Florida Department of Education
Curriculum Framework

Program Title: **Java Development & Programming**
Program Type: **Career Preparatory**
Career Cluster: **Information Technology**

Secondary – Career Preparatory	
Program Number	9007200
CIP Number	0511020313
Grade Level	9-12, 30, 31
Standard Length	8 credits
Teacher Certification	BUS ED 1 @2 COMP SCI 6 COMP PROG 7G
CTSO	FBLA BPA SkillsUSA
SOC Codes (all applicable)	15-1151 – Computer User Support Specialists 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 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 includes but is not limited to the fundamentals of programming and software development; procedural and object-oriented programming; creating regular and specialized applications using the Java programming language, including testing, monitoring, debugging, documenting, and maintaining Java computer applications.

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 four occupational completion points, with OCPs A, B, and C comprising the Software Development Core. Secondary or postsecondary students who have previously completed the Software Development Core will not have to repeat the core. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or exit as an occupational completer.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	8207310	Introduction to Information Technology	1 credit	15-1151	2	VO
B	9007210	Foundations of Programming	1 credit	15-1131	3	VO
	9007220	Procedural Programming	1 credit		3	
C	9007230	Object-Oriented Programming Fundamentals	1 credit	15-1131	3	VO
D	9007240	Java Programming Essentials	1 credit	15-1131	3	VO
	9007250	Applied Object-Oriented Java Programming	1 credit		3	
	9007260	Java Database Programming	1 credit		3	
	9007270	Java Programming Capstone	1 credit		3	

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics Honors	Integrated Science 1	Marine Science 1 Honors	Physical Science	Physics 1	Environmental Science
8207310	15/87 17%	22/80 28%	14/83 17%	20/69 29%	12/67 18%	15/69 22%	12/82 15%	23/66 35%	16/74 22%	18/72 25%	23/70 33%
9007210	3/87 3%	8/80 10%	3/83 4%	5/69 7%	5/67 7%	4/69 6%	4/82 5%	8/66 12%	7/74 9%	5/72 7%	5/70 7%
9007220	22/87 25%	22/80 28%	2/83 2%	21/69 30%	2/67 3%	22/69 32%	2/82 2%	17/66 26%	2/74 3%	21/72 29%	20/70 29%
9007230	21/87 24%	21/80 26%	1/83 1%	20/69 29%	1/67 1%	21/69 30%	1/82 1%	16/66 27%	1/74 1%	20/72 28%	20/70 29%

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
8207310	20/67 30%	15/75 20%	4/54 7%	40/46 82%	40/45 83%	40/45 89%	40/45 0%
9007210	20/67 30%	14/75 19%	17/54 31%	0/46 0%	0/45 0%	0/45 0%	0/45 0%
9007220	11/67 16%	19/75 25%	9/54 17%	9/46 17%	0/45 0%	0/45 0%	0/45 0%
9007230	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Applied Cybersecurity.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Applied Cybersecurity.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Applied Cybersecurity.
04.0 Demonstrate knowledge, skill, and application of information systems to accomplish job objectives and enhance workplace performance.
05.0 Demonstrate comprehension and communication skills.
06.0 Use technology to enhance the effectiveness of communication skills.
07.0 Develop an awareness of management functions and organizational structures as they relate to today's workplace and employer/employee roles.
08.0 Practice quality performance in the learning environment and the workplace.
09.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
10.0 Apply mathematical operations and processes as well as financial planning strategies to commonly occurring situations in the workplace to accomplish job objectives and enhance workplace performance.
11.0 Assess personal strengths and weaknesses as they relate to job objectives, career exploration, personal development, and life goals.
12.0 Incorporate knowledge gained from individual assessment and job/career exploration to design an individual career plan that reflects the transition from school to work, lifelong learning, and personal and professional goals.
13.0 Demonstrate human relations/interpersonal skills appropriate for the workplace.
14.0 Participate in work-based learning experiences.
15.0 Perform e-mail activities.
16.0 Demonstrate knowledge of different operating systems.
17.0 Demonstrate proficiency navigating the internet, intranet, and the WWW.
18.0 Demonstrate proficiency using HTML commands.
19.0 Demonstrate proficiency in page design applicable to the WWW.
20.0 Demonstrate proficiency using specialized web design software.
21.0 Develop an awareness of the information technology industry.
22.0 Develop an awareness of microprocessors and digital computers.
23.0 Develop an awareness of programming languages.
24.0 Develop an awareness of emerging technologies.
25.0 Demonstrate an understanding of the seven layers of the Open Systems Interface (OSI) model.
26.0 Demonstrate proficiency using common software applications.
27.0 Demonstrate proficiency using specialized software applications
28.0 Demonstrate language arts knowledge and skills.
29.0 Demonstrate mathematics knowledge and skills.
30.0 Demonstrate science knowledge and skills.
01.0 Explore the characteristics, tasks, work attributes, options, and tools associated with a career in software development.

02.0 Demonstrate an understanding of the characteristics, use, and selection of numerical, non-numerical, and logical data types.
03.0 Distinguish between iterative and non-iterative program control structures.
04.0 Differentiate among high level, low level, procedural, object-oriented, compiled, interpreted, and translated programming languages.
05.0 Describe the processes, methods, and conventions for software development and maintenance.
06.0 Explain the types, uses, and limitations of testing for ensuring quality control.
07.0 Create a program design document using Unified Modeling Language (UML) or other common design tool.
08.0 Describe information security risks, threats, and strategies associated with software development.
09.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas.
10.0 Solve problems using critical thinking skills, creativity and innovation.
11.0 Use information technology tools.
12.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Java Development & Programming.
13.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Java Development & Programming.
14.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Java Development & Programming.
15.0 Design a computer program to meet specific physical, operational, and interaction criteria.
16.0 Create and document a computer program that uses a variety of internal and control structures for manipulating varied data types.
17.0 Create and document an interactive computer program that employs functions, subroutines, or methods to receive, validate, and process user input.
18.0 Create a unit test plan, implement the plan, and report the results of testing.
19.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
20.0 Describe the importance of professional ethics and legal responsibilities.
21.0 Explain key concepts that distinguish object-oriented programming from procedural programming.
22.0 Create a project plan for an object-oriented programming project that defines requirements, structural design, time estimates, and testing elements.
23.0 Design, document, and create object-oriented computer programs.
24.0 Design a unit test plan for an object-oriented computer program, test and debug the program, and report the results.
25.0 Construct statements that declare, initialize, and modify different types of variables used in Java programs.
26.0 Describe the types and characteristics of lexical units in the Java programming language.
27.0 Describe the data types employed in Java programs.
28.0 Construct Java statements that employ the use of various operators.
29.0 Write executable statements using Java.
30.0 Describe variable scope and its implications in Java programming.
31.0 Apply common Java programming style guidelines and conventions.
32.0 Demonstrate use of the compiler and interpreter through command line interface.
33.0 Construct conditional control statements in Java.
34.0 Construct iterative control statements in Java.
35.0 Use nested loop iterative control statements in Java.
36.0 Produce input and output for Java programs.
37.0 Use packages and import statements in a Java program.
38.0 Create a Java program that uses methods.

39.0 Create a Java program that uses parameters in methods.
40.0 Describe and use recursion in a Java program.
41.0 Construct Java statements that use the String class to manipulate String data.
42.0 Construct Java statements that use Classes.
43.0 Manage class relationships.
44.0 Construct Java statements that illustrate the use of multiplicities in class relationships.
45.0 Use object references.
46.0 Describe the types of arrays and construct Java statements that illustrate the use and manipulation of multi-dimensional and jagged arrays.
47.0 Construct Java statements that illustrate different ways of using inheritance.
48.0 Construct Java statements that use collections.
49.0 Write Java code that uses the Iterator and List interfaces.
50.0 Create Java code that includes exception handling code.
51.0 Create Java code that uses the Object class.
52.0 Use standard library classes that comprise the Java API.
53.0 Create Java code that uses exceptions to improve program quality.
54.0 Describe Java 2 Micro Edition (J2ME) uses, characteristics, and constraints.
55.0 Create and convert classes using Unified Modeling Language (UML).
56.0 Create programs that use of Remote Method Invocation (RMI) and other server technologies associated with Relational Database Management Systems (RDMS) and Structured Query Language (SQL).
57.0 Demonstrate an understanding of Java Integration APIs, including Java Message Service (JMS), Enterprise JavaBeans (EJB), and Java Naming and Directory Interface (JNDI).
58.0 Demonstrate an understanding of Java Client APIs, including the Abstract Window Toolkit (AWT), Swing, and Java applet.
59.0 Understand and apply Java 2 Enterprise Edition (J2EE) Server Solutions.
60.0 Create a database application using the Java programming language.
61.0 Create a graphical user interface application using the Java programming language.
62.0 Create a web-based application using the Java programming language.
63.0 Write code to perform common and union database queries using SQL and Java.
64.0 Implement Java program statements using objects.
65.0 Utilize debugging tools and write error handlers.
66.0 Demonstrate file input/output (I/O).
67.0 Utilize API functions.
68.0 Test and debug databases.
69.0 Successfully work as a member of a software development team.
70.0 Manage time according to a plan.
71.0 Keep acceptable records of progress problems and solutions.
72.0 Plan, organize, and carry out a project plan.
73.0 Manage resources.
74.0 Use tools, materials, and processes in an appropriate and safe manner.
75.0 Demonstrate an understanding of the software development process.
76.0 Research content related to the project and document the results following industry conventions.
77.0 Use presentation skills, and appropriate media to describe the progress, results and outcomes of the experience.
78.0 Demonstrate competency in the area of expertise related to developing computer software using the Java programming language.

Florida Department of Education
Student Performance Standards

Course Title: **Introduction to Information Technology**
Course Number: **8207310**
Course Credit: **1**

Course Description:

This course is designed to provide an introduction to information technology concepts and careers as well as the impact information technology has on the world, people, and industry and basic web design concepts. The content includes information technology career research; operating systems and software applications; electronic communications including e-mail and Internet services; basic HTML, DHTML, and XML web commands and design; and emerging technologies and web page design. After successful completion of Introduction to Information Technology, students will have met Occupational Completion Point A, Information Technology Assistant, SOC Code 15-1151.

Florida Standards			Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in the program in which the BTE Core is associated.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a	

Florida Standards			Correlation to CTE Program Standard #
		procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
	01.03	Integration of Knowledge and Ideas	
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
	01.04	Range of Reading and Level of Text Complexity	
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in the program in which the BTE Core is associated.		
	02.01	Text Types and Purposes	
	02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
	02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
	02.02	Production and Distribution of Writing	
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge		
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing		
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in the program in which the BTE Core is associated.		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1		
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1		
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1		
03.04	Model with mathematics. MAFS.K12.MP.4.1		
03.05	Use appropriate tools strategically. MAFS.K12.MP.5.1		
03.06	Attend to precision. MAFS.K12.MP.6.1		
03.07	Look for and make use of structure.		

Florida Standards	Correlation to CTE Program Standard #
MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate knowledge, skill, and application of information systems to accomplish job objectives and enhance workplace performance – the student will be able to:		SC.912.L.14.12, 16, 16.10, 17.11, 13, 15, 16, 19, 20; SC.912.N.1.1, 3, 4, 7, 2.2, 5, 3.5, 4.2
04.01 Develop keyboarding skills to enter and manipulate text and data.	LAFS.910.SL.2.5, LAFS.1112.SL.2.5, LAFS.910.W.2.6, LAFS.1112.W.2.6, LAFS.910.SL.1.2, LAFS.1112.SL.1.2, LAFS.910.L.1.2, LAFS.1112.L.1.2	
04.02 Describe and use current and emerging computer technology and software to perform personal and business related tasks.	LAFS.910.SL.1.1, LAFS.910.SL.1.2, LAFS.910.SL.1.3, LAFS.910.SL.2.4, LAFS.910.SL.2.5, LAFS.910.SL.2.6, LAFS.910.W.1.2, LAFS.910.W.2.6, LAFS.1112.SL.1.1, LAFS.1112.SL.1.2, LAFS.1112.SL.1.3, LAFS.1112.SL.2.4, LAFS.1112.SL.2.5, LAFS.1112.SL.2.6, LAFS.1112.W.1.2, LAFS.1112.W.2.6	
04.03 Identify and describe communications and networking systems used in workplace environments.	LAFS.910.RI.2.4, LAFS.1112.RI.2.4, LAFS.910.SL.1.2, LAFS.1112.SL.1.2, LAFS.910.W. 2.4, LAFS.910.W. 2.5, LAFS.910.W. 2.6, LAFS.1112.W. 2.4, LAFS.1112.W. 2.5, LAFS.1112.W. 2.6, LAFS.910.W.3.8, LAFS.1112.W.3.8	
04.04 Use reference materials such as on-line help, vendor bulletin boards, tutorials, and manuals available for application software.	LAFS.910.RI.1.1, LAFS.910.RI.1.2, LAFS.910.RI.1.3, LAFS.910.RI.2.4, LAFS.910.RI.2.5, LAFS.910.RI.2.6, LAFS.910.RI.3.7, LAFS.1112.RI.1.1, LAFS.1112.RI.1.2, LAFS.1112.RI.1.3, LAFS.1112.RI.2.4, LAFS.1112.RI.2.5, LAFS.1112.RI.2.6, LAFS.1112.RI.3.7, LAFS.910.RI.4.10, LAFS.1112.RI.4.10	
04.05 Troubleshoot problems with computer hardware peripherals and other office equipment.	LAFS.910.SL1.1, LAFS.1112.SL.1.1, LAFS.910.SL.2.5, LAFS.1112.SL.2.5	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	04.06 Describe ethical issues and problems associated with computers and information systems.	LAFS.910.RI.4.10, LAFS.1112.RI.4.10, LAFS.910.RI.1.1, LAFS.910.RI.1.2, LAFS.910.RI.1.3, LAFS.1112.RI.1.1, LAFS.1112.RI.1.2, LAFS.1112.RI.1.3, LAFS.910.RI.3.8, LAFS.1112.RI.3.8, LAFS.910.W.3.8, LAFS.1112.W.3.8, LAFS.910.W.1.1, LAFS.1112.W.1.1, LAFS.910.W.1.2, LAFS.1112.W.1.2, LAFS.910.SL.1.1, LAFS.910.SL.1.2, LAFS.910.SL.1.3, LAFS.910.SL.2.4, LAFS.910.SL.2.5, LAFS.910.SL.2.6, LAFS.1112.SL.1.1, LAFS.1112.SL.1.2, LAFS.1112.SL.1.3, LAFS.1112.SL.2.4, LAFS.1112.SL.2.5, LAFS.1112.SL.2.6	
05.0	Demonstrate comprehension and communication skills – the student will be able to:		
	05.01 Use listening, speaking, telecommunication and nonverbal skills and strategies to communicate effectively with supervisors, co-workers, and customers.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	05.02 Organize ideas and communicate oral and written messages appropriate for information technology environments.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
	05.03 Collaborate with individuals and teams to complete tasks and solve information technology problems.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	05.04 Identify, define, and discuss professional information technology terminology appropriate for internal and external communications in an information technology environment.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L 2.3, 3.4, 3.5, 3.6	
	05.05 Apply the writing process to the creation of appropriate documents following designated business formats.	LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.L.1.1, 1.2 LAFS.1112.L1.1, 1.2	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
05.06	Demonstrate an awareness of project management concepts and tools (e.g., timelines, deadlines, resource allocation, time management, delegation of tasks, collaboration).	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
06.0	Use technology to enhance the effectiveness of communication skills – the student will be able to:		SC.912.N.1.1, 4, 2.2, 3.5
06.01	Use database, spreadsheet, presentation software, scheduling, and integrated software packages to enhance communication.	LAFS.910.RI.4.1 LAFS.910.W.4.1 LAFS.1112.RI.4.1 LAFS.1112.W.4.1 MAFS 912.A-CED.1.1	
06.02	Respond to and utilize information derived from multiple sources (e.g., written documents, instructions, e-mail, voice mail) to solve business problems and complete business tasks.	LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.L.1.1, 1.2 LAFS.1112.L1.1, 1.2	
07.0	Investigate management functions and organizational structures as they relate to today's workplace and employer/employee roles – the student will be able to:		
07.01	Explore, design, implement, and evaluate organizational structures and cultures.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.3.7, 3.8, 4.1 LAFS.1112.W.3.7, 3.8, 4.1	
07.02	Explore and demonstrate an awareness of current trends in business and the employee's role in maintaining productive business environments in today's global workplace.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.3.7, 3.8, 4.1 LAFS.1112.W.3.7, 3.8, 4.1	
07.03	Collaborate with individuals and teams to complete tasks and solve business-related problems and demonstrate initiative, courtesy, loyalty, honesty, cooperation, and punctuality as a team member.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.3.7, 3.8, 4.1 LAFS.1112.W.3.7, 3.8, 4.1	
08.0	Practice quality performance in the learning environment and the workplace – the student will be able to:		
08.01	Assess personal, peer and group performance and identify and implement strategies for improvement (e.g., organizational skills, note taking/outlining, advance organizers, reasoning skills, problem-solving skills, and decision-making skills).	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.3.7, 3.8, 4.1 LAFS.1112.W.3.7, 3.8, 4.1	
08.02	Develop criteria for assessing products and processes that incorporate effective business practices (e.g., time management,	LAFS.910.SL.1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL1.2, 1.3, 2.4, 2.5, 2.6	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	productivity, total quality management).		
09.0	Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance – the student will be able to:		
09.01	Demonstrate awareness of the following workplace essentials: Quality customer service; business ethics; confidentiality of information; copyright violations; accepted workplace rules, regulations, policies, procedures, processes, and workplace safety, and appropriate attire and grooming.	LAFS.910.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
10.0	Apply mathematical operations and processes as well as financial planning strategies to commonly occurring situations in the workplace to accomplish job objectives and enhance workplace performance – the student will be able to:		
10.01	Analyze, interpret, compile, and demonstrate the ability to present/communicate data in understandable and measurable terms using common statistical procedures.	LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1 MAFS 912.S-ID.1.1 MAFS.9.12.A-APR.4.6 MAFS.912.A-CED.1.3 MAFS.912.S-MD.2.5 B	
10.02	Use common standards of measurement including the metric system in solving work-related or business problems (e.g., length, weight, currency, time).	LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1	SC.912.N.1.5
10.03	Select and use the correct mathematical processes and tools to solve complex problem situations that are typical of business settings and use formulas when appropriate.	LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1 MAFS.912.A-CED.1.1, 1.3, 1.4 MAFS 912.A-REI.2.3	
11.0	Assess personal strengths and weaknesses as they relate to job objectives, career exploration, personal development, and life goals – the student will be able to:		
11.01	Use personal assessment tools to identify personal strengths and weaknesses related to learning and work environments.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2 LAFS.910.RI.4.1 LAFS.1112.RI. 4.1	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	11.02 Analyze job and career requirements and relate career interests to opportunities in the global economy.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2 LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1	
12.0	Incorporate knowledge gained from individual assessment and job/career exploration to design an individual career plan that reflects the transition from school to work, lifelong learning, and personal and professional goals – the student will be able to:		
	12.01 Research, compare, and contrast information technology career clusters (e.g., characteristics needed, skills required, education required, industry certifications, advantages and disadvantages of information technology careers, the need for information technology workers).	LAFS.910.SL.1.2 LAFS.1112.SL.1.2 LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
	12.02 Describe the variety of occupations and professions within the world of information technology including those where information technology is either in a primary focus or in a supportive role.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2 LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1	
	12.03 Describe job requirements for the variety of occupations and professions within the global world of information technology.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2 LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1	
	12.04 Analyze personal skills and aptitudes in comparison with information technology career opportunities.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2 LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1	
	12.05 Refine and implement a plan to facilitate personal growth and skill development related to information technology career opportunities.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2 LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1	
	12.06 Develop and maintain an electronic career portfolio, to include, but not limited to the Resume and Letter of Application.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
		LAFS.910.RI.4.1 LAFS.1112.RI. 4.1 LAFS.910.W. 4.1 LAFS.1112.W. 4.1	
13.0	Demonstrate human relations/interpersonal skills appropriate for the workplace – the student will be able to:		
13.01	Accept constructive criticism.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1	
13.02	Demonstrate personal and interpersonal skills appropriate for the workplace (e.g., responsibility, dependability, punctuality, integrity, positive attitude, initiative, respect for self and others, professional dress).	LAFS.910.SL.1.1 LAFS.1112.SL.1.1	
14.0	Participate in work-based learning experiences – the student will be able to:		
14.01	Participate in work-based learning experiences in an information technology environment.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1	
14.02	Discuss the use of technology in an information technology environment.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1	
15.0	Perform e-mail activities – the student will be able to:		SC.912.N.1.1, 4, 3.5, 4.1, 2
15.01	Describe e-mail capabilities and functions.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.02	Identify components of an e-mail message.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.03	Identify the components of an e-mail address.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.04	Identify when to use different e-mail options.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.05	Attach a file to an e-mail message.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.06	Forward an e-mail message.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.07	Use an address book.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.08	Reply to an e-mail message.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.09	Use the Internet to perform e-mail activities.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.10	Identify the appropriate use of e-mail and demonstrate related e-mail etiquette.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
15.11	Identify when to include information from an original e-mail message in a response.	LAFS.910.W.4.1 LAFS.1112.W.4.1	

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	15.12 Identify common problems associated with widespread use of e-mail.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
16.0	Demonstrate knowledge of different operating systems – the student will be able to:		
	16.01 Identify operating system file naming conventions.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
	16.02 Demonstrate proficiency with file management and structure (e.g., folder creation, file creation, backup, copy, delete, open, save).	LAFS.910.W.4.1 LAFS.1112.W.4.1	
	16.03 Demonstrate a working knowledge of standard file formats.	LAFS.910.W.4.1 LAFS.1112.W.4.1	
	16.04 Explain the history and purpose of various operating systems (e.g., DOS, Windows, Mac, and Unix/Linux).	LAFS.910.W.4.1 LAFS.1112.W.4.1 LAFS.910.RI.4.1 LAFS.1112.RI.4.1	
17.0	Demonstrate proficiency navigating the internet, intranet, and the WWW – the student will be able to:		
	17.01 Identify and describe Web terminology.	LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L. 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	17.02 Demonstrate proficiency in using the basic features of GUI browsers (e.g., setting bookmarks, basic configurations, e-mail configurations, address book).	LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L. 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	17.03 Define Universal Resource Locators (URLs) and associated protocols (e.g., .com, .org, .edu, .gov, .net, .mil).	LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L. 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	17.04 Describe and observe Internet/Intranet ethics and copyright laws and regulatory control.	LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L. 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	17.05 Trace the evolution of the Internet from its inception to the present and into the future.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
	17.06 Demonstrate proficiency using search engines (e.g., Yahoo!, Google).	LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L. 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
		LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	17.07 Demonstrate proficiency using various web tools (e.g., downloading of files, transfer of files, telnet, PDF).	LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L. 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	
	17.08 Identify effective Boolean search strategies.	LAFS.910.RI.4.1 LAFS.1112.RI.4.1	
18.0	Demonstrate proficiency using HTML commands – the student will be able to:		
	18.01 Identify elements of a Web page.	LAFS.910.RL.1.1,1.2,1.3,2.4,2.6,3.7,3.9 4.1 LAFS.1112.RL.1.1,1.2,1.3,2.4,2.6,3.7,3. 9,4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.910.L.2.3 LAFS.1112.L.2.3	
	18.02 Describe individual Web page layouts and content (e.g., writing for the Web, Web structure).	LAFS.910.RL.1.1,1.2,1.3,2.4,2.6,3.7,3.9 4.1 LAFS.1112.RL.1.1,1.2,1.3,2.4,2.6,3.7,3. 9,4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.910.L.2.3 LAFS.1112.L.2.3	
	18.03 Define basic HTML terminology.	LAFS.910.RL.1.1,1.2,1.3,2.4,2.6,3.7,3.9 4.1 LAFS.1112.RL.1.1,1.2,1.3,2.4,2.6,3.7,3. 9,4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.910.L.2.3 LAFS.1112.L.2.3	
	18.04 Analyze HTML source code developed by others.	LAFS.910.RL.1.1,1.2,1.3,2.4,2.6,3.7,3.9 4.1 LAFS.1112.RL.1.1,1.2,1.3,2.4,2.6,3.7,3.	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
	9,4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.910.L.2.3 LAFS.1112.L.2.3	
18.05 Create Web pages using basic HTML tags (e.g., links, lists, character styles, text alignment, tables).	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
18.06 Use storyboarding techniques for subsequent Web pages (e.g., linear, hierarchical).	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
18.07 Edit and test HTML documents for accuracy and validity.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
18.08 Use basic functions of WYSIWYG editors.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
	LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
18.09 Use basic functions of HTML, DHTML, and XML editors and converters.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
18.10 Enhance web pages through the addition of images and graphics including animation.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
19.0 Demonstrate proficiency in page design applicable to the WWW – the student will be able to:		
19.01 Develop an awareness of acceptable Web page design, including index pages in relation to the rest of the Web site.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
19.02 Describe and apply color theory as it applies to Web page design (e.g., background and text color).	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
	LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
19.03 Access and digitize graphics through various resources (e.g., scanner, digital cameras, on-line graphics, clipart, CD-ROMs).	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
19.04 Use image design software to create and edit images.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
19.05 Demonstrate proficiency in publishing to the Internet.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
19.06 Demonstrate proficiency in adding downloadable forms to web pages.	LAFS.910.L. 2.3, 3.4, 3.5, 3.6 LAFS.1112.L 2.3, 3.4, 3.5, 3.6	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	19.07 Explain the need for web-based applications.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1	
20.0	Demonstrate proficiency using specialized web design software – the student will be able to:		
	20.01 Compare and contrast various specialized web design software (e.g., Flash, Shockwave, GoLive, Director).	LAFS.910.W.4.1 LAFS.1112.W.4.1 LAFS.910.RI.4.1 LAFS.1112.RI.4.1	
	20.02 Demonstrate proficiency using use of various specialized web design software (e.g., Flash, Shockwave, GoLive, Director).	LAFS.910.W.4.1 LAFS.1112.W.4.1 LAFS.910.RI.4.1 LAFS.1112.RI.4.1	
21.0	Develop an awareness of the information technology industry – the student will be able to:		
	21.01 Explain how information technology impacts the operation and management of business and society.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
	21.02 Explain the emergence of e-commerce and e-government and the potential impact on business and society.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
	2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
21.03 Explain the emergence of a paperless society.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
22.0 Develop an awareness of microprocessors and digital computers – the student will be able to:		
22.01 Describe the evolution of the digital computer.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
22.02 Explain the general architecture of a microcomputer system.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
	3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
22.03 Explain the evolution of microprocessors.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
22.04 Explain software hierarchy and its impact on microprocessors.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
22.05 Explain the need for and use of peripherals.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
	LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
22.06 Demonstrate proficiency using peripherals.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
22.07 Identify the basic concepts of computer maintenance and upgrades.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
22.08 Differentiate between diagnosing and troubleshooting.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
23.0 Develop an awareness of programming languages – the student will be able to:		
23.01 Explain the history of programming languages.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
23.02 Explain the need for and use of compilers.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
	3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
23.03 Explain how compilers work.	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
23.04 Identify the three types of programming design approaches (e.g., top-down, structured, and object-oriented).	LAFS.910.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.1112.L.1.1, 1.2, 1.3, 2.3, 3.4, 3.5, 3.6 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.1.1,1.2,1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.W.1.1,1.2,1.3, 2.4, 2.5, 2.6,3.7, 3.8, 3.9, 4.1 LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
24.0 Develop an awareness of emerging technologies – the student will be able to:		
24.01 Compare and contrast various methods of evaluation for emerging technologies.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
24.02 Demonstrate knowledge of the process of planning upgrades and changeovers.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
24.03	Compare and contrast emerging technologies and describe how they impact business in the global marketplace (e.g., wireless, wireless web, cell phones, portables/handhelds, smart appliances, home networks, peer-to-peer).	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
25.0	Demonstrate an understanding of the seven layers of the Open Systems Interface (OSI) model – the student will be able to:		
25.01	Identify how types of networks and how they work.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
25.02	Identify the role of servers and clients on a network.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
25.03	Identify benefits and risks of networked computing.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
25.04	Identify the relationship between computer networks and other communications networks (i.e. telephone systems).	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
25.05	Identify Intranets, Extranets and how they relate to the Internet.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
25.06	Demonstrate basic understanding of network administration.	LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.4.1 LAFS.1112.W4.1 LAFS.910.L.2.3, 3.4, 3.6 LAFS.1112.L.2.3, 3.4, 3.6	
25.07	Describe the evolution of OSI from its inception to the present and into the future.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
25.08	Explain the interrelations of the seven layers of the Open Systems Interface (OSI) as it relates to hardware and software.	LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.910.W.4.1 LAFS.1112.W4.1 LAFS.910.L.2.3, 3.4, 3.6	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
		LAFS.1112.L.2.3, 3.4, 3.6	
26.0	Demonstrate proficiency using common software applications – the student will be able to:		
26.01	Compare and contrast the appropriate use of various software applications (e.g., word processing, desktop publishing, graphics design, web browser, e-mail, presentation, database, scheduling, financial management, Java applet, music).	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	SC.912.N.1.1, 3, 4, 6, 7, 3.5, 4.2; SC.912.P.10.18
26.02	Demonstrate proficiency in the use of various software applications (e.g., word processing, desktop publishing, graphics design, web browser, e-mail, presentation, database, scheduling, financial management, Java applet, music).	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	SC.912.N.1.1, 3, 4, 1.7, 3.5;
27.0	Demonstrate proficiency using specialized software applications – the student will be able to:		
27.01	Compare and contrast the appropriate use of specialized software applications (e.g., OLTP, Computer Aided Design, Computer Aided Manufacturing, 3D animation process control, materials management).	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
27.02	Demonstrate awareness of specialized software applications (e.g., OLTP, Computer Aided Design, Computer Aided Manufacturing, 3D animation, process control, materials management).	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1	
27.03	Demonstrate the ability to incorporate digital sound.	LAFS.910.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.1112.RI.1.1, 1.2, 1.3, 2.4, 2.5, 2.6, 3.7, 3.8, 3.9, 4.1 LAFS.910. SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6 LAFS.1112.SL.1.1, 1.2, 1.3, 2.4, 2.5, 2.6	

Florida Department of Education
Student Performance Standards

Course Title: **Foundations of Programming**
Course Number: **9007210**
Course Credit: **1**

Course Description:

This course introduces concepts, techniques, and processes associated with computer programming and software development. After successful completion of Programming Foundations and Procedural Programming, students will have met Occupational Completion Point B, Computer Programmer Assistant, SOC Code 15-1131.

Florida Standards			Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Java Development & Programming.		
01.01	Key Ideas and Details		
01.01.1		Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2		Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3		Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure		
01.02.1		Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2		Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3		Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	

Florida Standards			Correlation to CTE Program Standard #
		LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Java Development & Programming.		
02.01	Text Types and Purposes		
	02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
	02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.02	Production and Distribution of Writing		
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's	

Florida Standards			Correlation to CTE Program Standard #
		capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0		Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Java Development & Programming].	
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
	03.04	Model with mathematics. MAFS.K12.MP.4.1	
	03.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
	03.06	Attend to precision. MAFS.K12.MP.6.1	
	03.07	Look for and make use of structure. MAFS.K12.MP.7.1	

Florida Standards	Correlation to CTE Program Standard #
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
31.0 Explore the characteristics, tasks, work attributes, options, and tools associated with a career in software development. – The student will be able to:		
31.01 Describe the evolution of programming and programming careers.	MAFS.912.A-REI.1.1	
31.02 Identify tasks performed by programmers.	MAFS.912.N-Q.1.1	
31.03 Describe how businesses use computer programming to solve business problems.	MAFS.912.A-REI.1.1	
31.04 Investigate job opportunities in the programming field.		
31.05 Explain different specializations and the related training in the computer programming field.	MAFS.912.A-REI.1.1 MAFS.912.G-SRT.1.2	
31.06 Explain the need for continuing education and training of computer programmers.	MAFS.912.A-REI.1.1	
31.07 Explain enterprise software systems and how they impact business.	MAFS.912.A-REI.1.1	
31.08 Describe ethical responsibilities of computer programmers.	MAFS.912.A-REI.1.1	
31.09 Describe the role of customer support to software program quality.	MAFS.912.A-REI.1.1	
31.10 Identify credentials and certifications that may improve employability for a computer programmer.	MAFS.912.N-Q.1.1	
31.11 Identify devices, tools, and other environments for which programmers may develop software.	MAFS.912.G-CO.4.12; MAFS.912.N-Q.1.1	
32.0 Demonstrate an understanding of the characteristics, use, and selection of numerical, non-numerical, and logical data types. – The student will be able to:		
32.01 Identify the characteristics (e.g., size, limits) and uses of different numerical and non-numerical data types.	MAFS.912.N-Q.1.2	
32.02 Explain the types and uses of variables in programs.	MAFS.912.A-REI.1.1; MAFS.912.A-SSE.1.1	
32.03 Determine the best data type to use for given programming problems.	MAFS.912.A-REI.1.1	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
32.04	Identify the types of operations that can be performed on different data types.	MAFS.912.N-Q.1.1	
32.05	Evaluate arithmetic and logical expressions using appropriate operator precedence.	MAFS.912.A-REI.1.1; MAFS.912.N-Q.1.1	
32.06	Explain how computers store different data types in memory.	MAFS.912.A-REI.1.1	
32.07	Use different number systems to represent data.	MAFS.912.N-Q.1.1	
32.08	Explain how national and international standards (i.e., ASCII, UNICODE) are used to represent non-numerical data.	MAFS.912.A-REI.1.1	
32.09	Use Boolean logic to perform logical operations.		
33.0	Distinguish between iterative and non-iterative program control structures. – The student will be able to:		
33.01	Explain non-iterative programming structures (e.g., if, if/else) and their uses.	MAFS.912.A-REI.1.1	
33.02	Explain iterative programming structures (e.g., while, do/while) and their uses.	MAFS.912.A-REI.1.1	
34.0	Differentiate among high level, low level, procedural, object-oriented, compiled, interpreted, and translated programming languages. – The student will be able to:		
34.01	Identify the characteristics, uses, and limits of low-level programming languages.	MAFS.912.N-Q.1.1	
34.02	Identify the characteristics, uses, and limits of high-level programming languages.	MAFS.912.N-Q.1.1	
34.03	Identify the characteristics, uses, and limits of rapid development programming languages.	MAFS.912.N-Q.1.1	
34.04	Describe object-oriented concepts.	MAFS.912.A-REI.1.1	
34.05	Explain the characteristics of procedural and object-oriented programming languages.	MAFS.912.A-REI.1.1	
34.06	Compare and contrast programming languages that are compiled (e.g., C++), interpreted (e.g., Basic, HTML), and translated (e.g., Java).	MAFS.912.G-SRT.1.2	
35.0	Describe the processes, methods, and conventions for software development and maintenance. – The student will be able to:		
35.01	Describe and explain tools used in software development.	MAFS.912.A-REI.1.1; MAFS.912.G-CO.4.12	
35.02	Describe the stages of the program life cycle.	MAFS.912.A-REI.1.1	
35.03	Compare and contrast alternatives methods of program development (e.g., rapid prototyping, waterfall).	MAFS.912.G-SRT.1.2	
35.04	List and explain the steps in the program development cycle.	MAFS.912.A-REI.1.1	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
35.05	Describe different types of documentation used in the program development cycle (e.g., requirements document, program design documents, test plans).	MAFS.912.N-Q.1.1	
35.06	Describe the on-going need for program maintenance.	MAFS.912.A-REI.1.1	
35.07	Describe different methods companies use to facilitate program updates for enhancements and defects (e.g., how customers receive patches, updates, new versions, upgrades).	MAFS.912.A-REI.1.1; MAFS.912.G-SRT.1.2	
35.08	Describe different methods used to facilitate version control and change management.	MAFS.912.A-REI.1.1; MAFS.912.G-SRT.1.2	
36.0	Explain the types, uses, and limitations of testing for ensuring quality control. – The student will be able to:		
36.01	Explain the uses and limits of testing in ensuring program quality.	MAFS.912.A-REI.1.1	SC.912.N.1.1
36.02	Explain testing performed at different stages of the program development cycle (e.g. unit testing, system testing, user acceptance testing).	MAFS.912.A-REI.1.1; MAFS.912.A-CED.1.1	
36.03	Describe data and the use of test plans/scripts to be used in program testing.	MAFS.912.A-REI.1.1	SC.912.N.1.1
36.04	Describe and identify types of programming errors (e.g., syntactical, logic, usability, requirements mismatch).	MAFS.912.A-REI.1.1; MAFS.912.N-Q.1.1	
36.05	Identify the data to be used for boundary conditions.	MAFS.912.N-Q.1.1	
36.06	Explain different types of testing (e.g., usability, automated, regression) and testing tools.	MAFS.912.A-REI.1.1; MAFS.912.G-CO.4.12	SC.912.N.1.1
37.0	Create a program design document using Unified Modeling Language (UML) or other common design tool. – The student will be able to:		
37.01	Describe different design methodologies and their uses (e.g., object-oriented design, structured design, and rapid application development).	MAFS.912.A-REI.1.1	SC.912.N.1.1, SC.912.N.3.5
37.02	Describe tools for developing a program design (e.g., UML, flowcharts, design documents, pseudocode).	MAFS.912.A-REI.1.1	SC.912.N.1.1
37.03	Explain the role of existing libraries and packages in facilitating programmer productivity.	MAFS.912.A-REI.1.1	
37.04	Participate and contribute to a design review of a program design developed using a common program design tool (e.g., UML, flowcharts, design documents, pseudocode).	MAFS.912.A-CED.1.1	SC.912.N.1.1, SC.912.N.1.3, SC.912.N.2.4, SC.912.N.4.2
37.05	Write a program design document using UML or other standard design methodology.	MAFS.912.A-CED.1.1	
37.06	Define input and output for a program module using UML or other standard design methodology.	MAFS.912.F-IF.1.1	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
38.0	Describe information security risks, threats, and strategies associated with software development. – The student will be able to:		
38.01	Explain the security risks to personal and business computer users.	MAFS.912.S-IC.2.6	
38.02	Identify different types of threats to computer systems.	MAFS.912.N-Q.1.1	
38.03	Identify methods to protect against different threats to computer systems.	MAFS.912.N-Q.1.1	
38.04	Understand the importance of a disaster / emergency response plan.		
38.05	Identify alternative methods for data storage and backup (e.g., mirroring, fail-over, high availability, types of backups).	MAFS.912.N-Q.1.1	
39.0	Use oral and written communication skills in creating, expressing and interpreting information and ideas. – The student will be able to:		
39.01	Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace.		SC.912.N.1.9, SC.912.N.1.10
39.02	Locate, organize and reference written information from various sources.		SC.912.N.1.1.6
39.03	Design, develop and deliver formal and informal presentations using appropriate media to engage and inform diverse audiences.	MAFS.912.A-CED.1.1	SC.912.N.1.1.9, SC.912.N.1.1.10
39.04	Interpret verbal and nonverbal cues/behaviors that enhance communication.	MAFS.912.G-SRT.1.2	SC.912.N.1.1.5, SC.912.N.1.1.6, SC.912.N.1.1.8
39.05	Apply active listening skills to obtain and clarify information.		
39.06	Develop and interpret tables and charts to support written and oral communications.	MAFS.912.A-REI.1.1; MAFS.912.A-CED.1.1 MAFS.912.F-IF.3.9	SC.912.N.1.1.6-11
39.07	Exhibit public relations skills that aid in achieving customer satisfaction.		
40.0	Solve problems using critical thinking skills, creativity and innovation. – The student will be able to:		
40.01	Employ critical thinking skills independently and in teams to solve problems and make decisions.	MAFS.912.G-CO.3.9	SC.912.N.1.1
40.02	Employ critical thinking and interpersonal skills to resolve conflicts.	MAFS.912.G-CO.3.9	SC.912.N.1.3, SC.912.N.4.1
40.03	Identify and document workplace performance goals and monitor progress toward those goals.	MAFS.912.N-Q.1.1	
40.04	Conduct technical research to gather information necessary for decision-making.	MAFS.912.S-IC.2.6; MAFS.912.S-IC.1.1	SC.912.N.1.3, SC.912.N.1.1.5
41.0	Use information technology tools. – The student will be able to:		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
41.01	Use personal information management (PIM) applications to increase workplace efficiency.		
41.02	Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications.	MAFS.912.G-CO.4.12	
41.03	Employ computer operations applications to access, create, manage, integrate, and store information.	MAFS.912.Z-CED.1.1	
41.04	Employ collaborative/groupware applications to facilitate group work.		

Florida Department of Education
Student Performance Standards

Course Title: **Procedural Programming**
Course Number: **9007220**
Course Credit: **1**

Course Description:

This course continues the study of computer programming concepts with a focus on the creation of software applications employing procedural programming techniques. After successful completion of Programming Foundations and Procedural Programming, students will have met Occupational Completion Point B, Computer Programmer Assistant, SOC Code 15-1131.

Florida Standards			Correlation to CTE Program Standard #
42.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Java Development & Programming.		
42.01	Key Ideas and Details		
	42.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	42.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	42.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
42.02	Craft and Structure		
	42.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	42.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	42.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards			Correlation to CTE Program Standard #
		LAFS.1112.RST.2.6	
42.03	Integration of Knowledge and Ideas		
	42.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
	42.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
	42.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
42.04	Range of Reading and Level of Text Complexity		
	42.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	42.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
43.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Java Development & Programming.		
43.01	Text Types and Purposes		
	43.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	43.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
43.02	Production and Distribution of Writing		
	43.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	43.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
	43.02.3	Use technology, including the Internet, to produce, publish, and update	

Florida Standards			Correlation to CTE Program Standard #
		individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
	43.03	Research to Build and Present Knowledge	
	43.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
	43.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
	43.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	43.04	Range of Writing	
	43.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
44.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Java Development & Programming.		
	44.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	44.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	44.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
	44.04	Model with mathematics. MAFS.K12.MP.4.1	
	44.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
	44.06	Attend to precision. MAFS.K12.MP.6.1	
	44.07	Look for and make use of structure. MAFS.K12.MP.7.1	

Florida Standards	Correlation to CTE Program Standard #
44.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
45.0	Design a computer program to meet specific physical, operational, and interaction criteria. – The student will be able to:		
45.01	Choose appropriate data types depending on the needs of the program.	MAFS.912.N-Q.1.1	
45.02	Define appropriate user interface prompts for clarity and usability (e.g., user guidance for data ranges, data types).	MAFS.912.N-Q.1.2	
45.03	Design and develop program that are designed for efficiency (e.g., less memory usage, less inputs/outputs, faster processing).	MAFS.912.A-REI.1.1	
45.04	Identify the software environment required for a program to run (e.g., operating system required, mobile, Web-based, desktop, delivery method).	MAFS.912.N-Q.1.1	
45.05	Identify the tools required to develop a program (e.g., editors, compilers, linkers, integrated development environments, application programming interfaces (APIs), libraries).	MAFS.912.N-Q.1.1	
46.0	Create and document a computer program that uses a variety of internal and control structures for manipulating varied data types. – The student will be able to:		
46.01	Use appropriate naming conventions to define program variables and modules (methods, functions).	MAFS.912.N-Q.1.1	
46.02	Use a program editor to write the source code for a program.	MAFS.912.A-REI.1.1	
46.03	Write programs that use selection structures (e.g., if, if/else).	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
46.04	Write programs that use repetition structures (e.g., while, do/while).	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
46.05	Write programs that use nested structures.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
46.06	Use internal documentation (e.g., single-line and multi-line comments, program headers, module descriptions, and meaningful variable and function/module names) to document		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	a program according to accepted standards.		
46.07	Compile and run programs.	MAFS.912.A-REI.1.1	
46.08	Write programs that use standard arithmetic operators with different numerical data types.	MAFS.912.N-Q.1.1; MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2 MAFS.912.A-REI.1.2, MAFS.912.A-REI.2.3	
46.09	Write programs that use standard logic operators.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
46.10	Write programs that use a variety of common data types.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2 MAFS.912.N-Q.1.1, MAFS.912.A-REI.1.2, MAFS.912.A-REI.2.3	
46.11	Write programs that perform data conversion between standard data types.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
46.12	Write programs that define, use, search, and sort arrays.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
46.13	Write programs that use user-defined data types.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
46.14	Demonstrate understanding and use of appropriate variable scope.	MAFS.912.A-REI.1.1	
47.0	Create and document an interactive computer program that employs functions, subroutines, or methods to receive, validate, and process user input. – The student will be able to:		
47.01	Write programs that perform user input and output.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
47.02	Write programs that validate user input (e.g., range checking, data formats, valid/invalid characters).	MAFS.912.A-CED.1.1;	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
		MAFS.912.A-CED.1.2	
	47.03 Write program modules such as functions, subroutines, or methods.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
	47.04 Write program modules that accept arguments.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
	47.05 Write program modules that return values.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
	47.06 Write program modules that validate arguments and return error codes.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
	47.07 Write interactive programs.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
	47.08 Write programs that use standard libraries to enhance program function.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
	47.09 Participate in a peer code review to verify program functionality, programming styles, program usability, and adherence to common programming standards.		
48.0	Create a unit test plan, implement the plan, and report the results of testing. – The student will be able to:		
	48.01 Write a unit test plan that identifies the input data and expected results for program tests.	MAFS.912.A-REI.1.1	SC.912.N.1.1
	48.02 Test and debug programs, including programs written by others.	MAFS.912.A-REI.1.1	
	48.03 Write a test report that identifies the results of testing.	MAFS.912.A-REI.1.1	SC.912.N.1.1
	48.04 Trace through the function of a program to ensure valid operation.	MAFS.912.N-Q.1.1	
	48.05 Identify the system resources used by the program (e.g., memory, disk space, execution time, external devices).	MAFS.912.N-Q.1.1 MAFS.912.N-Q.1.2	
	48.06 Create a disaster/emergency response plan for a computer system.	MAFS.912.A-CED.1.1; MAFS.912.A-	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
		CED.1.2	
49.0	Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives. – The student will be able to:		
	49.01 Employ leadership skills to accomplish organizational goals and objectives.		
	49.02 Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.		
	49.03 Conduct and participate in meetings to accomplish work tasks.		
50.0	Describe the importance of professional ethics and legal responsibilities. – The student will be able to:		
	50.01 Evaluate and justify decisions based on ethical reasoning.	MAFS.912.S-IC.2.6	
	50.02 Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies.	MAFS.912.S-IC.2.6	
	50.03 Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace.	MAFS.912.S-IC.2.6; MAFS.912.A-REI.1.1	

Florida Department of Education
Student Performance Standards

Course Title: **Object-Oriented Programming Fundamentals**
Course Number: **9007230**
Course Credit: **1**

Course Description:

This course continues the study of computer programming concepts with a focus on the creation of software applications employing object-oriented programming techniques. After successful completion of Object-Oriented Programming Fundamentals, students will have met Occupational Completion Point C, Computer Programmer, SOC Code 15-1131.

Florida Standards			Correlation to CTE Program Standard #
42.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Java Development & Programming.		
42.01	Key Ideas and Details		
	42.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	42.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	42.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
42.02	Craft and Structure		
	42.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	42.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	42.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards			Correlation to CTE Program Standard #
		LAFS.1112.RST.2.6	
42.03	Integration of Knowledge and Ideas		
	42.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
	42.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
	42.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
42.04	Range of Reading and Level of Text Complexity		
	42.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	42.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
43.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Java Development & Programming.		
43.01	Text Types and Purposes		
	43.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	43.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
43.02	Production and Distribution of Writing		
	43.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	43.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
	43.02.3	Use technology, including the Internet, to produce, publish, and update	

Florida Standards			Correlation to CTE Program Standard #
		individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
	43.03	Research to Build and Present Knowledge	
	43.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
	43.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
	43.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	43.04	Range of Writing	
	43.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
44.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Java Development & Programming.		
	44.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	44.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	44.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
	44.04	Model with mathematics. MAFS.K12.MP.4.1	
	44.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
	44.06	Attend to precision. MAFS.K12.MP.6.1	
	44.07	Look for and make use of structure. MAFS.K12.MP.7.1	

Florida Standards	Correlation to CTE Program Standard #
44.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
51.0 Explain key concepts that distinguish object-oriented programming from procedural programming. – The student will be able to:		
51.01 Demonstrate the understanding and use of classes, objects, attributes, and behaviors.	MAFS.912.A-REI.1.1	
51.02 Demonstrate the understanding and use of inheritance.	MAFS.912.A-REI.1.1	
51.03 Demonstrate the understanding and use of data encapsulation.	MAFS.912.A-REI.1.1	
51.04 Demonstrate the understanding and use of polymorphism.	MAFS.912.A-REI.1.1	
52.0 Create a project plan for an object-oriented programming project that defines requirements, structural design, time estimates, and testing elements. – The student will be able to:		
52.01 Write a project plan for completion of a project that includes gathering program requirements, developing the program, and testing it.	MAFS.912.A-REI.1.1	
52.02 Write a program requirements document that identifies business purpose, functional requirements, system requirements, and other common components of a requirements document.	MAFS.912.A-REI.1.1	
52.03 Design an object-oriented program using UML or another standard design methodology.	MAFS.912.H-CED.1.1	
52.04 Work with other team members to develop a project plan for a program.	MAFS.912.A-REI.1.1	
52.05 Work with other team members to write a design document for a program with multiple functions and shared data.	MAFS.912.A-REI.1.1	
52.06 Participate in design meetings that review program design documents for conformance to program requirements.	MAFS.912.S.IC.2.6	
52.07 Estimate the time to develop a program or module.	MAFS.912.S.IC.2.6	
53.0 Design, document, and create object-oriented computer programs. – The student will be able to:		
53.01 Compare and contrast recursive functions to other iterative methods.	MAFS.912.G-SRT.1.2	
53.02 Understand the implementation of character strings in the programming language.		
53.03 Write programs that perform string processing (e.g., string manipulation, string	MAFS.912.A-REI.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
compares, concatenation).		
53.04 Write programs that use user-defined data types.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.05 Write object-oriented programs that use inheritance.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.06 Write object-oriented programs that use polymorphism.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.07 Develop class constructors.	MAFS.912.S-MD.1.3	
53.08 Write programs that define and use program constants.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.09 Write programs that perform error handling.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.10 Participate in program code review meetings to evaluate program code for validity, quality, performance, data integrity, and conformance to program design documents.	MAFS.912.S-IC.2.6	
53.11 Write programs that perform dynamic memory allocation.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.12 Write programs that perform effective management of dynamically allocated memory.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.13 Update a program module to implement enhancements or corrections and demonstrate appropriate documentation (internal and external) related to version control.	MAFS.912.A-REI.1.1	
53.14 Write programs that use complex data structures (e.g., stacks, queues, trees, linked list).	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
53.15 Write programs that are event-driven.	MAFS.912.A-CED.1.1; MAFS.912.A-	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
		CED.1.2	
	53.16 Write programs that perform file input and output (i.e., sequential and random access file input/output).	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	
	53.17 Perform basic database commands including connect, open, select, and close.	MAFS.912.A-REI.1.1	
54.0	Design a unit test plan for an object-oriented computer program, test and debug the program, and report the results. – The student will be able to:		
	54.01 Develop a test plan for an object-oriented program.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	SC.912.N.1.1
	54.02 Write test plans for event-driven programs.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	SC.912.N.1.1
	54.03 Write test plans for programs that perform file input and output.	MAFS.912.A-CED.1.1; MAFS.912.A-CED.1.2	SC.912.N.1.1
	54.04 Perform test and debug activities on object-oriented programs, including those written by someone else.	MAFS.912.A-REI.1.1	
	54.05 Perform test and debug activities on an event-driven program.	MAFS.912.A-REI.1.1	
	54.06 Perform test and debug activities on programs that perform file input and output and verify the correctness of output files.	MAFS.912.A-REI.1.1	
	54.07 Document the findings of testing in a test report.	MAFS.912.S-CP.1.4	SC.912.N.1.1

Florida Department of Education
Student Performance Standards

Course Title: **Java Programming Essentials**
Course Number: **9007240**
Course Credit: **1**

Course Description:

This course continues the study of computer programming concepts specific to the Java programming language.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
55.0	Construct statements that declare, initialize, and modify different types of variables used in Java programs. – The student will be able to:		
55.01	Describe how variables are used in programs.		
55.02	Identify the eight Java primitive data types.		
55.03	Identify the minimum and maximum ranges of primitive data types.		
55.04	Identify which data type should be used for a given situation.		
55.05	Identify the syntax for using variables.		
55.06	Declare and initialize variables.		
55.07	Assign new values to variables.		
55.08	Create and use constant variables.		
56.0	Describe the types and characteristics of lexical units in the Java programming language. – The student will be able to:		
56.01	Describe the types of lexical units.		
56.02	Describe identifiers and identify valid and invalid identifiers.		
56.03	Describe and identify reserved words, delimiters, literals, and comments.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
57.0	Describe the data types employed in Java programs. – The student will be able to:		
57.01	Describe the data type categories.		
57.02	Give examples of primitives, reference data types.		
57.03	Identify and use enumerations.		
57.04	Understand the use of Wrapper Classes in programs.		
57.05	Describe the difference between real and integer data types.		
58.0	Construct Java statements that employ the use of various operators. – The student will be able to:		
58.01	Construct statements using arithmetic operators.		
58.02	Construct statements using relational operators.		
58.03	Construct and use statements using logical operators.		
58.04	Construct and use statements using assignment operators.		
58.05	Construct and execute statements using operator precedence.		
59.0	Write executable statements using Java. – The student will be able to:		
59.01	Construct variable assignment statements.		
59.02	Construct statements using built-in Math functions.		
59.03	Differentiate between implicit and explicit data type conversions.		
59.04	Describe when implicit data type conversions take place.		
59.05	List the drawbacks of implicit data type conversions.		
59.06	Describe the process of autoboxing and promotion.		
59.07	Construct statements using functions to explicitly convert data types.		
60.0	Describe variable scope and its implications in Java programming. – The student will be able to:		
60.01	Understand the scope and visibility of variables.		
60.02	Write programs using local variables.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	60.03 Describe the scope of a variable.		
	60.04 Describe the default value of local, instance, and static scope of variables.		
	60.05 Describe how compiler uses scope to identify variables with the same name.		
61.0	Apply common Java programming style guidelines and conventions. – The student will be able to:		
	61.01 List examples of good programming practices.		
	61.02 Insert comments into code.		
	61.03 Follow formatting guidelines when writing code.		
	61.04 Understand the different types of errors produced by programs.		
62.0	Demonstrate use of the compiler and interpreter through command line interface. – The student will be able to:		
	62.01 Describe the use of the Java compiler (javac) and Java interpreter (Java VM).		
	62.02 Demonstrate the use of the - classpath flag and –d flag to the compiler.		
	62.03 Identify the environmental variables of PATH and CLASSPATH.		
	62.04 Describe the process of command line arguments to the program.		
	62.05 Create programs that take in multiple command line arguments.		
63.0	Construct conditional control statements in Java. – The student will be able to:		
	63.01 Construct and use an if statement.		
	63.02 Construct and use a switch statement.		
	63.03 Construct and use a while, do while, and for loop.		
	63.04 Construct and use a conditional operator.		
64.0	Construct iterative control statements in Java. – The student will be able to:		
	64.01 Describe the types of loop statements and their uses.		
	64.02 Construct and use the while and do while loop.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
64.03 Construct and use the for loop.		
64.04 Construct and use the enhanced for loop.		
64.05 Describe when a while loop is used.		
64.06 Describe when a for loop is used.		
65.0 Use nested loop iterative control statements in Java. – The student will be able to:		
65.01 Construct and execute a program using nested loops.		
65.02 Construct and execute a loop using break and continue.		
65.03 Evaluate a nested loop construct and sentinel value.		
66.0 Produce input and output for Java programs. – The student will be able to:		
66.01 Describe and use classes (e.g., Scanner, System) to input data into programs.		
66.02 Demonstrate the use of different ways to input data into programs using Scanner or System class.		
66.03 Describe and demonstrate the use of the System class to produce output to the console.		
66.04 Explain the difference between print and println functions in the System class.		
66.05 Create and use escape sequences.		
67.0 Use packages and import statements in a Java program. – The student will be able to:		
67.01 Describe the use of import statements.		
67.02 Describe the use of packages.		
67.03 Create code that uses package statements to avoid class conflict.		
67.04 Create packages that abide by standard Java naming convention.		
67.05 Demonstrate the use of Java-API to search for classes and packages.		
68.0 Create a Java program that uses methods. – The student will be able to:		
68.01 Differentiate between anonymous blocks and methods.		
68.02 Identify the benefits of using methods.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	68.03 Describe a method signature.		
	68.04 Create a method.		
	68.05 Describe how a method is invoked.		
	68.06 Describe the purpose of overloading methods.		
	68.07 Create overloaded methods in programs.		
69.0	Create a Java program that uses parameters in methods. – The student will be able to:		
	69.01 Describe how parameters are passed into functions.		
	69.02 Define a parameter.		
	69.03 Create a method using a parameter.		
	69.04 Invoke a method that has parameters.		
	69.05 Distinguish between formal and actual parameters.		
	69.06 Demonstrate the use of reference parameters in methods.		
70.0	Describe and use recursion in a Java program. – The student will be able to:		
	70.01 Describe the use of recursion in solving problems.		
	70.02 Describe the difference of iterative and recursive methods.		
	70.03 Demonstrate the use of direct recursion.		
	70.04 Demonstrate the use of indirect recursion.		
71.0	Construct Java statements that use the String class to manipulate String data. – The student will be able to:		
	71.01 Explain the use of the String class.		
	71.02 Create code to concatenate strings using the concatenation operator.		
	71.03 Demonstrate how to search a string using indexOf method of the String class.		
	71.04 Explain the effect of immutability of Strings.		
	71.05 Create Strings using string literals, and through new keyword.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
71.06	Demonstrate the use of the following string manipulation methods of the String class: charAt,length ,trim, substring, replace,startsWidth and endsWith.		

Florida Department of Education
Student Performance Standards

Course Title: **Applied Object-Oriented Java Programming**
Course Number: **9007250**
Course Credit: **1**

Course Description:

This course continues the study of computer programming concepts specific to the Java programming language.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
72.0 Construct Java statements that use Classes. – The student will be able to:		
72.01 Describe and identify abstract data types.		
72.02 Describe the difference between an object and a class.		
72.03 Identify class attributes.		
72.04 Create instance variables for a class.		
72.05 Use visibility modifiers for attributes.		
72.06 Identify constructors and describe their use.		
72.07 Describe encapsulation.		
72.08 Write class using encapsulation.		
72.09 Apply data abstraction through the use of accessor or and mutator methods.		
72.10 Describe the equals method.		
72.11 Demonstrate the use of classes in methods as both parameters and return types.		
72.12 Describe the garbage collection process.		
72.13 Demonstrate reusability and extensibility in class creation.		
72.14 Demonstrate the use of Comparable interface to compare objects.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
73.0	Manage class relationships. – The student will be able to:		
73.01	Explain the association relationship among classes.		
73.02	Explain the direct association relationship among classes.		
73.03	Explain the composition and aggregation relationship among classes.		
73.04	Explain the direct association relationship among classes.		
73.05	Write programs that use composition, association.		
73.06	Write programs that use direct association.		
74.0	Construct Java statements that illustrate the use of multiplicities in class relationships. – The student will be able to:		
74.01	Describe how multiplicities affect class relationships.		
74.02	Describe one-to one, one-to-many, and many-to-many relationships.		
74.03	Write programs that use multiplicities in class relationships.		
75.0	Use object references – The student will be able to:		
75.01	Identify reference aliases.		
75.02	Understand and use null reference.		
75.03	Explain the this reference and its use in class creation.		
76.0	Describe the types of arrays and construct Java statements that illustrate the use and manipulation of multi-dimensional and jagged arrays. – The student will be able to:		
76.01	Declare and initialize and array.		
76.02	Demonstrate the use of initializer lists.		
76.03	Demonstrate the use of arrays in methods.		
76.04	Demonstrate the updating, populating and destroying arrays.		
76.05	Explain linear and binary searching.		
76.06	Sort arrays using selection sort, insertion sort, and bubble sort.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	76.07 Demonstrate the use of multidimensional arrays.		
	76.08 Demonstrate the use of jagged arrays.		
	76.09 Demonstrate basic hashing using arrays.		
77.0	Construct Java statements that illustrate different ways of using inheritance. – The student will be able to:		
	77.01 Explain the purpose and use of inheritance in object oriented programming.		
	77.02 Explain the difference between single and multiple inheritance.		
	77.03 Create parent and child classes.		
	77.04 Create overloaded methods.		
	77.05 Describe the has-a and is-a relationship.		
	77.06 Create class hierarchies.		
	77.07 Explain the process of generalization to specification.		
	77.08 Demonstrate the use of abstract classes.		
	77.09 Explain polymorphism.		
	77.10 Create a program that uses polymorphism.		
	77.11 Demonstrate the use of the instance of method.		
78.0	Construct Java statements that use collections. – The student will be able to:		
	78.01 Describe data structure of linked lists.		
	78.02 Create a linked list manually.		
	78.03 Use the ArrayList class.		
	78.04 Create a stack and Queue manually.		
	78.05 Use the Stack and Queue standard class.		
	78.06 Identify which data structure is best fitted for a situation.		
	78.07 Use iterators with collections.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
78.08 Identify how to insert, delete, update, and traverse data structures.		
79.0 Write Java code that uses the Iterator and List interfaces. – The student will be able to:		
79.01 Describe the purpose of interfaces.		
79.02 Create and use interfaces in programs.		
79.03 Use the Comparable interface.		
79.04 Use the Iterator interface and List Interface in programs.		
79.05 Understand the program to the interface principle.		
80.0 Create Java code that includes exception handling code. – The student will be able to:		
80.01 Describe the advantages of including exception handling code.		
80.02 Describe the purpose of an EXCEPTION section in a program block.		
80.03 Create code to include an EXCEPTION section.		
80.04 List the guidelines for exception handling.		
81.0 Create Java code that uses the Object class. – The student will be able to:		
81.01 Understand the Object class relationship to other classes.		
81.02 Demonstrate the use of toString method.		
81.03 Demonstrate the use of clone and finalize methods.		
81.04 Write program to use Object class functionality.		
82.0 Use standard library classes that comprise the Java API. – The student will be able to:		
82.01 Describe the classes and methods in the basic input/output package.		
82.02 Describe the classes and methods in the utilities package.		
82.03 Describe the classes and methods in the networking package.		
82.04 Describe the classes and methods in the AWT and swing package.		
82.05 Describe the classes and methods in the SQL and SQLX package.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
83.0	Create Java code that uses exceptions to improve program quality. – The student will be able to:		
83.01	Explain how exception handling works in Java.		
83.02	Trap exceptions using try and catch.		
83.03	Explain when to use the finally clause.		
83.04	Demonstrate handling exceptions through throwing and catching.		
83.05	Create and Exception and manage the exception.		
83.06	Explain the use of inheritance and exceptions.		

Florida Department of Education
Student Performance Standards

Course Title: **Java Database Programming**
Course Number: **9007260**
Course Credit: **1**

Course Description:

This course continues the study of computer programming concepts specific to the Java programming language.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
84.0	Describe Java 2 Micro Edition (J2ME) uses, characteristics, and constraints. – The student will be able to:		
84.01	Understand midlets.		
84.02	Explain CLDC and profiles.		
84.03	Explain the constraints specific to J2ME programming when compared to J2SE.		
84.04	Understand the high architectural goal of J2ME.		
84.05	Create user-defined functions.		
85.0	Create and convert classes using Unified Modeling Language (UML). – The student will be able to:		
85.01	Identify UML elements Classes, abstract Classes, Interfaces.		
85.02	Identify UML attributes, operators, visibility modifiers and UML associations.		
85.03	Given a set of classes be able to convert the classes to a UML diagram.		
85.04	Given a UML diagram be able to create classes.		
86.0	Create programs that use of Remote Method Invocation (RMI) and other server technologies associated with Relational Database Management Systems (RDMS) and Structured Query Language (SQL). – The student will be able to:		
86.01	Understand and describe RMI.		
86.02	Write a program to use RMI.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	86.03 Understand RDMS and SQL technologies.		
	86.04 Use the Java Database Connectivity API to connect and execute SQL statements to RDMS.		
87.0	Demonstrate an understanding of Java Integration APIs, including Java Message Service (JMS), Enterprise JavaBeans (EJB), and Java Naming and Directory Interface (JNDI). – The student will be able to:		
	87.01 Understand and describe JMS.		
	87.02 Understand and describe EJB technology.		
	87.03 Understand and describe JNDI technology.		
88.0	Demonstrate an understanding of Java Client APIs, including the Abstract Window Toolkit (AWT), Swing, and Java applet. – The student will be able to:		
	88.01 Understand and describe AWT and GUI interface.		
	88.02 Understand and describe the use of Swing components and GUI.		
	88.03 Understand and describe the use of applet technology.		
89.0	Understand and apply Java 2 Enterprise Edition (J2EE) Server Solutions. – The student will be able to:		
	89.01 Understand java Web Services.		
	89.02 Underrated and use SMTP and Java Mail technologies.		
	89.03 Understand how to use JSP and Servlets.		
90.0	Create a database application using the Java programming language. – The student will be able to:		
	90.01 Utilize loop statements.		
	90.02 Given a scenario, use arithmetic, comparison, and pattern-matching operators.		
	90.03 Create user-defined functions.		
	90.04 Utilize common built-in functions.		
	90.05 Declare variables in modules and procedures.		
	90.06 Declare arrays, and initialize elements of arrays.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
90.07	Declare and use object variables and collections, and use their associated properties and methods.		
90.08	Declare symbolic constants, and make them available locally or publicly.		
90.09	Respond to events.		
91.0	Create a graphical user interface application using the Java programming language. – The student will be able to:		
91.01	Utilize loop statements.		
91.02	Given a scenario, use arithmetic, comparison, and pattern-matching operators.		
91.03	Create user-defined functions.		
91.04	Utilize common built-in functions.		
91.05	Declare variables in modules and procedures.		
91.06	Declare arrays, and initialize elements of arrays.		
91.07	Declare and use object variables and collections, and use their associated properties and methods.		
91.08	Declare symbolic constants, and make them available locally or publicly.		
91.09	Use the Java Event model to handle user inputs from events.		
91.10	Use JComponents and layout managers to create the GUI.		
92.0	Create a web-based application using the Java programming language. – The student will be able to:		
92.01	Utilize loop statements.		
92.02	Given a scenario, use arithmetic, comparison, and pattern-matching operators.		
92.03	Create user-defined functions.		
92.04	Utilize common built-in functions.		
92.05	Declare variables in modules and procedures.		
92.06	Declare arrays, and initialize elements of arrays.		
92.07	Declare and use object variables and collections, and use their associated properties and methods.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	92.08 Declare symbolic constants, and make them available locally or publicly.		
	92.09 Write JSP pages to process user input.		
	92.10 Write Servlets to provide input and output processing for the web solution.		
93.0	Write code to perform common and union database queries using SQL and Java. – The student will be able to:		
	93.01 Utilize SQL to write common queries.		
	93.02 Refer to objects by using SQL.		
	93.03 Utilize union queries.		
94.0	Implement Java program statements using objects. – The student will be able to:		
	94.01 Determine when to use data access objects.		
	94.02 Differentiate between objects and collections.		
	94.03 Write statements that access and modify database objects, EJB objects.		
	94.04 Select appropriate methods and property settings for use with specified objects.		
95.0	Utilize debugging tools and write error handlers. – The student will be able to:		
	95.01 Trap errors.		
	95.02 Utilize debugging tools to suspend program execution, and to examine, step through, and reset execution of code.		
	95.03 Debug code samples.		
	95.04 Utilize the Debugger to monitor variable values.		
	95.05 Write an error handler.		
96.0	Demonstrate file input/output (I/O). – The student will be able to:		
	96.01 Read from sequential and random access files.		
	96.02 Write to sequential and random access files.		
	96.03 Use file serialization.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
97.0 Utilize API functions. – The student will be able to:		
97.01 Properly declare functions.		
97.02 Use the by value and by reference parameters.		
98.0 Test and debug databases. – The student will be able to:		
98.01 Implement error handling.		
98.02 Test and debug library databases.		

Florida Department of Education
Student Performance Standards

Course Title: **Java Programming Capstone**
Course Number: **9007270**
Course Credit: **1**

Course Description:

This course serves as the capstone course, providing students with the opportunity to apply acquired computer programming knowledge and skills specific to the Java programming language. The range of competencies students will be expected to demonstrate include project planning, design, documentation, Java programming, and reporting/presenting the results of the project. Each student will be expected to maintain a portfolio of the project and give a presentation of the completed work at the end of the course.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
99.0 Successfully work as a member of a software development team. – The student will be able to:		
99.01 Accept responsibility for specific tasks in a given situation.		
99.02 Document progress, and provide feedback on work accomplished in a timely manner.		
99.03 Complete assigned tasks in a timely and professional manner.		
99.04 Reassign responsibilities when the need arises.		
99.05 Complete daily tasks as assigned on one's own initiative.		
100.0 Manage time according to a plan. – The student will be able to:		
100.01 Set realistic time frames and schedules.		
100.02 Keep a written time sheet of work accomplished on a daily basis.		
100.03 Meet goals and objectives set by the team.		
100.04 Identify individual priorities.		
100.05 Complete a weekly evaluation of accomplishments, and reevaluate goals, objectives and priorities as needed.		
101.0 Keep acceptable records of progress problems and solutions. – The student will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
101.01 Develop a record keeping system in the form of a log book to record daily progress.		
101.02 Use a project journal to identify problem statement.		
101.03 Develop a portfolio of work accomplished to include design drawings, flowcharts, drawings and plans, and prototypes.		
102.0 Plan, organize, and carry out a project plan. – The student will be able to:		
102.01 Determine the scope of a project.		
102.02 Organize the team according to individual strengths.		
102.03 Assign specific tasks within a team.		
102.04 Determine project priorities.		
102.05 Identify required resources.		
102.06 Plan research, design, development, and evaluation activities as required.		
102.07 Carry out the project plan to successful completion.		
103.0 Manage resources. – The student will be able to:		
103.01 Identify required resources for each stage of the project plan.		
103.02 Determine the methods needed to acquire needed resources.		
103.03 Demonstrate good judgment in the use of resources.		
103.04 Recycle and reuse resources where appropriate.		
103.05 Demonstrate an understanding of proper legal and ethical treatment of copyrighted material.		
104.0 Use tools, materials, and processes in an appropriate and safe manner. – The student will be able to:		
104.01 Identify the proper tool for a given job.		
104.02 Use tools and machines in a safe manner.		
104.03 Adhere to laboratory or job site safety rules and procedures.		
104.04 Identify the application of processes appropriate to the task at hand.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
104.05	Identify materials appropriate to their application.		
105.0	Demonstrate an understanding of the software development process. – The student will be able to:		
105.01	State the goals of the software application clearly.		
105.02	Identify and write a plan to achieve each goal.		
105.03	Develop a list of materials and content required for each goal.		
105.04	Develop a step by step procedure for developing the application.		
105.05	Follow a written procedure.		
105.06	Record data from evaluation activities.		
105.07	Document conclusions and solutions based on evaluation results, observations and data.		
105.08	Document progress using a project log.		
105.09	Write an abstract describing the project plan.		
106.0	Research content related to the project and document the results following industry conventions. – The student will be able to:		
106.01	Identify the basic research needed to develop the project plan.		
106.02	Identify available resources for completing background research required in the project plan.		
106.03	Demonstrate the ability to locate resource materials in a library, data base, internet and other research resources.		
106.04	Demonstrate the ability to organize information retrieval.		
106.05	Demonstrate the ability to prepare a topic outline.		
106.06	Write a draft of the research report.		
106.07	Edit and proof the research report. Use proper form for a bibliography, footnotes, quotations, and references.		
106.08	Prepare an electronically composed research paper in proper form.		
106.09	Conduct an alpha and beta evaluation of the project's product.		
106.10	Write a report on the evaluations, documenting results, data, observations, and design changes based on the results.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
107.0	Use presentation skills, and appropriate media to describe the progress, results and outcomes of the experience. – The student will be able to:		
107.01	Prepare a multi-media presentation on the completed project.		
107.02	Make an oral presentation, using multi-media materials.		
107.03	Review the presentation, and make changes in the delivery method(s) to improve presentation skills.		
108.0	Demonstrate competency in the area of expertise related to developing computer software using the Java programming language. – The student will be able to:		
108.01	Demonstrate a mastery of the content of the selected subject area.		
108.02	Demonstrate the ability to use related technological tools, materials and processes related to the specific program area.		
108.03	Demonstrate the ability to apply the knowledge, experience and skill developed in the previous program completion to the successful completion of this demonstration.		

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.

Special Notes

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

Future Business Leaders of America (FBLA) and Business Professionals of America (BPA) are the intercurricular career and technical student organizations providing leadership training and reinforcing specific career and technical skills for secondary students. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. 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.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly

indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

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