EUCIP
European Certification of Informatics Professionals

Core Syllabus

C – "OPERATE" KNOWLEDGE AREA:
OPERATION AND SUPPORT OF INFORMATION SYSTEMS

Version 2.6

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EUCIP CORE Version 2.6 Syllabus.

The following is the Syllabus for *EUCIP CORE Version 2.6*, which provides the basis for the tests in this module domain.

Module Goals

EUCIP CORE: Operate Knowledge Area	Module C, Operate, deals with networks and related communication services of an IT Infrastructure, as well as the maintenance and usage issues in terms of service provision. The module requires the candidate to know about hardware components, computing architectures and different operating systems. The candidate shall also distinguish between the various levels of communication protocols, and their application both to wired and wireless network technologies. In addition, he/she shall understand the simple network management protocol (SNMP), e-mail and web services, and the related security threats and remedies. The candidate shall appreciate the importance of a client-oriented approach to IT support, and apply some of the basic principles of IT service delivery.

C - OPERATE KNOWLEDGE AREA : OPERATION AND SUPPORT OF INFORMATION SYSTEMS

Category	Topic	Ref	Item
C.1 Computing Components and Architecture	**C.1.1 Main Hardware**	C.1.1.1	Describe the main components of a computer system and their functions
		C.1.1.2	Describe the main types of peripheral units and their functions
		C.1.1.3	Understand the parameters which characterise any type of peripheral units
		C.1.1.4	Describe the main types of memory technology
		C.1.1.5	Identify various types of buses in a computer system
		C.1.1.6	Describe the concept of instruction pipelining
		C.1.1.7	Describe the concept of instruction-level parallelism
		C.1.1.8	Understand the parameters which characterise a microprocessor: (clock frequency, pipeline stages, caching system, chip size)
	C.1.2 Computer Architecture	C.1.2.1	Show, using diagrams, the architecture of a general purpose computer
		C.1.2.2	Describe the concept of a multiprocessor machine

Category	Topic	Ref	Item
		C.1.2.3	Describe the concept of a Memory Hierarchy
	C.1.3 Multimedia Components	C.1.3.1	Know the standard multimedia types (audio, music, graphics, image, video, telephony, TV)
		C.1.3.2	Know the main multimedia I/O devices (scanners, digital camera, microphone, etc.)
		C.1.3.3	Know the major multimedia storage standards (CD-ROM, DVD, Magneto Optical disk)
C.2 Operating Systems	**C.2.1 Principles**	C.2.1.1	Describe the functions of a typical Operating System
		C.2.1.2	Describe the different types of Operating System (Time-sharing, Real-time, Batch)
		C.2.1.3	Describe the concept of Application Program Interfaces
		C.2.1.4	Describe how the resources of a computer system are managed by software
	C.2.2 Concurrent and Parallel Processes	C.2.2.1	Justify the presence of concurrency inside an Operating System
		C.2.2.2	Describe the mutual exclusion problem
		C.2.2.3	Describe the concept of a process
		C.2.2.4	Describe the concept of a thread
		C.2.2.5	Describe a context switch operation
	C.2.3 Memory and Storage Management	C.2.3.1	Explain the concept of virtual memory
		C.2.3.2	Describe how virtual memory is realised in hardware and software
		C.2.3.3	Describe the thrashing concept
		C.2.3.4	Describe the concept of memory hierarchy
		C.2.3.5	Describe the functions of a file system
	C.2.4 Security and Protection	C.2.4.1	Recognise the need for protection and security in a computer system

Category	Topic	Ref	Item
		C.2.4.2	Describe the protection mechanisms implemented by Operating Systems
		C.2.4.3	Understand the difference between identification and authentication
		C.2.4.4	Describe the principles of access control
		C.2.4.5	Recognise the need for recovery and back-up
		C.2.4.6	Describe the concept of “backdoor”, Trojan horse and computer virus threats
	C.2.5 Examples of Operating Systems	C.2.5.1	Describe the main features of the Unix or Linux Operating System
		C.2.5.2	Describe the main features of the W2000 or Windows XP Operating System
C.3 Communications and Networks	**C.3.1 Communication Principles**	C.3.1.1	Understand the difference between an analog and a digital signal
		C.3.1.2	Understand the transformation between an analog signal and its corresponding digital version
		C.3.1.3	Describe the concepts of circuit switching and packet switching
		C.3.1.4	Describe the concepts of streams and datagrams
		C.3.1.5	Describe the role of the main network standardisation bodies
	C.3.2 Network Components and Architectures	C.3.2.1	Describe the components of a network and their roles
		C.3.2.2	Describe the different characteristics of the transmission media (twisted pair, Coaxial cable, fiber optic, microwaves)
		C.3.2.3	Describe how the components of a network are connected to each other in practice
		C.3.2.4	Describe the roles of interconnecting devices (hub, switch, router)
		C.3.2.5	Describe the standard network topologies
		C.3.2.6	Differentiate between the concepts of LAN and WAN
		C.3.2.7	Name the major LAN Standards

Category	Topic	Ref	Item
	C.3.3 Communication Protocols	C.3.3.1	Describe the ISO 7-layer reference model
		C.3.3.2	Describe the instantiation of the ISO reference model in TCP/IP
		C.3.3.3	Describe how a packet is routed over the Internet
		C.3.3.4	Understand the differences between TCP and UDP
		C.3.3.5	Know the major differences between a connection-oriented and a connectionless protocol
		C.3.3.6	Understand the concept of network congestion and the mechanisms for avoiding it
C.4 Network Services	**C.4.1 Network Security**	C.4.1.1	Know the main security threats in networks (sniffing and spoofing)
		C.4.1.2	Describe the scope of cryptography
		C.4.1.3	Differentiate between secret-key algorithms from public key algorithms
		C.4.1.4	Describe a “strong” authentication protocol
		C.4.1.5	Understand how to use cryptography for protecting networks
	C.4.2 Domain Name System	C.4.2.1	Define the scope of the Domain Name System (DNS)
		C.4.2.2	Describe the naming of Internet hosts
		C.4.2.3	Describe the concept of resource descriptor
		C.4.2.4	Outline how a Domain Name is translated into an IP address
	C.4.3 The World-Wide-Web	C.4.3.1	Describe the World Wide Web (WWW) as a client server application
		C.4.3.2	Describe the role of the server
		C.4.3.3	Describe the role of the client: browser
		C.4.3.4	Describe the role and the functions of the Hypertext Transmission Protocol (HTTP)
		C.4.3.5	Understand the concept of Universal Resource Locator (URL)
		C.4.3.6	Describe the main characteristics of Hypertext Mark-up Language (HTML)

Category	Topic	Ref	Item
		C.4.3.7	Describe the concept of the Common Gateway Interface (CGI)
		C.4.3.8	Describe the concept of an applet
	C.4.4 E-mail	C.4.4.1	Understand the role of an e-mail client
		C.4.4.2	Understand the role of an e-mail server
		C.4.4.3	Understand the role of an e-mail gateway
		C.4.4.4	Describe the SMTP protocol
		C.4.4.5	Describe the POP3 protocol
		C.4.4.6	Describe the Internet Message Access Protocol (IMAP) protocol
	C.4.5 Multimedia Impact	C.4.5.1	Know the network impact of the most important multimedia tools
		C.4.5.2	Know about the resource needs of a major multimedia application
		C.4.5.3	Describe the characteristics of a server computer system that has to host a multimedia application
C.5 Wireless and Mobile Computing	**C.5.1 Principles of Wireless Communication**	C.5.1.1	Describe technologies used for wireless communications
		C.5.1.2	Describe the major wireless standards
		C.5.1.3	Know the problems characterising wireless and mobile computing
	C.5.2 Wireless Networks	C.5.2.1	Describe the main components of a Wireless LAN
		C.5.2.2	Know the compatibility of different technologies
		C.5.2.3	Describe the main components of a satellite-based network
	C.5.3 Protocols for Mobile Stations	C.5.3.1	Describe the functions of the main protocols for mobile stations (Mobile IP, Wireless Application Protocol (WAP), Bluetooth)
		C.5.3.2	Understand the range of applicability of each protocol
C.6 Network Management	**C.6.1 Principles of Network Management**	C.6.1.1	Describe the main functions of a Network Management System

Category	Topic	Ref	Item
		C.6.1.2	Describe the different parameters which can be managed in a network (performance, failures, configuration settings)
		C.6.1.3	Describe the different architectures of Network Management systems
	C.6.2 The Simple Network Management Protocol	C.6.2.1	Describe the main components of the simple network management protocol (SNMP) and their interaction
		C.6.2.2	Describe the main services provided by the protocol
		C.6.2.3	Describe the main limitations of the protocol
	C.6.3 Tools for Network Management	C.6.3.1	Name the most important Network Management tools
		C.6.3.2	Understand the differences between a System Management tool and a Network Management tool
		C.6.3.3	Understand the system requirements for operating a Network Management tool
C.7 Service Delivery and Support	**C.7.1 Customer Relationships and Service Level Agreements**	C.7.1.1	Describe the Service Level Management process and identify its benefits
		C.7.1.2	Name the main elements of a Service Level Agreement
		C.7.1.3	Compare the uses and purposes of Service Level Agreements, underpinning contracts and Operational Level Agreements
	C.7.2 Capacity and Contingency Planning	C.7.2.1	Describe the three sub-processes (business, service and resource) as defined within ITIL-based Capacity Management and explain the importance of each
		C.7.2.2	Identify the purpose and describe the main elements of a Capacity Plan
		C.7.2.3	Explain the concepts of risk, threat and vulnerability and give examples of each
		C.7.2.4	Give examples of risk reduction measures
		C.7.2.5	Identify the purpose and describe the main elements of a contingency/service continuity plan
	C.7.3 Availability Management	C.7.3.1	Identify the purpose and benefits of Availability Management as referenced in ITIL and define the main terms used (availability, reliability, failure, recovery)

Category	Topic	Ref	Item
		C.7.3.2	Compare some of the commonly-used measures of availability (percentage availability, frequency of failure, mean time between failures, impact of failure)
		C.7.3.3	Name the main Availability Management methods and techniques (such as Component Failure Impact Analysis (CFIA), CRAMM, Fault Tree Analysis (FTA))
	C.7.4 Service Desk	C.7.4.1	Explain the purpose of a Service Desk in a service support organisation
		C.7.4.2	Identify the different types of Service Desk and describe the circumstances in which each is appropriate
		C.7.4.3	Define the main elements of an ITIL-based incident management system
	C.7.5 Change Management	C.7.5.1	Explain the importance of managing change in an IT environment
		C.7.5.2	Construct a basic ITIL -based change management procedure
		C.7.5.3	Define the purpose of a Request for Change and propose the essential elements that it should contain