SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babeş Bolyai University**
1.2 Faculty	**Faculty of Mathematics and Computer Science**
1.3 Department	**Department of Computer Science**
1.4 Field of study	**Computer Science**
1.5 Study cycle	**Master**
1.6 Study programme / Qualification	**Cyber Security**

2. Information regarding the discipline

2.1 Name of the discipline	**Securing Mobile Applications**						
2.2 Course coordinator	Lect. Ph.D. Dan Cojocar						
2.3 Seminar coordinator	Lect. Ph.D. Dan Cojocar						
2.4. Year of study	**2**	2.5 Semester	**3**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Mandatory**
2.8. Code of the discipline	**MME8200**						

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	1 lab + 1 project
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28

Time allotment:	hours
Learning using manual, course support, bibliography, course notes	20
Additional documentation (in libraries, on electronic platforms, field documentation)	30
Preparation for seminars/labs, homework, papers, portfolios, and essays	30
Tutorship	8
Evaluations	6
Other activities:	-

3.7 Total individual study hours	94
3.8 Total hours per semester	150
3.9 Number of ECTS credits	6

4. Prerequisites (if necessary)

4.1. curriculum	•
4.2. competencies	•

5. Conditions (if necessary)

5.1. for the course	•
5.2. for the seminar /lab activities	•

6. Specific competencies acquired

Professional Competencies	**C1.3 Elaboration of adequate source codes and unitary testing of some components in a known programming language, based on given design specifications.** **C1.5 Development of program units and elaboration of the corresponding documentation.** **C6.3 Techniques for installation, configuration, and administration of systems and computer networks.** **Proficient use of verification, validation, and evaluation criteria and methods in order to ensure software security;** **Demonstrate advanced skills to analysis, design, and construction of secure software systems, using a wide range of hardware / software platforms, programming languages and environments, and modeling, verification and validation tools;**
Transversal Competencies	**Professional communication skills; concise and precise description, both oral and written, of professional results;** **Applying the norms of organized and efficient work, responsibility and reliability of the work performed both individually and within a team;** **Good English communication skills.**

7. Objectives of the discipline (the outcome of the acquired competencies)

7.1 General objective of the discipline	• Knowledge of key base concepts for developing mobile applications and security models used in such applications.
7.2 Specific objective of the discipline	• Learn the Android platform. • Learn JavaScript frameworks for mobile development.

8. Content

8.1 Course	Teaching methods	Remarks
1. Base Android tooling - Android Studio. - Activity/Fragment lifecycle. - User interfaces.	Exposure: description, examples, discussion of case studies, live demo	
2. Lists and rest resources - Views - Background processing - Networking	Exposure: description, examples, discussion of case studies, live demo	
3. Master-details and rest resources - More views: NavigationDrawer - OkHttp, JsonReader, JsonWriter - ContentProviders	Exposure: description, examples, discussion	

	of case studies, live demo	
4. Local persistence - Preferences and Files - Databases: SQLite, Room, Realm.	Exposure: description, examples, discussion of case studies, live demo	
5. Securing mobile apps - Android security model - JSON Web Tokens - OAuth 2.0	Exposure: description, examples, discussion of case studies, live demo	
6. Synchronizing data - WebSockets - Local synchronization services - LoaderManagers	Exposure: description, examples, discussion of case studies, live demo	
7. Reactive programming - Realm - real-time database - Rx - reactive programming - Coroutines	Exposure: description, examples, discussion of case studies, live demo	
8. System services and sensors - Services - Processes - Sensors	Exposure: description, examples, discussion of case studies, live demo	
9. Animations - ValueAnimator. - ObjectAnimator. - Transitions framework	Exposure: description, examples, discussion of case studies, live demo	
10. Firebase Services - Authentication - Database - Remote Config	Exposure: description, examples, discussion of case studies, live demo	
11. Monetize - Ads - In-app billing - Firebase	Exposure: description, examples, discussion of case studies, live demo	
12. Awareness and nearby - Anticipate and react - Nearby - Physical Web	Exposure: description, examples, discussion of case studies, live demo	
13. Test your app - Junit - Mockito - UI Automator, Expresso - Firebase test lab - Performance testing	Exposure: description, examples, discussion of case studies, live demo	

14. Exam simulation and discussions - Sample exam requirement - Live exam simulation	Discussion of case studies, live exam simulation	
Bibliography - Android Development. http://developer.android.com/index.html - React Native. https://facebook.github.io/react-native/ - Flutter. https://flutter.io/docs - Vogella. Android Development Tutorials. http://www.vogella.com/android.html		
8.2 Seminar / laboratory	Teaching methods	Remarks
1. Getting Started - Create Android and Flutter sample applications. - Discuss the L1 and L2 assignments.	Exposure: description, examples, discussion of case studies, live demo	
2. Specification evaluation.	Exposure: description, discussion. Evaluation.	
3. CRUD Specifications discussion. Specification reevaluation.	Exposure: description, discussion. Evaluation.	
4. Evaluate the UI module.	Exposure: description, discussion. Evaluation.	
5. Evaluate the local persistence logic.	Exposure: description, discussion. Evaluation.	
6. Evaluate the network/online communication logic.	Exposure: description, discussion. Evaluation.	
7. Bonus project evaluation.	Exposure: description, discussion. Evaluation.	
Bibliography - Android Development. http://developer.android.com/index.html - React Native. https://facebook.github.io/react-native - Flutter. https://flutter.io/docs - Vogella. Android Development Tutorials. http://www.vogella.com/android.html		

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations, and representative employers within the field of the program

- The course respects the IEEE and ACM Curricula Recommendations for Computer Science studies.
- The course exists in the studying program of all major universities in Romania and abroad.

- The content of the course is considered the software companies as important for average programming skills.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	- the basic principle of the domain; - apply the course concepts - problem-solving	Practical examination	40 %
10.5 Seminar/lab activities	- be able to implement course concepts and algorithms - apply techniques for different classes of programming languages	- Practical evaluation during the semester. - Portfolio	60 %
10.6 Minimum performance standards			
➢ Attend 90% of lab activities during the semester ➢ At least grade 5 (from a scale of 1 to 10) at both the practical exam and laboratory work.			

Date	Signature of course coordinator	Signature of seminar coordinator
May 2022	**Lect. Ph.D. Dan Cojocar**	**Lect. Ph.D. Dan Cojocar**

Date of approval	Signature of the head of department
.....	**Prof. Ph.D. Laura Silvia Dioșan**