Virginia CTE

Advanced Programming (6641)

Developing Object-Oriented Programming (OOP) AP.1

1. Explain the reasoning behind the steps in the software development life cycle (SDLC). AP.1.1
2. Describe the primary principles of object-oriented programming (OOP). AP.1.2
3. Identify potential objects, attributes, and methods within a problem description. AP.1.3
4. Design attributes (properties) and methods of each class within a problem description. AP.1.4
5. Create a program with user-defined classes. AP.1.5
6. Describe the concept of reusability. AP.1.6
7. Identify reusable resources that will help solve a problem. AP.1.7
8. Import code from existing sources. AP.1.8
9. Describe the concepts of overloading and overriding methods in an object-oriented language. AP.1.9
10. Code a program that uses looping structures, conditional structures, and sequential control structures. AP.1.10
11. Analyze abstract data types. AP.1.11
12. Implement searching and sorting algorithms. AP.1.12
13. Code a program that uses error-handling and input-validation procedures. AP.1.13
14. Code a program to use an interface. AP.1.14
15. Create a test suite that will verify proper operation of a class or group of related classes. AP.1.15
16. Perform a peer review and test of a program. AP.1.16

	17 **Analyze code that uses recursion.** AP.1.17
Developing Database Applications AP.2	1 **Identify relational database terminology.** AP.2.1
	2 **Identify database model types.** AP.2.2
	3 **(Optional) Describe the three-layer/tier model for database applications.** AP.2.3
	4 **Identify the data object model for the program language.** AP.2.4
	5 **Design a GUI for a database application.** AP.2.5
	6 **Write code to integrate an existing database into a program application.** AP.2.6
	7 **Write code to manage a database.** AP.2.7
	8 **Bind database fields to the interface elements (controls).** AP.2.8
Developing Interactive Multimedia Applications AP.3	1 **Write a design document for a game.** AP.3.1
	2 **Code a multiplayer game.** AP.3.2
Developing Connected Applications (Mobile and/or Web) AP.4	1 **Determine the programming languages used to create connected applications.** AP.4.1
	2 **Design a web application with security features.** AP.4.2
	3 **(Optional) Design a GUI for a connected application.** AP.4.3
	4 **(Optional) Code a web application (e.g., shopping cart) for a smart device or emulator.** AP.4.4
	5 **(Optional) Describe the process of mobile application deployment.** AP.4.5
	6 **(Optional) Describe the web application publishing process.** AP.4.6
	7 **Describe client-side and server-side applications.** AP.4.7
Preparing for Industry Certification AP.5	1 **Describe the process and requirements for obtaining industry certifications related to the Programming, Advanced course.** AP.5.1
	2 **Identify testing skills/strategies for a certification examination.** AP.5.2
	3 **Demonstrate ability to successfully complete selected practice examinations (e.g., practice questions similar to those on certification exams).** AP.5.3
	4 **(Optional) Successfully complete an industry certification examination representative of skills learned in this course (e.g., MCP, IC3).** AP.5.4

Developing Employability Skills AP.6

1. **Investigate continuing education pathways and careers in the information technology industry.** AP.6.1
2. **Create or update a résumé.** AP.6.2
3. **Update professional portfolio.** AP.6.3
4. **Deliver an oral presentation of programming projects.** AP.6.4