Course Description: This course is designed to be a yearlong independent study for students wishing to further study the inner workings of a computer and how computers can be connected in a network. The course is designed for students whom have successfully completed Computer I, Computer II, and AP Computer Science. The course will focus on computer components, operating systems, PC troubleshooting and maintenance, installing new hardware and software, creating and maintaining a computer network, and some basic cybersecurity. The ultimate goal of this class is to prepare students to take the A+ certification test.

Prerequisite: Completion of Computer I, Computer II, and AP Computer Science, as well as a teacher recommendation.

Course Standards: Standards will come from the objectives set forth by CompTIA, who are the providers of the A+ Certification exam. The standards are for exams 220-901 and 220-902, which are both required for A+ certification.

Course Outline:

Unit 1: Computer Hardware
i) Working with BIOS
ii) Motherboard Components
iii) Installing RAM, CPUs, and Other Devices
iv) Connections
v) Power Supplies
vi) Customizing Computers

Standards:
- 1.1 (901 Exam): Given a scenario, configure settings and use BIOS/UEFI tools on a PC.
- 1.2 (901 Exam): Explain the importance of motherboard components, their purpose, and properties.
- 1.3 (901 Exam): Compare and contrast various RAM types and their features.
- 1.4 (901 Exam): Install and configure PC expansion cards.
- 1.5 (901 Exam): Install and configure storage devices and use appropriate media.
- 1.6 (901 Exam): Install various types of CPUs and apply the appropriate cooling methods.
- 1.7 (901 Exam): Compare and contrast various PC connection interfaces, their characteristics, and purpose.
- 1.8 (901 Exam): Install a power supply based on given specifications.
- 1.9 (901 Exam): Given a scenario, select the appropriate components for a custom PC configuration, to meet customer specifications or needs.
- 1.10 (901 Exam): Compare and contrast types of display devices and their features.
- 1.11 (901 Exam): Identify common PC connector types and associated cables.
- 1.12 (901 Exam): Install and configure common peripheral devices.
- 1.13 (901 Exam): Install SOHO multifunction device/printers and configure appropriate settings.
- 1.14 (901 Exam): Compare and contrast differences between the various print technologies and the associated imaging process.
- 1.15 (901 Exam): Given a scenario, perform appropriate printer maintenance.

Assessment: Student will complete a unit test that covers the standards above. The test will consist of multiple choice questions similar to that of the A+ certification test. In addition, there will be a practical portion where the student will be given tasks to accomplish with provided equipment. These tasks will be related to the standards above.
Unit 2: Computer Networking

i) Types of Network Connections
ii) TCP/IP Protocols and Ports
iii) WiFi Networking
iv) Network Architecture

Standards:
- 2.1 (901 Exam): Identify the various types of network cables and connectors.
- 2.2 (901 Exam): Compare and contrast the characteristics of connectors and cabling.
- 2.3 (901 Exam): Explain the properties and characteristics of TCP/IP.
- 2.4 (901 Exam): Explain common TCP and UDP ports, protocols, and their purpose.
- 2.5 (901 Exam): Compare and contrast various WiFi networking standards and encryption types.
- 2.6 (901 Exam): Given a scenario, install and configure SOHO wireless/wired router and apply appropriate settings.
- 2.7 (901 Exam): Compare and contrast Internet connection types, network types, and their features.
- 2.8 (901 Exam): Compare and contrast network architecture devices, their functions, and features.
- 2.9 (901 Exam): Given a scenario, use appropriate networking tools.

Assessment: Student will complete a report that identifies the various types of networking connections and their major differences. This report will also have the student identify when each network connection is appropriate. The student will also complete tasks related to computer networking.

Unit 3: Mobile Devices

i) Laptop computer hardware
ii) Laptop displays
iii) Mobile computing – tablets, smartphones, and wearable technology

Standards:
- 3.1 (901 Exam): Install and configure laptop hardware and components.
- 3.2 (901 Exam): Explain the features of components within the display of a laptop.
- 3.3 (901 Exam): Given a scenario, use appropriate laptop features.
- 3.4 (901 Exam): Explain the characteristics of various types of other mobile devices.
- 3.5 (901 Exam): Compare and contrast accessories and ports of other mobile devices.

Assessment: Student will complete a unit test that covers the standards above. The test will consist of multiple choice questions similar to that of the A+ certification test. In addition, there will be a practical portion where the student will be given tasks to accomplish with provided equipment. These tasks will be related to the standards above.

Unit 4: Hardware and Network Troubleshooting

i) Computer Hardware Troubleshooting
ii) Network Troubleshooting
iii) Mobile Device Troubleshooting

Standards:
- 4.1 (901 Exam): Given a scenario, troubleshoot common problems related to motherboards, RAM, CPU, and power with appropriate tools.
- 4.2 (901 Exam): Given a scenario, troubleshoot hard drives and RAID arrays with appropriate tools.
- 4.3 (901 Exam): Given a scenario, troubleshoot common video, projector, and display issues.
- 4.4 (901 Exam): Given a scenario, troubleshoot wired and wireless networks with appropriate tools.
- 4.5 (901 Exam): Given a scenario, troubleshoot and repair common mobile device issues while adhering to the appropriate procedures.
• 4.6 (901 Exam): Given a scenario, troubleshoot printers with appropriate tools.

**Assessment:** Student will complete an organizer that identifies common problems identified throughout the unit along with the best response to these problems. The student will also be required to complete various tasks that involve troubleshooting problems with a PC or other computer device.

**Unit 5: The Windows Operating System**

i) Features of Windows  
ii) Installation of Windows software  
iii) Microsoft Command Line  
iv) Operating System Features and Tools  
v) Networking with Windows

**Standards:**

• 1.1 (902 Exam): Compare and contrast various features and requirements of Microsoft Operating Systems (Windows Vista, Windows 7, Windows 8, Windows 8.1)  
• 1.2 (902 Exam): Given a scenario, install Windows PC operating systems using appropriate methods.  
• 1.3 (902 Exam): Given a scenario, apply appropriate Microsoft command line tools.  
• 1.4 (902 Exam): Given a scenario, use appropriate Microsoft operating system features and tools.  
• 1.5 (902 Exam): Given a scenario, use Windows Control Panel utilities.  
• 1.6 (902 Exam): Given a scenario, install and configure Windows networking on a client/desktop.  
• 1.7 (902 Exam): Perform common preventative maintenance procedures using the appropriate Windows OS tools.

**Assessment:** Student will complete a unit test that covers the standards above. The test will consist of multiple choice questions similar to that of the A+ certification test. In addition, there will be a practical portion where the student will be given tasks to accomplish with provided equipment. These tasks will be related to the standards above.

**Unit 6: Other Operating Systems**

i) Mac OS and Linux  
ii) Virtualization  
iii) Cloud Computing and Network Hosting  
iv) Mobile Operating Systems and Networks

**Standards:**

• 2.1 (902 Exam): Identify common features and functionality of the Mac OS and Linux operating systems.  
• 2.2 (902 Exam): Given a scenario, setup and use client-side virtualization.  
• 2.3 (902 Exam): Identify basic cloud concepts.  
• 2.4 (902 Exam): Summarize the properties and purpose of services provided by networked hosts.  
• 2.5 (902 Exam): Identify basic features of mobile operating systems.  
• 2.6 (902 Exam): Install and configure basic mobile device network connectivity and email.  
• 2.7 (902 Exam): Summarize methods and data related to mobile device synchronization.

**Assessment:** Student will complete a unit test that covers the standards above. The test will consist of multiple choice questions similar to that of the A+ certification test. In addition, there will be a practical portion where the student will be given tasks to accomplish with provided equipment. These tasks will be related to the standards above.
Unit 7: Security
i) Common Computer and Network Threats
ii) Methods of Prevention
iii) Windows OS Security
iv) Best Practices for Security
v) Network Security

Standards:
- 3.1 (902 Exam): Identify common security threats and vulnerabilities.
- 3.2 (902 Exam): Compare and contrast common prevention methods.
- 3.3 (902 Exam): Compare and contrast differences of basic Windows OS security settings.
- 3.4 (902 Exam): Given a scenario, deploy and enforce security best practices to secure a workstation.
- 3.5 (902 Exam): Compare and contrast various methods for securing mobile devices.
- 3.6 (902 Exam): Given a scenario, use appropriate data destruction and disposal methods.
- 3.7 (902 Exam): Given a scenario, secure SOHO wireless and wired networks.

Assessment: Student will complete a written report that discusses cybersecurity from the perspective of a computer professional. This report will have the student identify the most common threats to a computer and computer network, the best ways to prevent these attacks, and best practices to maintain a secure environment.

Unit 8: Software Troubleshooting
i) PC Troubleshooting
ii) Mobile Troubleshooting

Standards:
- 4.1 (902 Exam): Given a scenario, troubleshoot PC operating system problems with appropriate tools.
- 4.2 (902 Exam): Given a scenario, troubleshoot common PC security issues with appropriate tools and best practices.
- 4.3 (902 Exam): Given a scenario, troubleshoot common mobile OS and application issues with appropriate tools.
- 4.4 (902 Exam): Given a scenario, troubleshoot common mobile OS and application security issues with appropriate tools.

Assessment: Student will complete a unit test that covers the standards above. The test will consist of multiple choice questions similar to that of the A+ certification test. In addition, there will be a practical portion where the student will be given tasks to accomplish with provided equipment. These tasks will be related to the standards above.

Unit 9: Operational Procedures
i) Computer Repair Safety
ii) Environmental Concerns
iii) Responding to Prohibited Actions
iv) Communication and Professionalism in the Workplace

Standards:
- 5.1 (902 Exam): Given a scenario, use appropriate safety procedures.
- 5.2 (902 Exam): Given a scenario with potential environmental impacts, apply the appropriate controls.
- 5.3 (902 Exam): Summarize the process of addressing prohibited content/activity, and explain privacy, licensing, and policy concepts.
• 5.4 (902 Exam): Demonstrate proper communication techniques and professionalism.
• 5.5 (902 Exam): Given a scenario, explain the troubleshooting theory.

Assessment: Student will complete a practice A+ certification test. This test will cover the standard in all previous units and will help identify the student’s level of readiness for taking the real A+ certification exam.