COURSE OUTLINE

Section 1:

Course Title: A+ Hardware

Course Code: CMPH-1000

Course Description: In-depth study of computer hardware, computer peripherals, and computer networking hardware. Students will disassemble and assembly a PC; upgrade and configure computers; perform maintenance; and repair common computer problems. Effective problem solving and troubleshooting strategies are developed through hands-on assignments. The learning outcomes of this course map to components of the Comptia A+ certification.

Grade Scheme: ☐ Pass/Fail ☒ Percentage Minimum Pass Mark: 60%

Course Value:	Outcome hours	OR	3 Credit(s)	60 (15 class + 45 lab) Hours

Pre-requisites: NONE

Co-requisites: NONE

Section 2:

Learning Outcomes and Competencies

1. **Assemble computer hardware according to user and manufacturer specifications**.

   1.1 Identify the major components of a personal computer (PC): power supply, motherboard, chipset, microprocessor, memory, hard drive, optical drive, floppy drive, expansion busses, expansion ports, and BIOS chip.

   1.2 Describe the operation of the major components.

   1.3 Protect computer hardware from Electrostatic Discharge (ESD) damage while handling by using antistatic wrist straps, antistatic container bags, and antistatic mats.

   1.4 Identify the different types of cable and connectors by visual inspection.

   1.5 Compare and contrast the different types of RAM, hard drives, microprocessors, and motherboard chip sets.

   1.6 Compare and contrast the different types of expansion busses: PCI, PCI Express, SCSI, USB, and Firewire.

1.7 Identify required safety measures and procedures.

1.8 Disassemble and reassemble a PC.

1.9 Use motherboard documentation to aid in assembly.

2. Upgrade computer hardware and software to customer requirements.

2.1 Identify computer form factors.

2.2 Use motherboard documentation to determine hardware compatibility.

2.3 Upgrade components such as the microprocessor, hard drive, system RAM, and power supply.

2.4 Install expansion cards such as sound cards, graphics cards, and network interface cards (NICs).

2.5 Explain the basic principles of electricity.

2.6 Calculate power requirements for upgrades.

2.7 Calculate wattage capacity of uninterruptible power supplies to meet equipment needs.

2.8 Identify the system resources used by system components.

2.9 Identify proper disposal methods to meet environmental legislation and to protect confidential information.

3. Resolve computer hardware problems.

3.1 Implement steps to isolate the cause of problems.

3.2 Recognize common problems and their symptoms for each computer component.

3.3 Use the technique of component swamping to identify faulty components.

3.4 Use the technique of system minimization to identify faulty components.

3.5 Use BIOS beep codes to identify the cause of a PC not starting.

3.6 Use the CMOS setup program in the BIOS to fix problems.

3.7 Use diagnostic utilities to locate and repair hardware problems.

3.8 Use a digital multimeter to measure voltage and test for continuity.

3.9 Use an outlet tester to verify proper AC power is being supplied.

4. Implement printing systems to meet users' requirements.

4.1 Identify the most common types of printers.

4.2 Explain the operation of each type of printer.

4.3 Install printer hardware and software.

4.4 Configure printing options to meet user requirements.

4.5 Resolve common printing problems.

5. **Explain computer networking technologies in order to aid in network troubleshooting.**
    - 5.1 Compare and contrast different types of computer networks.
    - 5.2 Describe the operation of basic computer networking devices.
    - 5.3 Identify common types of network cables and connectors.
6. **Utilize PC preventative maintenance to ensure maximum hardware effectiveness.**
    - 6.1 Identify the various types of preventative maintenance measures, products, and procedures.
    - 6.2 Properly handle, use, and store chemicals required for computer maintenance.
    - 6.3 Perform recommended preventative maintenance on computer hardware.
    - 6.4 Identify environmental protection measures and how to use them when performing maintenance.
7. **Service laptop and notebook computers to ensure proper operation.**
    - 7.1 Describe the special considerations when supporting laptop and notebook computers.
    - 7.2 Describe the general guidelines for the care of laptop and notebook computers.
    - 7.3 Identify peripheral devices for laptop and notebook computers.
    - 7.4 Install peripheral devices for laptop and notebook computers.
    - 7.5 Troubleshoot and repair problems with laptop and notebook computers.

Section 3:

Assessment Categories:

Professionalism	10%
Quizzes	10%
Labs and Projects	25%
Practical (Skills) Exam	25%
Theory Exam	30%

Research Component? ☐ Yes ☒ No

Section 4:

(For administrative use only)

Is this course new? ☐ Yes ☒ No

Is this course replacing an existing course(s)? ☐ Yes ☒ No

If this course is replacing another, please record the name and code of the old course:

Course equivalents: NONE

Note: See Quality Procedure A01 for more details.

Catalog Year of Original Course Implementation: 2011

Catalog Year of Current Version Implementation: 2015

Revision level: 3 **Version:** 3 **Date:** June/2016 **Authorized by:** MLGJ

Accreditation and or Supporting Documents:	National Technology Benchmarks: Canadian Council of Technicians & Technologists; Discipline: Information Technology; Level: Technologist
Additional Information:	None
Subject matter expert(s):	Lino Forner

Approved by: (Program Manager)

Paul Murnaghan Date Approved: **2016-06-30**

Approved by: (Curriculum Consultant)

Mary Lou Griffin-Jenkins Date Approved: **2016-06-30**