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

Course Title	*Medical Detectives Re-Write*	**Course Code**	*KT011*

Transcript Title:	*Medical Det*	Grades Levels:	*7-8*	Board Adoption Date:	
Content Area:	***Engineering***	**GPA Scale:**	***4.0***	**Date Course Submitted:**	***3/27/18***
Credential Required:	*CTE*	Graduation Subject Areas:	*ELECTIVE*		
UC/CSU "A-G" Area Approvals:			School Site/person that wrote and submitted the course:	*TeWinkle/Candice Woods*	
Recommend Skills:	*Reading, Writing, Math, Speaking*				
Next course(s):	*Flight and Space*				

Medical Detectives

DATE: March 6, 2018

INDUSTRY SECTOR: Engineering and Architecture

PATHWAY: Engineering Design

CBEDS TITLE: Indroduction to Engineering and Architecture (999)

CBEDS Code: 7700

HOURS:

Total	Classroom	Laboratory/CC/CVE
90 Hours	15 Hours	75 Hours

JOB TITLE	ONET CODES	JOB TITLE	ONET CODES
N/A	N/A		

COURSE DESCRIPTION: In the Medical Detectives (MD) unit, students play the role of real-life medical detectives as they analyze genetic testing results to diagnose disease and study DNA evidence found at a "crime scene." They solve medical mysteries through hands-on projects and labs, investigate how to measure and interpret vital signs, and learn how the systems of the human body work together to maintain health.

PREREQUISITES: n/a

High School Name:	Site Prerequisite:

A – G APPROVAL: ☐ Yes ☒ No ☐ Desired

ARTICULATION: N/A

High School Name:	College Name:	College Course Title:
N/A	N/A	

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

CERTIFICATION: **N/A**

High School Name:	Embedded/Leads to:	Description:
N/A		

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:

PLTW Course Curriculum

MODEL CTE PATHWAY:
Exploratory PLTW Course

CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS
California Department of Education CTE Standards website: http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp

Advanced Manufacturing and Engineering
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 Engineering and Architecture academic alignment matrix for identification of standards.

2.0 Communications
Acquire and accurately use Engineering and Architecture 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.

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 Engineering and Architecture 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 Web-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 projects to create alternative solutions to answer a question or solve a problem unique to the Engineering and Architecture 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.

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 Engineering and Architecture 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).

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 Engineering and Architecture 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 Engineering and Architecture 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 Engineering and Architecture industry sector.
8.3 Demonstrate ethical and legal practices consistent with Engineering and Architecture 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 Engineering and Architecture sector laws and practices.

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 as practiced in the 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 develop¬ment 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 Engineering and Architecture sector issues and problems.

10.0 Technical Knowledge and Skills
Apply essential technical knowledge and skills common to all pathways in the Engineering and Architecture 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 Engineering and Architecture sector.
10.2 Comply with the rules, regulations, and expectations of all aspects of the Engineering and Architecture sector. 10.3 Construct projects and products specific to the Engineering and Architecture sector requirements and expectations.
10.4 Collaborate with industry experts for specific technical knowledge and skills.

11.0 Demonstration and Application
Demonstrate and apply the knowledge and skills contained in the Engineering and Architecture anchor standards, pathway standards, and performance indicators in classroom, laboratory and workplace settings, and through the SkillsUSA career technical student organization.
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 Engineering and Architecture 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 Engineering and Architecture 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.	What Is a Medical Detective?	CR	LAB/ CC	STANDARDS
	Activity 1.1 Vital Signs: Temperature • In this activity, students will measure the temperature of the palm of their hand and the palm temperatures of their teammates. You will also get to know the Vernier *Logger Lite*®software and temperature probe. **Activity 1.2 Vital Signs: Heart Rate and Blood Pressure** • In this activity, students will measure their heart rate and blood pressure and calculate average readings for their team. They will also use an interactive website to maintain homeostasis in a virtual body. **Activity 1.3 Chickenpox Outbreak** • In this activity, students will model the different ways that a virus such as chickenpox spreads through a population and what happens if inoculation is introduced. **Activity 1.4 Mystery Illness** • Students will research a foodborne pathogen. Research food safty regulations and later diagnose a patient with given symptoms . From their they will diganose a patient that has come in contact with a pathogen. They will implement the skills learned in Activity 1.1 and 1.2 to make a proper diagnosis. **Activity 1.5 Biomedical Careers** • There are eight different career-related exploration opportunities in this activity. Students choose which activity best fits their interest. These exploration activities are currently written to give students a broad introduction to all types of biomedical science careers. ❖ Activity 1.5a Scaveger Hunt ❖ Activity 1.5b Interview ❖ Activity 1.5c Brochure ❖ Activity 1.5d Book ❖ Activity 1.5e Skit ❖ Activity 1.5f Online Magazie ❖ Activity 1.5g Glog ❖ Activity 1.5h Concept Map	4 hrs	15 hrs	**Academic:** **Reading:** AS.R.1-4 AS.W2,4,6-8,10 AS.SL.1,2,5,6 AS.L.1,2,6 **Technology:** 12.6-8.J 13.6-83.F,G 14.6-8.G-I 15.6-8.H,J **Math:** 7.NS.A.1,3 7.EE.B.3,4 **Health:** 1.2.1,3 1.3.1,2 2.1.5 2.3.1 4.1.1 4.3.1-2 7.1.2 10.1.1 11.1.1 **Science:** MS.PS3.4 **CTE Anchor:** 2.0 3.0 4.0 5.0 6.0 7.0 9.0 10.0 11.0 **CTE Pathway:** C2.0 C11.0
II.	**Mysteries of the Human Body System**	**CR**	**LAB/ CC**	**STANDARDS**

	Activity 2.1 Testing the Senses • In this activity, students will test their senses of taste, smell, and touch as well as explore how their nervous system collects information from the outside world. **Activity #1: Taste** Students will act as a detective and investigate the taste sensitivity of the each region of the tongue. **Activity #2: Smell** Students will learn about smell receptors and their locations. Then will conduct mini experiment to learn about This phenomenon is known as olfactory fatigue **Activity #3: Hearing** Students will learn about bone conduction by performing an experiment using tuning forks. **Activity #4: Touch Sensation** During this activity, students conduct skin tests to learn that certain parts of our body are more receptive to touch than other. **Activity #5: Two-Point Discrimination** Students continue to develop their understanding with touch sensation by conducting a skin density test. **Activty 2.2: Testing the Senses: Sight** • Students will test their visual senses through a series of experiments. **Activity 2.3: Hearing Loss** • Students will explore your sense of hearing and investigate a preventable form of hearing loss. **Activity 2.4: Brain Anatomy** • Students will explore a computer animation to learn about the structure and functions of the human brain. **Activity 2.5: Brain Dissection** • Students will learn about the structure and functions of the brain as you they dissect a sheep brain and compare the anatomy with what they've have learned about the human brain. **Activity 2.6: Mystery Disease Part 1: Diagnosis** • Students will create a pedigree from the patient history, research the patient's symptoms, and recommend tests to confirm their diagnosis. **Activity 2.7: Mystery Disease Part 2: Genetic Testing** • Students will learn more about Huntington's disease and investigate how DNA is isolated for genetic testing by collecting your cheek cells, isolating DNA, and	4hrs	30 hrs	**Academic:** **Reading:** AS.R.1 AS.R.4 AS.R.7 AS.R.10 AS.W.1,2,4,7-9 AS.SL.1,2,5 AS.L.6 **Technology:** 12.6-8.J 14.6-8.G **Math:** 7.NS.A.1,3 7EE.B.3 **Health:** 1.1.1,3 1.2.1,3 1.3.2 2.1.5 2.3.1 6.1.2 11.1.1 **Science:** MS.LS1.3,5,8 MS.LS.3.1 **CTE Anchor:** 2.0 4.0 5.0 6.0 7.0 8.0 9.0 10. 11.0 **CTE Pathway:** C2.0 C3.0 C10.0 C11.0

	creating a necklace with your isolated DNA.			
III.	**Murder Mystery**	**CR**	**LAB/ CC**	**STANDARDS**
	Activity 3.1: Time of Death • Students will investigate relative cooling rates and estimate time of death based on temperature data for a murder victim. **Activity 3.2: Autopsy** • Students will complete a computer simulation of an autopsy and read a portion of the autopsy report for the hotel operator murder victim to determine the cause of death. **Activity 3.3: Suspect Identification** • Students will use gel electrophoresis to analyze DNA from two suspects, the victim, and DNA from the crime scene to identify which suspect should be charged with the crime.	3 hrs	20 hrs	**Academic:** **Reading:** AS.W.4,6,9,10 AS.SL.1,4-6 AS.L.1,2,6 **Technology:** 1.6-8.F 14.6-8.G 15.6-8.H **Math:** 7.NS.A.1,3 7.EE.B.3,4 8.EE.B.5 **Health:** 1.3.1,2 2.1.5 2.3.1 11.1.1,2, 11.2.1 **Science:** MS.LS4.5 **CTE Anchor:** 2.0 4.0 5.0 6.0 9.0 10. 11.0 **CTE Pathway:** C.2.0 C.3.0 C.4.0 C.11.0
IV.	**EMPLOYMENT PORTFOLIO**	**CR**	**LAB/ CC**	**STANDARDS**
	Students will prepare an update to their professional portfolio (lab book) A. Portfolio showcases best professional level work B. Portfolio is organized C. Research engineers/careers specific to content	4 hr ONGOING	10 hrs ONGOING	**Academic:** **Reading:** AS.R.1,4,7 AS.W.2,4,7 AS.SL.1,2,4 AS.L.1,2,6 **CTE Anchor:** 1.0 2.0 3.0 11.0 **CTE Pathway:** C11.0