#### **ELEC 88 Course Outline as of Fall 2020**

## **CATALOG INFORMATION**

Dept and Nbr: ELEC 88 Title: COMPUTER HARDWARE

Full Title: Computer Hardware Last Reviewed: 4/22/2019

Units		Course Hours per Week	•	Nbr of Weeks	<b>Course Hours Total</b>	
Maximum	3.00	Lecture Scheduled	2.50	17.5	Lecture Scheduled	43.75
Minimum	3.00	Lab Scheduled	1.50	8	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 87.50 Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

#### **Catalog Description:**

Fundamentals of computer hardware repair and basic diagnostic tests. Emphasis on general computer operation and maintenance including a unit on laptops. Includes complete disassembly and reassembly of a personal computer (PC) by each student.

## **Prerequisites/Corequisites:**

# **Recommended Preparation:**

#### **Limits on Enrollment:**

#### **Schedule of Classes Information:**

Description: Fundamentals of computer hardware repair and basic diagnostic tests. Emphasis on general computer operation and maintenance including a unit on laptops. Includes complete disassembly and reassembly of a personal computer (PC) by each student. (Grade or P/NP) Prerequisites/Corequisites:

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

# **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

**AS Degree:** Area Effective: Inactive: **CSU GE: Transfer Area** Effective: **Inactive:** 

**Transfer Area IGETC:** Effective: **Inactive:** 

**CSU Transfer:** Transferable Effective: Fall 2013 **Inactive:** 

**UC Transfer:** Effective: Inactive:

CID:

## Certificate/Major Applicable:

Both Certificate and Major Applicable

#### **COURSE CONTENT**

#### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

- 1. Upgrade and install personal computer (PC) components.
- 2. Maintain laptop components.
- 3. Troubleshoot and repair system components.
- 4. Completely disassemble and reassemble a PC.

#### **Objectives:**

At the conclusion of this course, the student should be able to:

- 1. Apply appropriate safety procedures while working on systems.
- 2. Inspect and evaluate the input, processing, and output functions of a PC.
- 3. Remove and replace PC components.
- 4. Identify motherboard components and classify by their type and function.
- 5. Identify networking systems and devices.
- 6. Identify laptop systems and devices.
- 7. Perform mathematical conversions between binary, octal, and hexadecimal numbers.
- 8. Perform basic electrical measurements.
- 9. Upgrade random access memory (RAM).
- 10. Inspect and evaluate individual peripheral devices.11. Evaluate the operation of the computer, utilizing diagnostic tests.
- 12. Partition and format a hard drive.
- 13. Perform a clean installation of an operating system (OS).14. Perform system component troubleshooting and repair.
- 15. Disassemble and reassemble a PC.

# **Topics and Scope:**

- I. PC Overview
  - A. Structure of the PC system
  - B. Motherboard and subsystems

C. Memory and addresses
D. Mass storage
E. Computer language levels

# II. Number Systems

- A. Conversions
- B. Metric prefixes

## III. PC Operations

- A. Basic parts of the PC
- B. PC bus structure
- C. Input and output
- D. Power supply

## IV. Electrical Units and Measurement

- A. Volt, ohm, ampere, watt
- B. Engineering prefix notation
- C. Correct use of test equipment to measure voltage

## V. Troubleshooting and Repair

- A. Start-up problems
- B. Run problems
- C. Display problems
- D. Component failures
- E. Safety precautions during troubleshooting and repairs

#### VI. Routine Preventive Maintenance

- A. Contributors to system failure
- B. Virus protection
- C. Data protection
- D. Hard drive maintenance

## VII. Upgrades, Installation and Troubleshooting

- A. Random access memory (RAM)
- B. Hard drives
- C. Multimedia and mass storage

# VIII. Supporting Windows OS

- A. Clean install of an OS
- B. Configuration
- C. Troubleshooting

# IX. Supporting Input/Output (I/O) Devices

- A. Installation
- B. Configuration
- C. Troubleshooting

#### X. Network Structure

- A. Basic network components
- B. Networking interconnect devices

# XI. Supporting Laptops

- A. Maintaining laptop components
- B. Replacing and upgrading internal parts
- C. Troubleshooting laptops

## XII. COMPTIA A+ Certification

- A. Test resources
- B. Process for earning certification

# XIII. Laboratory Topics

- A. Laboratory safety
  - 1. static electricity
  - 2. using meters

- B. Using software tools to examine a PC
- C. Collecting hardware drivers
- D. Measuring power supply voltages
- E. Upgrading RAM
- F. Supporting hard drives
- G. Clean installation of an OS
- H. I/O devices and multimedia
- I. Basic networking
- J. Laptop overview
- K. Disassemble and reassemble a PC

#### **Assignment:**

Lecture-Related Assignments:

- 1. Written repair log reports, 1-3 pages in length (4-6)
- 2. Homework problem sets (8-12)
- 3. Quizzes (2-4)
- 4. Final exam

Lab-Related Assignments:

- 1. Laboratory assignments (4-10)
- 2. Lab practicum

#### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Repair log reports

Writing 10 - 20%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems

Problem solving 15 - 25%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Laboratory assignments and final lab practicum

Skill Demonstrations 25 - 40%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes and final exam

Exams 25 - 40%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Class participation		Other Category 5 - 10%
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Representative Textbooks and Materials:
A+ Guide to IT Technical Support (Hardware and Software). 9th ed. Andrews, Jean. Cengage Learning. 2017