



## ENGINEERING

The Engineering Pathway at Assumption High School is designed to ignite curiosity, foster innovation, and prepare students for the dynamic and evolving world of engineering and technology. This pathway offers a rigorous, hands-on curriculum that blends foundational knowledge in math and science with real-world applications in engineering, design, and aviation.

Students in this pathway are encouraged to think critically, solve complex problems, and collaborate on creative solutions—skills that are essential in any engineering discipline. Through a combination of advanced coursework, including AP science classes and specialized electives like 3D print & design and aviation science, students gain both the theoretical understanding and practical experience needed to thrive in college-level engineering programs and beyond.

What sets this pathway apart is its flexibility and depth. Whether a student is passionate about aerospace, mechanical systems, environmental design, or emerging technologies, the Engineering Pathway provides opportunities to explore those interests while building a strong academic foundation. Students also benefit from access to cutting-edge tools and technologies, such as 3D printers and flight simulators, which bring learning to life in meaningful and engaging ways.

Beyond the classroom, students can participate in STEM-related clubs, competitions, and service projects that reinforce their learning and connect them with the broader engineering community. By the time they graduate, students in the Engineering Pathway are not only well-prepared for college—they are equipped to lead, innovate, and make a lasting impact in the world.

### PATHWAY COURSES:

#### AP BIOLOGY II

This intensive course includes a detailed study of molecular biology, explores the role of genetics in evolution, and includes a comparative study of microorganisms, plants, animals, physiology, and their impact on the environment.

#### AP CHEMISTRY II

This course builds heavily upon the foundation laid in Advanced Chemistry I and includes advanced topics in atomic structure, structure and properties of compounds, intermolecular forces, solubility, equilibrium, redox, kinetics, electrochemistry, and acid-base systems.

#### AP CALCULUS AB

Topics covered are the same as those for DC Calculus I with additional application problems, tests, and assignments included to match the rigorous nature of the AP exam. Students must take the AP AB Exam in May.

#### AP CALCULUS BC

AP Calculus BC is roughly equivalent to both first and second semester college calculus courses and extends the content learned in AB to different types of equations and introduces the topic of sequences and series. The AP course covers topics in differential and integral calculus, including concepts and skills of limits, derivatives, definite integrals, the Fundamental Theorem of Calculus, and series. The course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, and verbally, and to make connections among these representations. Students learn how to use technology to help solve problems, experiment, interpret results, and support conclusions.

#### AP PHYSICS C: MECHANICS

Designed for engineers, this course explores concepts such as kinematics; Newton's laws of motion, work, energy, and power; systems of particles and linear momentum; rotation; oscillations; and gravitation. Students will engage in hands-on laboratory work and in-class activities to investigate phenomena and use calculus to solve problems.

## **PATHWAY COURSES:**

### **AP COMPUTER SCIENCE PRINCIPLES**

This course covers the basic principles of computer science and introduces students to the creative aspects of programming, abstractions, algorithms, large data sets, the internet, cybersecurity concerns, and computing impacts. Students use technology to address real-world problems and build relevant solutions. This course is designed to open a pathway for students to continue studies in college-level STEM and computing courses. Students prepare for the AP exam and create a digital artifact to submit to earn AP credit.

### **AP COMPUTER SCIENCE A**

This course introduces students to object-oriented programming and design using the Java programming language. Fundamental topics include the design of solutions to problems, the use of data structures to organize large sets of data, and the development and implementation of algorithms to process data and discover new information. Students prepare for the AP CS-A exam through which college credit can be earned.

### **3D PRINT & DESIGN**

This course provides students with a hands-on introduction to the world of 3D printing. Students will explore the applications of 3D printing across various industries. The course emphasizes the use of Computer-Aided Design (CAD) software to create original 3D models. Students will learn to translate their digital designs into physical objects using 3D printers, fostering creativity and problem-solving skills.

### **FOUNDATION IN FLIGHTS AND AIRCRAFT SYSTEMS**

In this course students explore aircraft categories, components, and construction, gaining a solid understanding of the four forces of flight—lift, weight, thrust, and drag—along with essential flight calculations. The course covers key aircraft systems for both manned and unmanned vehicles, including powerplants, fuel, electrical, pitot-static, and vacuum systems. Students also learn to assess performance factors and determine critical operating data. The program includes a mandatory three-day summer kickstart and meets once every four days during the study block. Sponsored by Aircraft Owners and Pilots Association.

### **THE FLYING ENVIRONMENT AND FLIGHT PLANNING**

This course prepares students for the FAA Private Pilot Knowledge Test, covering pre-flight procedures, airspace, radio communications, regulations, airport operations, aviation safety, weather, cockpit and emergency procedures. Students also study pilot and aircraft qualifications, cross-country planning, weight and balance, performance, human factors, chart use, night operations, navigation, and aeronautical decision-making. Multiple practice exams are included, and schools may arrange FAA written exam sign-offs. The course meets once every four days during the study block and includes a mandatory three-day summer kickstart. Sponsored by Aircraft Owners and Pilots Association.

### **FLIGHT TEST PREP**

This course is to prepare for the Private Pilot Knowledge Test and Part 107 Remote Pilot Test to achieve a pilot or ground pilot (drone) license.

### **AP SEMINAR**

AP Seminar is a foundational course that engages students in cross-curricular conversations that explore the complexities of academic and real-world topics and issues by analyzing divergent perspectives. Using an inquiry framework, students practice reading and analyzing articles, research studies, and literary and philosophical texts; listening to and viewing speeches, broadcasts, and personal accounts; and experiencing artistic works and performances. Students learn to synthesize information from multiple sources, develop their own perspectives in written essays, and design and deliver oral and visual presentations, both individually and as part of a team. Ultimately, the course aims to equip students with the power to analyze and evaluate information with accuracy and precision in order to craft and communicate evidence-based arguments.

### **AP RESEARCH**

This course is the second course in the AP Capstone Diploma Program. Students design, plan, and conduct a yearlong research-based investigation using a variety of research methods from multiple perspectives. The project can build on a topic, problem, or issue covered in AP Seminar or on a new topic of the student's choosing. At the end of the project, students will submit a 4,000-5,000 word academic paper as well as complete a presentation and oral defense of the research findings to a panel. Students complete research ethics training and employ ethical practices in their research processes. The academic paper and presentation and oral defense components contribute to the overall AP Research score.

## **CLUBS & INVOLVEMENT**

- Participate in the Architecture, Construction, Engineering (ACE) program.
- Participate in Women's Day in Engineering Day field trip to UofL Speed School.
- Complete a job shadow experience with a professional in your chosen field of engineering to gain real-world insight and explore your area of interest.
- Attend career-related RTI sessions designed to expose students to various engineering disciplines.
- Become a Student Technology Leader to assist students in the Boeckmann Lab.