



EUCIP
European Certification of
Informatics Professionals

EUCIP IT Administrator - Fundamentals

Syllabus Version 1.0



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EUCIP IT Administrator - Fundamentals

This document details the syllabus for *EUCIP IT Administrator - Fundamentals*. The syllabus describes, through learning outcomes, the knowledge and skills that a candidate for *EUCIP IT Administrator - Fundamentals* should possess. The syllabus also provides the basis for the theory-based test in this module.

Module Goals

EUCIP IT Administrator - Fundamentals requires the candidate to have a broad understanding of hardware, operating systems, networks and IT Security.

The candidate shall be able to:

- Know the main elements of hardware of a personal computer.
- Understand operating system (OS) fundamentals and configure and maintain an operating system.
- Understand the OSI reference model, how to connect to a network and how common network services such as e-mail and groupware work.
- Understand key IT security concepts, be aware of malware and common network security concepts, as well as appreciate social, ethical and legal aspects of IT security.

CATEGORY	SKILL SET	REF.	TASK ITEM
F.1 Hardware	<i>F.1.1 Introduction to Personal Computer</i>	F.1.1.1	Understand the basic concepts of hardware and software.
	<i>F.1.2 Motherboards</i>	F.1.2.1	Understand the role and basic functions of a motherboard.
		F.1.2.2	Identify the basic components of a motherboard like: CPU slot/socket, chipset, cache memory, buses, ports, expansion slots.
		F.1.2.3	Know the different types of motherboards and their differences like: LPX, ATX, NLX.
	<i>F.1.3 BIOS</i>	F.1.3.1	Know what BIOS is, where it is stored and its functions. Understand the terms: POST, SETUP, CMOS, Firmware and their function.
		F.1.3.2	Be aware of possible alternatives to BIOS like: UEFI, Open Firmware, and Coreboot.
	<i>F.1.4 Microprocessors</i>	F.1.4.1	Understand the role of the CPU. Define the terms: CPU speed, overclocking, multiple factor.



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		F.1.4.2	Be aware of factors that determine the processor's capacity like: clock, architecture, cache size.
		F.1.4.3	Understand best practice relating to CPU installations.
		F.1.4.4	Be aware of thermal CPU problems and know how they are solved.
		F.1.4.5	Understand the terms RAM and ROM.
		F.1.4.6	Know the features of DRAM like: speed, capacity.
		F.1.4.7	Be aware of the number of bits each type of DRAM memory uses. Understand the term banking.
		F.1.4.8	Know the different types of ROM like: PROM, EPROM, EEPROM. Know their features like: speed, capacity.
		F.1.4.9	Know how cache memory works and its benefits.
	<i>F.1.5 Buses and System Resources</i>	F.1.5.1	Understand the term bus, its structure and functions. Know how bus structure can affect bandwidth.
		F.1.5.2	Be aware of the terms front side bus and back side bus.
		F.1.5.3	Be aware of the various I/O buses like: PCI, PCI-X, USB and distinguish between them.
		F.1.5.4	Understand basic system resources like: I/O port addresses, IRQ's and DMA's. Be able to check the status of used and available system resources.
	<i>F.1.6 Interfaces</i>	F.1.6.1	Understand how an IDE interface works. Understand the terms Primary IDE, Secondary IDE, Master and Slave.
		F.1.6.2	Know how SCSI works, the main types of SCSI. Understand the terms Host adapter, SCSI ID, LUN and Terminator.
		F.1.6.3	Know how the SATA interfaces work and their difference with PATA.



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		F.1.6.4	Identify different USB interfaces, working principles, physical connections.
		F.1.6.5	Identify different FireWire interfaces, working principles, capacities and limitations.
		F.1.6.6	Identify different types of memory card like: Flash, SD, Memory Stick. Understand the function of a card reader.
		F.1.6.7	Understand different RAID configurations for performance and security.
	<i>F.1.7 Mass Storage</i>	F.1.7.1	Know how a disk stores and reads data. Understand the disk management terms low level format, partition, high level format.
		F.1.7.2	Know how to install a hard disk or an optical drive. Know which cables are necessary and how to connect them.
	<i>F.1.8 Video Display</i>	F.1.8.1	Be aware of the most common monitor types like: TFT and LED, and how they work.
		F.1.8.2	Be aware of factors that impact on image quality like: resolution, refresh rate, number of colours.
		F.1.8.3	Be aware of the most common display modes like: VGA, SVGA, XVGA.
	<i>F.1.9 Printers</i>	F.1.9.1	Distinguish between the main printing technologies such as dot matrix, inkjet and laser. Know the benefits and limitations of each technology.
		F.1.9.2	Recognise ways that a PC can communicate with a printer like: parallel, serial, USB, wireless and LAN.
F.2 Operating Systems	<i>F.2.1 Operating System Fundamentals</i>	F.2.1.1	Understand the function and uses of an operating system.
		F.2.1.2	Be aware of the characteristics of common operating systems like: CLI, GUI, interactivity, multiusage.
		F.2.1.3	Know how to install an operating system from CD-ROM, network.



CATEGORY	SKILL SET	REF.	TASK ITEM
		F.2.1.4	Understand the role of a server, its basic components, requirements and function. Understand the role of the client.
	<i>F.2.2 System Configuration</i>	F.2.2.1	Know how to configure and change monitor settings like: colours, resolution, refresh rate. Know how to change monitor and graphic adapter drivers.
		F.2.2.2	Know how to make desktop configuration changes like: changing background, themes, taskbar settings.
		F.2.2.3	Configure mouse and keyboard settings.
		F.2.2.4	Configure regional settings.
		F.2.2.5	Be able to add, modify, remove a printer. Be able to set a printer as default, check a printer's status and update drivers.
		F.2.2.6	Know how the operating system organises its folders/directories. Know where files are stored like: system files, application files, temporary files, internet files.
		F.2.2.7	Understand the importance of keeping a system up to date. Be able to install operating system patches and updates.
		F.2.2.8	Know how to configure the system to automatically install patches and updates.
		F.2.2.9	Define the terms device and driver and their role in installing hardware.
		F.2.2.10	Be able to check for and resolve resource conflict.
		F.2.2.11	Be able to install, upgrade, uninstall application software.
	<i>F.2.3 Disk Management</i>	F.2.3.1	Use the available disk administration utility.
		F.2.3.2	Use the available disk partitioning program.



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		F.2.3.3	Recognise the most common file systems your operating system can use.
		F.2.3.4	Know file and directory attributes and their function.
		F.2.3.5	Understand the importance of creating backups.
	<i>F.2.4 Disk Maintenance</i>	F.2.4.1	Use an available utility to test disks and repair problems.
		F.2.4.2	Describe fragmentation and explain why it occurs. Know what defragmentation is and use a utility to perform defragmentation.
		F.2.4.3	Recognise unwanted files on a disk and use an available utility to remove unwanted files.
	<i>F.2.5 Shared Resources and Account Permissions</i>	F.2.5.1	Know what shared resources are. Be aware of their benefits and their security and privacy risks.
		F.2.5.2	Create shared resources like: file resources and printer resources.
		F.2.5.3	Know how to install a network printer.
		F.2.5.4	Know how to check the printer status (print queue status).
		F.2.5.5	Know how to cancel, pause or reorder a print job.
	<i>F.2.6 Administrative Tools</i>	F.2.6.1	Know how to use the available utility for managing users and groups.
	<i>F.2.7 Diagnosing and Troubleshooting</i>	F.2.7.1	Be able to use the available diagnostic programs to analyse the current hardware and software settings.
		F.2.7.2	Be able to make and use a repair disk, emergency disk, for recovery. Also, know the way the disk works.
		F.2.7.3	Be able to diagnose printing problems.
		F.2.7.4	Know the available utility used to monitor memory and its functions.



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		F.2.7.5	Use the availability utility to monitor the events, system log.
	<i>F.2.8 Databases</i>	F.2.8.1	Be aware of the need for consistent data storage on servers.
		F.2.8.2	Know the requirements for installing a DBMS.
		F.2.8.3	Be aware of the term ACID and the related issues.
		F.2.8.4	Be aware of the transaction log and its purpose.
F.3 Networks	<i>F.3.1 OSI Reference Model</i>	F.3.1.1	Describe the role of the different OSI model layers: physical, data link, network, transport, session, presentation, and application.
	<i>F.3.2 Physical, Datalink and Network Layers</i>	F.3.2.1	Describe the properties of analog and digital signals. Distinguish between bits and bytes in digital binary signals.
		F.3.2.2	Understand and distinguish between types of Network Cables, that can be used, such as coaxial, twisted pair, fiber optic. Know their capabilities and limitations.
		F.3.2.3	Recognise the main network topologies like: bus, star, ring, tree.
		F.3.2.4	Describe Ethernet systems like: data transmission rates and media.
		F.3.2.5	Describe circuit and packet switching concepts.
		F.3.2.6	Explain the purpose of an addressing system. Illustrate the aims of IP protocol.
		F.3.2.7	Describe IP addressing, the relationship between IP addresses and network. Describe principles of routing.
	<i>F.3.3 Transport, Session and Presentation Layers</i>	F.3.3.1	Define port, well-known-port, and connection. Describe the purpose of TCP protocol.



CATEGORY	SKILL SET	REF.	TASK ITEM
		F.3.3.2	Describe the purpose of Network Address Translation (NAT), Port Address Translation (PAT). Recognise different types of NAT like: SNAT, DNAT.
		F.3.3.3	Recognise the function of the Dynamic Host Configuration Protocol (DHCP).
		F.3.3.4	Understand how Multipurpose Internet Mail Extensions (MIME) protocol can be used as a way to manage different objects.
	<i>F.3.4 Application Layer</i>	F.3.4.1	Describe the purpose of TELNET.
		F.3.4.2	Describe the purpose of file transfer protocol (FTP).
	<i>F.3.5 World Wide Web (WWW)</i>	F.3.5.1	Define the term uniform resource locator (URL).
		F.3.5.2	Describe the aim and the main operations of the domain name system (DNS).
		F.3.5.3	Describe the purpose of the HTTP, HTTPS protocols.
		F.3.5.4	Define the term cookie. Recognise the benefits and dangers of cookies.
		F.3.5.5	Understand the purpose of the main markup languages and style sheets like: HTML, XML, CSS.
	<i>F.3.6 E-Mail</i>	F.3.6.1	Describe the purpose and components of simple mail transfer protocol (SMTP). Describe the structure of an e-mail address.
		F.3.6.2	Understand the purpose of the POP3, IMAP protocols.
		F.3.6.3	Understand how MIME relates to SMTP.
	<i>F.3.7 Groupware and Sharing</i>	F.3.7.1	Describe the purpose and features of instant messaging (IM) systems.
		F.3.7.2	Describe the purpose and use of a mailing list.
		F.3.7.3	Describe the purpose and use of a forum.



CATEGORY	SKILL SET	REF.	TASK ITEM
		F.3.7.4	Understand the term netiquette.
		F.3.7.5	Describe the purpose of file sharing protocols like: SMB, CIFS.
	<i>F.3.8 Connecting to a Network</i>	F.3.8.1	Connect a computer to an Ethernet segment like: 10BaseT, 100BaseT, 100BaseF.
		F.3.8.2	Connect a computer to a wireless network. Know how to use Access Point. Know why and how to set the channel, encryption and device authentication.
		F.3.8.3	Install network card drivers on different operating systems.
		F.3.8.4	Configure IP base parameters on different operating systems.
	<i>F.3.9 Network Services Usage and Configuration</i>	F.3.9.1	Know how to install, configure and update Internet browser software. Be able to check for and change the default browser.
		F.3.9.2	Install, update and configure mail software like: POP3, IMAP, SMTP, news server.
		F.3.9.3	Configure e-mail accounts and related items like: POP or imap server, SMTP server.
		F.3.9.4	Configure automatic handling rules for e-mail.
		F.3.9.5	Setup email format types like: HTML, text.
		F.3.9.6	Use an FTP program for simple file transfers.
		F.3.9.7	Share disks, directories, printers using various operating systems.
		F.3.9.8	Use ICMP with the ping command to test server reachability and network behaviour under stress.
F.4 IT Security	<i>F.4.1 Basic Concepts</i>	F.4.1.1	Understand the main aspects of information security: confidentiality, integrity, availability.



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		F.4.1.2	Understand the need for disaster recovery and business continuity plans in an organisation.
		F.4.1.3	Be aware of the main principles, advantages and limitations of symmetric and asymmetric encryption. Be aware of the hash and digest functions.
		F.4.1.4	Understand the key principles and characteristics of encryption for enforcing confidentiality. Understand how to use hashing and digest to enforce integrity and authentication.
		F.4.1.5	Understand how digital signatures are used to enforce non-repudiation.
		F.4.1.6	Understand the main principles of SSL. Understand how smartcards are used to store private keys and for ciphering, deciphering.
	<i>F.4.2 Authentication, Availability and Access Control</i>	F.4.2.1	Describe different authentication schemes like: plain text, challenge/response, public key.
		F.4.2.2	Know the principles of access control and the main approaches like: MAC, DAC, RBAC.
		F.4.2.3	Know different types of information availability requirements.
	<i>F.4.3 Malware</i>	F.4.3.1	Understand how a command can be executed on a PC and how these methods can be used to infect computers.
		F.4.3.2	Understand the terms adware, spyware. Recognise methods used to distribute adware, spyware like: using MIME types, macros, applets. Know how to defend a PC from these methods like: disabling macros, disabling dangerous MIME types, only enabling signed applets, training computer operators.
		F.4.3.3	Recognise basic types of viral software like: trojans, viruses, worms.
		F.4.3.4	Know how an anti-virus program works. Understand the purpose and limitations of anti-virus programs.



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	<i>F.4.4 Public Key Infrastructure</i>	F.4.4.1	Understand public key infrastructure (PKI) and its principal components: Registration Authority and Certification Authority.
	<i>F.4.5 Network Security</i>	F.4.5.1	Be aware of the main type of attacks to the TCP/IP stack like: sniffing, spoofing, rerouting, connection hijacking, (distributed) denial of service.
		F.4.5.2	Understand the security risks related to wireless networks and the available solutions.
		F.4.5.3	Understand the concept of services as access points to servers, and that unnecessary services should not be enabled. Be aware of malicious usage like: abusive usage, denial of service, data falsification.
		F.4.5.4	Be aware of the risks of DNS misuse. Be aware of the main authentication schemes and their vulnerability. Be aware servers can be exploited due to protocols or software weaknesses.
		F.4.5.5	Recognise relevant security information that can be found in system log files.
		F.4.5.6	Understand the difference between http, https based web sites.
		F.4.5.7	Understand that an e-mail source address and associated information can be forged.
		F.4.5.8	Understand the term spam. Outline methods to control spam.
	<i>F.4.6 Firewalls</i>	F.4.6.1	Understand the term firewall and the advantages and limitations of a firewall.
		F.4.6.2	Understand the term demilitarized zone (DMZ).
		F.4.6.3	Understand how to use a proxy to save IP addresses and secure an internal network.



CATEGORY	SKILL SET	REF.	TASK ITEM
		F.4.6.4	Understand IP firewall principles for restricting IP services access. Understand proxy firewall principles for restricting and securing protocol handling.
	<i>F.4.7 Social, Ethical and Legal Aspects of Computer Security</i>	F.4.7.1	Understand the terms privacy, anonymity, pseudonymity.
		F.4.7.2	Know the main legal requirements relating to protecting personal data in your country.
		F.4.7.3	Understand ethical issues associated with monitoring in the job like: email monitoring, websurfing controlling, job surveillance.
		F.4.7.4	Recognise common forms of computer crime like: device theft, phishing, cracking, identity theft.
		F.4.7.5	Be aware of Data Protection Legislation (European 95/46 Directive) and understand the associated implications for personal data processing.