Florida Department of Education
Curriculum Framework

Program Title: **Computer Programming and Analysis**
Career Cluster: **Information Technology**

AS	
CIP Number	1511020101
Program Type	College Credit
Standard Length	60 credit hours
CTSO	Phi Beta Lambda, BPA
SOC Codes (all applicable)	15-1131 – Computer Programmers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers such as entry level programmers, programmer specialists, computer programmers, senior programmers, chief business programmers, programmer analysts, and information systems programmers in the Information Technology career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Information Technology career cluster.

The content prepares individuals to analyze business situations and to design, develop and write computer programs; to store, locate, and retrieve specific documents, data, and information; analyze problems using logic/analysis tools, code into computer language; test, monitor, debug, document and maintain computer programs.

More than one programming language should be addressed in this degree program.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of 60 credit hours.

Standards

After successfully completing this program, the student will be able to perform the following:

01.0 Perform data file activities.
02.0 Perform analysis activities.
03.0 Perform program design activities.
04.0 Perform coding activities.
05.0 Demonstrate fundamental proficiency in network security essentials.
06.0 Perform testing activities.
07.0 Perform user-training activities.
08.0 Perform implementation activities.
09.0 Perform user support activities.
10.0 Perform evaluation activities.
11.0 Demonstrate professional development skills.
12.0 Demonstrate employability skills.
13.0 Demonstrate general organizational computing workplace competencies.
14.0 Develop an algorithm that solves a problem.
15.0 Use development methodologies.

Florida Department of Education
Student Performance Standards

Program Title: **Computer Programming and Analysis**
CIP Number: **1511020101**
Program Length: **60 credit hours**
SOC Code(s): **15-1131**

Refer to Rule 6A-14.030 (4) F.A.C., for the minimum amount of general education coursework required in the Associate of Science (AS) degree. At the completion of this program, the student will be able to:	
01.0	Perform data file activities. The student will be able to:
01.01	Identity methods of file organization.
01.02	Select an efficient method of file organization for a given situation.
01.03	Identify security procedures to maintain integrity of files.
02.0	Perform analysis activities. The student will be able to:
02.01	Communicate with users to ascertain system requirements.
02.02	Develop information system requirements to accomplish specific task.
02.03	Analyze and document user requirements.
02.04	Evaluate alternative solutions.
02.05	Analyze and document system requirements.
02.06	Create a plan for the design phase of an information technology system.
02.07	Develop a timeline for system development.
02.08	Communicate the plan.
02.09	Develop systems specifications.
02.10	Develop systems documentation.
02.11	Evaluate system performance.
02.12	Demonstrate understanding of technical and operational feasibility issues in determining a system solution.

	02.13 Demonstrate knowledge, skills, and application of information systems to accomplish specific job objectives.
03.0	Perform program design activities. The student will be able to:
	03.01 Demonstrate proficiency in design of information technology systems.
	03.02 Demonstrate knowledge of computer concepts and terminology.
	03.03 Demonstrate understanding of computer systems architecture including components, networked environments, and operating systems.
	03.04 Develop design specifications.
	03.05 Select a feasible development environment.
	03.06 Validate design specifications.
	03.07 Document design.
	03.08 Communicate design specifications.
	03.09 Develop prototype.
	03.10 Assist in revisions and enhancements of software systems.
04.0	Perform coding activities. The student will be able to:
	04.01 Identify modules.
	04.02 Design modules.
	04.03 Code modules.
	04.04 Document modules.
	04.05 Test modules.
	04.06 Debug code.
	04.07 Revise code.
	04.08 Assemble modules.
	04.09 Demonstrate proficient use of programming development tools.
05.0	Demonstrate fundamental proficiency in network security essentials. The student will be able to:
	05.01 Describe common security threats to, and vulnerabilities of, computer systems and the corresponding best practices for mitigation.

	05.02 Define and describe malicious software and techniques to protect systems from its effects.
	05.03 Describe Denial of Service attacks and means to defend against them.
	05.04 Identify the risks and techniques of data loss and its prevention.
	05.05 Describe the principles and techniques of securing data storage and transmission.
	05.06 Identify current encryption and authentication standards.
	05.07 Implement security policies, including compliance and operational security.
	05.08 Enable access control, identity management and security logging.
	05.09 Manage client and network system security software and related updates.
	05.10 Describe the functions and characteristics of firewalls.
	05.11 Perform a ping sweep to identify network hosts.
	05.12 Perform a port scan to probe network hosts for open TCP and UDP ports.
	05.13 Describe the purpose and operation of network protocol analyzers.
	05.14 Utilize a network protocol analyzer to capture and analyze network traffic for security issues.
06.0	Perform testing activities. The student will be able to:
	06.01 Develop test plan.
	06.02 Develop test data.
	06.03 Validate input(s).
	06.04 Perform test(s).
	06.05 Validate expected outcomes.
	06.06 Determine boundary test cases.
	06.07 Load-test the system.
	06.08 Revise program code as necessary.
	06.09 Document test results.
07.0	Perform user-training activities. The student will be able to:

	07.01 Assist in development of user documentation.
	07.02 Assist in development of training plan.
	07.03 Demonstrate appropriate user training techniques.
08.0	Perform implementation activities. The student will be able to:
	08.01 Develop an implementation plan.
	08.02 Install system.
	08.03 Validate system.
	08.04 Troubleshoot methodologies.
	08.05 Document implementation.
09.0	Perform user-support activities. The student will be able to:
	09.01 Demonstrate proficient use of productivity software (word processing, spreadsheets, databases, presentation) skills.
	09.02 Demonstrate appropriate communication and interpersonal skills.
	09.03 Determine the customer needs using system analysis strategies.
	09.04 Listen to the customer and ask appropriate questions.
	09.05 Persist when dealing with difficult customers maintaining a professional demeanor.
	09.06 Provide suggested information technology solutions.
	09.07 Research and understand specific corporate culture.
	09.08 Use tact when dealing with customer and competitors.
	09.09 Maintain professional work ethics and follow policies and procedures.
	09.10 Respect customer work space/environment.
	09.11 Set realistic expectations when establishing deadlines for customer solutions.
	09.12 Communicate action plan including timelines.
	09.13 Recognize the existence of internal/external customers and follow appropriate guidelines for each.
10.0	Perform evaluation activities. The student will be able to:

	10.01 Review software development plans.
	10.02 Assess validity and performance of software systems.
	10.03 Identify improvements to software systems.
	10.04 Assist in revisions and enhancements of software systems.
	10.05 Assist in project evaluation.
	10.06 Recommend improvements.
	10.07 Provide feedback to management, users and peer groups.
11.0	Demonstrate professional development skills. The student will be able to:
	11.01 Use on-line resources related to employee job requirements.
	11.02 Understand the importance of continuing development activities such as reading industry journals and magazines; attending trade shows, seminars and other continuing professional development activities; participating in professional organizations and developing professional contacts for future projects.
	11.03 Understand the evolving nature of information technology systems and necessity of flexibility and willingness to implement needed changes.
	11.04 Set career goals/directions.
	11.05 Build mentor relationships.
12.0	Demonstrate employability skills. The student will be able to:
	12.01 Demonstrate business communication skills such as producing applications, business letters and memos, and resumes.
	12.02 Understand appropriate workplace dress and demeanor for specific corporate cultures.
	12.03 List representative jobs and career paths for people trained in the computer programming field.
	12.04 List several functions of each representative computer programming job and career path.
13.0	Demonstrate general organizational computing workplace competencies. The student will be able to:
	13.01 Follow oral and written instructions.
	13.02 Prepare, outline, and deliver a short oral presentation.
	13.03 Utilize research skills to obtain appropriate information, graphics and other data needed.

	13.04 Prepare visual material to support an oral presentation.
	13.05 Demonstrate self-motivation and responsibility to complete an activity.
	13.06 Choose appropriate action in situations requiring effective time management.
	13.07 Identify and discuss issues contained within professional codes of conduct.
	13.08 Identify and discuss software licensing, property rights, privacy, encryption and legal liability issues.
14.0	Develop an algorithm that solves a problem. The student will be able to:
	14.01 List the steps in problem solving.
	14.02 Write pseudocode for sequential control structures.
	14.03 Write pseudocode for selection control structures.
	14.04 Write pseudocode for repetition control structures.
	14.05 Determine efficiency of an algorithm.
	14.06 Determine the complexity of an algorithm.
15.0	Use development methodologies. The student will be able to:
	15.01 Define the Waterfall methodology.
	15.02 Define the Agile methodology.
	15.03 Compare and contrast Waterfall and Agile methodologies.
	15.04 Develop a simple application using the Waterfall methodology.
	15.05 Develop a simple application using the Agile methodology.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Phi Beta Lambda and Business Professionals of America (BPA) are the intercurricular career and technical student organizations providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Certificate Programs

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This AS degree program includes the following College Credit Certificates:

Computer Programming Specialist (0511020103) – 18 credit hours
Computer Programmer (0511020200) – 33/36 credit hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

Additional Resources

For additional information regarding articulation agreements, Bright Futures Scholarships, Fine Arts/Practical Arts Credit and Equivalent Mathematics and Equally Rigorous Science Courses please refer to:
http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml