

Career-related Programme career-related study outline

Complete one form for each career-related study being offered at the school

Name of the school

Judd Thompson

School code

000999

Career-related study area

Computer Science

Career-related study provider

Palomar Community College

Language of instruction

English

Number of years this career-related study has been provided for students at the school

Begun offering 2018-19 Academic Year

Name of the person completing this outline

Judd Thompson

Role of the person completing this outline

IBCP Coordinator

1. What was the school's rationale for selecting this career-related study?

It is our desire to provide meaningful career opportunities that will provide students real employment opportunities in an unknown future. Through our research and feedback, we have identified three areas including a Computer Science. In looking at the potential partnership with Palomar and the courses that would comprise this path of study. We also had Charter Tech Services, a contract based Technology company evaluate the courses, and they stated that this path would provide a meaningful course of study that would prepare students with an entry-level career path.

2. Provider

- a. Who will deliver the career-related study?

The school

Another entity in partnership with the school

If the career-related study is being delivered in partnership with another entity:

- i. provide the name of the partner entity:

Palomar Community College

- ii. describe how the school has familiarized the partner entity with the CP:

Through collaborative planning between the CP coordinator and the Dual Enrolment Coordinator at Palomar Community College. Together we have shared materials regarding the philosophy and core elements of the CP program with Palomar Community College as we worked together in designing the course curriculum. Over the second semester, and going into the summer, the instructor for the specific courses will also be joining us and participating in our IB collaboration and our Launching the CP Workshop.

Accreditation

a. Who is the accrediting body for this career related study? Please enter the name of the organization in the appropriate place below.

<input type="checkbox"/>	government body:	
<input type="checkbox"/>	awarding body:	
<input type="checkbox"/>	appropriate employer organization or professional body:	
<input checked="" type="checkbox"/>	further/higher education institution:	Palomar Community College
<input type="checkbox"/>	other :	

Please describe the accrediting body.

Palomar Community College is accredited through the Western Association of Schools and Colleges, Accrediting Commission for Community and Junior Colleges (ACCJC/WASC) an institutional accrediting body recognized by the Council of Higher Education Accreditation and the Department of Education. They have held accreditation since January 1, 1952, and have their next accreditation review set for March 1, 2022.

Please describe the process of accreditation the school went through for this career-related study.

The processes of accreditation operate on a seven year cycle. Institutions are required to submit an Institutional Self Evaluation (ISER) every seven years, a possible follow-up report in year two, and a midterm report in year four. Additional Accreditation Reports and Fiscal Reports are required annually. Whenever an institution undergoes a substantive change, a Substantive Change Proposal is required as well. All aspects of Palomar Community College's accreditation process: including timelines, accreditation reports, expected student learning outcomes, and all other additional information can be found at <https://www2.palomar.edu/pages/accreditation/>.

Please describe how this career-related study will be subject to a demonstrable form of external quality assurance and/or reaccreditation, including the frequency of this review.

There are no additional accreditation requirements for Web Development; therefore, it will run on the accreditation cycle mentioned above.

Please provide official evidence of this accreditation or recognition (e.g., certificate, official letter, appearance on accrediting organization website, etc.). If the evidence is not in one of the three IB working languages, please provide a certified translation.

Note: If this documentation is not uploaded by the time of the verification visit, there may be a delay in authorization.

Does successful completion of this career-related study result in a certification or qualification?

Yes

No

If so, what is it?

What specific post-secondary pathways will this career-related study provide to students (e.g., apprenticeships, post-secondary degree, employment)?

This pathway will advance students in post-secondary study, completing four 100-level college courses, *and earning them a Certificate of Proficiency in cyber security*. In addition to furthering students higher-education in computer science, this pathway and certification provides an excellent entry-level career certification.

Please describe the structure of the career-related study (*coursework, online learning, work placement, etc.*).

The structure of the course is a blended learning model that combines online learning and independent work, with twice weekly classroom instruction. A professor from Palomar Community College is on Guajome's campus twice a week to provide direct instruction and hands on laboratory work.

Teaching hours/schedules

- a. How many total teaching hours per student will be part of the career-related study?

318.25 Hours

How many teaching (clock) hours are there per week for the career-related study?

4 hrs. 45 min. per week

Please upload a sample schedule for an **individual student** enrolled in this career-related study for year 1 and year 2 of the CP. The schedule should include the elements of the career-related study, the DP courses and CP core components.

9 th Grade	10 th Grade	11 th Grade	12 th Grade
English 9	English 10	English 11	English 12
Geometry	Algebra II	IB Math SL	IB Math SL
Biology	Chemistry	IB Biology HL	IB Biology HL
German 1	German 2	German 3	Design Tech SL
Physical Education	World History	US History	Government/Econ
Elective (VAPA)	Elective (VAPA if not taken 9 th Grade)	Personal and Professional Skills	Personal and Professional Skills
		Palomar – Computer Science	Palomar – Computer Science

Content

Please describe the content of this career-related study in detail.

a. Topics covered

Courses in this career related study include the following courses:

CSNT 110	Hardware and O.S. Fundamentals
CSNT 111	Networking Fundamentals
CSIT 125	Computer Information Systems
CSNT 255	Ethical Hacking Principles

Topics for each course covered include the following:

CSNT 110: Hardware and OS Fundamentals

Hardware Fundamentals

1. Introduction to Microcomputers
 - a. A brief history of computers
 - b. Numbering systems
 - c. Microcomputer system components and their functions
 - d. Software and firmware
 - e. Tools of the trade
2. Safety
 - a. Basics of Electricity and Electronics
 - b. General Safety Guidelines
 - c. Fire Safety
 - d. Computer equipment disposal
3. System components
 - a. Power supplies
 - b. ROM BIOS
 - c. Central processing units
 - d. System boards
 - e. Memory
4. Bus architectures

- a. What is a Bus?
- b. The 8-bit Bus
- c. The ISA Bus
- d. The EISA Bus
- e. Micro channel architecture Bus
- f. The PCI Bus
- g. Plug and play
- h. Video circuitry Buses
5. Ports, Connectors, and Cables
 - a. Overview of Input/Output ports
 - b. PS/2 ports
 - c. Serial ports
 - d. Parallel ports
 - e. Universal serial Bus ports
 - f. Firewire ports
6. Expansion Boards
 - a. Drive controllers
 - b. Video cards
 - c. Sounds cards
 - d. Modem cards
7. Storage Systems
 - a. Fixed disk drives
 - b. Removable media disk drives
 - c. Backup systems
8. Peripheral Devices
 - a. Primary input devices
 - b. Primary Output devices
 - c. Other input/output devices
9. Portable Computing
 - a. Components of portable systems
 - b. PC cards
 - c. Power management
10. Networking
 - a. Network concepts
 - b. Introduction to the OSI Model
 - c. Network connectivity

Operating System Fundamentals

1. Troubleshooting Windows (most current version)
 - a. Troubleshooting strategy
 - b. Troubleshooting configuration problems

2. Introduction to the Windows (most current version) family of products
 - a. Overview of Windows (most current version)
 - b. Installing Windows (most current version)
 - c. Server-based installations
3. The Windows (most current version) boot process
 - a. Examining the Windows (most current version) boot process
 - b. Troubleshooting the boot process
4. Windows 2000 system administration basics
 - a. System administration in Windows (most current version)
 - b. the Windows 2000 registry
5. Introduction to Networking with TCP/IP
6. The Microsoft TCP/IP protocol suite
7. IP addresses and address classes
8. Network and host addresses
9. Troubleshooting TCP/IP addressing
10. Name resolution services
 - a. Host name resolution methods
 - b. NetBIOS name resolution methods
11. Customizing a Windows (most current version) Installation
 - a. Installing new hardware
 - b. Customizing Windows (most current version)
 - c. Adding and removing software and operating system updates
 - d. Configuring Internet Explorer for web access
12. Managing Network Printing
 - a. An overview of Windows (most current version) printing
 - b. Administering printers
 - c. Web-based printing in Windows (most current version)
13. Managing Hard Disks and Partitions
 - a. Creating and managing partitions on basic disks
 - b. Dynamic disks
 - c. Disk defragmentation and compression
 - d. Managing encryption
14. Monitoring and Troubleshooting Windows (most current version)
 - a. Working with Event Viewer
 - b. Monitoring performance
 - c. Protecting against disaster

CSNT 111: Networking Fundamentals

1. Networking Basics
 - a. Network Communications
 - b. The OSI Reference Model

2. Network Hardware
 - a. Network Cables
 - b. Network Interface Adapters
 - c. Network Hubs
3. Network Connections
 - a. Bridging
 - b. Switching
 - c. Routing
4. Network Software
 - a. Network Operating Systems
 - b. Network Clients
 - c. Directory Services
5. Data-Link Layer Protocols
 - a. Ethernet
 - b. Token Ring
6. Network Layer Protocols
 - a. IP, IPX, NetBEUI
7. Transport Layer Protocols
 - a. TCP and UDP
8. TCP/IP Fundamentals, Routing, Applications, and Configuration
 - a. TCP/IP Protocols
 - b. IP Addressing
 - c. Routing Principles
 - d. Building Routine Tables
 - e. TCP/IP Services, Utilities
 - f. Installing Protocols
 - g. Configuring TCP/IP
9. Remote Network Access
 - a. Using Remote Connections
10. Network Security
 - a. Password Protection
 - b. Security Models
 - c. Firewalls
11. Planning the Network
 - a. Pulling Cable
 - b. Making Connections
12. Installing a Network
13. Network Maintenance
 - a. Backups
 - b. Anti-Virus Policies
 - c. Patches and Updates

CSIT 125: Computer Information Systems

1. Why MIS?
 - a. The Importance of MIS
 - b. Collaboration Information systems
 - c. Strategy and Information Systems
2. Information Technology
 - a. Hardware, Software, and Mobile Systems
 - b. Database Processing
 - c. The Cloud
3. Using IS for Competitive Advantage
 - a. Processes, Organizations, and Information Systems
 - b. Social Media Information Systems
 - c. Business Intelligence Systems
4. Information Systems Management
 - a. Information Systems Security
 - b. Information Systems Management
 - c. Information Systems Development
5. Microsoft Access
 - a. Introduction to Access
 - b. Tables and Queries in Relational Databases: Designing Databases
 - c. Customize, Analyze, and Summarize Query Data
6. Microsoft Excel
 - a. Introduction to Excel
 - b. Formulas and Functions: Performing Quantitative Analysis
 - c. Charts: Depicting Data Visually
 - d. Datasets and Tables
 - e. Subtotals, PivotTables, and PivotCharts
7. Case Study Using Database Software
 - a. Analyze information systems challenge
 - b. Design database
 - c. Develop database
 - d. Develop relevant queries
 - e. Develop forms and reports
8. Case Study Using Electronic Spreadsheet
 - a. Analyze problem statement
 - b. Design spreadsheet
 - c. Create worksheets for each challenge in problem statement
 - d. Spreadsheet Skills:
 - i. Average, CountA, CountIF, Max, Median, Min, Mod Function
 - ii. Cell Formatting
 - iii. Chart

- iv. Pivot Table
 - v. Sort
 - vi. Import External Data
9. Case Study utilizing Information Systems Development to create Web Site
- a. Analyze problem statement to create a web site.
 - b. Create document documenting SDLC or SCRUM System Development.
 - c. Develop web site using a current development platform.

CSNT 255: Ethical Hacking Principles

1. Understand and explain the security triad – confidentiality, integrity, and availability
2. Recognize the difference between ethical hacking and criminal activity
3. Recognize and understand penetration testing footprinting and reconnaissance
 - a. Seven-step information gathering process
 - b. Identifying active machines
 - c. OS fingerprinting
4. Recognize and demonstrate the ability to perform network scanning
 - a. Mapping the network attack surface
 - i. Manual mapping
 - ii. Automated mapping
 - b. Using Nmap network scan tool
5. Understand and demonstrate the procedures for account enumeration
 - a. Enumerating services, applications, and protocols
 - b. Netbios and LDAP enumeration
 - c. Linux enumeration
 - d. NTP enumeration
 - e. SMTP enumeration
 - f. DNS enumeration
6. Describe and explain the tools and techniques used in system hacking
 - a. Non-technical password attacks
 - b. Technical password attacks
 - c. Password guessing
 - d. Password sniffing
 - e. Keylogging
 - f. Privilege escalation and exploiting vulnerabilities
 - g. Hiding files and covering tracks
 - h. Rootkits
7. Recognize and understand the various types of malware exploits used
 - a. Viruses
 - b. Worms
 - c. Trojans
 - d. Covert communication

- e. Keystroke logging and spyware
- f. Malware countermeasures
- 8. Recognize and understand the concepts of network sniffing
 - a. Network sniffing tools
 - b. ARP spoofing
 - c. MAC flooding
 - d. Spoofing countermeasures
- 9. Describe and understand social engineering and its applicability to penetration testing
 - a. Six types of social engineering
 - i. Scarcity
 - ii. Authority
 - iii. Liking
 - iv. Consistency
 - v. Social validation
 - vi. Reciprocation
 - b. Computer-based social engineering
 - i. Pop-up windows
 - ii. Email attachments
 - iii. Social networking
 - iv. Websites
 - v. Phishing
 - vi. Spear phishing
 - vii. Whaling
 - viii. SMiShing
 - c. Reverse social engineering
- 10. Explore and demonstrate the function of distributed denial of service attacks
 - a. Bandwidth attacks
 - b. SYN flood attacks
 - c. ICMP attacks
 - d. Peer-to-peer (P2P) attacks
 - e. Program and application-level attacks
 - f. Permanent DOS attacks
 - g. DOS and DDOS countermeasures
- 11. Recognize and understand the process of application session hijacking
- 12. Understand and demonstrate the procedures for hacking web servers and web applications
 - a. Banner grabbing and enumeration
 - b. Web server vulnerability identification
 - c. Web server attacks
 - d. DNS server hijacking and DNS amplification attacks
 - e. Directory traversal
 - f. Man-in-the-middle attacks
 - g. Website defacement

- h. Web server misconfigurations
 - i. HTTP response splitting
 - j. Web server password cracking
 - k. IIS vulnerabilities
 - l. Securing web servers
 - i. Harden before deployment
 - ii. Patch management
 - iii. Disable unneeded services
 - iv. Lock down file system
 - v. Log and audit
 - vi. Vulnerability scanning
 - m. Web application hacking
 - i. Invalidated inputs
 - ii. Parameter/form tampering
 - iii. Injection flaws
 - iv. Cross-site scripting and cross-site request forgery attacks
 - v. Hidden field attacks
 - vi. Attacking web based authentication
 - vii. Web application password cracking
 - viii. URL obfuscation
 - ix. Intercepting web traffic
 - x. Securing web applications
13. Describe and explore the process of using SQL injection attacks against databases
- a. Hierarchical database management systems
 - b. Network database management systems
 - c. Relational database management systems
 - d. Object-oriented database systems
 - e. Identifying SQL servers
 - f. SQL Injection vulnerabilities
 - i. Simple SQL injection
 - ii. Union SQL injection
 - iii. Error-based SQL injection
 - iv. Blind SQL injection
 - g. SQL injection hacking tools
14. Recognize and demonstrate the tools used for hacking wireless networks
- a. Overview of wireless technologies
 - b. Wireless LAN frequencies and signaling
 - c. Wireless LAN security
 - d. Wireless LAN threats
 - i. War chalking
 - ii. War driving
 - iii. War flying

- iv. Eavesdropping
 - v. Rogue and unauthorized access points
 - vi. Denial of service
 - A. Authentication flood attack
 - B. De-authentication flood attack
 - C. Network-jamming attack
 - D. Equipment destruction attack
 - e. Wifi network discovery
 - f. Wireless traffic analysis
 - g. Wireless attacks
 - h. Cracking Wifi networks
 - i. Securing wireless networks
 - j. Wireless site surveys
 - k. Wireless Authentication
 - l. Wireless misuse detection
15. Recognize and demonstrate the tools used for hacking mobile devices
- a. Mobile device concerns
 - i. Data exfiltration
 - ii. Mobile malware
 - iii. Geolocation and location-based services
 - iv. Bump attacks
 - v. Jailbreaking
 - vi. Application sandbox issues
 - b. Mobile device platforms
 - i. Android
 - ii. IOS
 - iii. Windows phone
 - iv. Blackberry
 - c. Mobile device management and protection
 - i. Physical controls
 - ii. Technical controls
 - iii. Administrative controls
 - d. Bluetooth communications
16. Understand the function and effectiveness of various network defense tools such as intrusion defense system, firewalls, and honeypots and know how to evade them
- a. Network-based IDS
 - b. Host-based IDS
 - c. Pattern matching and anomaly detection
 - d. IDS evasion
 - e. Firewall types
 - f. Network address translation
 - g. Packet filters

- h. Bypassing firewalls
- i. Types of honeypots
- j. Detecting honeypots
- 17. Recognize the complexity and security challenges with cloud computing
- 18. Understand and identify the various types of cryptographic algorithms and how each one is used differently in securing data
 - a. History of cryptography
 - b. Algorithms
 - i. Symmetric
 - ii. Asymmetric
 - c. Public key infrastructure
 - d. Hashing
 - e. Steganography
 - f. Digital Watermarks
 - g. Trust Models
 - h. Encryption cracking and tools

Skills acquired

Students will be able to do the following:

CSNT 110: Hardware and OS Fundamentals

1. Introduction to Microcomputers
2. Safety

3. System Components
4. Bus Architectures
5. Ports, Connectors, and Cables
6. Expansion Boards
7. Storage Systems
8. Peripheral Devices
9. Portable Computing
10. Networking
11. Troubleshooting Windows (most current version)
12. Introduction to the Windows (most current version) Family of Products
13. The Windows (most current version) Boot Process
14. Windows (most current version) System Administration Basics
15. Introduction to Networking with TCP/IP
16. Name Resolution Services
17. Customizing a Windows (most current version) installation
18. Managing Network Printing
19. Managing Hard Disks and Partitions
20. Monitoring and Troubleshooting Windows (most current version)

CSNT 111: Networking Fundamentals

1. Understand networking basics.
2. Identify network software, hardware and connections.
3. Understand the OSI model.
4. Become familiar with TCP/IP Fundamentals, Routing, Applications, and Configuration.
5. Plan and efficiently manage IP addressing and subnetting.
6. Explain Remote Network Access.
7. Identify network security issues.

CSIT 125: Computer Information Systems

1. Describe existing and emerging technologies and their impact on organizations and society.
2. Demonstrate an understanding of the development and use of information systems to enhance business processes.
3. Solve common business problems using appropriate Information Technology applications and systems.

CSNT 255: Ethical Hacking Principles

1. Understand and explain the security triad - confidentiality, integrity, and availability;
2. Recognize the difference between ethical hacking and criminal activity;
3. Recognize and understand penetration testing footprinting and reconnaissance;
4. Recognize and demonstrate the ability to perform network scanning;

5. Understand and demonstrate the procedures for account enumeration;
6. Describe and explain the tools and techniques used in system hacking;
7. Recognize and understand the various types of malware exploits used;
8. Recognize and understand the concepts of network sniffing;
9. Describe and understand social engineering and its applicability to penetration testing;
10. Explore and demonstrate the function of distributed denial of service attacks;
11. Recognize and understand the process of application session hijacking;
12. Understand and demonstrate the procedures for hacking web servers and web applications;
13. Describe and explore the process of using SQL injection attacks against databases;
14. Recognize and demonstrate the tools used for hacking wireless networks;
15. Recognize and demonstrate the tools used for hacking mobile devices;
16. Understand the function and effectiveness of various network defense tools such as intrusion defense system, firewalls, and honeypots and know how to evade them;
17. Recognize the complexity and security challenges with cloud computing;
18. Understand and identify the various types of cryptographic algorithms and how each one is used differently in securing data.

Internship/work experience (if applicable)

None

Additional information

None

Student assessment

- b. How will students be assessed in this career-related study? Please clearly indicate any elements of the assessment plan that are required by the accrediting body for this career-related study.

Students will be assessed using the following methods:

1. Class participation
2. Class work
3. Exams/tests
4. Projects
5. Skills tests
6. Homework
7. Demonstration

Who will assess students in this career related study?

School

Partner entity

External assessment body

Other (*please describe*):

DP courses

- a. Which DP courses will be offered in connection with this career-related study?

IB Design Tech SL
IB Mathematics SL
IB Math Studies SL
Language A: Literature HL

What was the school's reasoning for selecting the DP courses that will be made available to the students enrolled in this career-related study?

IB Design Technology, will be required for students taking the computer science career-study. This course will further introduce them to design concepts and problem solving.

Mathematics SL or Math Studies SL, as math can be beneficial in both the medical field, or further study of computer science at a higher level. Finally, students have a choice of Language A: Literature HL. This course provides so much opportunity for students to build up their communication skills preparing them for either continued education at a higher level, or directly in a career field.