Science, Technology, Engineering and Math (STEM) Academy

The T.C. Williams STEM Academy is a school-within-a-school. This program is an appropriate option for any student who:

- Learns best by doing, rather than by more traditional instructional models;
- Benefits from inquiry-based learning;
- Is inquisitive and likes taking things apart to see how they work;
- Is interested in math and/or science and/or engineering and/or technology such as computer graphics or animation;
- Demonstrates creativity and inquisitiveness; and
- Will be a freshman in the 2021-22 school year.

The Academy starts with a team of students and teachers who create a learning community that is a collaborative, caring environment. Both students and teachers are learners in a real-world, problem-solving, project-based environment. Students in the Academy will participate in a STEM Explorations course in which they will be immersed in the investigation of real-world engineering and technology problems and decisions affecting their local, state, national and global problems related to human sustainability. In addition, students will participate in core classes taught by a team of teachers and will focus on creating connections between the content areas and studied through the lens of STEM.

Student Requirements

Graduates of the T.C. STEM Academy complete the program by meeting the following benchmarks:

- Meet the requirements for an advanced high school diploma
- Earn one or more industry certifications
- Complete a rigorous STEM Pathway
- Earn at least nine transferable college credits as defined by the Early College Scholars program including dual enrollment and Advanced Placement
- Participate in cohort model in grade 9
- Follow course requirements and CTE STEM pathways in grades 9 through 12
- Complete the Senior STEM Seminar or Science Research class in grades 11 or 12. This class will include:
    - apprenticeships, mentorships, job shadowing, internships, cooperative education
    - project-based learning opportunities
    - school, community or service learning experiences
    - culminating research project with an electronic portfolio and final STEM reflection presentation.

Academy Goals

- To maximize opportunities in preparing students for targeted careers by breaking down barriers between traditional core academics and CTE, between high school and postsecondary education and training, and between education and the workplace.
- To raise student aspirations and attract more students to postsecondary education in preparation for technical careers.
- To provide well-trained workers to support the recruitment of new businesses and industries to the commonwealth and to meet the workforce needs of existing business and industry.

Application Procedure

The 2020-21 9th grade cohort application will be released in February 2021. The application includes a section for students to fill out which includes a paragraph of interest, as well as two recommendation forms that must be submitted by teachers or mentors. After the application due date, the STEM team will schedule interviews with students who have submitted a complete application with recommendations. Upon the conclusion of interviews, students will be notified of their status based on the information obtained from the application, recommendations, and interview.

CTE Stem Pathway Options and Courses

PATHWAY OPTIONS	YEAR I 9TH GRADE	YEAR II 10TH GRADE	YEAR III 11TH GRADE	YEAR IV 12TH GRADE
Engineering and Technology	Engineering Explorations I	Engineering Analysis and Applications II (Robotics)	Aerospace Technology I	Dual Enrollment Introduction to Engineering
Electronics Systems	Engineering Explorations I	Engineering Analysis and Applications II (Robotics)	Electronics Systems I	Electronics Systems II
Computer Systems Networking	Engineering Explorations I	Engineering Analysis and Applications II (Robotics)	Cybersecurity Fundamentals	CISCO Academy / Networking Hardware Operations I and II
Cybersecurity	Engineering Explorations I	Engineering Analysis and Applications II (Robotics)	Cybersecurity Fundamentals	CISCO Academy / Networking Hardware Operations I and II
Cloud Computing	Engineering Explorations I	Engineering Analysis and Applications II (Robotics)	Cybersecurity Fundamentals	CISCO Academy / Networking Hardware Operations I and II
Sustainability/ Biotechnology/ Forensics	Engineering Explorations I	Engineering Analysis and Applications II (Robotics)	Sustainability and Renewable Technologies	Biotechnology and Forensics Foundations
Architectural/Engineering Design	Engineering Explorations I	Technical Drawing and Design I	Advanced Engineering Drawing and Design II	Advanced Architectural Drawing and Design II

Recommended STEM Course Map with Advanced Studies Diploma

	9TH GRADE COHORT	10TH GRADE COHORT	11TH GRADE STUDENT CHOICE	12TH GRADE STUDENT CHOICE *Available to seniors in 2021-22 school year.
English Language Arts	Honors English 9	Honors English 10	Honors English 11: Survey of American Literature AP English Language and Composition Dual Enrollment College Composition 11	AP English Literature and Composition Dual Enrollment College Composition 12 Dual Enrollment Survey of World Literature
Mathematics	Algebra II / Geometry	Pre-Calculus Discrete Mathematics AP Statistics AP Computer Science A AP Computer Science Principles Algebra II	AP Statistics AP Calculus AB AP Computer Science A AP Computer Science Principles Discrete Mathematics Pre-Calculus	AP Statistics AP Calculus BC AP Computer Science A AP Computer Science Principles Discrete Mathematics Dual Enrollment Calculus II
Science	Honors Biology I	Honors Chemistry I AP Physics 1	Physics I AP Biology AP Chemistry Honors Earth Science I AP Environmental Science AP Physics 1	Physics I AP Biology AP Chemistry Honors Earth Science I AP Environmental Science AP Physics 1 AP Physics 2
Social Studies	Honors World History and Geography Part I	Honors World History and Geography Part II AP World History: Modern	Honors Virginia and U.S. History AP United States History	Honors Virginia and U.S. Government - We the People

4	AP Human Geography		Dual Enrollment College U.S. History	AP United States Government and Politics
CTE	CTE STEM Pathway Course: Engineering and Technology Electronics Systems Computer Systems Networking Sustainability / Biotechnology / Forensics Architectural / Engineering Design	CTE STEM Pathway Course: Engineering and Technology Electronics Systems Computer Systems Networking Sustainability / Biotechnology / Forensics Architectural / Engineering Design	CTE STEM Pathway Course: Engineering and Technology Electronics Systems Computer Systems Networking Sustainability / Biotechnology / Forensics Architectural / Engineering Design	CTE STEM Pathway Course: Engineering and Technology Electronics Systems Computer Systems Networking Sustainability / Biotechnology / Forensics Architectural / Engineering Design
Economics and Personal Finance			Economics and Personal Finance (This course can be taken either in grade 11 or 12) AP Economics	Economics and Personal Finance (This course can be taken either in grade 11 or 12) AP Economics
STEM Elective	(Advisory) STEM Explorations I		STEM Capstone or Science Research STEM Seminar or Science Research (one of these courses should be taken either in grade 11 or 12)	STEM Research: Independent Study including: a) apprenticeships, mentorships, job shadowing, internships, cooperative education b) project-based learning opportunities c) school, community, or service learning experiences d) culminating research project with an electronic portfolio and final STEM reflection presentation

Health and Physical Education	Health and Physical Education 9	Health and Physical Education 10		
World Language	Chinese I, Chinese II, Chinese III French I, French II, French III German I, German II, German III Latin I, Latin II, Latin III Spanish I, Spanish II, Spanish III	Chinese II, Chinese III, Chinese IV Honors, French II, French III, French IV Honors, German II, German III, German IV Honors, Latin II, Latin III, Latin IV Honors, Spanish II, Spanish III, Spanish IV Honors	(Elective) Chinese III, Chinese IV Honors, AP Chinese Language and Culture, French III, French IV Honors, AP French Language and Culture, German III, German IV Honors, AP German Language and Culture, Latin III, Latin IV Honors, AP Latin, Spanish III, Spanish IV Honors, AP Spanish Language and Culture	

Alexandria City Public Schools 2021-22 Program of Studies