Tabla del número de ítems por resultados de aprendizaje del programa de estudio Prueba Nacional Escrita Comprensiva de Especialidades en Educación Técnica
Convocatoria ordinaria y extraordinaria (aplazados) 2024

COMPUTER NETWORKING 2024

Estimada persona docente:

A continuación, se le suministra el número de ítems que tendrá la Prueba Nacional Escrita Comprensiva Estandarizada de Especialidades en Educación Técnica de la especialidad Computer Networking, según la distribución de objetivos adaptados y contenidos del programa de estudio para el periodo lectivo 2024, de acuerdo con la consulta realizada a los profesores en las diferentes regiones educativas del país.

Topic	Objective adapted for the curriculum	Contents	N° ítem

COMPUTER BASICS	1. Identifying concepts, characteristics and elements for Information and Communication Technologies (ICT).	- History of computing and computer science
		- Computer generations
		- Differences between computing and computer science
		- Development of information and communication technologies
		- Concepts
		  - Information,Communication,ICT,Computer science
		  - Computers
		  - Hardware
		  - Software
		  - Application
		  - ,Systems
		  - Programming languages
		  - Tutors,System authors and experts,Simulators
		  - Artificial Intelligence, Robotics,Virtual reality,
		  - Telematic Networks
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

APPLICATION SOFTWARE	2. Distinguishing the operating system functions for computer hardware and software administration.	- Disk Operating System
		  - Concept
		  - Characteristics
		  - Utilities
		  - Drivers devices
		  - Configuration
		- DOS Internal Commands
		  - Concept
		  - Characteristics
		  - Uses
		  - Syntax
		- DOS External Commands
		  - Concept
		  - Characteristics
		  - Uses
		  - Syntax
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

WEBSITE DESIGN	3. Distinguishing applications related to the Internet and searching information.	- Internet
		  - Concepts
		  - History
		  - Concepts related to the Internet
		  - Domains
		  - Hypertext
		  - Protocols
		  - Address
		- Internet Services
		  - Surf or search for information
		  - Electronic mail
		  - Chat
		  - TelNet
		  - File Transfer Protocol (FTP)
		  - World Wide Web (WWW)
		- TCP/IP
		- Requirements for Internet connection
		  - Connection forms
		  - Suppliers
		  - Access types
		  - Access software
		  - Hardware
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
SPECIALIZED INFORMATION SYSTEMS	4. Identifying concepts, characteristics and applications of information systems.	- Information Systems - Concepts - Characteristics - Uses and applications - Contributions to daily work - Elements of information System - Menus, buttons, windows and others - User accessible registers - Search options - Basic operations to obtain information	**1**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
CONNECTIVITY	5. Recognizing characteristics and requirements for the operation of different mobile devices and equipment connectivity.	- Concepts - Characteristics - Uses and applications - Requirements - Compatibility between equipment and devices - Contributions to daily work - Connectivity options between equipment or devices - Wire,Wireless - Infrared Port ,Microwaves - Wi-Fi,Bluetooth - Others - Mobile devices - Computers - desktop - laptop - Digital cameras - Photography - Video - Cellular telephones - TDMA - GSM - Dual use Technology,Others	**2**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

HERRAMIENTAS LÓGICAS	6. Distinguir la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada.	- Conectivas básicas de la lógica
		  - Negación
		  - Disyunción
		  - Conjunción
		- Leyes de De Morgan
		- Proposiciones condicionales y equivalencias lógicas
		- Razonamientos y demostraciones
		- Tablas de verdad
			1

	7. Resolver problemas utilizando el álgebra de Boole, sistemas numéricos, álgebra de matrices, relaciones de recurrencia.	- Álgebra de Boole
		  - Teoremas y propiedades
		  - Compuertas
		  - Principios de dualidad
		- Circuitos combinatorios
		- Sistemas numéricos
		  - Binario, octal, hexadecimal
		  - Representación numérica
		  - Cambio de base
		  - Operaciones básicas
		- Matrices y álgebra de matrices
		- Relaciones de recurrencia
		  - Sucesión del Fibonacci
		  - Torres de Hanoi
		  - Función Arkermam
			3

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Tema	Objective adapted for the curriculum	Contenido	N° ítems
HERRAMIENTAS LÓGICAS		- Resolución de relaciones de recurrencia - Resolución de problemas	
ALGORITMOS Y DIAGRAMAS DE FLUJO	8. Resolver problemas computacionales utilizando algoritmos como herramienta para la resolución lógica de los mismos en pseudocódigo.	- Introducción a los algoritmos - Diseño de algoritmos - Entradas, salidas, límites y procesos - Diseño Top-down - Pseudocódigo - Tipos de datos - Operadores - Asignación de variables - Expresiones lógicas y aritméticas - Estructuras lógicas - Condiciones - Ciclos(estructuras anidadas)	**3**
ELEMENTOS DE PROGRAMACIÓN	9. Resolver problemas específicos utilizando bloques de decisión, condiciones compuestas, estructuras repetitivas como parte de la solución de los mismos en pseudocódigo.	- Bloques de decisión - Usos y aplicaciones - Condiciones - Usos y aplicaciones - Expresiones Booleanas - Usos y aplicaciones - Estructura para la declaración - Decisiones múltiples - Decisiones anidadas - Estructuras repetitivas - Usos y aplicaciones - Contadores y acumuladores	**3**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
ELEMENTOS DE PROGRAMACIÓN		- Aplicaciones - Ciclos - Usos y aplicaciones - Ciclos anidados - Usos y aplicaciones	
OCCUPATIONAL HEALTH	10. Describing the main concepts and specific aspects of Occupational Health	- Meaning of the words - Work - Health - Occupational Health - Risks at work - Accidents - Occupational diseases - Professional diseases - Igneology - Fire - Ignition - Flames - Fumes - Flammable - Workload - Fatigue, stress - Physical load	**2**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

OCCUPATIONAL HEALTH		- Wastes
		  - Types
		  - Originated from computers
		  - Elimination and management
		- Garbage
		  - Type
		  - Classification
		- Types of agents
		  - Physical
		  - Chemical
		Biological, Ergonomic
		- Normalization of colors
		- Symbols and danger signs
		- Demarcation of machines, risk areas and safety roads	

COMPUTER ARCHITECTURE	11. Describing internal components of the computer.	- Basic (hardware) components
		  - BIOS
		  - Memory
		  - Types
		  - Characteristics
		  - Speeds
			3

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

COMPUTER ARCHITECTURE		- Processor
		  - History
		  - Types or families
		  - Technical characteristics
		  - Mathematical coprocessor
		  - Cache
		- Sink of heat or fan
		- Motherboard
		  - Types
		  - Technical characteristics
		  - Parts
		  - Grooves or sockets
		- Storage devices
		  - Hard disks
		  - CD,DVD
		- Tape,Others,Multimedia
		- Video
		  - Cards
		  - Types
		  - Characteristics
		  - Memory
		  - Monitors
		  - Resolution
		  - Sizes
		  - Cards for video capture	

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

COMPUTER ARCHITECTURE		- I/O adapters and ports
		  - Concepts
		  - Characteristics
		  - Types
		  - Series
		  - Parallel
		  - Wireless
		  - USB
		- Net interface software and cards
		  - Concepts
		  - Characteristics
		  - MAC address
		- Other components
		  - Buses
		  - Switches and jumpers
		  - Cables, bands and strips
		  - Wireless devices
		  - Portable devices
		  - Encluster
		Units of massive storage,mobile phones	

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

DATA COMMUNICATION PRINCIPLES	12. Distinguishing telematic services, characteristics and applications.	- Telematics
		  - Concepts
		  - Characteristics
		  - Required infrastructure
		- Data transmittal
		  - Switching techniques application
		  - Equipment required
		  - Modems
		  - Multiplexors
		  - Characteristics
		  - Series and parallel
		  - Duplex and semi-duplex
		  - Asynchronous and synchronous
		  - On 2 and 4 wires
		  - Modulation techniques
		  - Bandwidth and transmission speed
		  - Market standards
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
DATA COMMUNICATION PRINCIPLES		- Communication Protocols - Concept - Characteristics - Functions - Information codes - Classification - BSC - HDLC/SDLC - TCP/IP - SLIPP/PPP,SNMP	
	13. Recognizing concepts associated with data transmission.	- Data communication - Protocols - Interface - Data transfer mode - Simplex - Half –duplex - Duplex - Connection oriented and non connection oriented services - Types of connection - Point to point - Multipoint - Type modulation and signal switching - Switching and dedicated lines -	**2**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
		- Synchronous and asynchronous transmission - Detection and correction of errors - Broadband - Baseband - Characteristics and examples	
DATA COMMUNICATION PRINCIPLE	14. Distinguishing basic elements of the OSI model and TCP/IP used in network building.	- OSI reference model - Concepts - Characteristics - Uses and applications - Layers - Physics - Links - Network, Transportation - Session - Application - TCP/IP - Concepts - Characteristics - Uses and applications	**2**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

LOCAL AREA NETWORKS	15. Identifying the characteristics of local area networks.	- Local area networks
		- Concepts
		- Characteristics
		- Uses and applications
		- Evolution
		- Distributed processing
		- Construction
		- Topologies
		  - Star
		  - Ring
		  - Bus
		  - Reticular or mesh
		  - Logical topologies
			2

	16. Utilizing concepts of IP, NAT and PAT in network routing structure.	- IP addressing in the LAN
		  - Addressing IP
		  - Dividing a network into subnets
		  - Types of Subnets IPv6
		- NAT and PAT
		  - Translation of web addressing
		  - NAT terminology
		  - NAT static and dynamic
		  - Translation of directions according to the PAT port
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
LOCAL AREA NETWORKS	17. Configuring network devices.	- Initial configuration of an ISR (Integrated Services Routers) router - Configuration of router in and out of the band - IOS Router Programs - Configuration of one ISR with SDM (Security Device Manager) - WAN Serial Connection - NAT dynamic configuration - Interface and command line modes	**2**
	18. Utilizing line console to apply router configuration commands.	- Use CLI (Command Line Interface) of CISCO IOS - Show commands - Basic configuration - Interface Configuration - Default route - DHCP Services - Static NAT - Router backup - Initial configuration of a switch - CPE installation - Configuration of WAN connections	**2**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

LOCAL AREA NETWORKS	19. Using the routing method for a network device in order to send messages through the network.	- Configuration
		  - Router with SSH
		  - WAN Connections
		- Enable routing protocols
		- Autonomous Systems
		- Protocols of exterior routing and ISP
			2

	20. Identifying the ISP services available in our country and the service providers' responsibilities.	- ISP services
		  - TCP/IP protocols
		  - Differences between TCP and UDP
		  - TCP/IP Host Name
		  - DNS (Servers)
		  - Services and protocols
		  - Support of HTTP and HTTPS, FTP, SMTP, POP3, IMPAP
		- ISP security
		  - Data encryption
		  - Security tools (access lists, firewalls, IDS and IPS, host security)
		  - ISP Supervision and administration Security copies and disaster recoveries
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

NETWORK DESIGN AND REPRESENTATION	21. Distinguishing the concepts related to the design and representation of networks.	- Drawing procedures
		  - Basic concepts
		  - Parallels
		  - Perpendiculars
		  - Tangents
		  - Line and angle division
		  - Polygons
		  - Others
		- Scales
		  - Concepts
		  - Functions
		  - Types
		  - Characteristics
		  - Using scales in drawing
		- Binding(levels)
		  - Concepts
		  - Importance
		  - Application
		  - Basic norms
		- Labeling
		  - Concepts
		  - Norms
		  - Applications
		- Sketches
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
NETWORK DESIGN AND REPRESENTATION		- Concepts, characteristics, applications - Application of scales and labels - Drawing sketches	

STRUCTURED WIRING	22. Identifying different kinds of cables and connectors, their characteristics, and applications.	- Cables
		  - Concepts
		  - Characteristics
		  - Criteria for the selection according to the use
		  - Types
		  - Coaxial
		  - UTP – braided pair
		  - Optic fiber
		  - Categories
		  - Connectors
		  - Concepts
		  - Characteristics
		  - Types and uses
			2

	23. Recognizing the fundamental contents of the codes and norms related to structured wiring.	- Structured wiring codes and regulations
		  - Characteristics
		  - Importance
		  - Advantages of application
		  - Technical requirements
		- Updated regulations and codes
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
PHYSICAL INSTALLATION OF THE NETWORK	24. Distinguishing basic concepts related to building a computer network.	- Basic concepts - Server and station - Dedicated and non-dedicated server - Shared and distributed processing - Technology client /server - Internet servers - Electronic mail - Physical devices - Network Interface Card (NIC) - ISA/PCI	**2**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

PHYSICAL INSTALLATION OF THE NETWORK		- Connectors
		- BNC/ coaxial cable 10 base T
		- RJ- 45
		- Speed transmission of cards in different network operative systems
		- Physical installation of a transmission medium according to its topology
		  - 10 base 2
		  - 10 base 5
		  - 10 base T
		  - Concentrator
		- Installation CHECKLIST
		- Physical equipment
		- Access user programs
		- Expansion of a network
		  - Repeaters
		  - Bridges
		  - Routers
		  - Cubes
		  - Protocol gateways
		  - Backbone	

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Tema	Objective adapted for the curriculum	Contenido	N° ítem

BASES DE DATOS	25. Reconocer los elementos fundamentales asociados con las bases de datos, así como las características de los diferentes modelos de bases de datos y el proceso de normalización.	- Conceptos
		  - Datos
		  - Registros
		  - Archivo
		  - Campo
		  - Fuentes de datos
		  - Tipos de datos
		  - Atributos
		  - Valor de los datos
		  - Sistemas de manejo de datos
		- Bases de datos
		  - Objetivos de los sistemas de bases de datos
		  - Administrador de bases de datos
		  - Modelo entidad – relación
		  - Interdependencia de los datos
		  - Arquitectura de un SABD
		- Modelo relacional
		  - Relaciones, dominios, atributos y tuplas
		  - Dependencia funcional
		- Llaves
		  - Primaria
		  - Candidata
		  - Alterna
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Tema	Objective adapted for the curriculum	Contenido	N° ítems
BASES DE DATOS		- Externa - Normalización - Las tres primeras formas de normalización	

INTRODUCCIÓN A LA PROGRAMACIÓN EN AMBIENTE VISUAL	26. Resolver problemas computacionales utilizando los elementos de programación modular en un lenguaje de ambiente visual.	- Procedimientos y funciones
		  - Ubicación dentro del programa
		  - Declaración
		  - Llamadas
		  - Diseño
		- Transferencia de información
		  - Parámetros valor y variable
		  - Variables locales y globales
			1

GESTIÓN EMPRESARIAL	27. Reconocer los componentes del proceso administrativo en el ámbito de trabajo asociado a la informática.	- Tipos de empresas
		- Áreas funcionales
		  - Producción, Mercadeo, Recursos, Humanos, Finanzas
		- Administración financiera
		  - Concepto
		  - Procedimientos
		  - Aspectos jurídicos
		- Administración del recurso humano
		  - Contratación y selección
		  - Motivación
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Tema	Objective adapted for the curriculum	Contenido	N° ítems

GESTIÓN EMPRESARIAL		- Comportamiento organizacional
		- Normas ISO 9000 para el funcionamiento de una empresa
		- Análisis FODA
		  - Concepto
		  - Fortalezas, Oportunidades
		- Debilidades, Amenazas
		- Mezclas de mercadeo
		  - Producto, Precio,Plaza,Promoción	

	28. Utilizar diferentes estrategias para la gestión y desarrollo de proyectos informáticos.	- Proyectos informáticos
		  - Concepto
		  - Características
		  - Errores clásicos en la programación del desarrollo
		  - Gestión de riesgos
		- Ciclo de vida del proyecto
		  - Concepto
		  - Características
		  - Tipos de diseño
		  - Cascada
		  - Prototipado
		  - Entrega por etapas
		  - Entrega evolutiva
		  - Otros.
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Tema	Objective adapted for the curriculum	Contenido	N° ítems

GESTIÓN EMPRESARIAL		- Selección del ciclo de vida más rápido para un proyecto específico
		- Estimación
		  - Del tamaño
		  - Del esfuerzo
		  - Refinamiento
		  - De la planificación
		- Planificación
		  - Objetivos
		  - Estrategias
		  - Planificación demasiado optimista
		  - Presión sobre la planificación
		- Desarrollo orientado al cliente
		- Control de calidad
		  - Motivación
		  - Trabajo en equipo
		  - Negociación
		- Herramientas para el aumento de la productividad
		- Presupuesto
		  - Componentes
		  - Estrategias para la elaboración
		- Proyectos informáticos
		  - Componentes para su elaboración	

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
		- Aspectos de diseño y presentación - Documentación	
NETWORK DEVICES	29. Recognizing the fundamental concepts and elements in company network switching.	- Switching and segmentation of network - Prevention of loops in a switch (Root Bridges, spanning tree, RSTP) - Configuration of VLANs, (Virtual LAN) - Trunking and Inter-VLAN Routing	**2**

	30. Distinguishing the network characteristics for addressing companies.	- Use of hierarchical IP network addresses
		- Use of the sub netting to create network structures
		- Use of VLSM
		  - Subnet masks
		  - Binary representation of sub netting
		  - Variable length subnet mask (VLSM)
		  - Implementation of VLSM for addressing companies
		- Use of routing with CIDR classifications
		- Use of NAT and PAT
		- Distance Vector Protocols (RIP, RIPV2, EIGRP)
		Link state routing protocols (OSPF and multiple protocols)
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
NETWORK DEVICES	31. Utilizing basic principles for filtering network traffic using access control lists.	- Use of access control lists - Use of a Wildcard mask - Access control lists configuration (standard and extended) - Allow and deny specific traffic types - Routing with access control lists	**2**
	32. Analyzing the principles necessary for the solution of company.	- Monitoring and maintenance - Solving addressing and connectivity problems - Routing problems - Wan configuration problems - Accessing control lists problems - Prevention of loops in a switch	**2**

NETWORK TECHNOLOGIES	33. Distinguishing characteristics and functions of networking technologies.	- Elements of a network with different technologies
		  - Servers
		  - Stations
		  - Cards
		  - wired
		  - wireless
		  - Cabling
		  - Repeaters
		  - Hubs
		  - Routers, bridges
			2

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
NETWORK TECHNOLOGIES		- LAN and WAN networks - Standards - Layers - Access - Devices - Transmission - IP Addressing - ARP and RARP - TCP/IP	
COMPUTER SECURITY	34. Distinguishing basic concepts, security methods and techniques associated with computer security.	- Computer security - Concepts - Characteristics - Value company's information - Information security functions - Type of security - Physical,Logical - Digital	**1**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
COMPUTER SECURITY		- Information auditing - Concepts - Types - Evaluation of the - organic structure - human resources - systems - computer equipment - security - Prevention in computer security - Encryption - Concepts - Characteristics - Encryption techniques - Symmetric encryption and public classes - Authentication - Passwords selection and management - Backups,Consequences of risks and prevention - Protection of data - Concepts - Type of protection - Issues in the protection of company data	

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
QUALITY CULTURE	35. Relating basic principles of quality to the development of daily tasks of a computer system technician.	- Quality - Concepts - Characteristics - Quality in different fields - Personal - Family - Community - Professional - Importance within the context of globalization - Benefits - Improving quality - Continuous improvement - Concepts - Importance of measuring quality - Statistical - Quality control - Tools for continuous improvement - Brainstorming - Flow diagram - Cause-effect diagram - Pareto chart	**1**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

QUALITY CULTURE	36. Recognizing the contribution of team work to achieve target goals.	- Teamwork
		  - Concept
		  - Characteristics
		  - Importance
		  - Attitudes and personal values
		  - Elements that influence teamwork
		- Group
		  - Concept
		  - Characteristics
		- Difference between groups and teams
		- Negotiation
		  - Concept
		  - Characteristics
		  - Principles
		  - Attitudes and personal values necessary for negotiation
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

OPERATING SYSTEMS	37. Using operating system functions for device and file management.	- Device manager
		  - System devices
		  - Direct access storage media
		  - Direct access to storage devices
		  - Fixed head DASD
		  - Mobile head DASD
		  - Optical storage on disk
		  - Required access time
		  - I/O subsystem components
		  - Communication between devices
		- Management of I/O requests
		  - Search device strategies
		  - Latency strategies
		- File manager
		  - Functions
		  - Interaction
		  - Volume configuration
		  - Subdirectories
		  - File identification rule
		- File organization
		  - Record format,
		  - Physical storage assignment
		  - Data compression
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

OPERATING SYSTEMS	38. Distinguishing the characteristics of the network function manager and the system used by the operating system.	- Network functions manager
		  - History
		  - Comparison between network operating systems and distributors
		- Managers of
		  - memory
		  - processes
		  - devices
		  - files
		  - networks
		- NOS Development
		  - Characteristics
		  - Functions
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems
OPERATING SYSTEMS		- System manager - Evaluation of an operating system - Components - Security - Levels of protection - Management system - Assaults to the system - Assaults to the network and Internet - Performance measurement	
	39. Distinguishing the characteristics of the main operating systems currently being used.	- MS – DOS - History - Design goals - Management of - memory - processor - devices - files - User interface	**1**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

OPERATING SYSTEMS		- Windows
		  - History
		  - Design goals
		  - Management of the
		  - memory
		  - processor
		  - devices
		  - files
		  - network
		  - security
		  - User interface
		- UNIX – Linux
		  - History
		  - Design goals
		  - Management of the
		  - Memory, processor
		  - Devices,files	

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

NETWORK USER	40. Distinguishing the main characteristics of some network operating systems.	- Network Operating Systems
		  - Concepts
		  - Characteristics
		  - Requirements
		  - Applications, advantages, and disadvantages
		  - Differences in various versions
		  - Criteria to consider in the decision making for choosing one existing version
			1

NETWORK MANAGEMENT	41. Distinguishing tools and native commands of network operating systems in order to manage the system.	- Tolerant failure method
		- Memory management
		  - Domains and their management
		  - Trust relationship
		- Groups
		  - work
		  - local
		  - global
		  - predefined
			1

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

Topic	Objective adapted for the curriculum	Contents	N° ítems

NETWORK MANAGEMENT		- Native commands of the network system:
		  - Concept
		  - Characteristics
		  - Applications
		- Syntax ,List of commands	

ENGLISH FOR COMMUNICATION	42. Identifying information about personal interaction at the company, ways of interacting, meeting people, ethics, personal skills, cultural aspects	- Personal skills, job skills and qualifications, occupations, personal and professional goals - Problem solving	**1**
	43. Identifying, consequences of accidents, safe practices in the workplace, prevention procedures.	- Signs and prevention procedures - Procedures to follow in case of an accident - Safe use of work equipment - Special clothes and their use	**2**
	44. Distinguishing general and specific ideas from technical texts, manuals and catalogues.	- Technical manuals - Technical catalogues - Equipment and their components	**1**
TOTAL DE ÍTEMS			**75**

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

COMPUTER NETWORKING 2024

ANEXX
GLOSSARY
OPERATIONAL DEFINITION OF THE VERBS THAT ARE USED IN THE THEMA TIC OBJECTIVES AT THE TECHINICAL LEVEL

ANALYZING
To describe the concepts of monitoring and network maintenance. To illustrate solutions for switching and connectivity problems. To illustrate the uses of access control lists through problem-solving. To recognize switching and connectivity problems in order to solve them. To design access control lists for specific problems.

CONFIGURATING:
To define concepts related to the initial configuration of the router. To identify the steps for the in and out configuration of a band. To recognize ISR with SDM configurations. To understand steps for the use of the configuration programming consoles with commands.

DETERMINING:
To mention concepts related to networks. To enumerate types of networks available on the market. To describe the Internet protocols used in networks. To illustrate physical components used in networks.

DESCRIBING
To describe basic concepts related to computer components. To explain technical characteristics of the computer components. To identify each element and its technical characteristics. To define basic concepts related to the storage devices. To describe technical characteristics of the devices. To differentiate technical approaches for the selection of a computer device. To describe concepts related to the adapters of I/O. To identify storage devices and technical characteristics of an I/O adapter. To use technical approaches for the selection of storage devices. To recognize I/O adapters. To explain the operation of each of the devices. To describe technical characteristics of the módems and

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

the technical characteristics. To describe technical characteristics of adapters and modem. To differentiate types of buses, switches, jumpers, cables and others.

DISTINGUISHING:

To define concepts. To differentiate among two or more concepts. To compare features. To explain concepts. To determine characteristics, differences and technical functions. To describe concepts that characterize a specific topic. To categorize. To describe parts forming a concept. To show the technical functioning of the system's components. To explain similarities, advantages, disadvantages and differences among different topics. To explain technical processes. To describe technical procedures. To report differences. To use the knowledge to find solutions to problems. To tell apart among two or more concepts, phenomena, situations and processes. To know the particularities that they each characterize. To present characteristics of several projects, of the phases in a technical process, causes and effects of a physical phenomenon, mechanical, electrical or an historical fact.

EXPLAINING

To define concepts related to memory management by the operating system. To describe the processes of memory assignment, pagination and page replacement. To illustrate different processes used by the operating system for memory management. To identify basic concepts related to memory management. To recognize the processes carried out by the operating system for memory assignment. To explain different processes developed by the operating system for memory management. To explain concepts related to processor administration by the operating system. To describe the planning of processes development. To illustrate planning policy of processes which are defined by the operating system for management. To explain the algorithms planning process used by the operating system. To describe basic concepts related to the processor management. To recognize processes carried out by the operating system for the assignment of the processor and policy definition.

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

IDENTIFYING:
To define concepts. To determine features and technical differences. To describe technical requirements, operations and applications. To recognize uses and applications. To classify categories. To explain processes. To recognize elements forming a concept. To distinguish components and elements that determine a concept. To enumerate classes or types of components that form a concept.

RECOGNIZING:
To identify concepts related to a specific topic. To differentiate concepts. To interpret concepts related to a specific topic. To classify thematically. To distinguish differences among concepts related to a specific topic. To define concepts. To differentiate categories. To describe functions or features. To explain differences among two or more concepts. To determine advantages and disadvantages of a specific topic. To distinguish technical requirements. To interpret concepts. To describe methods of sorting and searching in arrays. To explain technical procedures.

RELATING:

To define concepts associated with any topic. To show the benefits of improving any topic. To establish the importance of methods of obtaining quality. To explain the importance of statistical control. To descibre the concepts associated with queality.To identify the benefits provided by improvement.

SOLVING:

To solve computational problems in a technical field by applying one or more processes. To solve computational problems by choosing the appropriate procedures in order to find the solution that requires going beyond the simple calculation in a specific technical field. To interpret pseudocode to find the solution to specific problems. To use knowledge to find solutions to problems.

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

USING:

To define basic concepts related to the Internet. To differentiate available services on the Internet. To recognize the minimum requirements for an Internet connection. To mention basic concepts related to router configuration with SSH. To explain characteristics to enable routing protocols. To illustrate protocol configurations. To recognize protocol operation by verification when installing each protocol. To describe characteristics and functions of direct access media and storage devices. To illustrate different components of the I/O subsystem. To explain the communication process between devices. To identify characteristics and functions of direct access media and storage devices. To recognize different components of the I/O subsystem. To explain the communication process between device. To describe the management process of I/O requests. To describe different elements of file organization. To explain the method for the assignment of physical storage and data compression. To recognize different elements of file organization. To describe the method for the assignment of physical storage and data compression.

UTILIZING:

To define basic concepts for the CLI use in a router. To identify show commands characteristics and basic configuration. To illustrate services to be installed in a router, such as DHCP, NAT. To illustrate configurations for a WAN connections. To determine the use of the access control lists to prevent breaches in the security of a network. To recognize the use of the access control lists by creating them from the console. To use the access lists by using console for specific problems.

DISTINGUIR:

Diferenciar entre dos o más conceptos. Identificar conceptos. Comparar características. Explicar conceptos. Determinar características, diferencias y funciones técnicas. Comparar características. Describir conceptos que caracterizan una temática específica. Categorizar. Describir partes de un todo. Señala el funcionamiento técnico de los componentes que forman un sistema. Diferenciar características y el funcionamiento entre dos más conceptos. Explicar similitudes, ventajas, desventajas y diferencias entre distintas temáticas. Explicar procesos técnicos. Describir procedimientos técnicos. Describir el uso del subneteo para crear estructuras de red. Ilustrar el uso del VLSM para el direccionamiento a través del Subneteo. Describir el uso de las listas de acceso mediante la creación de ellas. Determinar el uso de las listas de acceso para prevenir fallas en la seguridad de la red. Utilizar las listas de acceso mediante el uso de consola con problemas específicos.

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr

RECONOCER:
Identificar conceptos relacionados con una temática específica. Diferenciar conceptos. Interpretar conceptos asociados a un tema específico. Clasificar temáticas. Distinguir diferencias entre conceptos involucrados. Definir conceptos. Diferenciar categorías. Describir características. Explicar diferencias entre dos o más conceptos. Determinar ventajas y desventajas de un tópico específico. Distinguir requerimientos técnicos. Describir el uso de los diferentes protocolos para prevenir los loops en un switch. Determinar el uso de comandos de consola para definir las VLANs. Ejemplificar la interconexión de diferentes VLANs en diferentes dispositivos mediante los enlaces troncales.

RESOLVER:
Dar solución a problemas de cálculo dentro del campo técnico mediante la aplicación de una o varios procesos. Hallar la solución de un problema, implica decidir el procedimiento apropiado para lograrlo, va más allá del simple cálculo. Interpretar pseudocódigo para hallar la solución a problemas específicos. Utilizar el conocimiento adquirido para encontrar la solución de un problema.

UTILIZAR:
Identificar conceptos relacionados con un tópico específico. Describir elementos, características y procesos técnicos. Reconocer requerimientos técnicos involucrados en una temática específica. Resolver problemas específicos mediante la teoría involucrada. Identifica categorías. Determinar similitudes y diferencias técnicas. Identificar posibles errores. Interpretar diferentes tipos de configuraciones. Resolver problemas de enrutamiento.

San José, Paseo Colón. Av. 1, calle 24, edificio Torre Mercedes, piso 7
Teléfono: (506)2547-5681 deac.dgec@mep.go.cr