

West Potomac Engineering & Technology Education Courses

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STEM DESIGN (843500)

(9,10,11,12)

If student has interest in:

Drawing, Art, Computer Aided Design (CAD), Architecture, Fashion Design, Advertising, Computer Games, Animation, Construction, Engineering, Building things, 3D Printing and Prototyping, Computer Numerical Controlled (CNC) Milling.

DESCRIPTION:

Students develop skills in drawing, study careers related to drafting, become familiar with Computer-Aided Design (CAD). Students will gain an understanding of the technical drawing process and solve engineering-drafting problems as part of the objectives. This course is recommended for students interested in technical drawing, interior design, fashion merchandising, decorating, construction, architecture, or engineering careers.

This course follows the STEM (Science, Technology, Engineering and Mathematics) directive.

Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

ELECTRONICS (841600)

(10,11,12)

If student has interest in:

Electronics, Computers, Electrical/Electronic Engineering, Robotics, Ham Radio operation, Building electronic devices.

DESCRIPTION: This course is designed to give the student the basic understanding of both practical and theoretical knowledge in the field of electronics. Course includes material on electrical and electronic theory and applications, circuit simulation, circuit troubleshooting, use of test equipment, consumer information and career opportunities.

This is accomplished through classroom lecture, experimentation, demonstration, and practical application with projects. Students will be prepared to either enter the electronics career field or continue their education in Electronics Engineering. Students interested in engineering or related technical careers will benefit from this course.

Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922. Must have a "B" or better in Algebra I.

AEROSPACE SCIENCE I (848700)
(10,11,12)

If student has interest in:

**Airplanes, Rockets, Helicopters, Blimps, Radio Control Airplanes,
Aerospace Engineering, Flight Simulation.
Just about anything that flies or moves fast.**

DESCRIPTION:

Aerospace Science I is an introduction to flight, space travel, and supporting technologies. Students will use a hands-on approach to study concepts including the history of aviation, aerodynamics, aircraft components, flight conditions, airport and flight operations, space, rocketry, and the aviation and space industries.

Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

ENGINEERING DRAWING (843600)
(10,11,12)

If student has interest in:

**Computer Aided Design (CAD), Computer Animation, Mechanical Devices,
Engineering, Building things, 3D Printing and Prototyping, Computer Controlled
(CNC) Milling. Becoming Certified in Computer Aided Design.**

DESCRIPTION:

Students gain a broader understanding of technical drawing careers and usage in modern industry. The course includes engineering specific drafting problems using Computer Aided Design (CAD). Students will be exposed to actual examples and exercises in the field of engineering with a focus on areas of student interest. Presentation of technical material will be practiced as well.

Students interested in engineering or related technical careers will benefit from this course.

This course follows the STEM (Science, Technology, Engineering and Mathematics) directive.

Students completing Engineering Drawing (843600) and Basic Technical Drawing (843500) with a grade of "B" or better may articulate three credits at the Northern Virginia Community College. In addition, if the complete Art 1 (912000) and Computer Applications (661132) with a grade of "B" or better they may articulate up to eight additional credits at the Northern Virginia Community College.

Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

Prerequisite: Basic Technical Drawing.

ARCHITECTURAL DRAWING (843700)
(10,11,12)

If student has interest in:

Architecture, Computer Aided Design (CAD), Civil Engineering, Construction, Engineering, Model Building. Becoming Certified in Computer Aided Design.

DESCRIPTION:

This course examines the history of architecture, various construction techniques, Computer Aided Design (CAD) and house design. Students will develop working drawings and specifications as well as build scale models. Students interested in architecture or related careers will benefit from this course. Students completing Architectural Drawing may articulate three to six credits at the Northern Virginia Community College by successfully completing the Assessment by Local Examination (ABLE) administered by the community college staff.

This course follows the STEM (Science, Technology, Engineering and Mathematics) directive. *Industry certification may be available as part of this course. Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.*

Prerequisite: Basic Technical Drawing.

ADVANCED DRAWING (843800)
(11,12)

If student has interest in:

Computer Aided Design (CAD), Any form of Engineering or Construction, Computer Animation, Model Building. Becoming Certified in Computer Aided Design.

DESCRIPTION:

A study of advanced architecture and/or engineering drawing/design. This class gives the student an opportunity to advance in one or more selected fields in cooperation with the instructor. Various sections of study will be focused on dependant on student's subject matter choice. Students are encouraged to work independently with general supervision rather than from detailed instruction. This course follows the STEM (Science, Technology, Engineering and Mathematics) directive.

Industry certification may be available as part of this course. Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

Prerequisite: Architectural or Engineering Drawing.

STEM PRE-ENGINEERING (840500)
(10,11,12)

If student has interest in:

If student has interest in Design, Engineering, Mechanics, 3D printing, Computer Programming & simulations, Hands-on activities. This course builds upon the materials learned in STEM Design.

DESCRIPTION:

STEM Pre-Engineering is the study of various technologies working together as a system. The central theme of STEM Pre-Engineering is the integration of the technological systems of production, energy, communication, transportation, and other related current or emerging technologies. Students work on individual and group activities that are integrated with core subjects and reinforce mathematics, science, and technical writing. Integrated or thematic activities in this course challenge students to use the technological method to solve practical and critical thinking skills problems in a variety of systems or subsystems.

Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

THE FOLLOWING COURSES ARE HONORS

STEM ENGINEERING (845000)
(10,11,12)

If student has interest in:

Any form of Engineering including Mechanical, Electrical, Civil, and Aerospace. This class will give them an introduction to real engineering and/or prepare them for engineering at the college level.

DESCRIPTION:

This course introduces students to the engineering field. Students will be involved with high-tech devices, engineering graphics and math/scientific principles through problem solving experiences. Students will research and develop projects in the areas of civil, mechanical, electrical and aerospace engineering. Students will work in collaborative teams and solve group design projects, compete and then be given the opportunity to optimize their designs. Students will be challenged to design projects using mathematics, computer simulations, scientific analysis, oral and writing skills.

This course follows the STEM (Science, Technology, Engineering and Mathematics) directive and carries an honors weight of .5.

Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

ADVANCED ELECTRONICS AND ROBOTICS (841300)
(11,12)

If student has interest in:

Engineering, Computers, Programming, Electronics, Robotics, Biomechanics

DESCRIPTION:

A study of advanced electronics concepts. Course will include analog and digital electronics review and advancement. Students will also explore more advanced electronics concepts leading to robotics engineering, construction and programming. This class gives the student an opportunity to advance in field of electronics and robotics for those interested in exploring these topics in the future. This course follows the STEM (Science, Technology, Engineering and Mathematics) directive and carries an honors weight of .5.

Industry certification may be available as part of this course. Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

Prerequisite: Architectural or Engineering Drawing.

STEM ADVANCED ENGINEERING AND EMERGING TECHNOLOGIES
(845360)
(11,12)

If student has interest in:

Developing a full engineering project from idea to prototype using skills they learned in Introduction to Engineering.

Past projects include: Aircraft Design and Simulation, Cardboard boat designed to carry two students, Tesla Coil.

DESCRIPTION:

Course emphasizes student knowledge and application of engineering problem solving through research and development concepts. Students learn to work in collaborative engineering teams and solve group design projects in real world scenarios. Students are challenged to solve problems using design, mathematics, computer simulations, scientific analysis, and oral and written skills. Engineering is studied with a focus on modeling. systems, technology-society interaction, ethics, environmental concerns and budgeting. Projects may be models, systems, or products that creatively solve an engineering problem. Students will have access to rapid prototyping techniques. This course follows the STEM (Science, Technology, Engineering and Mathematics) directive.

Students successfully completing this course may be eligible to earn a Career and Technical Education Diploma Seal. Students successfully completing this course will satisfy the sequential elective requirement for the Standard or Modified Standard diploma. This course requires a student material fee as listed in FCPS Notice 5922.

Prerequisite: Introduction to Engineering or instructor approval.

High School Pathways

STEM Engineering Pathway

STEM Design
STEM Pre-Engineering
STEM Engineering
STEM Advanced Engineering

Advanced Drawing Pathway

STEM Design
Engineering Drawing
Architectural Drawing
Advanced Drawing

Robotics Pathway

STEM Design
STEM Pre-Engineering
Electronics I
STEM Advanced Electronics & Robotics

Technology Education Math Correlations

Course

Works Best When Taken With or After

STEM DESIGN (843500) -----	→ Algebra or Geometry
STEM ENGINEERING (849000) -----	→ Algebra or Trigonometry
STEM ADVANCED ENGINEERING/EMERGING TECHNOLOGIES (849100) →	Calculus
STEM ADVANCED ELECTRONICS AND ROBOTICS (841300) →	Algebra or Trigonometry
ELECTRONICS 1 (841600) -----	→ Algebra I
AEROSPACE SCIENCE I (848700) -----	→ Algebra I
PRE-ENGINEERING (843500) -----	→ Geometry or Algebra I
ENGINEERING DRAWING (843600) -----	→ Geometry or Algebra I
ARCHITECTURAL DRAWING (843700) -----	→ Geometry or Algebra I
ADVANCED DRAWING (846600) -----	→ Algebra II or Geometry