

LAST REVIEW: 2008-2009
(i.e. 2003-2004)

NEXT REVIEW: 2014-2015
(i.e. 2008-2009)

STATUS: A
(A, I, D)

COURSE TITLE: A+ Essentials

COMMON COURSE NUMBER: CTS1133C

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN
(per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture:	36	Lab:	12
Clinic:	0	Other:	0

PREREQUISITE(S): None

COREQUISITE(S): None

PRE/COREQUISITE(S): None

COURSE DESCRIPTION *(750 characters, maximum):*

This course provides students with the knowledge required to understand the fundamentals of computer technology, networking, and security, and the skills required to identify hardware, peripheral, networking, and security components.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area
General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

1. Hardware
2. Troubleshooting, Repair and Maintenance
3. Operating Systems and Software
4. Networking
5. Security
6. Operational Procedure

EVALUATION:

Please provide a brief description (250 characters maximum) that details how students will be evaluated on the course outcomes.

Evaluation instruments will include written and/or skills-based examination and individual in-class and/or take-home assignments. Evaluation methods may also include group in-class and/or take-home assignments.

Common Course Number: CTS1133C

UNITS

Unit 1

General Outcome:

1.0 The student shall: Understand hardware

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

1.1 Categorize storage devices and backup media

- FDD
- HDD
 - Solid state vs. magnetic
- Optical drives
 - CD / DVD / RW / Blu-Ray
- Removable storage
 - Tape drive
 - Solid state (e.g. thumb drive, flash, SD cards, USB)
 - External CD-RW and hard drive
 - Hot swappable devices and non-hot swappable devices

1.2 Explain motherboard components, types and features

- Form Factor
 - ATX / BTX,
 - micro ATX
 - NLX
- I/O interfaces
 - Sound
 - Video
 - USB 1.1 and 2.0
 - Serial
 - IEEE 1394 / Firewire
 - Parallel
 - NIC
 - Modem

- PS/2
- Memory slots
 - RIMM
 - DIMM
 - SODIMM
 - SIMM
- Processor sockets
- Bus architecture
- Bus slots
 - PCI
 - AGP
 - PCIE
 - AMR
 - CNR
 - PCMCIA
- PATA
 - IDE
 - EIDE
- SATA, eSATA
- Contrast RAID (levels 0, 1, 5)
- Chipsets
 - BIOS / CMOS / Firmware
 - POST
 - CMOS battery
- Riser card / daughterboard

1.3 Classify power supplies types and characteristics

- AC adapter
- ATX proprietary
- Voltage, wattage and capacity
- Voltage selector switch Pins (20, 24)
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1.4 Explain the purpose and characteristics of CPUs and their features

- Identify CPU types
 - AMD
 - Intel
- Hyper threading
- Multi core
 - Dual core
 - Triple core
 - Quad core
- Onchip cache
 - L1
 - L2
- Speed (real vs. actual)
- 32bit vs. 64 bit

1.5 Explain cooling methods and devices

- Heat sinks
- CPU and case fans

- Liquid cooling systems
- Thermal compound
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1.6 Compare and contrast memory types, characteristics and their purpose

- Types
 - DRAM
 - SRAM
 - SDRAM
 - DDR / DDR2 / DDR3
 - RAMBUS
- Parity vs. Non-parity
- ECC vs. non-ECC
- Single sided vs. double sided
- Single channel vs. dual channel
- Speed
 - PC100
 - PC133
 - PC2700
 - PC3200
 - DDR3-1600
 - DDR2-667

1.7 Distinguish between the different display devices and their characteristics

- Projectors, CRT and LCD
- LCD technologies
 - Resolution (e.g. XGA, SXGA+, UXGA, WUXGA)
 - Contrast ratio
 - Native resolution
- Connector types
 - VGA
 - HDMi
 - S-Video
 - Component / RGB
 - DVI pin compatibility
- Settings
 - Refresh rate
 - Resolution
 - Multi-monitor
 - Degauss

1.8 Install and configure peripherals and input devices

- Mouse
- Keyboard
- Bar code reader
- Multimedia (e.g. web and digital cameras, MIDI, microphones)
- Biometric devices
- Touch screen
- KVM switch

1.9 Summarize the function and types of adapter cards

- Video
 - PCI
 - PCIe
 - AGP
- Multimedia
 - Sound card
 - TV tuner cards
 - Capture cards
- I/O
 - SCSI
 - Serial
 - USB
 - Parallel
- Communications
 - NIC
 - Modem

1.10 Install, configure and optimize laptop components and features

- Expansion devices
 - PCMCIA cards
 - PCI Express cards
 - Docking station
- Communication connections
 - Bluetooth
 - Infrared
 - Cellular WAN
 - Ethernet
 - Modem
- Power and electrical input devices
 - Auto-switching
 - Fixed input power supplies
 - Batteries
- Input devices
 - Stylus / digitizer
 - Function keys
 - Point devices (e.g. touch pad, point stick / track point)

1.11 Install and configure printers

- Differentiate between printer types
 - Laser
 - Inkjet
 - Thermal
 - Impact
- Local vs. network printers
- Printer drivers (compatibility)
- Consumables

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Unit 2

General Outcome:

2.0 The student shall: Understand troubleshooting, repair and maintenance

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

2.1 Given a scenario, explain the troubleshooting theory

- Identify the problem
 - Question the user and identify user changes to computer and perform backups before making changes
- Establish a theory of probable cause (question the obvious)
- Test the theory to determine cause
 - Once theory is confirmed determine next steps to resolve problem
 - If theory is not confirmed re-establish new theory or escalate
- Establish a plan of action to resolve the problem and implement the solution
- Verify full system functionality and if applicable implement preventative measures
- Document findings, actions and outcomes

2.2 Given a scenario, explain and interpret common hardware and operating system symptoms and their causes

- OS related symptoms
 - Bluescreen
 - System lock-up
 - Input/output device
 - Application install
 - Start or load
 - Windows specific printing problems
 - _ Print spool stalled
 - _ Incorrect / incompatible driver
- Hardware related symptoms
 - Excessive heat
 - Noise
 - Odors
 - Status light indicators
 - Alerts
 - Visible damage (e.g. cable, plastic)
- Use documentation and resources
 - User / installation manuals
 - Internet / web based
 - Training materials

2.3 Given a scenario, determine the troubleshooting methods and tools for printers

- Manage print jobs
- Print spooler
- Printer properties and settings
- Print a test page

2.4 Given a scenario, explain and interpret common laptop issues and determine the appropriate basic troubleshooting method

- Issues
 - Power conditions
 - Video
 - Keyboard
 - Pointer
 - Stylus
 - Wireless card issues
- Methods
 - Verify power (e.g. LEDs, swap AC adapter)
 - Remove unneeded peripherals
 - Plug in external monitor
 - Toggle Fn keys or hardware switches
 - Check LCD cutoff switch
 - Verify backlight functionality and pixilation
 - Check switch for built-in WIFI antennas or external antennas

2.5 Given a scenario, integrate common preventative maintenance techniques

- Physical inspection
- Updates
 - Driver
 - Firmware
 - OS
 - Security
- Scheduling preventative maintenance
 - Defrag
 - Scandisk
 - Check disk
 - Startup programs
- Use of appropriate repair tools and cleaning materials
 - Compressed air
 - Lint free cloth
 - Computer vacuum and compressors
- Power devices
 - Appropriate source such as power strip, surge protector or UPS
- Ensuring proper environment
- Backup procedures

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Unit 3

General Outcome:

3.0 The student shall: Understand operating system and software

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

3.1 Compare and contrast the different Windows Operating Systems and their features

- Windows 2000, Windows XP 32bit vs. 64bit, Windows Vista 32 bit vs. 64bit
 - Side bar, Aero, UAC, minimum system requirements, system limits
 - Windows 2000 and newer – upgrade paths and requirements
 - Terminology (32bit vs. 64bit – x86 vs. x64)
 - Application compatibility, installed program locations (32bit vs. 64bit),
 - Windows compatibility mode
 - User interface, start bar layout

3.2 Given a scenario, demonstrate proper use of user interfaces

- Windows Explorer
- My Computer
- Control Panel
- Command prompt utilities
 - telnet
 - ping
 - ipconfig
- Run line utilities
 - msconfig
 - msinfo32
 - DxDiag
 - Cmd
 - REGEDIT
- My Network Places
- Task bar / systray
- Administrative tools
 - Performance monitor, Event Viewer, Services, Computer Management
- MMC
- Task Manager
- Start Menu

3.3 Explain the process and steps to install and configure the Windows OS

- File systems
 - FAT32 vs. NTFS
- Directory structures
 - Create folders
 - Navigate directory structures
- Files
 - Creation
 - Extensions
 - Attributes
 - Permissions
- Verification of hardware compatibility and minimum requirements
- Installation methods
 - Boot media such as CD, floppy or USB
 - Network installation
 - Install from image
 - Recover CD
 - Factory recovery partition
- Operating system installation options
 - File system type
 - Network configuration
 - Repair install
- Disk preparation order
 - Format drive
 - Partition
 - Start installation
- Device Manager
 - Verify
 - Install and update devices drivers
 - Driver signing
- User data migration – User State Migration Tool (USMT)
- Virtual memory
- Configure power management
 - Suspend
 - Wake on LAN
 - Sleep timers
 - Hibernate
 - Standby
- Demonstrate safe removal of peripherals

3.4 Explain the basics of boot sequences, methods and startup utilities

- Disk boot order / device priority
 - Types of boot devices (disk, network, USB, other)
- Boot options
 - Safe mode
 - Boot to restore point
 - Recovery options
 - Automated System Recovery (ASR)
 - Emergency Repair Disk (ERD)
 - Recovery console

Common Course Number: CTS1133C

Unit 4

General Outcome:

4.0 The student shall: Understand networking

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

4.1 Summarize the basics of networking fundamentals, including technologies, devices and protocols

- Basics of configuring IP addressing and TCP/IP properties (DHCP, DNS)
- Bandwidth and latency
- Status indicators
- Protocols (TCP/IP, NETBIOS)
- Full-duplex, half-duplex
- Basics of workgroups and domains
- Common ports: HTTP, FTP, POP, SMTP, TELNET, HTTPS
- LAN / WAN
- Hub, switch and router
- Identify Virtual Private Networks (VPN)
- Basics class identification

4.2 Categorize network cables and connectors and their implementations

- Cables
 - Plenum / PVC
 - UTP (e.g. CAT3, CAT5 / 5e, CAT6)
 - STP
 - Fiber
 - Coaxial cable
- Connectors
 - RJ45
 - RJ11

4.3 Compare and contrast the different network types

- Broadband
 - DSL
 - Cable
 - Satellite
 - Fiber
- Dial-up
- Wireless
 - All 802.11 types
 - WEP
 - WPA
 - SSID
 - MAC filtering
 - DHCP settings
- Bluetooth
- Cellular

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Unit 5

General Outcome:

5.0 The student shall: Understand security

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

5.1 Explain the basic principles of security concepts and technologies

- Encryption technologies
- Data wiping / hard drive destruction / hard drive recycling
- Software firewall
 - Port security
 - Exceptions
- Authentication technologies
 - User name
 - Password
 - Biometrics
 - Smart cards
- Basics of data sensitivity and data security
 - Compliance
 - Classifications
 - Social engineering

5.2 Summarize the following security features

- Wireless encryption
 - WEPx and WPAX
 - Client configuration (SSID)
- Malicious software protection
 - Viruses
 - Trojans
 - Worms
 - Spam
 - Spyware
 - Adware
 - Grayware
- BIOS Security
 - Drive lock
 - Passwords
 - Intrusion detection
 - TPM
- Password management / password complexity
- Locking workstation
 - Hardware
 - Operating system
- Biometrics
 - Fingerprint scanner

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Unit 6

General Outcome:

6.0 The student shall: Understand operational procedure

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

6.1 Outline the purpose of appropriate safety and environmental procedures and given a scenario apply them

- ESD
- EMI
 - Network interference
 - Magnets
- RFI
 - Cordless phone interference
 - Microwaves
- Electrical safety
 - CRT
 - Power supply
 - Inverter
 - Laser printers
 - Matching power requirements of equipment with power distribution and UPSs
- Material Safety Data Sheets (MSDS)
- Cable management
 - Avoiding trip hazards
- Physical safety
 - Heavy devices
 - Hot components
- Environmental – consider proper disposal procedures

6.2 Given a scenario, demonstrate the appropriate use of communication skills and professionalism in the workplace

- Use proper language – avoid jargon, acronyms, slang
- Maintain a positive attitude
- Listen and do not interrupt a customer
- Be culturally sensitive
- Be on time
 - If late contact the customer
- Avoid distractions
 - Personal calls
 - Talking to co-workers while interacting with customers
 - Personal interruptions

- Dealing with a difficult customer or situation
 - Avoid arguing with customers and/or being defensive
 - Do not minimize customers' problems
 - Avoid being judgmental
 - Clarify customer statements
 - _ Ask open-ended questions to narrow the scope of the problem
 - _ Restate the issue or question to verify understanding
- Set and meet expectations / timeline and communicate status with the customer
 - Offer different repair / replacement options if applicable
 - Provide proper documentation on the services provided
 - Follow up with customer / user at a later date to verify satisfaction
- Deal appropriately with customers confidential materials
 - Located on computer, desktop, printer, etc.