

**INTERVIEW TOPICS FOR ADMISSION**  
**September 2021 session**

**Study program:**

**ADVANCED STUDIES IN APPLIED COMPUTER SCIENCE**  
**(master)**

**1. DATA STRUCTURES, ALGORITHMS AND PROGRAMMING**

- 1.1 Fundamental algorithms. Efficiency of algorithms.
- 1.2 Object Oriented Programming. Objects and Classes. Polymorphism, Inheritance.
- 1.3 Arrays (one-dimensional, two-dimensional, multidimensional).
- 1.4 Dynamic memory allocation. Dynamically implemented structures (stack, queue, single chained list, double chained list).
- 1.5 Algorithms complexity.
- 1.6 .net framework.
- 1.7 Using Java in visual context.

**References**

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).

## 2. DATABASES AND WEB TECHNOLOGIES

- 2.1 Relational databases. History. Classification. Normal forms.
- 2.2 Creating and querying databases using a high level language. VBA programming elements.
- 2.3 Creating and querying relational databases using SQL
- 2.4 The main technologies for web programming
- 2.5 HTML language. JavaScript
- 2.6 MySQL databases. Php programming elements.

## References

1. Carlos Coronel (Author), Steven Morris (Author), Database Systems: Design, Implementation, & Management 13th Edition, Cengage Learning; 013 edition (January 1, 2018).
2. Josephine Bush (Author), Learn SQL Database Programming: Query and manipulate databases from popular relational database servers using SQL, Packt Publishing (June 9, 2020).
3. Dollinger R., Baze de date și gestiunea tranzacțiilor, Ed. Albastră, Cluj-Napoca, 1998, reeditată 2002.
4. Nagy M., Vizental M., Baze de date. Material de studiu pentru învățământul la distanță., UAV, 2010.
5. Vaswani V., Utilizarea și administrarea bazelor de date MySQL., Editura Rosetti Educational, București, 2010.
6. Valade J., Ballad T., Ballad B., PHP and MySQL Web Development All-in-one Desk Reference For Dummies, John Wiley & Sons Ltd, 2008.
7. Buraga S., Programarea în web 2.0, Editura Polirom, 2007.

## 3. CRYPTOGRAPHY AND INFORMATION SECURITY

- 3.1 Cryptology. Classical cryptography. Modern cryptography. Cryptanalysis.
- 3.2 The mathematical basics of cryptography. Symmetric algorithms. Asymmetric algorithms.
- 3.3 Methods for ensuring information security.
- 3.4 Electronic signature.

## References

1. Simon Edwards , Modern Cryptography for Beginners: A Complete Guide to Discover History, Features, Developments and Applications of Modern Cryptography, March 6, 2020.
2. Bart Preneel (Foreword), Christof Paar (19-Oct-2011) Hardcover, Understanding Cryptography: A Textbook for Students and Practitioners, Springer; 1st ed. 2010 edition (19 Oct. 2011) (1600)
3. Jean-Philippe Aumasson, Serious Cryptography: A Practical Introduction to Modern Encryption , No Starch Press (November 21, 2017)
4. Simon Singh, The Code Book: The Science of Secrecy from Ancient Egypt to Quantum Cryptography , Anchor; Reprint edition (January 26, 2011)
5. Seth James Nielson (Author), Christopher K. Monson (Author) , Practical Cryptography in Python: Learning Correct Cryptography by Example, Apress; 1st ed. edition (September 27, 2019) . 6. Bucerzan D., Criptografie și securitatea informației. Note de curs., Arad, 2011
7. Oprea D., Protecția și securitatea informațiilor, ed Polirom, Iasi, 2007.

## 4. INTELIGENȚA ARTIFICIALĂ

- 4.1 The object and fields of artificial intelligence.
- 4.2 Knowledge - based computer systems.
- 4.3 Fuzzy logic elements.
- 4.4 Mathematical properties and representation of Bayesian networks.
- 4.5 Causality and inference.
- 4.6 Inference algorithms and dedicated software packages - Netica.

## References

1. Dzitac I., Inteligența artificială, Ed. Univ. „Aurel Vlaicu” Arad, 2008.
2. Joseph C. Giarratano, Gary D. Riley, Expert Systems: Principles and Programming, Course Technology; 4 edition (October 15, 2004).
3. <https://www.norsys.com/netica.html>.
4. Therese M. Donovan, Ruth M. Mickey - Bayesian Statistics for Beginners: a step-by-step approach, Oxford University Press (July 23, 2019).
5. William Siler, James J. Buckley, Fuzzy Expert Systems and Fuzzy Reasoning, Wiley Interscience; I edition (December 13, 2004).
6. Abraham Kandel, Fuzzy Expert Systems, CRC; 1 edition (November 12, 1991).

7. S.J. Russel, P. Norvig, Artificial Intelligence: A Modern Approach, Third Edition, 2013.
8. Dzitac, I.; Bărbat, B. Artificial Intelligence + Distributed Systems = Agents , International Journal of Computers Communications & Control, ISSN 1841-9836, 4(1):17-26, 2009.
9. Russel, S.J.; Norvig, P. Artificial Intelligence: A Modern Approach, Modified May 26, 2016.<http://aima.cs.berkeley.edu/>

## 5. DEZVOLTAREA APLICATIILOR ANDROID

- 5.1 Operating systems for mobile platforms.
- 5.2 Mobile application design.
- 5.3 Interface elements for mobile applications.
- 5.4 Activities. Intents. Menus. Graphic and audio elements.
- 5.5 Processes, Threads and course of execution.
- 5.6 Events.
- 5.7 Storing files and SQLite elements.

## References

1. Rob Whitaker, Developing Inclusive Mobile Apps: Building Accessible Apps for iOS and Android, Apress, ISBN-13:9781484258132, 2020
2. Kishan Takoordyal, Beginning Unity Android Game Development: From Beginner to Pro, Apress, ISBN-13: 9781484260012,2020
3. Ian Darwin, Android Cookbook, 2e, O'Reilly, ISBN-13: 9781449374433, 2017
4. Octavian Dospinescu, Marian Perca, Aplicatii mobile pe platforma android, Editura Tehnopress, ISBN: 9789737029614, 2013
5. COSMIN STRILETCHI, LIGIA D. CHIOREAN, MIRCEA F. VAIDA, ADRIANA STAN, STEFAN DRAGOS, Tehnologii Javaorientate spre aplicatii cross-platform, Casa Cartii de Stiinta, ISBN:9786061716104, 2020