I. INTRODUCTION

A. Current personal computer hardware including assembly, upgrading, setup, configuration, and troubleshooting. This course is designed to provide the Computer Science student with instruction in the assembly, configuration, upgrading, setup, troubleshooting, and maintaining personal computer systems. It covers the diagnosis of faulty components, the optimization of system performance, and the installation and connection of peripherals. In addition, it provides preparation for the CompTIA A+ certification exams.

B. This course serves as a required or elective course on various degree plans. Curriculum plans for degrees and certificates are listed in the current Central Texas College catalog.

C. The delivery method of this course may be traditional lecture/lab, blended lecture/lab, or online.

D. Prerequisites: None.

II. LEARNING OUTCOMES

Upon successful completion of this course, Personal Computer Hardware, the student will be able to:

A. Assemble, setup, and upgrade personal computer systems by configuring computer hardware and software including the BIOS settings, the motherboard and expansion boards, the power supply, and cabling. (C5, C6)

B. Diagnose and isolate faulty components. (C5, C6)

C. Optimize system performance (C7, C18)

D. Install, configure and connect peripherals on desktop computers, laptops, various mobile devices, and printers. (C7, C18, F1, F10, F12)

E. Identify and use network transmission media. (C5, C6, C7, C9, C15, F1, F9, F10)

F. Using case study scenarios, evaluate safety procedures, environmental impact, and purposes of environmental controls. (C7, C18, F1, F10, F12)
G. Compare and contrast hardware and software in computer systems. (C7, C18, F1, F11, F12)
H. Using a case study install, connect, and configure appropriate operating systems including the selection of command line tools, Control Panel utilities. (C7, C18, F1, F11, F12)
I. Apply and employ appropriate security procedures and techniques. (C7, C18, F1, F11, F12)
J. Troubleshoot, diagnose, and repair personal computer hardware and software problems. (C7, C18, F1, F11, F12).

III. INSTRUCTIONAL MATERIALS
A. The instructional materials identified for this course are viewable through www.ctcd.edu/books
B. Lecture Classes also require at least one USB storage device. Online students may use cloud based storage.

IV. COURSE REQUIREMENTS
A. Attend both lecture and lab or in the case of online delivery, be actively engaged in Blackboard and maintain constant progress.
B. Be prepared to participate in discussion, team projects/assignments and take unannounced assessments relating to the lecture materials.
C. Complete all exams/assessments.
D. Submit all assignments on time.

V. ASSESSMENTS
A. Student content mastery will be evaluated in the following areas:
   • Assessments (midterm exam, quizzes, projects, discussion etc.)
   • Final Assessment (final exam and/or semester project, participation)
B. Scheduled and unscheduled assessments will be given at the discretion of the instructor.
C. Exams/assessments may be composed of both subjective and objective questions plus computer output.
D. A student must take all exams/assessments. Both online and on campus students who know in advance that they will be absent due to school sponsored trips, military duty or orders, or any other valid reason, must arrange to take an early exam/assessment. Unexpected absences due to illness or other extenuating circumstances will require the student to contact the instructor about make-up work in lieu of the missed exam/assessment.

E. Students with unexcused absences will be given a zero for each missed assignment.

VI. SEMESTER GRADE COMPUTATION

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Points</th>
<th>Points</th>
<th>Grade</th>
<th>Quality Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>300</td>
<td>900</td>
<td>A-Superior</td>
<td>4</td>
</tr>
<tr>
<td>Assessments</td>
<td>300</td>
<td>800-899</td>
<td>B-Above Average</td>
<td>3</td>
</tr>
<tr>
<td>Final Assessment</td>
<td>400</td>
<td>700-799</td>
<td>C-Average</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1000</td>
<td>600-699</td>
<td>D – Passing but Unsatisfactory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 -599</td>
<td>F-Failure</td>
<td>0</td>
</tr>
</tbody>
</table>

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. Information on the following Academic Policies, as described in the CTC Course Catalog will be followed:
1. Withdrawals
2. Grading
3. Class Attendance and Course Progress
4. Scholastic Honesty

B. Cell Phones and Pagers: Students will silence cell phones and mobile devices while in the classroom or lab.

C. Americans with Disabilities Act (ADA): Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Review the website at www.ctcd.edu/disability-support for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

D. Instructor Discretion: The instructor reserves the right of final decision in course requirements and may make changes to the course outline and/or assignments as needed.
E. **Civility:** Individuals are expected to be aware of what a constructive educational experience is and be respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.
VIII. COURSE OUTLINE

A. Lesson One: First Look at Computer Parts and Tools

1. Learning Outcomes: Upon completion of this lesson, the student will be able to:
   a. Identify what’s inside a desktop case
   b. Recognize laptop components
   c. Identify mobile device hardware
   d. Determine which tools are used by hardware technicians

2. Learning Activities:
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)

3. Lesson Outline:
   a. Identify the various parts inside a desktop computer case
   b. Describe how they connect together and are compatible
   c. Identify the various ports, slots, and internal components of a laptop computer
   d. Explain special concerns when supporting and maintaining laptops
   e. Describe various hardware components in mobile devices and types of wired and wireless connections mobile devices can make
   f. Describe the purpose of various tools needed by computer hardware technicians

B. Lesson Two: Working inside Desktop Computers and Laptops, and All about Motherboards

1. Learning Outcomes: Upon completion of this lesson, the student will be able to:
   a. Define steps to work inside a desktop computer case
   b. Identify the special considerations when supporting laptops
   c. Explain how to work inside a laptop computer
   d. Identify the different types of motherboards and features
   e. Configure a motherboard
   f. Maintain a motherboard
   g. Install or replace a motherboard
h. Replace a laptop system board

2. **Learning Activities:**
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)

3. **Lesson Outline:**
   a. Take apart a desktop computer and put it back together
   b. Explain the special considerations when supporting laptop computers that are different than supporting desktop computers
   c. Take apart a laptop computer and put it back together
   d. Describe and contrast various types and features of motherboards
   e. Configure a motherboard using BIOS or UEFI firmware
   f. Maintain a motherboard, including updating drivers, flashing UEFI/BIOS, and replacing the CMOS battery
   g. Select, install, and replace a motherboard
   h. Replace a laptop system board

C. **Lesson Three: Supporting Processors and Upgrading Memory**

1. **Learning Outcomes:** Upon completion of this lesson, the student will be able to:
   a. Identify the different types of processors and their characteristics
   b. Select and install a processor
   c. Identify the memory technologies
   d. Determine how to upgrade memory

2. **Learning Activities:**
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)
3. **Lesson Outline:**
   a. Compare characteristics and purpose of Intel and AMD processors used for personal computers
   b. Install and upgrade a processor
   c. Compare the different kinds of physical memory and how they work
   d. Upgrade memory

D. **Lesson Four: Supporting the Power System and Troubleshooting Computers**

1. **Learning Outcomes:** Upon completion of this lesson, the student will be able to:
   a. Identify cooling methods and devices
   b. Select what type of power supply needed
   c. Determine how to approach a hardware problem
   d. Troubleshoot electrical system
   e. Troubleshoot the motherboard, processor and RAM
   f. Troubleshoot mobile devices

2. **Learning Activities:**
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)
   e. Complete the course midterm examination. (F9, F11)

3. **Lesson Outline:**
   a. Describe the methods and devices for keeping a system cool
   b. Select a power supply to meet the power needs of a system
   c. Demonstrate an organized approach to solving any computer problem, especially hardware problems occurring the boot
   d. Troubleshoot problems with the electrical system
   e. Troubleshoot problems with the motherboard, processor, and RAM
   f. Troubleshoot hardware problems with mobile devices

E. **Lesson Five: Supporting Hard Drives and Other Storage Devices**

1. **Learning Outcomes:** Upon completion of this lesson, the student will be able to:
a. Identify hard drive technologies and interface standards
b. Explain how to select and install hard drives
c. Identify tape drives
d. Determine how to support other types of storage devices
e. Explain how to troubleshoot hard drives

2. Learning Activities:
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)

3. Lesson Outline:
   a. Discuss technologies used inside a hard drive and how a computer communicates with a hard drive
   b. Install and support a hard drive
   c. Identify tape drives and tape cartridges
   d. Support optical drives and flash memory devices
   e. Troubleshoot hard drives

F. Lesson Six: Support I/O Devices

1. Learning Outcomes: Upon completion of this lesson, the student will be able to:
   a. Explain the basic principles for supporting devices
   b. Install I/O peripheral devices
   c. Install and configure adapter cards
   d. Support the video subsystem
   e. Troubleshoot I/O devices

2. Learning Activities:
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)
3. **Lesson Outline:**
   a. Describe the general approach technicians use to install and support I/O devices
   b. Install and configure several I/O devices, such as barcode readers, biometric devices, digital cameras, webcams, graphic tablets, and touch screens
   c. Install and configure adapter cards
   d. Support the video subsystem, including selecting a monitor and video card and supporting dual monitors and video memory
   e. Troubleshoot common problems with I/O devices

G. **Lesson Seven: Connecting to and Setting up a Network; Supporting Network Hardware**

1. **Learning Outcomes:** Upon completion of this lesson, the student will be able to:
   a. Understand TCP/IP and Windows Networking
   b. Connect a computer to a Network
   c. Set up a Multifunction Router for a SOHO Network
   d. Determine the different types of Networks and the Internet Connections they use
   e. Identify the hardware used by local networks
   f. Set up and troubleshoot network wiring

2. **Learning Activities:**
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)
   e. Write a clearly constructed paper on an assigned topic. (F2, F7)

3. **Lesson Outline:**
   a. Explain the TCP/IP protocols and standards Windows uses for networking
   b. Connect a computer to a wired or wireless network
   c. Configure and secure a multifunction router on a local network
   d. Describe network types and the internet connections they use
   e. Identify, compare, and contrast hardware used to build local networks
   f. Set up and troubleshoot the wiring in a small network
H. Lesson Eight: Supporting Printers and Customizing a System

1. Learning Outcomes: Upon completion of this lesson, the student will be able to:
   a. Identify printer types and features
   b. Use Windows to install, share, and manage printers
   c. Maintain printer maintenance and upgrades
   d. Troubleshoot printer issues
   e. Customize computer systems

2. Learning Activities:
   a. Read assigned text and complete assigned review and discussion questions at the end of the chapter. (F1, F2, F7).
   b. Post a message with reference hyperlinks on the course electronic discussion board. (C5, C6, C7, C8, C9, F2, F9)
   c. Participate as part of a virtual team in an ongoing network installation project. (C1, C5, C7, C8, C12, C13, C19, F7, F10, F15)
   d. Complete assigned laboratory hands-on exercises and Internet research. (C5, C6, C7, C8, F1, F2, F10)

3. Lesson Outline:
   a. Discuss printer types and features
   b. Install and share printers and manage printer features, add-on devices, and the printer queue
   c. Perform routine maintenance tasks necessary to support printers
   d. Troubleshoot printer problems
   e. Customize a computer system to meet customer needs