Programming and Web Development Equipment List

Each PWD student will need a modern, high-end workstation with sufficient RAM and processing capacity to support multiple virtual machines. Students will need Internet access and various USB flash drives for moving files between computers in the lab.  Lab space must include a space to work with an electrostatic discharge (ESD) mat with a ground cord, an electrostatic discharge (ESD) wrist strap and cord, and safety glasses.

Classroom licenses for appropriate certification learning platforms to support ISSN curriculum frameworks and IRC certification(s) are recommended (examples include Cisco, CompTIA, or GMetrix).

Additionally, the following PC assembly hardware, software, tools, equipment, accessories, and technology resources are needed for every two students in the program.

## Equipment

* 1 PCI, PCIe, or AGP-compatible motherboard
* 1 PC Case with 300W power supply
* 4 GB RAM (64-bit) (2 X 2GB suggested), some labs will require one module of RAM to be uninstalled or the simulation of a faulty module for troubleshooting purposes.
* 1 Intel or AMD CPU, 1 gigahertz (GHz) or faster with support for PAE, NX, and SSE2
* 1 CPU heat sink and cooling fan
* 60 GB hard drive (minimum); 80 GB or more (recommended), the system must support a full install of Windows 10 and two partitions of the same size
* 1 DVD-ROM (minimum), DVDR, or BD/BDR (optional)
* 1 Ethernet Card (If the motherboard does not have an Ethernet port)
* 1 Wireless network adapters (compatible with the wireless router)
* 1 PCI, PCIe, or AGP (recommended) video card. DirectX 9 graphics device with WDDM 1.0 driver
* Cables to connect HDD/CD (Quantities vary)
* 1 Keyboard
* 1 Mouse
* 1 Super VGA (1024 X 768) or higher-resolution video monitor
* Various operating systems to install such as the most recent Windows and Linux distributions
* Various anti-virus software
* At least 1 Internet connection for Internet searches and driver downloads
* Lint-free cloth
* Electronics cleaning solution
* Thermal compound
* Multimeter
* Compressed air service canister (optional due to globally varying classroom health and safety laws)
* Power supply tester
* Wire cutters
* Smartphones and tablets are desirable for use with the labs in the Mobile Devices standards
* 1 printer or integrated printer/scanner/copier for the class to share

### **Networking equipment and software** will be needed to share within the program. The following equipment are minimum requirements and recommended for every three students in the program.

* 2 - Cisco ISR 4221 (2GE, 2NIM, 8G FLASH, 4G DRAM, IPB) ordered with IOS-XE Image with Payload Encryption (ISR4221/K9).
* 2 - Catalyst 1000 24port GE, 4x1G SFP (C1000-24T-4G-L)
* 1 - Wireless router (generic brand) with WPA2 support
* Ethernet cables
* Console Cable 6ft with USB Type A and mini-USB Type B
* Console Cable 6ft with RJ45 and DB9F
* 1 - 4ft Open Frame 19 Inch 22U 2-Post Network Server Relay Rack with Rolling Casters
* 2 - 2 Port Serial WAN Interface card (NIM-2T)
* 2 - V.35 Cable, DTE Male to Smart Serial, 10 Feet
* 2 - V.35 Cable, DCE Female to Smart Serial, 10 Feet
* An extra PC to run an application server (MS Windows Server or Windows 10 or later)
* 2 extra Desktop PCs acting as clients (MS Windows 10 or later) that include 2 Wired/Wireless LAN Adapters for the client PCs -- Ethernet cables and Serial Cables as required
* Tera Term or Putty terminal emulation software and source SSH client software for lab PCs
* Oracle VirtualBox or VMWare Workstation Player (latest version)
* Wireshark (latest version)
* Open-source server software: For various services and protocols, such as Telnet, SSH, HTTP, DHCP, FTP, Trivial File Transfer Protocol (TFTP), etc.
* Windows Server (latest version)
* Kali Linux (latest version)
* Packet Tracer (latest version)