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

Course Title	*Exploring Computer Science Re-Write*	**Course Code**	*JT448-449*

Transcript Title:	*Exploring Computer Science (ECS)*	Grades Levels:	*9*	Board Adoption Date:	
Content Area:	***CTE- Computer Sci***	**GPA Scale:**	***4.0***	**Date Course Submitted:**	***3/27/18***
Credential Required:	*CTE*	Graduation Subject Areas:	*Elective*		
UC/CSU "A-G" Area Approvals:	*yes*		School Site/person that wrote and submitted the course:	*Bulone/Dominguez*	
Recommend Skills:	*None*				
Next course(s):	*Introduction to Computer Science in Python*				

Exploring Computer Science

DATE: February 18, 2018

INDUSTRY SECTOR: Information and Communication Technology

PATHWAY: Software and Systems Development Pathway

CBEDS TITLE: Introduction to Systems Programming (INTRO)

CBEDS Code: 8130

HOURS:

Total	Classroom	Laboratory/CC/CVE
180	68	112

JOB TITLE	ONET CODES	JOB TITLE	ONET CODES
Web Design	15-1134.00		
Data Entry	43-9021.00		
Computer Programming	15-1131.00		

COURSE DESCRIPTION: **Exploring Computer Science** is an introductory course that empowers students to engage with Computer Science as a medium for creativity, communication, problem solving, and fun. The course will include Web Design, E-Textiles, Robots, and Game Design with Block Programming.

PREREQUISITES:

High School Name:	Site Prerequisite:
N/A	

A – G APPROVAL: ☐ Yes ☒ No ☐ Desired

ARTICULATION:

High School Name:	College Name:	College Course Title:

LEVEL: [ ] **Introductory** [ ] **Concentrator** [ ] **Capstone**

CERTIFICATION:

High School Name:	Embedded/Leads to:	Description:
Newport Harbor	IC3	Digital Literacy

METHOD OF STUDENT EVALUATION:

- ✓ Pre and Post test
- ✓ Student Projects
- ✓ Written work
- ✓ Observation record of student performance
- ✓ Completion of assignments and worksheets

METHOD OF INSTRUCTION:

- ✓ Lecture
- ✓ Group and individual applied projects
- ✓ Demonstration
- ✓ Field Trips
- ✓ Guest Speaker

RECOMMENDED TEXTS:

Exploring Computer Science V7.0

MODEL CTE PATHWAY:

Software systems Development

Grade	Fall Semester	Spring Semester
9th	ECS	ECS
10th	Intro to Python	Intro to Python
11th	AP CSP	AP CSP
12th	AP CS A	AP CS A
Elective		

CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS California Department of Education CTE Standards website: http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp
Information and Communication Technology/Digital Media **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.

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.
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 fo 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.
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.

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

I.	Team Building/Problem Solving	CR	LAB/ CC	STANDARDS
	This unit provides students with opportunities to become "computational thinkers" by applying a variety of problem--□solving techniques as they create solutions to problems that are situated in a variety of contexts. The range of contexts motivates the need for students to think abstractly and apply known algorithms where appropriate, but also create new algorithms. Analysis of various solutions and algorithms will highlight problems that are not easily solved by computer and for which there are no known solutions. This unit also focuses on the connections between mathematics and computer science. Students will be introduced to selected topics in discrete mathematics including Boolean logic, functions, graphs and the binary number system. Students are also introduced to searching and sorting algorithms and	5	15	**Academic:** LS 9-10, 11-12.1, 11-12.2 11.12.3 11-12.6 RSIT 11-12.2 11-12.3, 11-12.7 WS 11.12.2 11-12.6 11-12.7 SLS 11-12.7 A-CED 1, 3 F-IF 3 G-GPE 4 N-Q 2 **CTE Anchor:** *2.0 (2.3, 2.4, 2.5,*

	graphs. A. What is a Computer? B. Computer Component Presentation C. Peanut Butter and Jelly Algorithm 1. Following Directions Quiz D. Team Skill/Building/Problem Solving 1. Build It! 2. Islands (Communication) E. Minimal Spanning Tree F. Digital Design Tool			*2.7)* *4.0 (4.4)* *5.0 (5.1, 5.4, 5.5, 5.7, 5.8, 5.10, 5.11)* *8.0 (8.8)* *10.0 (10.1, 10.5, 10.6, 10.9, 10.12, 10.13)* **CTE Pathway:** *C4.10,* *C6.3,* *C6.7,* *C8.8* *C10.1*
II.	**Robotics**	**CR**	**LAB/ CC**	**STANDARDS**
	1. **Robotics** This unit introduces robotics as an advanced application of computer science that can be used to solve problems in a variety of settings from business to healthcare and how robotics enables innovation by automating processes that may be dangerous or otherwise problematic for humans. Students explore how to integrate hardware and software in order to solve problems. Students will see the effect of software and hardware design on the resulting product. Students will apply previously learned topics to the study of robotics. A. What is a Robot 1. Characteristics 2. Algorithms B. Building Robots 1. Robot movement 2. Robot Software 3. Robot sensing C. Robot Competitions 1. Tic-Tac-Toe 2. Dance 3. Rescue Robot	15	20	**Academic:** LS 9-10, 11-12.6 WS 11-12.6, 11-12.7 SLS 11-12.11B A-CED 1, 3 F-IF 3 N-Q 2 **CTE Anchor:** 2.0 (2.3) 4.0 (4.1) 5.0 (5.4, 5.5, 5.8) 9.0 10.0 11.0 **CTE Pathway:** C 3.0 C 5.0, 5.4 C 9.3, 9.4, 9.5 C 10.0
III.	**Web Design**	**CR**	**LAB/ CC**	**STANDARDS**
	This section prepares students to take the role of a developer by expanding their knowledge of algorithms, abstraction, and web page design and applying it to the creation of web pages and documentation for users and equipment. Students will explore issues of social responsibility in web use. They will learn to plan and code their web pages using a variety of techniques and check their sites for usability. Students learn to create user--□friendly websites. Students will apply	15	20	**Academic:** LS 9-10, 11-12.1 11-12.3 11-12.6 RSIT 11-12.6 11-12.7 WS 11-12.2 11-12.4 11-12.6 11-12.7 SLS 9-10, 11-12.1 11-12.1(d) 11-

	fundamental notions of Human Computer Interaction (HCI) and ergonomics. A. Basic HTML B. Basic CSS C. Basic Javascript D. Build a website			12.11(b) 11-12.2 **CTE Anchor:** 2.0 3.0 (3.8) 4.0 5.0 7.0 (7.5) 8.0 9.0 10.0 11.0 **CTE Pathway:** C4.6 C6.1, C6.3, C6.6 C7.5
IV	**E-Textiles**	**CR**	**LAB/ CC**	**STANDARDS**
	This unit prepares student in the world of E-Textiles. Students will create E-Cards and Wearable Electronics. They will attack this Do-It-Yourself unit with a trial and error approach. This unit will also incorporate the programming language called Python to program circuit playgrounds to perform a variety of tasks. A. Electronic Card 1. Circuit Design 2. cards with light 3. cards that move 4. cards with sound B. Electronic Wrist-Band 1. Circuit Design 2. Sewing wrist-band C. Circuit Playground 1. programming with python	15	30	**Academic:** LS 9-10, 11-12.6 WS 11-12.6, 11-12.7 SLS 9-10 11-12.1 11-12.11B A-CED 1, 4 F-IF 2, 3 N-Q 2, 3 N-VM 6, 7, 8, 9 APPS 10 **CTE Anchor:** 2.0 4.0 5.0 8.0 9.0 10.0 11.0 **CTE Pathway:** C4.5, C4.6, C4.9 C5.5 C6.4, C6.6
V.	**Scratch**	**CR**	**LAB/ CC**	**STANDARDS**
	Students are introduced to some basic issues associated with program design and development. Students design algorithms and create programming solutions to a variety of computational problems using	15	25	**Academic:** LS 9-10, 11-12.6 WS 11-12.6, 11-12.7 SLS 9-10 11-12.1

	an iterative development process in Scratch. Programming problems include mathematical and logical concepts and a variety of programming constructs. A. Introduction to Scratch a. Telling a story b. Dance video B. Programming with Scratch a. Broadcasting b. Variables c. Conditionals C. Games with Scratch a. Rock Paper Scissors b. Fizz-Bang c. Make your own game			11-12.11B A-CED 1, 4 F-IF 2, 3 N-Q 2, 3 N-VM 6, 7, 8, 9 APPS 10 **CTE Anchor:** 2.0 4.0 5.0 8.0 9.0 10.0 11.0 **CTE Pathway:** C4.5, C4.6, C4.9 C5.5 C6.4, C6.6
VI	**EMPLOYMENT PORTFOLIO**	**CR**	**LAB/ CC**	**STANDARDS**
	A. Students will prepare a professional portfolio. 1. Portfolio showcases best professional level work 2. Portfolio is organized 3. Job application 4. Resume 5. References	3	2	**Academic:** LS 9-10, 11-12.1, 11-12.2, 11-12.3, 11-12.6 RSIT 11-12.1, 11-12.6, 11-12.7 RSTS 9-10, 11-12.4 RLST 11-12.7 WS 11-12.2, 11-12.6, 11-12.7 WHSST 11-12.7 SLS 9-10, 11-12.2 **CTE Anchor:** 1.0 2.0 3.0 4.0 7.0 10.0 11.0 **CTE Pathway:** C6.0 C7.0, 7.5 C8.0