

2015-2016.

Final examination syllabus

Operating and security of IT Systems– final examination syllabus – 2016.

Basic concepts. Problems and ideas of IT security: security, information, data, data security, data defence, secret defence, IT security.

International and national recommendations and standards: TCSEC, ITSEC, CC, COBIT, ITIL, MSZ ISO/IEC 27001

Threats against IT systems. Fake security awareness. Security environment. Threats and consequences. Grouping threats: Physical, logical, organizational and life cycle-connected threats.

Defence of IT Systems: Defence methods: Measures against physical, logical, organizational and life-cycle connected threats.

Planning of IT security: Defence requirement, situation analysis, threat analysis, risk analysis and management, defensive measures. IT security audit: methods, versions.

Business continuity, disaster recovery, crisis situation, IT catastrophe. Preventive and reactive measures. Content of a catastrophe plan. Organization to handle IT catastrophe.

Idea and components of IT systems. Main processes of IT operation. IT as a service. Importance of using standards.

International standards supporting IT operations: COBIT, ITIL. Structure and processes of ITIL. Supporting organizations and users.

Maturity model and its usage in the area of operating IT systems.

User support. Service desk. Types and parts of a Service Desk.

Idea and importance of SLA. Typical services.

Incident and problem management.

Change and release management.

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Infocommunication networks – final examination syllabus– 2016.

Ideas: Information, data, information techniques, telecommunication networks, multimedia, infocommunication. Types of infocommunication networks, its main characteristics, development directions.

Basic ideas of data transmission. Basic thesis (Shannon, Nyquist). Duplex/halfduplex/simplex transmission. Basic characteristics of synchronous and asynchronous data transmission. Connection between data transfer speed and symbol speed. Circuit, packet and message switching. Network topologies.

Questions and necessity of standardization. Standardization organizations. Idea of network architecture. Idea and main properties of protocol.

ISO OSI reference model. Interpretation of opening. Elements of OSI: protocol, entity, connection. Layers and properties of OSI layers. Protocol functions. Connectivity between layers, idea of interface. Service primitives. Protocol data units (PCI, PDU, SDU). Evaluation of OSI model.

Growing-up TCP/IP. Main properties of TCP/IP layers. Evaluation of OSI model. Comparing OSI and TCP/IP. The hybrid model.

Physical medium: Twisted pair, coaxial cable, optical cable, wireless transmission, microwave and satellite transmission.

Baseband transmission. Coding procedures (RZ, NRZ, AMI, Manchester, Diff. Manchester, HDB3, 2B1Q, 4B3T). Effects of noise and limited band for data transmission speed. Subscriber lines. Copper access technologies: ADSL, HDSL and VDSL

Serial transmission: PC serial port (RS 232C). Architecture of Universal Serial Bus (USB) and its application area.

Data link protocols: Tasks of data link layer: error control, separating data units, flow control.

Character and bit oriented procedures. Structures of blocks and frames. Transparency and control.

Media access sublayer: problem of media access. Static and dynamic access, Multiple access procedures: CSMA/CD, CSMA/CA. Ethernet. Token Ring. Wireless LAN-s. Bluetooth.

Network layer: Main properties of network layer. Connecting networks. Connectionless and connection based network services. Network layer of TCP/IP: IPv4, IPv6. IPv4 - IPv6 cooperating modes. ICMP, IGMP, ARP, RARP, BOOTP, DHCP.

Network hierarchy, routing. Routing algorithm (Static routing, Dynamic routing). Distance Vector (DV) routing, Link State (LS) routing, Open Shortest Path First (OSPF), Policy routing).

QoS on IP networks. Traffic forming. Ensuring QoS (DiffServ, IntServ, MPLS).

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Main properties and tasks of transport layer. Transport service primitives. Ports and sockets. Transport protocols of TCP/IP (TCP, UDP).

Application layer: Telnet, ftp, smtp, pop3, imap dns, wins, ssh. Web technologies (URL, http, https, HTML. XML, XHTML).

Client-server architectures. Partitioning applications, two-tyre C/S architecture, three-tyre C/S architecture, web architecture.

Multimédia: Quality of service. Protocol stack. Voice coding, H323. SIP. Possible scenarios.

Basic ideas and problems of Cryptography. Cryptography model. Classical methods. Symmetrical and asymmetrical cryptography. Digital signature. PKI. Steganography.

IPsec: security services and methods. VPN problem (Leased lines, private networks, Internet.) General VPN conception. VPN solutions

Component achieving of border protection. Types of firewalls. Operation component ad problems of NAT.

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