websites and usable apps, explore computer science careers, and learn Python programming. During sophomore year, students will enroll in the AP Computer Science Principles (CSP) course and delve more deeply into programming languages, computational thinking, and web development. During junior year, students have the option to enroll in either Cybersecurity or AP Computer Science A. The AP Computer Science A course engages students in an in-depth study of Java programming, advanced Android app development, and game development.

In their final year of high school, students who did not complete Cybersecurity during their junior year will have the opportunity to complete the course. The Cybersecurity course provides students with exposure to digital and information security, while encouraging socially responsible choices and ethical behavior. It inspires algorithmic and computational thinking, especially "outside-the-box" thinking. Students will explore educational and career paths available to cybersecurity experts. Students will study personal cybersecurity, system security, network security, and applied cybersecurity. The course aligns with the National Cybersecurity Workforce Framework developed by the National Institute of Standards and Technology (NIST). Signature Courses in the Computer Science Pathway include the following:

Grade 9	Grade 10	Grade 11	Grade 12
Exploring Computer Science	AP Computer Science Principles	Cybersecurity or AP Computer Science A	Cybersecurity

Engineering Pathway

The Engineering Pathway is designed to deeply engage students in the engineering design process and to develop skills that prepare students for college study in engineering and the sciences.

Students in the Engineering Pathway will enroll in the Introduction to Engineering Design course during their freshman year. In this course, students will work on numerous collaborative projects and design and build several devices. Students will develop a comprehensive understanding of the engineering design process and develop skills in the areas of technical drawing, Computer-Aided Design (CAD), and 3D modeling. Students will also learn how to safely use hand and power tools and become adept at using 3D printers.

In their sophomore year, students will participate in the Principles of Engineering course. In this course, students will learn how to design, build, program and control various devices. Students will learn the basics of mechanical systems, energy and power systems, and control systems. Students will also study the properties of different materials and explore how various structures function. During their junior and senior years, students will have the opportunity to engage in additional engineering coursework and work on an independent or group Capstone Project.

In their junior year, students will participate in an Aerospace Engineering course that ignites students' learning in the fundamentals of atmospheric and space flight. Students explore the fundamentals of flight in air and space as they bring the concepts to life by designing and testing components related to flight such as an airfoil, propulsion system, and a rocket. They also apply aerospace concepts to alternative applications such as a wind turbine and parachute.

In their senior year, students participate in the Engineering Design and Development course which is the capstone course in the Engineering Pathway. Engineering Design and Development is an open-ended engineering research course in which students work in teams to design and develop an original solution to a well-defined and justified open-ended problem by applying an engineering design process.

In the Engineering Pathway students are also expected to take AP-level math and science courses, as well as participate in engineering experiences and dual-enrollment opportunities with local universities. Signature Courses in the Engineering Pathway include the following:

Grade 9	Grade 10	Grade 11	Grade 12
Introduction to Engineering Design	Principles of Engineering	Civil Engineering and Architecture	Engineering Development and Design

Biomedical Science Pathway

The Biomedical Science Pathway prepares students to pursue a college major and career in the field of biomedical science. The program offers students a rigorous college preparatory curriculum that focuses on intense academic supports and enrichment opportunities.

Students enter the Biomedical Science Pathway in grade 9 and enroll in a full-year Principles of Biomedical Science course that provides an introduction to biomedical science through exciting hands-on projects and problems. Students investigate concepts of biology and medicine as they explore health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. The activities and projects in Principles of Biomedical Science introduce

students to human physiology, basic biology, medicine, and research processes and allow students to design experiments to solve problems.

In their sophomore year, students will participate in the Human Body Systems course. In this course, students step inside the human body and explore the systems that help us move, protect us from disease or injury, and facilitate communication within the body and with the outside world. Students will also solve a medical mystery, analyze a medical case file and diagnose disease. Students design experiments, investigate the structures and functions of the human body, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration.

In their junior year, students participate in a Medical Interventions course in which students investigate a variety of interventions involved in the prevention, diagnosis, and treatment of disease as they follow the lives of a fictitious family. Through these scenarios students will be exposed to the wide range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. Students will also practice problem solving with structured activities and progress to open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills.

In their senior year, students participate in a Biomedical Innovations course. In this capstone course, students apply their knowledge and skills to answer questions or solve problems related to the biomedical sciences. Students design innovative solutions for the health challenges of the 21st century as they work through progressively challenging open-ended problems, addressing topics such as clinical medicine, physiology, biomedical engineering, and public health. They have the opportunity to work on an independent project and may work with a mentor or advisor from a university, hospital, physician's office, or industry. Throughout the course, students are expected to present their work to an adult audience that may include representatives from the local business and healthcare community.

The Biomedical Science Pathway partners with *Boston University Medical School*, *Harvard Medical School*, and *Dana Farber Cancer Institute, Brigham and Women's Hospital, and Beth Israel Hospital* to offer an extended day enrichment curriculum. These partner programs offer students increased exposure to the medical field and provide hands-on learning opportunities connecting the classroom curriculum to experiential learning in a laboratory setting. Medical students, graduate students in health-related fields, and college professors support this enrichment program. Signature Courses in the Health Science Pathway include the following:

Grade 9	Grade 10	Grade 11	Grade 12
Principles of Biomedical Science	Human Body Systems	Medical Interventions	Biomedical Innovations