Bachelor Exam Requirements

Subject: Information Technology

Academic year 2023/2024

1. **Fundamental principles of PCs and their architecture** (history, von Neuman, Harvard, processor, cards, peripheral devices, memory types, RAID, RAM, ROM, Cache, HDD, CD, DVD, FLASH).
2. **Principles of computer networks** (RM ISO/OSI, topology, protocols, Ethernet, IP, network cards, WIFI, VPN).
3. **Principles of operating systems** (classification, types, processes and their management, system resources, user interface, Windows).
4. **Object modelling and programming** (basic concepts, principles, programming languages, design patterns, MVC architecture).
5. **Software process** (basic concepts, principles, procedures, tools, life cycle of IS, modelling phases).
6. **Database and database system** (main functions, history, data models, comparison of DB systems, architectures of DBMS, data security, parallel processing).
7. **Conceptual modelling** (E-R model and its graphical representation, relation model, relationships among entities, normal forms, relation algebra, SQL).
8. **Process modelling** (basic principles, process decomposition, BPMN, best practices in process modelling, related modelling techniques).
9. **Basic principles of business informatics** (fundamental concepts, principles of ICT use, classifications, information resources, types of IS, roles of humans in ICT).
10. **Systems theory** (main principles, definitions of a system, classifications, GST and related theories, structure, behaviour, feedback and its types).
11. **Systems engineering** (history, system engineer and related roles, standards and norms, requirements, SysML, soft systems).
12. **Systems analysis, dynamics and cybernetics** (main ideas, types of tasks, methods, mutual interrelationship).
13. **Knowledge applications** (knowledge, knowledge representation, knowledge application life-cycle, development of an application, expert, knowledge engineer, knowledge acquisition and storing).
14. **Ontologies and semantic web** (metadata, RDF, RDFS, OWL, RDF vocabularies, querying, inferencing, linked data, semantic web applications, ontologies, ontology development tools, classification, ontological representation languages).
15. **Internet and information** (structure, history, RFC documents, domains, technical requirements, threats, information process, search engines, mark-up languages, styling and scripting languages, semantic web, technologies for semantic web, querying, inference, possibilities of sematic applications development).
16. **Basic statistical concepts** (types of variables, data gathering, statistics in practice, data analysis, descriptive statistics, tables, graphs, mean, modus, median).

17. **Probability** (rules for probability calculations, random variable, continuous and discrete variable, distribution functions, parameters).

Literature:

Allemang, D., Hendelr, J.: Semantic Web for the Working Ontologist. Elsevier, 2007
Buitelaar, P., Cimiano, P.: Ontology Learning and Population: Bridging the Gap between Text and Knowledge. IOS Press, 2008
Bureš V.: Systems thinking and systems sciences, Gaudeamus, 2009.
Daconta, M.C., et al.: The Semantic Web. Wiley, 2003
Ferber, J.: Multi-Agent Systems: An Introduction to Distributed Artificial Intelligence (Addison-Wesley, 1999)
Gustafson, J.M. HTML5 Web Application Development By Example. Beginner's guide. Packt Publishing, 2013. ISBN 978-1-84969-594-7
Hvorecký J., Kelemen J.: Readings in Knowledge Management, Iura Edition, 2011
Jennings, N., Wooldridge, M. (eds): Agent Technology - Foundations, Applications, and Markets (Springer, 1998)
Luck, M., Ashri, R., D`Inverno, M.: Agent-based Software Development (Artech House, 2004)
Mellor R.: Knowledge management and information systems: strategies for growing organizations. Palgrave Macmillan. 2011
Nilsson, N.: Artificial Intelligence - A New Synthesis (Morgan Kaufmann, 1998)
Orand B., Villarreal J.: Foundations of IT Service Management: The ITIL Foundations Course in a Book, CreateSpace Independent Publishing Platform, 2011
Handbook of Applied Cryptography: http://www.cacr.math.uwaterloo.ca/hac/
Russell, S., Norvig,P.: Artificial intelligence - a Modern Approach (Prentice Hall, 2003)
Schiesser R.: IT Systems Management, Prentice Hall, Boston, 2010
Staab, S., Studer, R. (Eds.): Handbook on Ontologies. Springer, 2004
Stuckenschmidt, H., van Harmelen, F.: Information Sharing on the Semantic Web. Springer, 2005
Sward D.: Measuring the Business Value of Information Technology, Intel Press, 2006
Turban, E. a kol.: Decision Support and Business Intelligence Systems (9th Edition), Prentice Hall, 2010
Vidal J.M.: Fundamentals of Multiagent System Textbook http://www.multiagent.com/fmas (online, 2007)
Vlassis, N.: A Concise Introduction to Multiagent Systems and Distributed AI
http://staff.science.uva.nl/~mmaris/class_2006_2007/cimasdai.pdf (online, 2007)