# Scope & Sequence

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| Course Name: Computer Programming II**PEIMS Code:** 13027700 | **Course Credit:** 1.0**Course Requirements:** Grade Placement: 11 – 12. **Prerequisite:** None.**Recommended Prerequisites:** Principles of Information Technology and Computer Programming l. |
| **Course Description:** In Computer Programming II, students will expand their knowledge and skills in structured programming techniques and concepts by addressing more complex problems and developing comprehensive programming solutions. Students will analyze the social responsibility of business and industry regarding the significant issues relating to environment, ethics, health, safety, and diversity in society and in the workplace as related to computer programming. Students will apply technical skills to address business applications of emerging technologies. |
| **NOTE:** This is a suggested scope and sequence for the course content. This content will work with any textbook or instructional materials. If locally adapted, make sure all TEKS are covered. |
| **Total Number of Periods****Total Number of Minutes****Total Number of Hours** | 175 Periods 7920 Minutes132 Hours\* | \*Schedule calculations based on 175/180 calendar days. For 0.5 credit courses, schedule is calculated out of 88/90 days. Scope and sequence allows additional time for guest speakers, student presentations, field trips, remediation, extended learning activities, etc. |
| **Unit Number, Title, and Brief Description** | **# of Class Periods\***(assumes 45-minute periods)Total minutes per unit | **TEKS Covered****130.310. (c) Knowledge and Skills** |
| **Unit 1: Career Exploration and Employability**Students will expand their knowledge base and interest in careers and entrepreneurship opportunities in the field of Information Technology. Students will explore and discuss employment opportunities and industry certifications and requirements in small groups and as a class as they develop individualized career preparation plans. Students will discover and use resources available through Career and Technical Student Organizations (CTSO) or other extracurricular organization(s) to further develop leadership and employability skills. Students will discuss and demonstrate appropriate and proper etiquette and behavior as well as effective listening and speaking skills in this and in all units as they further develop their personal and career goals and increase their interpersonal and employability skills. | 10 periods450 minutes | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:(A) employ effective reading and writing skills;(B) employ effective verbal and nonverbal communication skills;(C) illustrate interview skills for successful job placement;(D) solve problems and think critically;(E) demonstrate leadership skills and function effectively as a team member;(F) identify and implement proper safety procedures;(G) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and(H) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring and controlling, and closing a project.(2) The student identifies various employment opportunities in the IT field. The student is expected to:(A) create a personal career plan along with education, job skills, and experience necessary to achieve career goals; and(B) develop a resume that includes letters of recommendation appropriate to a chosen career plan. |
| **Unit 2: Program Concept Consulting, Research, and Project Management**Students will engage in advanced opportunities to develop skills and knowledge in consulting and project management. Students will synthesize and demonstrate knowledge by utilizing hands-on skills activities that will enhance the skills designing a program for a specific client need. Students will gather information, design and develop the framework for a program.  | 30 periods 1,350 minutes | (3) The student identifies project software needs and requirements. The student is expected to:(A) identify input and output requirements;(B) identify system processing requirements;(C) identify hardware, networking, and software system functional requirements;(D) conduct a project needs analysis;(E) define a problem to be solved by a created application;(F) analyze requirement specifications using current approaches;(G) identify project constraints; and(H) use advanced modeling and analysis of functional requirements.(4) The student produces an IT-based strategy and project plan to solve a provided class problem. The student is expected to:(A) identify key functions and subsystem capabilities of modern software products;(B) identify software resources and individual product risks; and(C) identify software development methodologies. |
| **Unit 3: Advanced Programming Design and Logic** Students will engage in advanced opportunities to develop software skills in computer programming. Students will synthesize and demonstrate knowledge by utilizing hands-on skills activities that will enhance the use of programming while focusing on projects to apply theories of logic and algorithms into the framework of a program. Students will create flow charts to create programming concepts. Students will discuss security needs for personal identity protection in programming data.  | 40 periods1,800 minutes | (5) The student demonstrates knowledge of the software development environment. The student is expected to:(A) apply prototyping techniques;(B) use appropriate configuration management tools;(C) apply language-specific programming techniques;(D) develop programs using appropriate language;(E) apply the appropriate development environment for each selected language such as the compiler, debugger, test generator, and analyzer;(F) use appropriate modeling and analysis tools; and(G) use appropriate requirement tracking tools.(6) The student demonstrates knowledge of the software development process. The student is expected to:(A) articulate the information system life cycle;(B) identify system analysis issues related to design, testing, implementation, and maintenance;(C) identify the use of program design tools in a software-development process; and(D) identify current information life cycle models.(7) The student designs a software application. The student is expected to:(A) apply principals of system design such as structured, object-oriented, and event-driven processes;(B) develop a logical design;(C) document design specifications according to a defined procedure;(D) design system input, output, processing, and interfaces;(E) identify the characteristics and uses of data processing such as batch, interactive, event driven, and object oriented;(F) explain algorithmic and data structure concepts;(G) identify constraints;(H) identify modular design concepts;(I) identify the features, functions, and architectures of client-server computing;(J) articulate database management concepts;(K) define the objectives of a client-server application;(L) design static and dynamic online processing systems; and(M) employ interface techniques.(11) The student applies procedures for maintaining the security of computerized information. The student is expected to:(A) identify risks to information systems facilities, data, communication systems, and applications;(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse;(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks; and(D) apply procedures used to recover from situations such as system failure and computer virus. |
| **Unit 4: Advanced Programming Code**Students will engage in opportunities to develop advanced software skills in computer programming. Students will synthesize and demonstrate knowledge by utilizing hands-on skills activities that will enhance the use of programming while focusing on applying programming language code to meet the desired result of the design. Students will compile working computer programing with varying level of software engineering from search algorithms, sorting algorithms, and graphics.  | 65 periods2,925 minutes | (8) The student codes a software application. The student is expected to:(A) apply programming language concepts;(B) identify the hardware-software connection;(C) articulate the concept of data representation;(D) apply structured, object-oriented, and event-driven programming techniques;(E) articulate how a programming language can support multitasking and exception handling;(F) identify how current key programming languages work in different operating system environments;(G) translate data structures and program design into code in an appropriate language;(H) demonstrate key constructs and commands specific to a language;(I) identify current programming languages used in software development;(J) explain how to resolve program implementation issues such as debugging, documentation, and auditing;(K) articulate software development issues such as correctness, reliability, and productivity;(L) explain code analysis issues related to design, testing, implementation, and maintenance;(M) demonstrate how to design and implement programs in a top-down manner;(N) demonstrate how to translate algorithmic and modular design into computer code;(O) explain how programming control structures are used to verify correctness;(P) compile and debug computer code; and(Q) prepare appropriate commenting within code. |
| **Unit 5: Advanced Programming Compilation and Testing**Students will engage in opportunities to develop advanced software skills in computer program testing. Students will synthesize and demonstrate knowledge by utilizing hands-on skills activities that will enhance the use of programming while focusing on testing the validity of programming code. Student will perform quality assurance techniques and verify their code.  | 30 periods1,350 minutes | (9) The student demonstrates knowledge of software testing. The student is expected to:(A) develop a test plan;(B) define test procedures;(C) develop test cases; and(D) perform software testing.(10) The student performs quality assurance testing. The student is expected to:(A) explain the software quality assurance process;(B) apply standard requirements for software quality assurance;(C) perform software quality assurance tasks to determine a quality software product; and(D) conduct code inspection. |