Programming and Software Development Program of Study

Business and Industry or STEM Endorsement

The **Programming and Software Development** program of study explores the occupations and education opportunities associated with researching, designing, developing, and testing operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computer applications. This program of study may also include exploration into creating, modifying, and testing the codes, forms, and script that allows computer applications to run.

To complete the Program of Study, students must earn four credits in the Program of Study and one of the credits must be an Advanced Level course.

Postsecondary Options, Occupations and Additional Learning Opportunities

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
Oracle Certified Association JAVA SE 8 Programmer	Certified Computing Professional	Computer Programming/Programmer General	Mangement Information Systems, General	
Oracle Certified Database Associate	Cloud Technology Associate Certification	Computer Software Engineer		
	AEM 6 Developer	Computer Science		
	Certifed Software Analyst	Information Science/Studies		

*Includes Level I and Level II Certificates

For more information on postsecondary options for this programs of study, visit TXCTE.org

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Computer Network Architect	$111, 633	1,454	9%
Software Developer, Systems Software	$103, 334	2985	25%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:	Work Based Learning Activities:
Join TSA Participate in a coding club at school.	Obtain an industry based certification.

There are two pathways in Programming and Software development — one for those who plan to major in computer science in college and one for those who plan on a career in programming after high school.

Courses in the **PROGRAMMING AND SOFTWARE DEVELOPMENT FOR COMPUTER SCIENCE MAJORS** Program of Study

To complete the Program of Study, students must earn four credits in the Program of Study and one of the credits must be an Advanced Level course.

Entry-Level Courses	*Advanced Courses*
❑ Computer Science I	❑ Computer Science II ❑ Computer Science III ❑ Computer Science - Advanced Placement

Courses in the **PROGRAMMING AND SOFTWARE DEVELOPMENT FOR CAREER PROGRAMMING** Program of Study

To complete the Program of Study, students must earn four credits in the Program of Study and one of the credits must be an Advanced Level course.

Entry-Level Courses	*Advanced Courses*
❑ Computer Science I ❑ Game Programming and Design	❑ Computer Science II ❑ Practicum of STEM

Computer Science I Course #: 07222205

Recommended Grade Placement: 9-12 1 Credit

Prerequisite: Algebra I

Students will access, analyze, and evaluate all types of information in ways that are computable in order to solve problems that range in scope from computing a speeding ticket to instructing a robot to dance, from designing interactive, intelligent fashion garments to creating a mobile app game. Students are exposed to the vast and diverse world of computer science, working collaboratively and individually on projects and learning a variety of programming languages, both graphical and text-based, to use in implementing their solutions. This is the first in the sequence of computer science courses offered for students in the computer science program of study, STEM endorsement. This is an advanced academic course and is weighted in the GPA. ***This course receives weighted GPA credit.***

Computer Science - Advanced Placement Course #: 07222206

Recommended Grade Placement: 9-12 1 Credit

Approved by State Board of Education for math credit | Prerequisite: Algebra I

This course is a college-level course equivalent of a first semester computer science course in college. Students will learn and apply computer science concepts to write computer programs in the Java programming language and to prepare for the AP Computer Science A exam in May. Students should be comfortable with algebraic functions and concepts including the use of functional notation such as f(x) = x + 2 and f (x) = g(h(x)), should be successful working independently, be prepared to spend 3-5 hours per week outside of the classroom working on programming assignments and accept the challenge of preparing for an AP exam. This is the second in the sequence of computer science courses offered for students in the computer science program of study, STEM endorsement. This is an advanced academic course and is weighted in the GPA. Students enrolling in Advanced Placement courses will be required to take the Advanced Placement or Mock AP exams for each course in order to receive credit. ***This course receives weighted credit for GPA calculation.***

Computer Science II Course #: 07222220

Recommended Grade Placement: 10-12 1 Credit

Prerequisite: Computer Science I and Algebra I

This is the second in the sequence of computer science courses offered. Students will continue their learning of more advanced computer science concepts including object-oriented programming in the Java programming language. Students will learn much of the same information as contained in AP Computer Science A but without preparing for the AP exam. This is the second in the sequence of computer science courses offered for students in the computer science program of study, STEM endorsement. ***This course receives weighted credit for GPA calculation.***

Computer Science III Course #: 07222230

Recommended Grade Placement: 10-12 1 Credit

Prerequisite: Computer Science II or AP Computer Science

This is the third in the sequence of computer science courses offered. Students will learn additional data structures for storing and retrieving data including Sets, Maps, Lists, Stacks, Queues and Trees, and explore the advantages/disadvantages of each. Students will explore how technology impacts our lives by exploring current computer science topics such as artificial intelligence, cybersecurity and nanotechnology. In addition, students will choose computing topics of interest to research. This is the third in the sequence of computer science courses offered for students in the computer science program of study, STEM endorsement. ***This course receives weighted credit for GPA calculation.***

Game Programming And Design Course #: 07224940

Recommended Grade Placement: 10-12 1 Credit

Prerequisite: Algebra I

Game Programming and Design will foster student creativity and innovation by presenting students with opportunities to design, implement, and present meaningful programs through a variety of media. Students will collaborate with one another, their instructor, and various electronic communities to solve gaming problems. Through data analysis, students will include the identification of task requirements, plan search strategies, and use programming concepts to access, analyze, and evaluate information needed to design games. By acquiring programming knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will create a computer game that is presented to an evaluation panel.

Practicum of STEM Course #: 07228920

Recommended Grade Placement: 11-12 2 Credits

Prerequisite: Algebra I and Geometry | Recommended Prerequisite: Two credits in Programming and Software Program of Study

This course is designed to give students supervised practical application of previously studied knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience. A student may repeat this course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advanced knowledge and skills.