

Course: AACC: PC Hardware

Cyber Pathways Across Maryland SME Rubric

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Course materials can be found through this link:

<http://oli.cmu.edu/learn-with-oli/see-all-oli-courses/>. Scroll down to “PC HARDWARE: CYBER PATHWAYS ACROSS MARYLAND (CPAM)” and click “Enter Course.” Then “Enter Without An Account.”

This course is offered by Anne Arundel Community College (<http://www.aacc.edu/programs-and-courses/credit-and-degree-seekers/cybersecurity-and-digital-forensics/>) and also prepares students for the CompTIA A+ exam, version 220-901/902. The goal for this review is to validate that the curriculum is complete, current, and relevant to industry cybersecurity needs. Please use the comments sections for each category to explain your overall impressions, whether positive or negative.

COURSE STRUCTURE AND SYLLABUS	Y	N	N/A
Course description is factually complete and accurate	X		
Course structure includes major lessons and assignments	X		
Prerequisite requirements are included and appropriate	X		
Required facilities and equipment are included and appropriate	X		
Required course texts are listed	X		
Appropriate supplementary materials and resources are provided	X		
Course organization and design is clear, coherent, and appropriately structured	X		
Concepts and skills build logically, with appropriate transitions between course sections	X		
Learning outcomes are clearly stated, measurable, and appropriate for the level of the course	X		
Learning outcomes emphasize application of knowledge and skills	X		

Comments about the course structure and syllabus:

Overall the course is well structured and well thought out. There are examples throughout the lessons that illustrate real world application of the technical concepts. I like that historical info

is included. Students may run across it and it also subtly makes the point that the technology is constantly changing.

There was a minor issue with the display of the PCH numbers in the header. The PCH Numbers showed up wrong on the pages as I ran through the course. They did not match the syllabus.

LECTURE MATERIALS: INSTRUCTOR SLIDES OR AUDIO/VIDEO PRESENTATIONS	Y	N	N/A
Content is accurate.	X		
Materials accurately reflect course content.	X		
Materials are presented in a logical order.	X		
Materials reflect the major learning points and objectives for the related lesson.	X		

Comments about the instructor slides or video presentations:

The strikes a good balance between focusing on newer PC technology and recognizing that students will come across older technology in the “real-world.” The material also builds nicely as the course progresses. Students should have a great, practical, knowledge base which will serve them well in seeking their certification and more importantly as they enter the workforce.

STUDENT ACTIVITIES: LABS/EXERCISES/HOMEWORK	Y	N	N/A
Activities as a whole:	Y	N	N/A
<ul style="list-style-type: none"> Contribute to the achievement of the stated course objectives. 	X		
<ul style="list-style-type: none"> Are comprehensive enough to reinforce course objectives. 	X		
<ul style="list-style-type: none"> Are current. 	X		
Individual activities:	Y	N	N/A
<ul style="list-style-type: none"> Have a clearly explained purpose and learning goals. 	X		
<ul style="list-style-type: none"> Promote the achievement of their stated learning goals. 	X		
<ul style="list-style-type: none"> Include access to all necessary resources. 	X		

Comments about student activities:

The activities and labs are well structured to teach the students the skills they will need to perform various tasks when repairing and setting up computers and networks. The exercises follow naturally from the content and are well-bounded.

Many of the exercises say "you can assume that ESD precautions are in place." I do think it would be better to have the student actively do something to acknowledge they are employing ESD protection. It is a habit that should be drilled into them.

EXAMS AND ASSESSMENTS	Y	N	N/A
Assessments measure the stated learning objectives.	X		
Assessments are consistent with module activities and resources.	X		
Assessments are varied	X		
Assessments are appropriate to the student work being assessed.	X		

Comments about exams and assessments:

The capstone does a nice job of assessing in a student's practical mastery of the course material.

It might be good to incorporate parts of the CompTIA practice exams into the course material or as exams.

Overall Summary:

The course does a really nice job of covering a wide range of topics. It strikes a good balance between providing more depth in more current technologies while ensuring students will not be surprised by legacy hardware. Students should be well prepared to deal with most of the issues they will face as a computer technician. The format of the course and mixture of exercises, videos and labs works should work well.

One area that could be augmented is in teaching the students troubleshooting skills. There are a few areas in the course where troubleshooting is described, but it is probably the skill that they will use most in the workplace. The exercises seem to mostly give them some level of experience performing a task (install a component, configuring and pricing a machine, setting up a printer), but not necessarily solving a problem (a printer has stopped working, a computer "mysteriously" loses network access...). In future versions perhaps more exercises that lead them through a troubleshooting process would be helpful.

I enjoyed going through the material and hope the students will as well.

There are a few minor comments and suggestions I have that I've organized by section:

Customer Relations

- Unfortunately, some students are likely to encounter an abusive or harassing customer. I think it would be good to include a paragraph or two on how to deal with this situation.

Memory

- Learn by doing - minor point - RAM does not increase the speed of the CPU, adding more RAM increases performance by reducing CPU overhead activities
- In the section on Parity it might be better to use a monospace font for binary values in the examples and exercises. It is easier to compare and count 1's and 0's.
- The placement of the ECC code paragraph is a little confusing. It seems to be in between two sections on parity. Perhaps move it after the detecting errors parity section.
- Often when adding memory all the slots are full and the memory must be removed and replaced with higher capacity memory modules. It would be good to mention this scenario and how to remove a module. A video would be great.

BIOS

- You may want to mention the TPM and its uses. Particularly since it is required in computers for many types of government agencies.

POST

- You might want to mention that errors may also be reported as a flashing light/LED such as CAPS LOCK flashing. I believe that HP does this on their laptops.

BIOS Exercise

- In the BIOS simulator students may be confused that the enter key and +/- keys do nothing. It is also not a UEFI and the mouse works. This exercise is also after the POST section rather than the BIOS section.

RAID Drives

- Students may be confused by the statement that parity can be used to reconstruct the data when in the memory section it was stated that parity could only be used to detect an error not to correct one. It might be good to mention that parity can be used to correct the error because it is known which disk contains the error.

Active Air Cooling

- Just a note - A second drawback of active air cooling can be noise. This can actually be a problem with computers that are used for high performance audio applications.

Case Fans Installation

- "First, you must ensure that your PC is powered off before you install any component in your system." - An instruction to unplug the power cord should be added.

Networking

- In Twisted Pair Connectors it would be good to have a picture of the different connectors. Particularly since RJ11 and RJ45 are sometimes confused.

CSMA/CD Section

- "In the example shown below, four devices..." There are actually five devices on the network

Classful Vs. Classless Addressing: Subnet and CIDR

- In APIPA/Link-Local it would be good to really highlight the point about the 169 address indicating that there is a problem. Students will run into this many times.

Networking Transfer Protocols

- It might be good to mention sftp along with ftp as the more secure alternative. Alternatively, sftp could also be mentioned along with ssh since they both generally use port 22 and were designed to replace the older less secure protocols.
- Port numbers are mentioned for everything except DNS. You might want to add the DNS port, 53.

Wireless LANs

- Should this section contain a mention of portable hotspots and tethering? These are a sort of ad hoc network and a technician may need to set up and use one when visiting a customer with network issue or when corporate rules that prohibit the technician from connecting to the corporate network. I realize they are described more fully in the Internet Connectivity section. However, students may not make the connection to how they could be used at a customer site. Alternatively, mention their potential use at a customer site in the Internet Connectivity section.
- Should there be a discussion of range for WiFi and at least a mention of WiFi extenders and repeaters?

Setting Up a Networking

- This may be a place to consider discussing how to set up a multiple WiFi routers on the same network or use WiFi repeaters/extendere.

Troubleshooting Hard drives

- "You can do this by making sure the air intake and fans are working properly and are not filled with dust." Might also mention to check that the rubber "feet" are still on the laptop. Some, generally older, laptops have vent holes on the underside and missing "feet" can cause the laptop to bottom out and cover the vent holes.

Security

- The objective is to secure through a security cable or other measures. It might be good to at least mention other measures: anti-theft software, fingerprint readers, disk encryption...

Selecting a Printer

- Three other factors should be considered: size, expected prints per day and connectivity.
1. Size - will the printer be placed on a crowded desktop and used by a single person or will it be placed in a common area?
 2. Expected Prints - How many pages per day will be printed? This will determine the required durability as well as the capacity of the paper trays.
 3. Connectivity - Will this be a group printer or individual printer? Is USB connectivity acceptable or should it be connected by WiFi or LAN?

Connecting a Printer

- While there is a fair amount of material on network printers later in the course, there should be some discussion of them in this segment. Most printers in office environments are network connected not via USB or parallel port.

Networking Printers

- This also needs to show how to setup a network printer using a TCP/IP address. There are many occasions when windows will not discover a printer and the TCP/IP address must be used. Windows method of creating a "new port" for the printer is not intuitively obvious.

PC Hardware Lab 1

- If the course is to be generic I think the instructions in the first lab to how things should be done in MS excel should be removed. Different institutions may use different spreadsheets and the lab is about comparison, not which feature of a spreadsheet to use and not use.

PC Hardware Lab 2

- I like the idea of them connecting a KVM switch. I think it would be a better learning experience if they were to connect the KVM switch to 2 machines. They will learn that paying attention to the connection ordering is important.