

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	<i>AP Computer Science A</i>	Course Code	<i>JT500-501</i>
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Transcript Title:	APCompSciA 1A/1B		Grades Levels:	11-12	Board Adoption Date:	6/09/2000
Content Area:	CTE / Single Subject IndusTech/IndusArts		GPA Scale:	5	Date Course Submitted:	3/13/20
Credential Required:	CTE	Graduation Subject Areas:		Applied Skills/Elective	CALPADSCode:	8132
UC/CSU "A-G" Area Approvals:				School Site/person that wrote and submitted the course:		Dominic Bulone
Recommend Skills:	Prerequisite: AP Computer Science Principles. College Board recommends Algebra.					
Next course(s):	N/A, this is the capstone.					
Textbook to be used:	Absolute Java, 6th edition, Walter Savitch. ISBN-13: 978-013401674					

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AP Computer Science A

DATE: March 12, 2020

INDUSTRY SECTOR: Information and Communication Technologies

PATHWAY: Software and Systems Development (174)

CALPADS TITLE: Advanced Systems Programming (Capstone)

CALPADS Code: 8132

HOURS:

Total	Classroom	Laboratory/CC/CVE
180	36	144

JOB TITLE	ONET CODES	JOB TITLE	ONET CODES
Computer Operators	43-9011.00	Computer Systems Analysts	15-1121.00
E/M Technicians	17-3024.00	Software Developers, Apps.	15-1132.00
Robotics Technicians	17-3024.01		

COURSE DESCRIPTION

AP Computer Science A is an introductory college-level course that exposes students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data and discover new information, the analysis of potential solutions, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design using the Java programming language.

PREREQUISITES:

High School Name:	Site Prerequisite:
Newport Harbor High School	AP Computer Science Principles

A – G APPROVAL: ☒ Yes ☐ No ☐ Desired

ARTICULATION: TBD

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High School Name:	College Name:	College Course Title:

LEVEL: ☐ **Introductory** ☐ **Concentrator** ☒ **Capstone**

CERTIFICATION: TBD

High School Name:	Embedded/Leads to:	Description:

METHOD OF STUDENT EVALUATION:

- ✓ Pre- and post-test
- ✓ Student projects
- ✓ Written work
- ✓ Observation record of student performance
- ✓ Completion of assignments and worksheets
- ✓ Peer review

METHOD OF INSTRUCTION:

- ✓ Lecture
- ✓ Group and individual applied projects
- ✓ Demonstration
- ✓ Field trips
- ✓ Guest speaker

RECOMMENDED TEXTS:

Absolute Java, 6th edition, Walter Savitch. ISBN-13: 978-013401674
Online curriculum source: [CodeHS](#)
Software: [BlueJ](#)

MODEL CTE PATHWAY:

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Grade	Fall Semester	Spring Semester
9	Exploring Computer Science 1A	Exploring Computer Science 1B
10	Introduction to Computer Science in Python 1A	Introduction to Computer Science in Python 1B
11	AP Computer Science Principles 1A	AP Computer Science Principles 1B
12	AP Computer Science A 1A	AP Computer Science A 1B

CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS

California Department of Education CTE Standards website: <http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp>

**INDUSTRY SECTOR
 KNOWLEDGE AND PERFORMANCE ANCHOR STANDARDS**

1.0 Academics: Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Information and Communication Technologies academic alignment matrix for identification of standards.

2.0 Communications: Acquire and accurately use Information and Communication Technologies sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats. (Direct alignment with LS 9-10, 11-12.6)

- 2.1 Recognize the elements of communication using a sender–receiver model.
- 2.2 Identify barriers to accurate and appropriate communication.
- 2.3 Interpret verbal and nonverbal communications and respond appropriately.
- 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
- 2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
- 2.7 Use technical writing and communication skills to work effectively with diverse groups of people.
- 2.8 Understand the principles of a customer-oriented service approach to users.

3.0 Career Planning and Management: Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. (Direct alignment with SLS 11-12.2)

- 3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.
- 3.2 Evaluate personal character traits such as trust, respect, and responsibility and understand the impact they can have on career success.
- 3.3 Explore how information and communication technologies are used in career planning and decision making.
- 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
- 3.5 Integrate changing employment trends, societal needs, and economic conditions into career planning.
- 3.6 Recognize the role and function of professional organizations, industry associations, and organized labor in a productive society.
- 3.7 Recognize the importance of small business in the California and global economies.
- 3.8 Understand how digital media are used by potential employers and postsecondary agencies to evaluate candidates.
- 3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.

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4.0 Technology: Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the Information and Communication Technologies sector workplace environment. (Direct alignment with WS 11-12.6)

4.1 Use electronic reference materials to gather information and produce products and services.

4.2 Employ technology based communications responsibly and effectively to explore complex systems and issues.

4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.

4.4 Discern the quality and value of information collected using digital technologies, and recognize bias and intent of the associated sources.

4.5 Research past, present, and projected technological advances as they impact a particular pathway.

4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.

5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Information and Communication Technologies sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)

5.1 Identify and ask significant questions that clarify various points of view to solve problems.

5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.

5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.

5.5 Use a logical and structured approach to isolate and identify the source of problems and to resolve problems.

5.6 Know the available resources for identifying and resolving problems.

5.7 Work out problems iteratively and recursively.

5.8 Create and use algorithms and solve problems.

5.9 Deconstruct large problems into components to solve.

5.10 Use multiple layers of abstraction.

5.11 Understand the concept of base systems, including binary and hexadecimal.

5.12 Apply the concepts of Boolean logic to decision making and searching.

6.0 Health and Safety: Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Information and Communication Technologies sector workplace environment. (Direct alignment with RSTS 9-10, 11-12.4)

6.1 Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions.

6.2 Interpret policies, procedures, and regulations for the workplace environment, including employer and employee responsibilities.

6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.

6.4 Practice personal safety when lifting, bending, or moving equipment and supplies.

6.5 Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics.

6.6 Maintain a safe and healthful working environment.

6.7 Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA).

6.8 Maintain a safe and healthful working environment.

6.9 Dispose of e-waste properly, understanding the health, environmental, and legal risks of improper disposal.

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6.10 Act conscientiously regarding the use of natural resources (e.g., paper, ink, etc.)

6.11 Conserve energy while computing (e.g., turn off equipment at night, power-saving settings, etc.)

7.0 Responsibility and Flexibility: Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Information and Communication Technologies sector workplace environment and community settings. (Direct alignment with SLS 9-10, 11-12.1)

7.1 Recognize how financial management impacts the economy, workforce, and community.

7.2 Explain the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.

7.3 Understand the need to adapt to changing and varied roles and responsibilities.

7.4 Practice time management and efficiency to fulfill responsibilities.

7.5 Apply high-quality techniques to product or presentation design and development.

7.6 Demonstrate knowledge and practice of responsible financial management.

7.7 Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.

7.8 Explore issues of global significance and document the impact on the Information and Communication Technologies sector.

8.0 Ethics and Legal Responsibilities: Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms. (Direct alignment with SLS 11-12.1d)

8.1 Access, analyze, and implement quality assurance standards of practice.

8.2 Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Information and Communication Technologies industry sector.

8.3 Demonstrate ethical and legal practices consistent with Information and Communication Technologies sector workplace standards.

8.4 Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace.

8.5 Analyze organizational culture and practices within the workplace environment.

8.6 Adhere to copyright and intellectual property laws and regulations, and use and appropriately cite proprietary information.

8.7 Conform to rules and regulations regarding sharing of confidential information, as determined by Information and Communication Technologies sector laws and practices.

8.8 Identify legal and ethical issues that have proliferated with increased technology adoption, including hacking, scamming, and breach of privacy.

9.0 Leadership and Teamwork: Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution such as those practiced in the Future Business Leaders of America and SkillsUSA career technical student organization. (Direct alignment with SLS 11-12.1b)

9.1 Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.

9.2 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills as applied in groups, teams and career technical student organization activities.

9.3 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting.

9.4 Explain how professional associations and organizations and associated leadership development and competitive career development activities enhance academic preparation, promote career choices, and contribute to employment opportunities.

9.5 Understand that the modern world is an international community and requires an expanded global view.

9.6 Respect individual and cultural differences and recognize the importance of diversity in the workplace.

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9.7 Participate in interactive teamwork to solve real Information and Communication Technologies sector issues and problems.

10.0 Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the Information and Communication Technologies sector, following procedures when carrying out experiments or performing technical tasks.(Direct alignment with WS 11-12.6)

10.1 Interpret and explain terminology and practices specific to the Information and Communication Technologies sector.

10.2 Comply with the rules, regulations, and expectations of all aspects of the Information and Communication Technologies sector.

10.3 Construct projects and products specific to the Information Communication Technologies sector requirements and expectations.

10.4 Collaborate with industry experts for specific technical knowledge and skills.

10.5 Understand the major software and hardware components of a computer and a network and how they relate to each other.

10.6 Understand data sizes of various types of information (text, pictures, sound, video, etc.) and data capacity of various forms of media.

10.7 Understand the SI (metric) prefixes commonly used in computing including, at least, kilo, mega, giga, and tera.

10.8 Understand security concepts including authorization, rights, and encryption.

10.9 Use common industry-standard software and their applications including word processing, spreadsheets, databases, and multimedia software.

10.10 Manage files in a hierarchical system.

10.11 Know multiple ways in which to transfer information and resources (e.g., text, data, sound, video, still images) between software programs and systems.

10.12 Know appropriate search procedures for different types of information, sources, and queries.

10.13 Evaluate the accuracy, relevance, and comprehensiveness of retrieved information.

10.14 Analyze the effectiveness of online information resources to support collaborative tasks, research, publications, communications, and increased productivity.

11.0 Demonstration and Application: Demonstrate and apply the knowledge and skills contained in the Information and Communication Technologies anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through career technical student organizations such as Future Business Leaders of America and SkillsUSA.

11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Information and Communication Technologies sector program of study.

11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.

11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.

11.4 Employ entrepreneurial practices and behaviors appropriate to Information and Communication Technologies sector opportunities.

11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

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CR = Classroom LAB/CC = Laboratory/Shop/Community Classroom

I.	Primitive Types	CR	LAB/ CC	STANDARDS
	This unit introduces students to the Java programming language and the use of classes, providing students with a firm foundation of concepts that will be leveraged and built upon in all future units. • Why Programming? • Why Java? • Variables and Data Types • Expressions and Assignment Statements • Compound Assignment • Operators • Casting and Ranges of Variables	2	8	Academic: A-CED 1, A-CED 2, LS 11-12.4, LS 11-12.6, WS 11-12.1 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5 CTE Pathway: C4.1, C4.4, C4.6
II.	Using Objects	CR	LAB/ CC	STANDARDS
	In the first unit, students used primitive types to represent real-world data and determined how to use them in arithmetic expressions to solve problems. This unit introduces a new type of data: reference data. • Objects: Instances of Classes • Creating and Storing VAR Objects (Instantiation) • Calling a Void Method • Calling a Void Method with Parameters • Calling a Non-void • String Objects: Concatenation, Literals, and More • String Methods • Wrapper Classes: Integer and Double • Using the Class	4	16	Academic: A-CED 1, A-CED 2, LS 11-12.4, LS 11-12.6, WS 11-12.1 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 5.8, 5.11 CTE Pathway: C1.1, C2.1, C3.1, C3.2, C4.1, C4.4, C4.6, C4.9, C5.4, C5.5

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III.	Boolean Expressions and if Statements	CR	LAB/ CC	STANDARDS
	Algorithms are composed of three building blocks: sequencing, selection, and iteration. • Boolean Expressions • if Statements and Control Flow • if-else Statements • else if Statements • Compound Boolean Expressions • Equivalent Boolean Expressions • Comparing Objects	4	16	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, A-REI 1 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 5.2, 5.5, 5.8, 5.12, 10.3 CTE Pathway: C1.1, C2.2, C2.5, C3.1, C3.2, C4.1, C4.4, C4.11, C5.1, C5.2, C5.4, C5.5, C5.6, C5.7, C5.8, C5.9, C5.10, C5.12
IV.	Iteration	CR	LAB/ CC	STANDARDS
	This unit focuses on iteration using while and for loops. As you saw in Unit 3, Boolean expressions are useful when a program needs to perform different operations under different conditions. Boolean expressions are also one of the main components in iteration. • while Loops • for Loops • Developing Algorithms • Using Strings • Nested Iteration • Informal Code Analysis	5	20	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, A-REI 1 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 5.2, 5.5, 5.7, 5.8, 10.3 CTE Pathway: C1.1, C2.2, C2.5, C3.1, C3.2, C4.1, C4.4, C4.11, C5.1, C5.2, C5.4, C5.5, C5.6, C5.7, C5.8, C5.9, C5.10, C5.12

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V.	Writing Classes	CR	LAB/ CC	STANDARDS
	This unit will pull together information from all previous units to create new, user-defined reference data types in the form of classes. The ability to accurately model real-world entities in a computer program is a large part of what makes computer science so powerful. • Anatomy of a Class • Constructors • Documentation with Comments • Accessor Methods • Mutator Methods • Writing Methods • Static Variables and Methods • Scope and Access • this Keyword • Ethical and Social Implications of Computing Systems	4	16	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, A-CED 3, F-IF 1, F-IF 2, US 11.8.7 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 10.3, 5.2, 5.3, 5.9, 5.10 CTE Pathway: C1.0, C2.0, C3.0, C4.0, C5.0
VI.	Array	CR	LAB/ CC	STANDARDS
	This unit focuses on data structures, which are used to represent collections of related data using a single variable rather than multiple variables. Using a data structure along with iterative statements with appropriate bounds will allow for similar treatment to be applied more easily to all values in the collection. • Array Creation and Access • Traversing Arrays • Enhanced for Loop for Arrays • Developing Algorithms Using Arrays	2	8	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, N-VM 6, N- VM 7, N-VM 8 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 10.3, 5.2, 5.10 CTE Pathway: C1.0, C2.0, C3.0, C4.4, C4.6, C4.7, C4.9, C5.4, C5.5, C5.6

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VII.	ArrayList	CR	LAB/ CC	STANDARDS
	As students learned in Unit 6, data structures are helpful when storing multiple related data values. The ArrayList object has a dynamic size, and the class contains methods for insertion and deletion of elements, making reordering and shifting items easier. • Introduction to ArrayList • ArrayList Methods • Traversing ArrayLists • Developing Algorithms Using ArrayLists • Searching Sorting • Ethical Issues Around Data Collection	4	16	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, N-VM 6, N- VM 7, N-VM 8 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.510.3, 5.2 CTE Pathway: C1.0, C2.0, C3.0, C4.4, C4.6, C4.7, C4.9, C5.4, C5.5, C5.6
VIII.	2D Array	CR	LAB/ CC	STANDARDS
	In Unit 6, students learned how 1D arrays store large amounts of related data. These same concepts will be implemented with two-dimensional (2D) arrays in this unit. • 2D Arrays • Traversing 2D Arrays	3	12	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, N-VM 6, N- VM 7, N-VM 8 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 10.3, 5.2 CTE Pathway: C1.0, C2.0, C3.0, C4.4, C4.6, C4.7, C4.9, C5.4, C5.5, C5.6

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IX.	Inheritance	CR	LAB/ CC	STANDARDS
	Creating objects, calling methods on the objects created, and being able to define a new data type by creating a class are essential understandings before moving into this unit. One of the strongest advantages of Java is the ability to categorize classes into hierarchies through inheritance. • Creating Superclasses and Subclasses • Writing Constructors for Subclasses • Overriding Methods • super Keyword • Creating References Using Inheritance Hierarchies • Polymorphism • Object Superclass	5	20	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, A-CED 3, F-IF 1, F-IF 2 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 10.3, 5.2, 5.3 CTE Pathway: C1.0, C2.0, C3.0, C4.0, C5.0
X.	Recursion	CR	LAB/ CC	STANDARDS
	Sometimes a problem can be solved by solving smaller or simpler versions of the same problem rather than attempting an iterative solution. This is called recursion, and it is a powerful math and computer science idea. • Recursion • Recursive Searching and Sorting	2	8	Academic: LS 11-12.4, LS 11-12.6, WS 11-12.1, A-CED 1, A-CED 2, A-CED 3, F-IF 1, F-IF 2, F-IF 3 CTE Anchor: 1.0, 2.3, 2.4, 2.5, 2.6, 2.7, 4.1, 5.1, 5.6, 6.3, 6.6, 6.11, 7.3, 7.4, 7.7, 8.3, 8.4, 8.6, 9.2, 9.3, 9.6, 9.7, 10.1, 10.11, 11.5, 10.3, 5.2, 5.3, 5.7 CTE Pathway: C4.1, C4.6, C4.8, C5.3

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XI.	EMPLOYMENT PORTFOLIO	CR	LAB/ CC	STANDARDS
	In this unit, students will add to their professional portfolio. - Portfolio showcases best professional level work - Portfolio is organized - Job application - Resume - References	1	4	Academic: LS: 11-12.1, 11-12.2, 11-12.3, 11-12.6 RSIT: 11-12.1, 11-12.7 WS: 11-12.2, 11-12.6, 11-12.7 CTE Anchor: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9: 4.1,4.2, 4.3, 4.4, 4.5, 4.6: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8: 10.1, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.11, 10.12, 10.13, 10.14: 11.1, 11.2, 11.3, 11.4, 11.5 CTE Pathway: C6.6, C6.7, C6.4, C6.5, C6.1, C6.2, C6.3, C7.5, C8.7