

Zarem/Golde ORT Technical Institute
HT301 - A+ Certification Training Core Hardware Exam

I. General Information

- a. Instructor: Kevin M. Drew, Email: kdrew@steptechnical.com
- b. Course Description: This course is the first module in a series of courses that prepares students for entry-level positions as technicians in the fields of personal computer and peripheral maintenance and support.

While emphasizing the practical skills needed to practice successfully as technicians, this course also prepares students to pass the internationally recognized A+ Core Hardware Exam (220-301).

- c. Required Text: A+ Certification All-In-One Exam Guide, Publisher: McGraw-Hill Osborne Media, 5th edition (October 31, 2003) ISBN: 0072229918
- d. Credits Awarded: 5 credit hours are awarded upon passing.
- e. Classes meet Monday – Friday, 8:30am - 3:30pm, lunch from 11:30am to 12:30pm.

II. Performance Objectives

Most course objectives map directly to certification objectives outlined by CompTIA for A+ Core Hardware exam. In addition to certification-oriented objectives, modules have been added (especially electronics and networking) to enhance the background and quality of performance for entry-level technicians.

Upon completion of this course, the student will be able to:

- a. Demonstrate mastery of basic electronic concepts and identify basic electronic devices used in computers or monitored and controlled by computers.
- b. Install, configure, and upgrade all field replaceable hardware modules and peripherals.
- c. Plan upgrades of hardware modules and peripherals while demonstrating an understanding of the issues to be considered.
- d. Troubleshoot boot-up problems, and develop a method for isolating problems and testing solutions.
- e. Plan and implement policies for preventative maintenance, safety, and environmental protection.
- f. Demonstrate an understanding of historical development and modern features of all CPUs, RAM, and motherboards.
- g. Identify ports and associated connectors. Configure IRQs, DMA, and I/O addresses and troubleshoot conflict scenarios.
- h. Install and configure IDE, SCSI, USB, and IEEE1394 storage devices.
- i. Identify, configure, and install communications devices, including modems, NICs, and null modem cables.
- j. Identify communication methods, network topologies, transmission media, MAC addresses, equipment, and connectors.
- k. Identify features, configuration, advantages, and disadvantages of each type of modern peripheral.
- l. Troubleshoot common computer and peripheral problems using problem isolation, testing, and documentation of the solution.

Zarem/Golde ORT Technical Institute
HT301 - A+ Certification Training Core Hardware Exam

- m. Demonstrate a thorough understanding of the functionality of each layer of the OSI model and the hardware protocols associated with the lowest three layers.
- n. Identify and understand the functionality of the following 802 standards: 802.1, 802.2, 802.3, and 802.11.

III. Course Outline

This course consists of 40 lessons. Two lessons will be completed per day, five days per week. Each lesson contains three 50-minute periods including a lecture, lab, and computer based quiz.

Week 1			
#	Lesson Topic	Lesson Objective	Assignment
1	Introduction to Personal Computers: History Of Computers, Basic PC Anatomy, Basic Inputs And Outputs	Introduction to the course material and methods. Brief history of computer science. Introduction to input and output. Objective b	All-In-One A+ Text Pages 1 – 23 Pages 311-335
2	Introduction to Electrical and Electronic Concepts	Demonstrate understanding of the nature of electricity and power generation. Objective a	
3	Power Supplies and Batteries	Troubleshoot computer power supplies and portable batteries. Objective a	All-In-One A+ Text Pages 336 - 373
4	Electronic Circuits I	Apply basic concepts of voltage, resistance, conductance, and switches. Objective a	
5	Electronic Circuits II	Apply concepts of inductance, capacitance, and impedance. Objective a	All-In-One A+ Text Pages 24 - 50
6	Electronic Circuits III	Demonstrate understanding of the uses of semiconductors, and transistors. Objective a	
7	Electronic Circuits IV	Build a basic power amplifier and preamplifier. Objective a	All-In-One A+ Text Pages 51 - 77
8	Electronic Circuits V	Build a basic speaker and microphone. Objective a	
9	Applied Binary and Hexadecimal Math	Apply binary and hexadecimal math to an understanding of computer technology. Objectives a, f	All-In-One A+ Text Pages 78 - 100
10	Introduction to Personal Computers: History Of Computers, Basic PC Anatomy	Identify key developments in the history of computer science. Identify basic PC components and their functions. Objective f	

Zarem/Golde ORT Technical Institute
HT301 - A+ Certification Training Core Hardware Exam

Week 2			
#	Lesson Topic	Lesson Objective	Assignment
11	CPU, Motherboards, RAM	Identify key features of modern CPUs, motherboards, and RAM. Objectives b, c, f, g	All-In-One A+ Text Pages 147 - 192
12	PC Assembly, Disassembly	Completely disassemble and then reassemble a PC. Objectives b, c, d, h	
13	PC Assembly, Disassembly	Practice completely disassembling and then reassembling PC. Objectives b, c, d, h	All-In-One A+ Text Pages 193 - 233
14	Microprocessors	Identify all the microprocessors found in modern PCs. Demonstrate understanding of issues that must be considered when choosing or upgrading CPUs. Objectives b, c	
15	Ports, Bus Architecture, Components	Identify ports, and associated connectors. Configure IRQs, DMA, I/O addresses and troubleshoot conflict scenarios. Objectives b, c, g	All-In-One A+ Text Pages 240 - 261
16	Chipset Interaction I	Demonstrate understanding of how a PC actually works on the bus level. Objectives b, c, g	
17	Chipset Interaction II	Be able to compare modern chipset features and functions. Objectives b, c, g	All-In-One A+ Text Pages 377 - 409
18	Introduction to Storage Memory	Identify various storage technologies including: Floppy drives, ATA, SCSI, USB, and IEEE1394 storage devices. Objectives b, c, h	
19	Storage - Floppy Disk Drives, Zip Disk Drives	Configure and install IDE, SCSI, USB, and IEEE1394 internal and external removable storage devices. Objectives b, c, h	All-In-One A+ Text Pages 411 - 451
20	Hard Disk Drives I - ATA	Configure and install ATA hard disk drives. Objectives b, c, d, h	

Week 3			
#	Lesson Topic	Lesson Objective	Assignment
21	Hard Disk Drives II - ATA	Configure and install ATA hard disk drives Objectives b, c, d, e, h	All-In-One A+ Text Pages 452 - 508
22	Hard Disk Drives III - SCSI	Configure and install SCSI internal and external storage devices. Objectives b, c, d, e, h	
23	CDROM, CD-R, CD-RW, DVD Drives	Configure and install IDE, SCSI, USB, and IEEE1394 internal and external optical devices. Objectives b, c, d, e, h	All-In-One A+ Text Pages 969 - 990
24	Video Cards, CRT Monitors	Plan and implement proper procedures for installing and configuring video cards and CRT monitors. Objectives b, c, e	
25	LCD Monitors	Plan and implement proper procedures for installing and configuring flat panel monitors. Objectives b, c	All-In-One A+ Text Pages 937 - 965
26	Sound Cards	Plan and implement proper procedures for installing and configuring sound cards. Objectives b, c, e	
27	Printers I - Introduction	Identify various printer technologies. Objectives b, c	All-In-One A+ Text Pages 1105 - 1133
28	Printers II - Lasers and Inkjets	Plan and implement proper procedures for installing and configuring printers. Objectives b, c	
29	Printer III - Maintenance and Troubleshooting	Troubleshoot printers Objectives e, k, l	All-In-One A+ Text Pages 1133 - 1142
30	Printer IV - Maintenance and Troubleshooting	Troubleshoot printers Objectives e, k, l	

Zarem/Golde ORT Technical Institute
HT301 - A+ Certification Training Core Hardware Exam

Week 4			
#	Lesson Topic	Lesson Objective	Assignment
31	Portable Devices – Laptops, PDAs	Identify portable computers and related peripherals. Plan and implement basic maintenance procedures. Objective h	All-In-One A+ Text Pages 1071 - 1098
32	MPEG Players, USB and other portable drives and formats	Install and configure portable storage devices. Objective h	
33	Communications Devices I - Introduction to Networking and Related Equipment	Identify communication methods, network topologies, transmission media, MAC addresses, equipment, and connectors. Objective j	All-In-One A+ Text Pages 1039 - 1069
34	Communications Devices II - Network Interface Cards and Network Media	Configure, and install communications devices, including modems, NICs, and null modem cables. Objectives i, j	
35	Communications Devices III - Hubs, Switches, and Routers	Demonstrate thorough understanding of the functionality of each layer of the OSI model. Identify the hardware and software protocols associated with each layer. Identify and understand the functionality of the following 802 standards: 802.1, 802.2, 802.3. Objectives m, n	All-In-One A+ Text Pages 1143 - 1173
36	Communications Devices IV - Wireless Network Equipment	Identify and understand the functionality wireless NICs, WAPs, and routers. Know the basic features of each of the 802.11 standards. Objectives i, j	
37	PC Hardware Maintenance	Create policies for preventative maintenance, safety, and environmental protection. Objective e	All-In-One A+ Text Pages 1105 - 1133
38	PC Hardware Troubleshooting I	Troubleshoot common computer problems, and develop a method for isolating problems and testing solutions. Objective l	
39	PC Hardware Troubleshooting II	Troubleshoot common computer problems, and develop a method for isolating problems and testing solutions. Objective l	All-In-One A+ Text Pages 1133 - 1142
40	PC Hardware Troubleshooting III	Troubleshoot common computer problems, and develop a method for isolating problems and testing solutions. Objective l	

IV. Course Information

- a. Course requirements: Students must have a high school diploma or equivalent, typing speed of 20wpm, basic verbal/mathematical skills, and computer operating skills.
- b. Types of exams and evaluation weight:
 1. Quizzes 20%
 2. Module level exams 50%
 3. Final exam 20%
 4. Participation 10%
- c. Attendance policy: (See the Zarem/Golde ORT Technical Institute: Course Catalog for the complete policy.) The institute expects students to demonstrate those work habits that are required in the work place. Students should attend classes on time and should not be absent for any sessions.

Zarem/Golde ORT Technical Institute
HT301 - A+ Certification Training Core Hardware Exam

Students are required to attend a minimum of 70% of scheduled class sessions during their program.

- d. Participation: Students are expected to participate in lectures and labs by taking notes, asking and answering questions, and completing assignments. Students are expected to review assigned material before class.
- e. Teaching methods: Each lesson module will be conducted in three phases of equal size: lecture, instructor assisted laboratory, and computer based drilling/examination.

V. Evaluation

Each hour of lecture and lab is followed by an hour of computer-based quizzes. Progress is recorded and monitored by instructors in order to ensure progress. Criteria for grading are as follows:

Grade	Score	Explanation	Grade Points
A	90-100	Excellent	4.0
B	80-89	Good	3.0
C	70-79	Average	2.0
D	60-69	Below Average	1.0
F	Below 60	Failure	0.0
W	Withdrawal		
I	Incomplete		
P	Passing		

A letter "P" or "F" is given for courses taken on a Pass/Fail basis. See catalog for Pass/Fail policy.