

## Computer Service and Repair Recommended Equipment List

As you begin to set up a PC repair course/program, it is critical to get it right the first time. What this means is, the first purchase made for the lab will most likely be the biggest dollar amount spent on the program for some time to come. Schools typically use grant-allocated money to setup a brand new lab facility. After the grant money is gone, there will be limited funds available for future equipment purchases, so **get it right the first time**. The intent of this article is to assist instructors and not to sound skeptical of the boss's intent. In this day and age, money is very hard to come by after the first set up and not to wait for promised of future funding.

You need to have an accurate and complete list. This suggested list is based upon a class lab to support 18 students. The items are listed in generic terms rather than vendor specific items.

There are some important variables to consider such as:

- How many classes will use the laboratory area in a 24 hour period. In a typical high school setting, you may have 5 or more class periods that students use the lab area.
- The lab may be also utilized by evening school.
- In a community college, the lab may be used by several different groups of students depending on scheduled day classes, evening and weekend classes.
- And there may be special training classes for regular one or two-day weekend workshops.

The more variable the schedule, the more thought you must give concerning equipment requirements. Remember that during the course of instruction, a shared workstation may not be available to all students.

If a student is involved with setting up partitions on a hard disk drive, and does not finish the project or completes it incorrectly, it may render the station temporarily useless, or it may affect other student's use of the station.

You may not be able to afford one computer for each and every student, but you can have at least one hard disk drive for each student. Having a hard disk drive available for each student is the next best thing to each student having their own computer station. There are also some drive selector modules that will allow you to install multiple disk drives in a single student station.

Typically, up to three different drives can be installed and a selector switch will allow the user to choose between three different drives. However, you may elect to install *Microsoft Virtual PC* which will allow you to run multiple operating systems on the same machine.

The course of study requires lab activities for software, as well as hardware systems. It is strongly recommended two sets of computer stations at a minimum.

One set for hardware will be used for lab activities, and another set for routine software activities. For the hardware set of activities, it is recommended that you use a barebones kits.

Barebones kits contain most of the hardware required to build a complete workstation. This will satisfy the majority of hardware lab activities. In addition to the barebones kits, a set of quality workstations should be purchased for software lab activities. The exact number of barebones kits, and quality workstations will be determined by the total number of students using the lab, and the total number of courses to be taught. Think at least three years ahead.

It is also important to anticipate the variety of courses that will be taught three years from the start of the program, and how many students are expected over the next three years. You may setup a more-than-adequate program for the first year of the program, but then you may find the same setting totally inadequate for a student load three or more times the size of the initial first year. Offered correctly, ***your program will expand!*** You will definitely need more than 18 kits and the exact number will depend on how you setup your lab. The list below is offered as a basic list. **Important notes are included as justifications for your needs. All entries assume your lab will be set up for 18 students. You must adapt the list to your needs and number of students.**

**This list is provided as a basic list. Your own program or course may need additional items, but this is intended to give you a good start.**

## BASIC LIST

ITEM	# of Students	# of Units	Important Comments
Hard Disk Drives- You will need both ATA and SATA for training purposes			A minimum of one per student expected to take the class, including day, night, and weekends
Video Cards- Quality cards with at least 250MB of memory. You will also need SLI type and Cross Fire with matching motherboards			
Modem- V92			
Network Adapter- PCI type & USB type			
Network Cable – Cat5e and Cat6			Length should be according to the station location or at least 100 foot each.
PC Stations Complete with software- Windows XP Professional Edition installed or Vista Ultimate. PC Kits – <i>See Important Comment #1, at the end of this list</i>			These are for software classes, not meant to be dismantled Check for operating systems to be included
Windows Vista Operating System – <i>See Important Comment #2, at the end of this list</i>			Additional units for PC Kits
Window 7 Operating System			Again, do not forget additional copies as needed for the kits
Floppy Drive			One (1) For Demo Purposes
CD-RW Drive (Both ATA and SATA types will be needed)			Additional CD Drives will be needed for demonstration & install lab activities
DVD-RW Drive			Additional number for demo and install lab activity

Hand Tool Kit			These need not be expensive
CD-RW (10 per student)			500 minimum
DVD-RW (10 per student)			500 minimum
Lap Top Computers – <i>See Important Comment #3, at the end of the list</i>		*	*Provide for 1 for each 2 students
Multimeters			Select a digital multimeter, with auto range. Expensive meters are not required.
Power Supply-ATX Style 500W or larger			Or other matching kits
UPS – uninterruptable power systems - <i>See Important Comment #4, at the end of this list.</i>			One for each workstation of approximately 1000W or larger. This will protect your investment.
Computer Station			Complete computer station with operating system. These are not to be used for hardware lab activities. These stations will be used mainly for software lab activities. Buy quality systems.
LCD Monitor – <i>See Important Comment #5 at the end of this list</i>			You may want a few extra, with different connection types, for demonstrations and lab activities.
Cat. 5e/6 Crimping Tool			This may be purchased in kit form to include some connectors, a tester and carrying case.
Cat. 5e/6 Cable - (100 feet per student)			2000 feet
Cat 6 Cable			2000 feett
RJ-45 Connectors (10 per student)			For Cat 5e – 200 feet
RJ-45 Connectors (10 per student)			For Cat 6 – 200 feet
Network Hub 8-ports			May use switches, they are as cheap as hubs. 4 Minimum
Laser Printers			Be sure to order toner and imaging cartridges. 2 Minimum

Ink Jet Color Printer			Be sure to order extra ink cartridges 2 Minimum
Wireless Network Card PCI			Some PCI wireless network cards come in two parts, a PCM CIA card and a separate PCI adapter card. Check before ordering.
Wireless Network Card USB			See note above. Also one wireless PCM CIA card for each laptop.
Wireless Access Point			One for each four students should be adequate.
Wireless Router			One for every four students
Wireless Mouse			Most require batteries and possibly a charger – This number assumes no loss of inventory.
Wireless Keyboard			Most require batteries and possibly a charger
Instructor PC Station in the classroom (1 per instructor)			If the facility has an office, an additional station is needed in the office
High quality with a Flat Panel display			For classroom demonstrations
High quality laser printer			Be sure to order toner and imaging cartridges
Large Screen TV			TV equipped to interface with the instructor PC for demonstrations in classroom. You can use a large flat panel display for TV as well as a computer display.
DDR - 2GB			Match the PC Kits. Additional memory DDR, DDR2 and DDR3 for demonstration and lab activities.
USB Drive 10+GB			These are to be issued to students or as a required purchase for class.
Quality Digital Camera			A quality camera with full motion is best. Get lots of memory
Digital Camera			The least expensive you can find. Minimum Resolution
Backup Drive USB attachment			Largest you can afford
Add Your Own Items			

***Important Comments about the list above, reference by number:***

1. There should be at least one kit per station. The students can build the kits as a part of the course. Monitors are typically not included. Software may be an option as well as a keyboard and mouse. Be sure to check [TigerDirect barebones kits](#). They have a nice variety and provide excellent service. Check with Carlos at Tiger. Send an email to [Carlos.LaRoz@TigerDirect.com](mailto:Carlos.LaRoz@TigerDirect.com) or telephone Educational Sales **888.278.4437** (M-F 8AM-8PM EST) and ask for Carlos.
2. You may need a few copies of Home Edition. Home Edition may be included with the PC Kits. Get corporate or OEM editions to avoid the nuisance of constant program activation requirements
3. At least nine will be needed to support student lab activities such as remote access and file transfer. I highly recommend at least 9 and try for 18. If you plan to have the students actually open them up and install/replace memory and hard drives, then you better get extras.
4. If you are fortunate enough to be involved with new construction of a lab, the lab facility may be designed with a single external UPS system to handle all of the computer power outlets.
5. If all the monitors, modems and video cards are the same, the lab activities will go smoothly.

## Additional Equipment

A variety of equipment really helps the student to learn the technology. By requiring students to perform lab activities using different brands and styles of equipment, you will give them greater depth of experience. If a variety is available to supplement the learning, the students gain valuable experience similar to the work place. I highly recommend additional materials of a wide variety. These items may be purchased later, but remember - get what you need prior to course opening. You will need a variety of the following:

- Hubs
- Switches
- Routers
- Variety of monitors both CRT and LCD.
- Variety of modems both cable and DSL.
- Wide Variety of Video Cards including SLI and Crossfire.
- Variety of CD-RW drives both ATA and SATA
- Variety of DVD-RW drives both ATA and SATA.
- Variety of memory DDR, DDR2 and DDR3.
- Variety of Processors and cooling fans. Check CompTIA for current list of processors in test objective outline. Additional Motherboards to match test objective processors. All should conform to the ATXform factor.
- Variety of PC case styles. Students will need to have several different case styles demonstrations as to how to open properly.

## Additional Software

AVG – Free anti virus download <http://free.avg.com/download-avg-anti-virus-free-edition>

Adaware – Free spyware <http://www.lavasoft.com/>

Both AVG and Adaware are available in FREE versions by download and this can save you a lot of money. After all, your students will be constantly installing and reinstalling operating systems and you will not need to purchase this type of software. Also most institutions have a site license of protection software. Check with your IT support personnel.

It is important to note here that many virus protection software programs will considerably slow your operation. I recommend simple, free software.

## Software (continued)

*Microsoft Virtual PC* – Virtual PC will allow you to install multiple operating systems of each workstation. *Example: Windows XP, Vista, Window 7, Linux Event Server.* <http://www.microsoft.com/windows/virtual-pc/>

## Special Requirements

Be sure you have access to plenty of properly wired electrical outlets which will be required for your lab.

You will need at least two Internet connections using telephone lines, modems. Two modem lines are a minimum. You **do not** want to connect a PC repair or networking fundamentals class into existing school network. This is not only a really bad idea from a security stand point, but it will not likely pass your MIS department personnel anyway.

In addition to the two Internet modem lines, a DSL line, ISDN line, Cable television line, satellite dish and service to support each line.

It would be wise to have the computer repair and networking lab on a separate service from the main school. You will have students who will try to hack the system so beware. Also, many institutions have firewall protection setup to prevent a lot of (student) download sites and such. Remember, your students are normal people and will try all of the latest techniques. Be aware that you may not have the ability to download various products or to access your lab remotely.

Web space for class lab assignments is important. For example, you will be uploading web pages, and setting up FTP sites. I highly recommend you have your own classroom website separate from the Institution, so that you and your students can freely access the website from home or other remote sites. Also this will provide a great training opportunity for the students to learn how to upload websites, and ftp files.

## Laboratory Facility

You should set up one workstation (18) for each student that will be restricted to software labs only. These stations are **not** to be used for hardware lab activities. These stations will not be used for formatting hard disk drives or any exercise that can leave the station inoperable. Remember, that there will be many students sharing the same PC station. You need to have a set number that will always be in service.

A separate area with adequate number of stations to be used for hardware lab activities is required. These stations are ideal for the PC kits.

Additional shared equipment as well as instructor equipment has been listed.

## Recommended Textbook, Student Workbook, Instructor Manual, and Complete Classroom and Reference Materials

[Computer Service and Repair](#), by Richard M. Roberts  
[Goodheart-Willcox Publisher](#), Inc., Tinley Park, IL.

Student Textbook	ISBN 978-1-59070-857-6
Student Laboratory Activities Manual	ISBN 978-1-59070-858-3
Instructor Manual	ISBN 978-1-59070-859-0
Instructor Resource CD	ISBN 978-1-59070-860-6
ExamView Assessment Suite (test bank)	ISBN 978-1-59070-980-1
Study Guide	ISBN 978-1-59070-863-7
Power Point Presentation – Site License	ISBN 978-1-59070-862-0

## Microsoft Press

Windows XP Professional Resource Kit ISBN 0-7356-1485-7

The Microsoft professional resource kits are for reference only. They are not teaching materials. The material is far too deep for entry level students. There are no review questions, and it is not structured in a textbook style.

Check out Microsoft Reference materials at

<http://www.microsoft.com/learning/books/ereference/default.aspx>