

Information technology - 2022

1. Basic requirements for algorithms and possibilities of graphical representation of algorithms. Properties of algorithms. Construction of algorithms.
2. Reading structured diagrams (structograms) - sequence, selection, iteration. Logical connectors and expressions. Creating conditions.
3. Variables and their representations in memory. Simple data types. Compound data types. Arrays.
4. Functions - function parameters, return values. Recursion.
5. Interpreted, compiled and hybrid programming languages. Syntax and semantics of programming languages.
6. Basic algorithmic constructions in C#. Types of cycles. Data types. Function parameters.
7. Computational (operational) model of IT - development stages, current models. Cloud computing, ASP, IaaS, PaaS, SaaS, cloud economy, advantages and disadvantages, security. Network OS and their development, status. Directory services and identity management.
8. Basic paradigms of computer networks - circuit / packet switching, reliable / unreliable transmissions, connection-oriented transmission networks / connectionless/datagram networks, convergence of the computer and telecommunication networks. Classification of computer networks, basics of data communications and principles of network development.
9. Network models and architectures, philosophy of layered architecture, history, and concepts of RM ISO/OSI, overview of layers and their basic role, evaluation of RM ISO/OSI. TCP/IP network model basic ideas and approaches, concept of the TCP/IP protocols and their standardization. Comparison of TCP/IP with ISO/OSI.
10. Definition and role of the operating system, division of the OS, their history, current state and development trends, main platforms and categories of devices and their OS. OS architectures and principles of OS development, system programs, hierarchical layered architecture, microkernel, OS services and generic components.
11. Markup languages in general and HTML, XML SVG languages and their characteristics and uses, semantics, HTML5, web page structure, content structure in HTML5, basic tags (text, lists, table, image, links), tools for XML format definition.
12. CSS, syntax, selectors, properties, values, responsive layout, layouts, Media Queries, advanced formatting in CSS, Flexbox, Grid, CSS methodologies, CSS frameworks.
13. WWW and its principle, web server, web browser, hypertext principle, URL, protocols, cookies, hosting, domains, DNS, dynamic technologies for the web.
14. Graphics and graphical formats for the web – raster and vector graphics, RGB and CMYK color models, resolution.
15. Accessibility, usability and UX including methodologies, rules and testing.
16. Internet advertising and its principles, terminology, traffic measurement, internet marketing, SEM, search engine optimization (SEO), search engine principles of operation.
17. Symmetric and asymmetric cryptography. Hash functions - properties, meaning, collision of hash functions. Electronic signature.
18. Data Backup. Backup media. Backup techniques. Hardware failure protection. RAID.

19. Information systems, the influence of information systems on the management of the company, the basic division of information systems, cloud computing.
20. Principles of information systems creation, information strategy, information systems architecture.

Recommended literature

- KNUTH, Donald E. *The art of computer programming*. Upper Saddle River: Addison-Wesley, 1997. ISBN 0321751043
- SKIENA, Steven S. *The Algorithm Design Manual* [online]. Second. England: Springer, 2008;2009;2011;2014;2012;. ISBN 9781848000698
- OKI, Eiji, et al. *Advanced internet protocols, services, and applications*. John Wiley & Sons, Incorporated, 2012.
- WEMPEN, Faithe et al. *Computing fundamentals* [online]. Wiley-Blackwell, 2014. ISBN 9781118974742
- TANENBAUM, A. S.: *Modern Operating Systems*. 3rd edition. Prentice Hall, 2007. 1104 pp. ISBN 0136006639
- TANENBAUM, A. S., WETHERALL, D. J. , *Computer Networks* (5th Edition). Pearson, 2010, ISBN: 9780133485936
- ERL, Thomas, MAHMOOD, Z., PUTTINI, R. 2015. *Cloud computing: concepts, technology, & architecture*. Prentice Hall. ISBN 9780133387520.
- World Wide Web Consortium* [online]. Available from: <https://www.w3.org>
- W3schools.com. The World's Largest Web Developer Site* [online]. Available from: <https://w3schools.com>
- ROBBINS, Jennifer Niederst. *Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web*. 2018.
- BLOOMENTHAL, Jules. *Computer Graphics Implementation and Explanation*. 2019. ISBN 1687550271
- KIM, Peter. *The hacker playbook 2: practical guide to penetration testing*. Secure Planet, LLC, 2015.
- MCCLURE, Stuart, SCAMBRA, Joel and KURTZ, George. 2007. *Hacking without mysteries*. place unknown : Grada, 2007. ISBN 978-80-247-1502-5.
- BOCIJ, Paul, GREASLEY, Andrew, HICKIE, Simon. *Business Information Systems: Technology, Development and Management for the Modern Business*. Pearson Education Ltd., 2018. ISBN: 1292220996.