MINISTRY OF NATIONAL EDUCATION

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

SYLLABUS

1. Study Program

1.1	Higher Education Institute	Technical University of Cluj-Napoca
1.2	Faculty	Electronics, Telecommunications and Information Technology
1.3	Department	Communications
1.4	Study domain	Electronics and Telecommunications Engineering
1.5	Study level	Master
1.6	Study program/ Qualification	Multimedia Technologies/ Telecommunications/ Master
1.7	Type of education	IF (Full-time learning)
1.8	Discipline code	TM-E17.20/ TC-E15.00

2. Discipline

2.1	Discipline name					Mobile Applications Development (MAD)						
2.2	Subject area					Electronics and Telecommunications Engineering, Software Engineering						
2.3	Responsible					Associate Professor Adriana Stan, Ph.D. Adriana.Stan@com.utcluj.ro						
2.4	Titular					Associate Professor Adriana Stan, Ph.D.						
2.5	Year of study	II	2.6	Semester	3	2.7	Evaluation	Exam	2.8	Type of discipline	DS/ DI	

3. Total estimated time

Year/ Sem	Discipline name	No. of weeks	Course	Applications			Course	Applications			Indiv. study	TOTAL	ECTS
			[hours/week]				[hours/week]						
			C	S	L	P		S	L	P			
II/3	Mobile Application Development	14	2	0	1	0	28	0	14	0	58	100	4

3.1	Number of hours per week	4	3.2	course	2	3.3	applications	1
3.4	Total hours per curriculum	56	3.5	course	28	3.6	applications	14
Individual study								Hours
Study based on manuals, course materials, references and notes								14
Supplementary documentation in libraries, electronic platforms and on field								10
Preparation of seminars/laboratories, homework, essays, portfolios								10
Tutorial work								7
Assessments								3
Other activities								14

3.7	Total hours of individual study	58
3.8	Total hours per semester	100
3.9	ECTS	5

4. Prerequisites (if necessary)

4.1	Curriculum	Algorithms, basic knowledge about Object Oriented Programming (OOP), Java, XML, and SQL
4.2	Competences	Java programming competences

5. Requisites (if necessary)

5.1	Course	Video-projector, screen, whiteboard
5.2	Applications	PCs with Internet access

6. Specific competences acquired

Professional competences	Theoretical knowledge (What do the student should know)	The student will consolidate his/her theoretical knowledge on: - software project management, - OOP, - design patterns, - programming paradigms (component, service, aspect), - distributed architectures, programming languages (Java, XML, SQL), - Android, iOS, and Windows Phone programming, - software engineering for mobile computing.
	Acquired skills (What the student is able to do)	At the end of this course, the students will be able to analyze, design and implement software applications for mobile devices. Java as programming language and Android as platform are especially targeted.
	Acquired abilities (what equipment/ instruments/ softwares the student is able to handle)	At the end of this course the students will be able to use software development programming tools (Eclipse and other IDEs), install and debug software applications on virtual (emulators) and real programmable mobile devices (smart-phones). A special focus is put on devices using the Android platform.
Transversal competences		CT3 Adapting to new technologies, professional and personal development through continuing education using electronic documentation and printed sources, in Romanian and in at least one international language (English). Competencies for analysis and synthesis and optimization systems thinking. Flexibility in thinking and ability to work with interdisciplinary concepts and tools.

7. Discipline objectives (based on the grid of specific competences acquired)

7.1	General objective	Enhance students practical programming skills.
7.2	Specific objectives	Adapt students programming skills to the specific requirements of mobile devices that are resource constrained.

8. Contents

8.1. Course (titles)		Teaching methods	Obser-vations
1	C1 - Introduction in Mobile Applications Development. Operating systems and technologies for mobile phones.	Presentation, discussions	Videoprojector
2	C2 - Software projects management. Mobile applications design.		
3	C3 - Software engineering. Design patterns.		
4	C4 - Java 2 Micro Edition - general presentation.		
5	C5 - Component and service-based applications. Introduction to Android platform.		
6	C6 - Android applications using a SQLite database.		
7	C7 - Distributed Android applications based on TCP, HTTP, SOAP, and JSON.		
8	C8 - Google Maps Android applications.		
9	C9 - Sensor-based Android applications.		

10	C10 - iOS applications - general presentation.		
11	C11 - Windows Phone applications - general presentation.		
12	C12 - Mobile web applications. HTML5 and JavaScript.		
13	C13 - Context-adaptive applications.		
14	C14 - Adaptation as an optimization problem. Complex adaptive systems.		
8.2. Applications (laboratory work)		Teaching methods	Obser-vations
1	L1 - The work methodology is introduced. The examination rules are stated. Relevant projects examples are presented in order to inspire students to chose a project subject.	Simulations, experiments	PC, simulator
2	L2 - Students chose their individual project subject. The first version of the specification document is written. Deliverables: specification document v.1.		
3	L3 - Students present the revised form of the specification document and they start the design phase: GUI design, UML diagrams for the main classes, and database design. Deliverables: specification document v.2. and design document v.1.		
4	L4 - Project activity.		
5	L5 - Project activity.		
6	L6 - Students present the revised design document. The first version of the application is presented (at least one functionality is implemented). Deliverables: design document v.2., application v.1.		
7	L7 - Project activity.		
8	L8 - Project activity.		
9	L9 - The second version of the application is delivered.		
10	L10 - Project activity.		
11	L11 - The third version of the application is delivered.		
12	L12 - Project activity.		
13	L13 - Projects presentations session 1 - demo and discussions. The final application and the technical report are delivered.		
14	L14 - Projects presentations session 2 - demo and discussions. The final application and the technical report are delivered.		

References:

[1]. M. Cremene, I. K. Benta, “Dezvoltarea de aplicatii pentru terminale mobile”, Ed. Albastra, Cluj-Napoca, 2006.
[2]. Martyn Mallick, “Mobile and Wireless Design Essentials”, John Wiley & Sons, 2003, ISBN 0471214191.
[3]. Introduction to Mobile Communications: Technology, Services, Markets, Autori:Tony Wakefield, Dave McNally, David Bowler, Editura:Auerbach Publications
[4]. Aaron Carroll, ”An Analysis of Power Consumption in a Smartphone”, https://www.usenix.org/legacy/event/usenix10/tech/full_papers/Carroll.pdf
[5]. Gamma, Erich; Richard Helm, Ralph Johnson, and John Vlissides (1995). Design Patterns: Elements of Reusable Object-Oriented Software. Addison-Wesley. ISBN 0-201-63361-2.
[6]. Gamma, E., Helm, R., Johnson, R., and Vlissides, J. 2002. Design patterns: abstraction and reuse of object-oriented design. In Software Pioneers: Contributions To Software Engineering, M. Broy and E. Denert, Eds. Springer-Verlag New York, New York, NY, 701-717.
[7]. Michael Y. Morckos, Android Architecture, German University in Cairo, May 13, 2009
[8]. Reto Meier, Professional Android 2 Application Development, 2010
[9]. http://mindtherobot.com/blog/675/android-architecture-message-based-mvc/
[10]. http://www.vogella.com/articles/AndroidIntent/article.html
[11]. http://developer.android.com/guide/topics/ui/menus.html

Other information - course web page : http://helios.utcluj.ro/mobile/datm.htm

9. Discipline content corroborated with the expectations of the epistemic community representatives, associations, professional and related program employers

Acquired skills will be needed in the following possible COR occupations: electronics engineer, telecommunications engineer, system and computer design engineer, or new occupations proposed to be included in COR (sales support engineer, developer of multimedia applications, network operating engineer, test engineer, project manager, traffic engineer, communications system consultant.

10. Assessment

Type of activity	10.1	Evaluation criteria	10.2	Evaluation method	10.3	The weight of the final grade
Course		Involvement (critical and creative thinking, questions, opinions) - I Technical study on a given subject - S		Questions and opinion are recorded and evaluated I max. = 1 Technical study review S max. = 1		I + S = 22%
Applications		Software application - A Technical report - T		Project defended at the end of semester (application demo and questions) A max. = 4 The final report is delivered at the end of semester T max. = 3 Penalization points are applied if the planned deliverables are delayed more than one week (-0.5 x number of delayed weeks).		A + T = 78%
10.4 Minimum performance standard						
The final grade (N) is calculated as the sum: N = 1 + I + S + A + T The condition for obtaining the ECTS credits is that N should be higher than or equal to 5 (five).						

Date
24.06.2018

Titular
Assistant Professor
Adriana Stan, Ph.D.

Responsible
Assistant Professor
Adriana Stan, Ph.D.

Date of approval
24.06.2018

Head of Department
Professor Virgil Dobrota, Ph.D.