Middle School Technology & Engineering Sequence

Courses have been designed to follow a sequential format based on prerequisites.

1

Engineering 1- Design and Modeling Course Code: 846432

Duration: 18 Weeks (Semester) **Recommended Class Size:** 28 students

Students apply the engineering design process to solve real world problems and understand the influence of creativity and innovation in their lives. This course challenges students to develop higher order problem solving skills by stimulating creativity in a hands-on learning environment. Academic subject disciplines such as applied physics, algebra, and geometry powerfully come alive as students design, build, and test modern structure and vehicle prototypes. Students acquire 21st Century Skills like communication and team problem solving, through the mastery of engineering concepts such as CAD and mechanical advantage.

2

Engineering 2- Simulation and Fabrication Course Code: 846332

Duration: 18 Weeks (Semester) **Recommended Class Size:** 28 students
Prerequisite: *Engineering 1- Design and Modeling*

In this course students will experience how science, technology, engineering, and mathematics interact to create our technological society. By active participation in research, design, fabrication, and prototype testing, students will explore various topics in Technology, such as structural engineering and transportation systems. Students will develop problem solving strategies and workplace skills that will be useful in 21st century careers. This course is a dynamic approach to many academic subject areas to include mathematics and science by physically demonstrating these concepts in real world applications with a focus on critical thinking skills and problem solving.

3

Engineering 3- Advanced Design and Prototyping Course Code: 8463

Duration: 18 Weeks (Semester) **Recommended Class Size:** 28 students
Prerequisite: *Engineering 1- Design and Modeling & Engineering 2- Simulation and Fabrication*

Through active engagement and collaboration, students will expand upon work-based readiness skills and processes experienced in prerequisite Engineering courses. Students will develop and apply creative and critical thinking skills to design, document, and showcase prototypes and solutions that solve real world problems in areas that include environmental sustainability.

All courses require a student materials fee as listed in FCPS Notice 5922.

HS

Next Step: STEM Design (foundational course at the high school level); IB Design Tech (grades 11 & 12)

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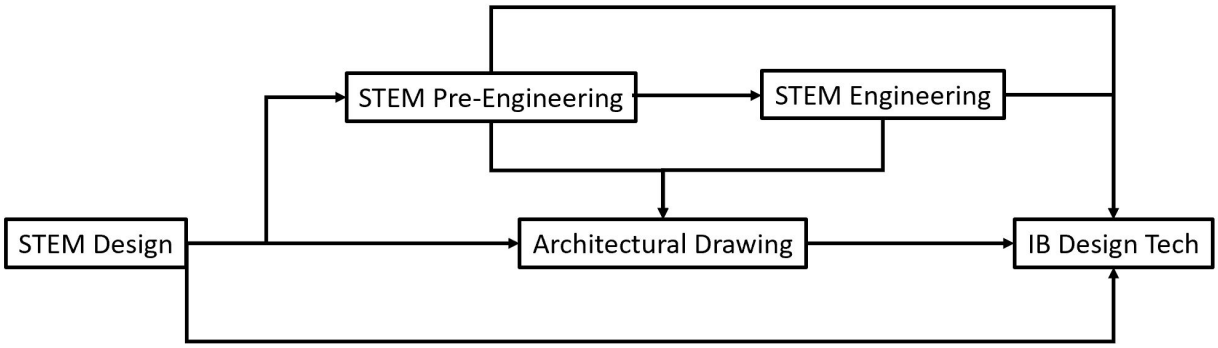
HIgh School Technology & Engineering Sequence



STEM Design (840300) – Grades 9-12 - This foundation course will introduce applied engineering using the newest technologies and skill building in Computer Aided Drafting (CAD). Students will experience authentic problems in the fields of Mechanical Motion, Energy, electronics, and Transportation Systems.

STEM Pre- Engineering (843600) – Grades 10-12 - Students gain an understanding of technical drawing careers in modern industry. The course includes engineering-drafting problems, use of Computer Aided Drafting, and drafting skills and techniques. Students use Autodesk Inventor software and specifications along with other resource materials. Students interested in engineering or related careers will benefit from this course. 3D parametric modeling is introduced. Students will also implement designs and prototypes with hands-on projects.

STEM Engineering (84060) – Grades 11-12 - Students are introduced conceptually and analytically to the primary concepts in the four classic Engineering disciplines: civil, mechanical, electrical, and aerospace. Students will explore and develop problem-based learning projects in these areas while applying mathematical skills, computer simulations, scientific analysis, and oral and written skills. Students are actively involved with high-tech devices, engineering graphics, and mathematical/scientific principles through problem-solving and critical thinking experiences. Students integrate mathematics, science, and technical writing with technology instruction to solve engineering-based problems. This course carries a weighted +0.5 towards GPA.

Architectural Drawing (843700) - Grades 10-12 - Students study the history of architecture, examine various construction techniques, use Computer-Assisted Drafting (CAD) equipment, and design elements of living and industrial structures. They develop working drawings and specifications as well as a scale model. Students interested in architecture or related careers will benefit from this course. Contextual instruction and student participation in co-curricular career and technical student organization activities will develop leadership, interpersonal, and career skills. High-quality work-based learning will provide experiential learning opportunities related to students' career goals and/or interests, integrated with instruction, and performed in partnership with local businesses and organizations.

International Baccalaureate Design Technology (IB Design Tech) (846508) - Grades 11-12 - Inquiry and problem-solving are at the heart of the subject. DP design technology requires the use of the DP design cycle as a tool, which provides the methodology used to structure the inquiry and analysis of problems, the development of feasible solutions, and the testing and evaluation of the solution. In DP design technology, a solution can be defined as a model, prototype, product or system that students have developed independently through creativity, critical thinking, and practical skills. This course carries a weighted +1.0 towards GPA.

There is no prerequisite for IBDT, however previously taken Technology & Engineering courses is encouraged.

All courses require a student materials fee as listed in FCPS Notice 5922.

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