#### 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		<b>Course Hours per Week</b>		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:

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

AS Degree: CSU GE:	Area Transfer Area	I.		Effective: Effective:	Inactive: Inactive:
<b>IGETC:</b>	Transfer Area	L		Effective:	Inactive:
CSU Transfer	<b>:</b> 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

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

Homework problems

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

Laboratory assignments and final lab practicum

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

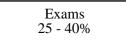
Quizzes and final exam

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

Writing	
10 - 20%	

Problem solving	
15 - 25%	

Skill Demonstrations
25 - 40%



Class participation

**Representative Textbooks and Materials:** A+ Guide to IT Technical Support (Hardware and Software). 9th ed. Andrews, Jean. Cengage Learning. 2017

Other Category 5 - 10%