

El Camino College COURSE OUTLINE OF RECORD – Approved

| I. | GENERAL COURSE INFORMATION | | |
|----|--|--|--|
| | Subject and Number: Electronics and Computer Hardware Technology 144 | | |
| | Descriptive Title: | CompTIA A+ Certification Preparation for Computer Hardware Systems | |
| | Course Disciplines: | Electronics AND Electronic Technology | |
| | Division: | Industry and Technology | |

Catalog Description:

This course is designed for the student pursuing a career as a computer service technician. Students will develop the skills and knowledge required for passing the CompTIA A+ Certification Core Hardware exam. Topics covered include safety, basics of electricity and electronics, micro-computer hardware and components, Complementary Metal Oxide Semiconductor (CMOS) settings, printers, portable systems and network hardware.

Note: Letter grade or pass/no pass option.

Conditions of Enrollment:

Recommended Preparation: Electronics and Computer Hardware Technology 140

| Course Length: | X Full Term | Other (Specify number of weeks): |
|--------------------|----------------|----------------------------------|
| Hours Lecture: | 2.00 hours per | week TBA |
| Hours Laboratory: | 4.00 hours per | week TBA |
| Course Units: | 3.00 | |
| Grading Method: | Both | |
| Credit Status | Associate Deg | ree Credit |
| Transfer CSU: | X Effective Da | te: 3/18/2002 |
| Transfer UC: | No | |
| General Education: | | |
| El Camino College: | | |
| CSU GE: | | |

IGETC:

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

SLO #1 Course Notebook

The students will assemble and maintain a five-section course notebook.

SLO #2 CompTIA Industry Certification

The student will acquire a knowledge base to prepare to take the A+ Certification Exam.

SLO #3 Electricity and Electronics

The student will acquire knowledge in safety and the basics of electricity and electronics, microcomputer hardware and components.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <u>http://www.elcamino.edu/academics/slo/</u>.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

- 1. Analyze proper procedures for installing and configuring system components and devices.
 - Laboratory reports
- 2. Diagnose and troubleshoot computer system problems and determine whether they are hardware or software related.
 - Performance exams
- 3. Identify safety procedures, environmental hazards and preventative maintenance techniques.
 - Objective Exams
- 4. Compare and contrast popular motherboards, types of memory, bus architectures and peripheral devices.
 - Written homework
- 5. Evaluate the print process and identify procedures for servicing printers.
 - Laboratory reports
- 6. Identify the unique components of portable systems.
 - Homework Problems
- 7. Define basic networking concepts and networking hardware components.
 - Homework Problems
- 8. Configure a computer to function on a network.
 - Performance exams
- 9. Differentiate between effective and ineffective behaviors related to customer satisfaction.
 - Class Performance

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

| Lecture or Lab | Approximate Hours | Topic Number | Major Topic |
|-------------------|----------------------|-----------------|---|
| Lecture | 1 | I | OVERVIEW OF COMPTIA A+ CERTIFICATION A. Scope of course B. History of computers and Personal Computer (PC) systems |
| Lab | 4 | II | OVERVIEW OF COMPTIA A+ CERTIFICATION A. Scope of course B. History of computers and PC systems |
| Lecture | 2 | | INTRODUCING HARDWARE AND SOFTWARE A. PC hardware components B Operating systems past and present |
| Lab | 4 | IV | INTRODUCING HARDWARE AND SOFTWARE A. PC hardware components B Operating systems past and present |
| Lecture | 2 | V | SAFETY, TOOLS AND ELECTRICITY A. PC support technician tools B. PC preventive maintenance tools C. How to work inside a computer case D. Measures and properties of electricity E. Energy Star systems (The Green PC) |
| Lab | 4 | VI | SAFETY, TOOLS AND ELECTRICITY A. PC support technician tools B. PC preventive maintenance tools C. How to work inside a computer case D. Measures and properties of electricity E. Energy Star systems (The Green PC) |
| Lecture | 4 | VII | SYSTEM CASES AND POWER SUPPLIES / POWER-ON SELF TEST (POST), BASIC INPUT/OUTPUT SYSTEM (BIOS), AND COMPUTER MINIMUM OPERATING SYSTEM (CMOS) SETTINGS A. System cases and power supplies System cases, motherboard and power supply form factors Protecting your computer system Troubleshooting the electrical system B. POST, BIOS and CMOS settings BOS Configuring the CMOS settings |
| Lab | 8 | VIII | SYSTEM CASES AND POWER SUPPLIES / POST, BIOS AND CMOS SETTINGS A. System cases and power supplies System cases, motherboard and power supply form factors Protecting your computer system Troubleshooting the electrical system |

| | | | B. POST, BIOS and CMOS settings 1. POST 2. BIOS 3. Configuring the CMOS settings |
|---------|---|------|--|
| Lecture | 4 | IX | CENTRAL PROCESSING UNITS AND SYSTEM BOARDS AND MEMORY A. Central processing units Processors past and present The Intel processors How choose the right processor B. System boards and memory Selecting a motherboard Configuring and supporting a motherboard Selecting the right type of memory |
| Lab | 8 | X | CENTRAL PROCESSING UNITS AND SYSTEM BOARDS AND MEMORY A. Central processing units Processors past and present The Intel processors How choose the right processor B. System boards and memory Selecting a motherboard Configuring and supporting a motherboard Selecting the right type of memory |
| Lecture | 4 | XI | BUS ARCHITECTURES AND PLUG AND PLAY DEVICES / PORTS, CONNECTORS AND CABLES A. Bus architectures and plug and play devices Buses and expansion slots On-board ports, connectors and riser slots B. Ports, connectors and cables Serial and parallel ports Universal Serial Bus (USB) and fire wire ports Ribbon cables for the PC |
| Lab | 8 | XII | BUS ARCHITECTURES AND PLUG AND PLAY DEVICES / PORTS, CONNECTORS AND CABLES A. Bus architectures and plug and play devices Buses and expansion slots On-board ports, connectors and riser slots B. Ports, connectors and cables Serial and parallel ports USB and firewire ports Ribbon cables for the PC |
| Lecture | 4 | XIII | DRIVE CONTROLLERS AND EXPANSION BOARDS / STORAGE AND BACKUP SYSTEMS A. Drive controllers and expansion boards On-board motherboard controllers Expansion board controllers B. Storage and backup systems Hard drives Optical and tape backup systems |

| Lab | 8 | XIV | DRIVE CONTROLLERS AND EXPANSION BOARDS / STORAGE AND BACKUP SYSTEMS A. Drive controllers and expansion boards 1. On-board motherboard controllers 2. Expansion board controllers B. Storage and backup systems 1. Hard drives 2. Optical and tape backup systems |
|---------|---|-------|--|
| Lecture | 4 | xv | PRINTERS AND THE PRINT PROCESS / PORTABLE SYSTEMS AND POWER MANAGEMENT A. Printers and the print process How printers work Installing and configuring printers Printer maintainable and troubleshooting B. Portable systems and power management Supporting notebooks Configuring power management settings |
| Lab | 8 | XVI | PRINTERS AND THE PRINT PROCESS / PORTABLE SYSTEMS AND POWER MANAGEMENT A. Printers and the print process How printers work Installing and configuring printers Printer maintainable and troubleshooting B. Portable systems and power management Supporting notebooks Configuring power management settings |
| Lecture | 6 | XVII | NETWORKING CONCEPTS AND CONNECTIVITY / CUSTOMER SATISFACTION AND COMMUNICATIONS A. Networking concepts and connectivity Physical network architectures Installing a Network Interface Card NIC) and connecting to a network Using resources on the network B. Customer satisfaction and communications The professional PC technician Job roles and responsibilities Providing good customer service |
| Lab | 8 | XVIII | NETWORKING CONCEPTS AND CONNECTIVITY / CUSTOMER SATISFACTION AND COMMUNICATIONS A. Networking concepts and connectivity Physical network architectures Installing a NIC and connecting to a network Using resources on the network B. Customer satisfaction and communications The professional PC technician Job roles and responsibilities Providing good customer service |

| Lecture | 3 | хіх | SEMESTER PROJECT DEVELOPMENT A. Critical analysis B. Individual and group discussion C. Outlining template for term project |
|------------------------|----|-----|--|
| Lab | 12 | хх | SEMESTER PROJECT DEVELOPMENT A. Critical analysis B. Individual and group discussion C. Presentation of term project |
| Total Lecture Hours | | 36 | |
| Total Laboratory Hours | | 72 | |
| Total Hours | | 108 | |

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

After replacing a system board in a customer's computer, the computer will not boot. On a lab report, document three possible power-related problems that could cause the system's failure to boot. **Submit lab** report to the instructor.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

- 1. Given a computer with a dead CMOS battery, install a new battery, enter the proper CMOS settings and test the system for proper performance. Report findings on a two-page lab report and submit to the instructor.
- 2. A customer-installed modem is not working properly. Diagnose the fault and configure the modem for proper operation. Consult the instructor for evaluation.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Performance exams **Objective Exams** Other exams Quizzes Written homework Laboratory reports **Class Performance** Homework Problems Term or other papers **Multiple Choice** Completion Matching Items True/False Other (specify): **Computer System Design Research Assignment** Presentation

V. INSTRUCTIONAL METHODS

Demonstration Discussion Group Activities Guest Speakers Laboratory Lecture Multimedia presentations Other (please specify) Computer Based Training (DVD-ROM software for enhanced student training)

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

Study Answer questions Skill practice Required reading Problem solving activities Written work

Estimated Independent Study Hours per Week: 4

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Michael Covington and Douglas Downing, <u>DICTIONARY OF COMPUTER AND INTERNET TERMS</u> 11th ed, BARRON, 2013 - INDUSTRY STANDARD

Scott Mueller, <u>UPGRADING AND REPAIRING PC'S</u>, 22nd ed, PEARSON/QUE, 2015 Cheryl Schmidt, COMPLETE COMPTIA A+ GUIDE TO HARDWARE, 7TH edition, Pearson, 2016

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

D. OTHER REQUIRED MATERIALS

- 2 Blank CD-RW disks
- 4 Blank DVD-RW disks
- 1 USB Flash Drive of at least 2GB of storage
- 1 3 Ring Binder 1 1/2" hard cover

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

| Requisites | Category and Justification |
|------------|-----------------------------------|
| | |

B. Requisite Skills

C. Recommended Preparations (Course and Non-Course)

| Recommended Preparation | Category and Justification |
|---|--|
| Course Recommended Preparation Electronics and Computer Hardware Technology 140 or equivalent | |
| Non-Course Recommended Preparation Equivalent | If students have not taken ECHT 140 but have taken a similar course at another college or have understanding of basic computer hardware technology, they will be prepared to enroll in this course. It is recommended that students have basic computer hardware knowledge or they may not succeed in this class. |

D. Recommended Skills

Recommended Skills

Understand computer system design and operational concepts. ECHT 140 -Understand the operating principals of computer system hardware.

Understand analog and digital concepts involving computer systems. ECHT 140 - Understand the operating principals of computer system hardware.

Assemble and disassemble personal computer systems, and install operating system software.

ECHT 140 - Assemble and disassemble computer systems using industry standard techniques and safety procedures.

E. Enrollment Limitations

| Enrollment Limitations and Category | Enrollment Limitations Impact |
|--|-------------------------------|
|--|-------------------------------|

Course created by Osanne Ugya on 09/01/1989

BOARD APPROVAL DATE: 03/12/1990

LAST BOARD APPROVAL DATE: 06/17/2019

Reviewed and/or Revised by STEVE COCCA 19868