LESSON PLAN

INFOTECH 115 - Core Hardware Technologies

This Heald Lesson Plan is intended to help instructors teach the course. It gives a weekly lesson plan to help the instructor plan strategies for presenting the required topics based on the course outcomes. While all topics must be covered, the activities used to support the topics and the order in which they are taught are up to the instructor. This is a suggested order and the instructor can move topics and subtopics around to best fit his/her teaching style. If you have questions about this course plan, contact caocurriculum@heald.edu.

Course Requirements
- Benchmark Assignment – PCs and Their Components
- Benchmark Assignment – Installation, Configuration, and Troubleshooting

Instructor Qualifications
Required:
- Instructor must meet all minimum Heald qualifications
- CompTia A+ Certification

Optimal:
- 5+ years hands-on experience with a variety of computer hardware

Resources
Publisher Resources
- A+ Guide to Hardware, Supplemental CD-ROM (ISBN: 1435487192)

- *Online Instructor Resources* (including instructor's manual, solutions, ExamView, PowerPoint presentations, etc.):
  http://login.cengage.com/sso/

Student Resources
- Content updates and supplements at http://www.course.com
- CD provided with textbook

EBSCO
EBSCO is an online research tool/online library.
> The URL to use for accessing EBSCO host is http://search.epnet.com
> You will then be prompted for your user id and password.
>> **User ID is:** *"heald" followed by your campus ("healdconcord", etc.)*
>> **password is:** *"student"*

(For more information about EBSCO contact your campus LRC manager)

Author and Reviewers

The curriculum team would like to acknowledge the following faculty member as the author of this course plan.

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The curriculum team would also like to recognize the faculty review team for their contributions to this course plan.

- Lenny Bailes, Heald San Francisco
- Gus Chang, Heald San Jose

Assessments

- **Formative Assessment**
  This lesson plan may contain quizzes and activities throughout the course that will engage students and help faculty formatively assess student learning. Faculty may modify these or use other quizzes / activities as needed.

- **Summative Assessment**
  This lesson plan provides projects and assignments that map directly to the Student Learning Outcomes (SLOs) and can be used for SLO assessment. These projects should be followed more closely, although instructors should make adjustments as necessary based on available resources and time constraints.

Week 1	

Topics	• Review A+ Topics and Testing Procedures
	   o Review voucher availability
	
	• Introducing Hardware
	   o PC hardware components - motherboard, processor, storage, expansion card, and electrical system

Reading Assignments and Homework	• Andrews, J. (2010*). A+ Guide to Hardware* (5th ed.). Boston: Course Technology. Read Ch 1 - Pp 1-28
	
	• Homework
	   o Answer Reviewing the Basics - Pp 29-30
	
	   o Define 10 Key Terms in your own words - Pg 29

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student.
	
	• Review classroom policies and procedures
	
	• Active Learning Activities
	
	   o Project 1-1: Identifying Ports on Your Computer - Pg 31
	
	   o Project 1-3: Identifying Motherboard Components - Pg 31

Assessments	• Formative o Chapter 1 Quiz
Notes to Instructor	• It is important to remind students why they are in school and what they can look forward to upon graduation. Topics should include job market as well as certifications and the importance of them. Work with Career Services to identify potential guest speakers to talk about careers in their field of study, as well as instructor discussing their own personal certifications and past employment. Schedule a speaker to visit during week 6 and invite Career Services to introduce the speaker and provide additional information after the presentation. • **Important!** There should be a minimum of 10 hours of lab time in this course. This Lesson Plan contains numerous suggestions for hands-on activities and projects, but you can

supplement with the Hands-On Projects at the end of each chapter, the guided exercises in the text, and your own labs.

- Students should be encouraged to create flashcards for each chapter.

- Instructor is encouraged to cover the binary and hexadecimal numbering systems as they are fundamental in later courses.

- Troubleshooting exercises should be incorporated into labs and projects wherever possible. Instructor may consider starting each class with a "real-life scenario" of a potential troubleshooting issue for students to solve.

- Instructor may consider grading quizzes and returning to students as study guides for mid-term and final exams. During the grading process or possible student review, make sure to provide the correct answers to all questions.

- IMPORTANT! There are two required benchmark assignments for this course. These assignments align to the student learning outcomes for INFOTECH 115 and allow us to assess student mastery of these outcomes. It is recommended that you familiarize yourself with these assignments now so that you can plan how to implement them within your course.

- The first Benchmark Assignment - PCs and Their Components - tests students' knowledge of PC components and includes a hands-on component to assess their ability to disassemble and assemble a computer. The assignment and rubric are available in the Benchmark folder on the SharePoint site for this course:

  INFOTECH 115_Benchmark Assignment_PCs and Components_ V2.0_06262010

  INFOTECH 115_Benchmark Assignment Rubric_PCs and Components_V2.0_06262010

  It is recommended that you administer this assignment during Week 6 of the course.

- The second Benchmark Assignment – Installation, Configuration, and Troubleshooting – assesses the student's ability to install and configure components and peripherals, and

	to troubleshoot and repair common problems. The assignment and rubric are available in the Benchmark folder on the SharePoint site for this course: *INFOTECH 115_Benchmark Assignment_Install Configure Troubleshoot_V2.0_07022010* *INFOTECH 115_Benchmark Assignment Rubric_Install Configure Troubleshoot_V2.0_07022010* It is suggested that this assignment be administered in Week 11. • INFOTECH 115 focuses on the A+ exams objectives and stresses preparation for taking these exams. However, this course must be taught with a very hands-on approach to help the students learn the material and to give them the skills that they need as Information Technology professionals. To make students fit for the workplace, they need the certification *and* hardware skills. There are many hands-on activities at the end of the chapters of the book that can be used in this regard. Instructors are encouraged to develop their own materials to encourage hands-on work. Throughout the course, effort must be made to strike this balance between theory and practice. • You are encouraged to take advantage of the lab manual, available at some campuses, to supplement and/or replace the labs listed here. If your campus does not use the lab manual, you should strongly consider creating a few labs that are more in-depth and challenging for the students, as it will be the hands-on exercises that best enforce the topics.

Week 2	
Topics	• Form Factors, Power Supplies, and Working Inside a Computer o Form Factors - motherboard, power supply & cases o Working with electricity – dangers, protecting yourself and the equipment o Working inside the case
Reading Assignments and Homework	• *A+ Guide to Hardware, 5E.* - Read Ch 2 - Pp 35-92 • Homework o Answer Reviewing the Basics - Pp 93-94 o Define 10 Key Terms in your own words - Pg 92
In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student. • Active Learning Activities o Project 2-1: Taking a Lab Computer Apart and Putting it Back Together - Pg 94 o Project 2-3: Finding PC Power Supply Facts - Pg 95 o Real Problem 2-1: Replacing a Power Supply - Pg 97 o Create a lab using pages 1225-1228 of "Electricity and Multimeters.pdf" to test the power supply connectors (see notes below).
Assessments	• Formative o Chapter 2 Quiz
Notes to Instructor	• Instructor should make use of the supplemental document "Electricity and Multimeters.pdf", available on the student resource CD that accompanies the book, to further explain electrical properties as well as the proper use of a multimeter. • Cover electrical safety prior to allowing students to work inside running computers. • It is important that the instructor take time to make sure the students are very comfortable with taking the computer apart and putting it back together. Make sure that each student is working with the PC and not just leaving it to a single individual in the group, as ALL students will be assessed on their ability to disassemble and assemble a PC during the first Benchmark

	Assignment.
	• It is strongly recommended that you include at least one formative assessment each week to monitor student progress and understanding of the concepts in the class; you can thus take remediation steps as needed. It is critical that you provide feedback on these assessments. Formative assessments could be quizzes or other activities that allow you to monitor student comprehension of the subject matter.
	• Be sure to emphasize and provide opportunities for collaboration in the classroom. This will give the students ample opportunities to practice and improve teamwork skills, which are highly desired in a work environment.

Week 3	

Topics	• Motherboards
	    o Motherboard types and features
	    o Working with BIOS

Reading Assignments and Homework	• *A+ Guide to Hardware, 5E*. - Read Ch 3 - Pp 99-156
	
	• Homework
	    o Answer Reviewing the Basics - Pp 157-158
	
	    o Define 10 Key Terms in your own words - Pg 157

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student.
	
	• Active Learning Activities
	
	    o Project 3-2: Examining BIOS settings - Pg 159
	
	    o Project 3-3: Inserting and Removing Motherboards - Pg 160
	
	    o Project 3-7: Labeling the Motherboard - Pg 161

Assessments	• Formative o Chapter 3 Quiz
Notes to Instructor	• Take some time to introduce the class to websites like www.newegg.com and www.geeks.com, making sure to review several different styles of motherboards and some of their features. Compare the features of different motherboards as well as some of the pricing differences. • Create reading guides for each chapter to walk your students through the content. Include questions that they will have to answer, ensuring that they go through the book. • Instructors are encouraged to share their best assignments, activities, and labs with other Heald INFOTECH 115 instructors. Send these to your Program Director for posting on the INFOTECH 115 SharePoint site. • Emphasize and provide opportunities for students to practice written communication in the course. Both technical and non-technical writing should be emphasized. For example, you could

	have students write a short paragraph at the end of each class that discusses what they feel they are doing well and what they feel they could use assistance understanding. This will also help you as an instructor know what your students are struggling with.

Week 4	

Topics	• Processors
	     o Processors and cooling devices
	     o Installing and troubleshooting the processor

Reading Assignments and Homework	• *A+ Guide to Hardware, 5E*. - Read Ch 4 - Pp 163-215
	
	• Homework
	     o Answer Reviewing the Basics - Pp 215-216
	
	     o Define 10 Key Terms in your own words - Pg 215

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student.
	
	• Active Learning Activities
	
	     o Project 4-1: Recognizing Processors - Pg 217
	
	     o Project 4-5: Inserting and Removing a Processor - Pg 218
	
	     o Assign a block of pages from the chapter to each student and have them create a minimum of three quiz questions from their section.

Assessments	• Formative o Chapter 4 Quiz - Student-created quiz
Notes to Instructor	• Instructor should take time to review the practice of changing fans due to noise issues or for increased efficiency reasons. This could be incorporated into the Project 4-5. • Before administering the student-created quiz, the instructor should review the questions. • Encourage students to sit for the CompTIA A+ exams within the first twelve months, if possible (after the successful completion of the following Heald courses: INFOTECH 115 and INFOTECH 125). You may encourage them to do so upon completing INFOTECH 160, as well. • Place an emphasis on troubleshooting and problem-solving throughout the course. Don't simply tell students how to fix something, but have them use critical thinking skills to figure

	out how to fix it on their own. Provide students with multiple real-world scenarios and assignments that require them to use critical thinking skills.

Week 5	

Topics	• Memory
	    o Installing, upgrading and troubleshooting memory
	• Hard Drives
	    o Installing and upgrading hard and floppy drives
	    o RAID technology

Reading Assignments and Homework	• *A+ Guide to Hardware, 5E*. - Read Ch 5 - Pp 221-247
	
	• Homework
	    o Answer Reviewing the Basics - Pp 248-249
	
	    o Define 10 Key Terms in your own words - Pg 247
	
	• *A+ Guide to Hardware, 5E*. - Read Ch 6 - Pp 253-310
	
	• Homework
	    o Answer Reviewing the Basics - Pg 311
	
	    o Define 10 Key Terms in your own words - Pg 310

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student.
	
	• Active Learning Activities
	
	    o Project 5-4: Upgrading Memory - Pg 250
	
	    o Project 6-1: Examining the BIOS Setting for a Hard Drive - Pg 312
	
	    o Project 6-6: Installing a Hard Drive - Pg 313
	
	    o Real Problem 6-3: Using Hardware RAID – Pg 314

Assessments	• Formative o Chapter 5-6 Quiz
Notes to Instructor	• You may choose to elaborate on RAID technology since the book offers little information on such an important server technology. One possible resource: o http://en.wikipedia.org/wiki/RAID • Consider assigning "Real Problem 6-3" as homework if sufficient PCs are not available in class.

Week 6	
Topics	• Review Chapters 1-6 for Mid-term
Reading Assignments and Homework	• none

In Class Activities	• Invite guest speaker to address the class if time permits.
	
	• Administer the first Benchmark Assignment – PCs and Their Components
	
	• Active Learning Activities
	
	    o Create Jeopardy and other games to help students review and prepare for the mid-term exam
	
	    o Have students utilize their flash cards to review in teams of two or more

Assessments	• Summative
	    o Mid-Term Exam
	
	    o Benchmark Assignment – PCs and Their Components

Notes to Instructor	• The Benchmark Assignment – PCs and Their Components – is a required assignment in this course. Plan accordingly - while some students are disassembling and assembling computers, others can be working on their component identifications and descriptions. Be sure to distribute the assignment and rubric documents to your students: *INFOTECH 115_Benchmark Assignment_PCs and Components_ V2.0_06262010* *INFOTECH 115_Benchmark Assignment Rubric_PCs and Components_V2.0_06262010* • It is recommended that the mid-term cover the contents of chapters 1-6 to provide a fair assessment to the student and the instructor as to the amount of information retained to this point. The mid-term exam is another opportunity for instructors to pull students away at times to have students demonstrate disassembling and assembling computers for the benchmark assignment. • Assuming there are sufficient PCs in the classroom, students

	who finish the mid-term early can spend time working in the Transcender software.

Week 7	
Topics	• I/O Devices ○ Installing, configuring, and troubleshooting I/O devices

Reading Assignments and Homework	• *A+ Guide to Hardware, 5E*. - Read Ch 7 - Pp 315-390
	
	• Homework
	  ○ Answer Reviewing the Basics - Pp 391
	
	  ○ Define 10 Key Terms in your own words - Pg 390

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student.
	
	• Review mid-term and Benchmark Assignment results
	
	• Active Learning Activities
	
	  ○ Project 7-1: Installing a Device - Pg 392
	
	  ○ Project 7-6: Working with a Monitor - Pp 393-394

Assessments	• Formative ○ Chapter 7 Quiz

Notes to Instructor	• Spend some time with the details of display devices, particularly:
	
	  ○ Projector
	  ○ CRT & LCD technologies
	  ○ Resolutions
	  ○ calculating required memory for certain resolutions
	  ○ contrast ratio
	  ○ connector types (VGA, HDMI, DVI, S-Video)
	  ○ settings
	  ○ refresh rate
	  ○ degaussing and multiple monitor displays
	
	• Provide ample opportunity for students to practice verbal communication in the course. Students should have both formal and informal opportunities to speak and present in front of the class.

Week 8	

Topics	• Multimedia Devices and Mass Storage
	    o Multimedia adapters
	    o Optical storage technology
	    o Removable storage
	    o Install, configure, and troubleshoot

Reading Assignments and Homework	• *A+ Guide to Hardware, 5E*. - Read Ch 8 - Pp 395-438
	
	• Homework
	    o Answer Reviewing the Basics - Pp 438-439
	
	    o Define 10 Key Terms in your own words - Pg 438

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student. • Active Learning Activities o Project 8-1: Practicing Troubleshooting Skills - Pg 440
Assessments	• Formative o Chapter 8 Quiz
Notes to Instructor	• Assuming there are sufficient PCs in the classroom, instructor may consider allowing students to spend time working in the Transcender software.

Week 9	

Topics	• Networking
	    o Networking technologies
	    o Network hardware
	    o Windows on a network

Reading Assignments and Homework	• *A+ Guide to Hardware, 5E*. - Read Ch 10 - Pp 471-520
	
	• Homework
	    o Answer Reviewing the Basics - Pp 521-522
	
	    o Define 10 Key Terms in your own words - Pg 520-521

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student.
	
	• Active Learning Activities
	
	    o Project 10-1: Investigating Your PC - Pg 523
	
	    o Create a lab to network small groups of computers together. Students could create cross-over cables to network PCs in groups of 2 or straight-through cables to connect groups of 3-4 PCs if network hubs and/or switches are available.

Assessments	• Formative o Chapter 10 Quiz
Notes to Instructor	• As this particular chapter is a fundamental building block for other classes in the program, it is very important that students grasp the concepts and are comfortable with the hardware side of networking.

Week 10	

Topics	• Notebooks
	    o Supporting notebooks
	    o Notebook peripherals
	    o Troubleshooting, replacing and upgrading internal parts
	• Printers
	    o Printer types and features
	    o Supporting, maintaining, and troubleshooting printers

Reading Assignments and Homework	• *A+ Guide to Hardware, 5E*. - Read Ch 11 - Pp 525-588
	
	• Homework
	    o Answer Reviewing the Basics - Pg 589
	
	    o Define 10 Key Terms in your own words - Pg 588
	
	• *A+ Guide to Hardware, 5E*. - Read Ch 12 - Pp 593-651
	
	• Homework
	    o Answer Reviewing the Basics - Pp 651-652
	
	    o Define 10 Key Terms in your own words - Pg 651

In Class Activities	• Present this week's topics and subtopics using the textbook, PowerPoint slides, the whiteboard, and other tools available to engage the student.
	
	• Active Learning Activities
	
	    o REAL PROBLEM 11-1: Upgrading Notebook Memory - Pg 592
	
	    o Project 12-2: Sharing a Local Printer - Pg 653

Assessments	• Formative o Chapter 11-12 Quiz
Notes to Instructor	• Assuming there are sufficient PCs in the classroom, instructor may consider allowing students to spend time working in the Transcender software. • Due to inaccessibility and the fragile nature of laptops, you may consider doing a demo teardown of a laptop or allowing certain students to teardown different portions of the laptop, making sure to pass around portions for all students to see. • Spend time on troubleshooting printer problems, as this is something students are likely to face on the job.

Week 11	
Topics	• Review for Final Exam
Reading Assignments and Homework	• none

In Class Activities	• Administer second Benchmark Assignment – Installation, Configuration, and Troubleshooting
	
	• Active Learning Activities
	
	    o Create Jeopardy and other games to review with students in preparation for final exam
	
	    o Have students utilize their flash cards to review in teams of two or more

Assessments	• Summative
	    o Benchmark Assignment – Installation, Configuration, and Troubleshooting
	
	    o Final Exam

Notes to Instructor	• The Benchmark Assignment – Installation, Configuration, and Troubleshooting – is a required assignment in this course. Plan accordingly to ensure you can implement it. Be sure to distribute the assignment and rubric documents to your students: *INFOTECH 115_Benchmark Assignment_Install Configure Troubleshoot_V2.0_07022010* *INFOTECH 115_Benchmark Assignment Rubric_Install Configure Troubleshoot_V2.0_07022010* • It is suggested that the Final Exam cover the contents of chapters 1-8 and 10-12