

"Aurel Vlaicu" University of Arad
Faculty of Exact Science
Department of Mathematics-Informatics

THEMES FOR BACHELOR EXAM 2020

Aria of bachelor degree: INFORMATICS

Study programmes: APPLIED INFORMATICS

1. PROGRAMMING LANGUAGES. DATA STRUCTURES, ALGORITHMS

- 1.1. The lexicon, syntax and semantics of a programming language.
- 1.2. Data types in a programming language.
- 1.3. Variables. Expressions and operators.
- 1.4. Decision making statements in a programming language.
- 1.5. Loops and iteration in a programming language.
- 1.6. Recursion.
- 1.7. Functions, methods, subroutines.
- 1.8. Classes and objects. Polymorphism, inheritance.
- 1.9. Arrays (one dimensional, two dimensional, multidimensional).
- 1.3. Sorting and searching algorithms (linear, binary).
- 1.4. Dynamic memory allocation. Dynamic Data Structures (stack, queue, simple linked list, doubly linked list).
- 1.5. Elements of graph theory.
- 1.6. Algorithm complexity analysis.

Bibliography

1. Bjarne Stroustrup, A Tour of C++ (2nd Edition) (C++ In-Depth Series) 2nd Edition, Publisher: Addison-Wesley Professional; 2 edition (July 9, 2018).
2. Michael B. White, Mastering Java: An Effective Project Based Approach including Web Development, Data Structures, GUI Programming and Object Oriented Programming (Beginner to Advanced), Publisher: Independently published (December 13, 2018)
3. Herbert Schildt, Java: The Complete Reference, Eleventh Edition 11th Edition, Publisher: McGraw-Hill Education; 11 edition (December 12, 2018)
4. Herbert Schildt, Java: A Beginner's Guide, Eighth Edition 8th Edition, Publisher: McGraw-Hill Education; 8 edition (November 2, 2018)
5. Joshua Bloch, Effective Java 3rd Edition, Publisher: Addison-Wesley Professional; 3 edition (January 6, 2018)
6. Daniel Solis, Cal Schrottenboer, Illustrated C# 7: The C# Language Presented Clearly, Concisely, and Visually 5th Edition, Publisher: Apress; 5 edition (February 19, 2018)

7. John Sharp, Microsoft Visual C# Step by Step (9th Edition) (Developer Reference) 9th Edition, Publisher: Microsoft Press; 9 edition (July 5, 2018)
8. Ryan Turner, C#: The Ultimate Beginner's Guide to Learn C# Programming Step by Step, Publication Date: March 7, 2019
9. Christian Nagel, Professional C# 7 and .NET Core 2.0, Publisher: Wrox; 7 edition (April 17, 2018).
10. Andrew Troelsen, Philip Japikse, Pro C# 7: With .NET and .NET Core 8th ed. Edition, Publisher: Apress; 8th ed. edition (November 21, 2017)

2. DATABASE AND WEB TECHNOLOGY

- 2.1 Database relational model. History. Classification. Normal Form.
- 2.2 Creating and querying databases in a high-level language. MS-Access. VBA – Elements of programming.
- 2.3 Creating and querying relational databases in SQL.
- 2.4 Main technologies for making web pages.
- 2.5 HTML. JavaScript.
- 2.6 MySQL databases. PHP – Elements of programming.

Bibliography

1. Valade J., Ballad T., Ballad B., PHP and MySQL Web Development All-in-one Desk Reference For Dummies, John Wiley & Sons Ltd, 2008.

3. CRIPTOGRAFIE SI SECURITATEA INFORMATIEI

- 3.1 Criptologia. Criptografia clasica. Criptografia moderna.
- 3.2 Bazele matematice al criptografiei.
- 3.3 Criptografia simetrica
- 3.4 Criptografia cu chei publice
- 3.5 Metode pentru asigurarea securitatii informatiei.
- 3.6 Semnatura electronica

Bibliography

1. Andrew S. Tanenbaum, Recele de calculatoare, Ed. a 4-a, Ed. Byblos , 2004
2. Ion Ivan, Cristian Toma (coordonatori) - Informati cs Security Handbook, Editura ASE, Bucure ti 2006,

4. INTELIGENTA ARTIFICIALA

- 4.1 Obiectul și domeniile inteligenței artificiale.
- 4.2 Sisteme informatice bazate pe cunoștințe.
- 4.3 Elemente de logica Fuzzy.
- 4.4 Proprietati matematice si reprezentarea retelelor Bayesian.
- 4.5 Cauzalitate si inferenta.
- 4.6 Algoritmi de inferenta si pachete soft dedicate- Netica.

Bibliography

1. Joseph C. Giarratano, Gary D. Riley, Expert Systems: Principles and Programming, Course Technology; 4 edition (October 15, 2004).
2. <https://www.norsys.com/netica.html>.
3. Therese M. Donovan, Ruth M. Mickey - Bayesian Statistics for Beginners: a step-by-step approach, Oxford University Press (July 23, 2019).
4. William Siler, James J. Buckley, Fuzzy Expert Systems and Fuzzy Reasoning, Wiley-Interscience; I edition (December 13, 2004).
5. Abraham Kandel, Fuzzy Expert Systems, CRC; 1 edition (November 12, 1991).
6. S.J. Russel, P. Norvig, Artificial Intelligence: A Modern Approach, Third Edition, 2013.
7. Dzitac, I.; Bărbat, B. Artificial Intelligence + Distributed Systems = Agents , International Journal of Computers Communications & Control, ISSN 1841-9836, 4(1):17-26, 2009.
8. 13. Russel, S.J.; Norvig, P. Artificial Intelligence: A Modern Approach, Modified May 26, 2016. <http://aima.cs.berkeley.edu/>