



**Academia de Studii Economice**  
**Departamentul de Informatică și Cibernetică Economică**

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**Contest Topics for Associate Professor**

**Position 60, 2021-2022, semester 1**

**Disciplines: Software Quality and Testing, Mobile Devices and Applications**

**Software Quality and Testing**

1. Principles regarding the quality of the source code - Clean Code. The concepts DRY, YAGNI, SOLID, KISS.
2. Design Patterns. Concepts and features. The concept of anti-pattern.
3. Design Patterns: Singleton, Simple Factory, Factory Method, Abstract Factory, Builder, Adapter, Decorator, Facade, Flyweight, Chain of Responsibility, Command, Observer, State, Strategy, Memento
4. Management of source code versions - Git, SVN. Concepts, basic operations. Advantages and disadvantages
5. Unit Testing Concepts. Unit test structure. Management of unit tests through Test Cases. Criteria and conditions used in unitary treatment.
6. Using the JUnit framework (versions 3, 4 and 5). Exemplification of test conditions by JUnit unit tests.
7. Concepts on software quality - metrics, indicators, tools, automated testing (testing web applications with Selenium platform). Cyclomatic complexity and its role in unit testing.

**Bibliography:**

1. JUnit documentation available at <http://junit.org/junit5/>
2. Scott Chacon, Bean Straub - Pro Git, 2nd edition, Apress, 2014, available at <http://git-scm.com/book/en/v2>
3. Robert C. Martin - Clean Code, A Handbook of Agile Software Craftsmanship, Prentice Hall, 2009
4. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides - Design Patterns: Elements of Reusable Object-Oriented Software, Addison-Wesley, 1995
5. Steve Holzner, Design Patterns for Dummies, Wiley, 2006
6. Lasse Koskela, Effective Unit Testing, Manning, 2013
7. Lasse Koskela, Practical TDD and Acceptance TDD for Java Developers, Manning, 2007
8. Andrew Hunt, David Thomas, Pragmatic Unit Testing in Java with JUnit, The Pragmatic Programmers, 2003
9. Arthur H. Watson; Thomas J. McCabe (1996). "Structured Testing: A Testing Methodology Using the Cyclomatic Complexity Metric" (PDF). NIST Special Publication 500-235. Available online, <http://www.mccabe.com/pdf/mccabe-nist235r.pdf>



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## **Mobile Devices and Applications**

1. Mobile devices: classifications (mobile phones, smartphones, tablets), hardware architecture
2. Technologies for mobile communications: Restricted area data communications (PAN, WLAN), extended area data communications (data technologies over the GSM network)
3. Operating systems for mobile devices: OS architecture; presentation of Android, iOS, Windows Phone, BlackBerry OS, Bada
4. Mobile applications: features, components, specific elements of interaction with users; technologies for implementing mobile applications
5. Developing applications for the Android platform: User interface: windows, containers, controls, menus, event handling, fragments, containers, lists, and adapters. Network access - asynchronous operations, XML, and JSON file processing. Persistent data storage on the device: files, shared preferences files, SQLite databases. Network databases. Two-dimensional graphics. Use of predefined services. Obtaining the geographical position. Using maps in applications. Use of predefined content providers. Message receivers. Verification, validation, and publication of applications.

## **Bibliography:**

1. P. Pocatilu, I. Ivan, A. Visoiu, F. Alecu, A. Zamfiroiu, B. Iancu, Programarea aplicatiilor Android, Editura ASE, Bucuresti, 2015, România.
2. P. Pocatilu, Programarea dispozitivelor mobile, Editura ASE, București, 2012, România.
3. Catalin Boja, Cristian Ciurea, Mihai Doinea, Android mobile applications: a practical development guide, Editura ASE, Bucuresti, 2015, România.
4. Android Developers, <http://developer.android.com/index.html>, Statele Unite ale Americii
5. Android Development Basics2, <https://play.google.com/store/apps/details?id=com.aviyehuda.androidcard2>, Statele Unite ale Americii
6. Wei-Meng Lee, Beginning Android 4 Application Development, Wiley, Statele Unite ale Americii, 2012.
7. E. Burnette, Hello, Android: Introducing Google's Mobile Development Platform, 2nd Edition, The Pragmatic Bookshelf, 2009.
8. M. Aydin, Android 4: New features for Application Development, Packt Publishing, 2012.
9. M. Etoh (Ed), Next Generation Mobile Systems 3G and Beyond, John Wiley & Sons, 2005.
10. B. Fling, Mobile Design and Development, O'Reilly, 2009.

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