

## SYLLABUS

### 1. Information regarding the programme

1.1 Higher education institution	<b>Babeş Bolyai University</b>
1.2 Faculty	<b>Faculty of Mathematics and Computer Science</b>
1.3 Department	<b>Department of Computer Science</b>
1.4 Field of study	<b>Computer Science</b>
1.5 Study cycle	<b>Bachelor</b>
1.6 Study programme / Qualification	<b>Computer Science</b>

### 2. Information regarding the discipline

2.1 Name of the discipline	<b>Mobile Application Programming</b>						
2.2 Course coordinator	Lect. PhD. Dan Cojocar						
2.3 Seminar coordinator	Lect. PhD. Dan Cojocar						
2.4. Year of study	<b>3</b>	2.5 Semester	<b>5</b>	2.6. Type of evaluation	<b>E</b>	2.7 Type of discipline	<b>Compulsory</b>

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

3.1 Hours per week	3	Of which: 3.2 course	2	3.3 seminar/laboratory	1 lab
3.4 Total hours in the curriculum	42	Of which: 3.5 course	28	3.6 seminar/laboratory	14
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					10
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					15
Tutorship					8
Evaluations					5
Other activities: .....					-
3.7 Total individual study hours			58		
3.8 Total hours per semester			100		
3.9 Number of ECTS credits			4		

### 4. Prerequisites (if necessary)

4.1. curriculum	.
4.2. competencies	.

### 5. Conditions (if necessary)

5.1. for the course	.
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5.2. for the seminar /lab activities	.
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## 6. Specific competencies acquired

<b>Professional competencies</b>	<ul style="list-style-type: none"> <li>- <b>Base understanding of key concepts on developing mobile applications.</b></li> <li>- <b>Understanding the validation and testing of quality mobile applications.</b></li> </ul>
<b>Transversal competencies</b>	<ul style="list-style-type: none"> <li>- <b>The ability to apply the learned concepts, principles and the techniques in solving real problems.</b></li> </ul>

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

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>· Knowledge of key base concepts for developing mobile applications.</li> </ul>
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> <li>· Learn the Android platform.</li> <li>· Learn JavaScript frameworks for mobile development.</li> </ul>

## 8. Content

8.1 Course	Teaching methods	Remarks
1. Base Android tooling <ul style="list-style-type: none"> <li>- Android Studio.</li> <li>- Activity/Fragment lifecycle.</li> <li>- User interfaces.</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
2. Lists and rest resources <ul style="list-style-type: none"> <li>- Views</li> <li>- Background processing</li> <li>- Networking</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
3. Master-details and rest resources <ul style="list-style-type: none"> <li>- More views: NavigationDrawer</li> <li>- OkHttp, JsonReader, JsonWriter</li> <li>- ContentProviders</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
4. Local persistence <ul style="list-style-type: none"> <li>- Preferences and Files</li> <li>- Databases: SQLite</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
5. Securing mobile apps <ul style="list-style-type: none"> <li>- Android security model</li> <li>- Json Web Tokens</li> <li>- OAuth 2.0</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	

6. Synchronizing data <ul style="list-style-type: none"> <li>- WebSockets</li> <li>- Local synchronization services</li> <li>- LoaderManagers</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
7. Reactive programming <ul style="list-style-type: none"> <li>- Realm - real time database</li> <li>- Rx - reactive programming</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
8. System services and sensors <ul style="list-style-type: none"> <li>- Services</li> <li>- Processes</li> <li>- Sensors</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
9. Animations <ul style="list-style-type: none"> <li>- ValueAnimator.</li> <li>- ObjectAnimator.</li> <li>- Transitions framework</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
10. Hybrid mobile applications <ul style="list-style-type: none"> <li>- Angular 2</li> <li>- Ionic Framework</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
11. Monetize <ul style="list-style-type: none"> <li>- Ads</li> <li>- In-app billing</li> <li>- Firebase</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
12. Awareness and nearby <ul style="list-style-type: none"> <li>- Anticipate and react</li> <li>- Nearby</li> <li>- Physical Web</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
13. Test your app <ul style="list-style-type: none"> <li>- Junit</li> <li>- Mockito</li> <li>- UI Automator, Espresso</li> <li>- Firebase test lab</li> <li>- Performance testing</li> </ul>	Exposure: description, examples, discussion of case studies, live demo	
14. Exam simulation and discussions <ul style="list-style-type: none"> <li>- Sample exam requirement</li> <li>- Live exam simulation</li> </ul>	Discussion of case studies, live exam simulation	
Bibliography <ul style="list-style-type: none"> <li>- Android Development. <a href="http://developer.android.com/index.html">http://developer.android.com/index.html</a></li> <li>- React Native. <a href="https://facebook.github.io/react-native/">https://facebook.github.io/react-native/</a></li> <li>- Vogella. Android Development Tutorials. <a href="http://www.vogella.com/android.html">http://www.vogella.com/android.html</a></li> </ul>		
8.2 Seminar / laboratory	Teaching methods	Remarks

<p>1. Getting Started</p> <ul style="list-style-type: none"> <li>- Understand the artifacts generated by react-native-cli when creating a new project</li> <li>- Define components using ES6 classes</li> <li>- Explain the lifecycle of components</li> <li>- Use logs to study the behavior of the application</li> <li>- Fetch data using promises (fetch api)</li> <li>- Discuss the L2 assignment</li> </ul>	<p>Exposure: description, examples, discussion of case studies, live demo</p>	
<p>2. Assessment Check &amp; ReactNative Demo</p> <ul style="list-style-type: none"> <li>- Fetching data</li> <li>- Add a pagination mechanism on the REST clients.</li> <li>- Create CRUD user interfaces.</li> <li>- Use dialogs and pickers.</li> <li>- Discuss L3 assignment</li> </ul>	<p>Exposure: description, examples, discussion of case studies, live demo. Evaluation.</p>	
<p>3. Online/Offline &amp; Secured App</p> <ul style="list-style-type: none"> <li>- Evaluate the homework</li> <li>- Transform an (online) master-detail app into an app using a local persistence</li> <li>- Implement the CRUD operations using async storages</li> <li>- Secure mobile applications which consume REST services via JWT</li> </ul>	<p>Exposure: description, examples, discussion of case studies, live demo. Evaluation</p>	
<p>4. React-Native - AsyncStorage</p> <ul style="list-style-type: none"> <li>- Demo app to present the async storage feature</li> <li>- Discuss assignments</li> <li>- Evaluate homework</li> </ul>	<p>Exposure: description, examples, discussion of case studies, live demo</p>	
<p>5. React-Native - Networking</p> <ul style="list-style-type: none"> <li>- Demo app to showcase the Fetch API</li> <li>- Present the final assignment requirements</li> <li>- Evaluate interim progress.</li> </ul>	<p>Exposure: description, examples, discussion of case studies, live demo. Evaluation</p>	
<p>6. React-Native - Authentication</p> <ul style="list-style-type: none"> <li>- Demo app to showcase the jwt, oauth</li> <li>- Discuss how to manage the app state outside the user interface</li> <li>- Submit data using promises</li> <li>- Navigate between views</li> </ul>	<p>Exposure: description, examples, discussion of case studies, live demo</p>	
<p>7. Final Laboratory Evaluation</p> <ul style="list-style-type: none"> <li>- Evaluate the final app</li> </ul>	<p>Exposure: description, examples, discussion of case studies, live demo. Evaluation</p>	
<p><b>Bibliography</b></p> <ul style="list-style-type: none"> <li>- Android Development. <a href="http://developer.android.com/index.html">http://developer.android.com/index.html</a></li> <li>- React Native. <a href="https://facebook.github.io/react-native/">https://facebook.github.io/react-native/</a></li> <li>- Vogella. Android Development Tutorials. <a href="http://www.vogella.com/android.html">http://www.vogella.com/android.html</a></li> </ul>		

**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 %
<b>10.6 Minimum performance standards</b>			
<ul style="list-style-type: none"> <li>➤ Attend 90% of lab activities during semester</li> <li>➤ At least grade 5 (from a scale of 1 to 10) at both the practical exam and laboratory work.</li> </ul>			

Date

05.05.2017

Signature of course coordinator

Lect. PhD. Dan Cojocar

Signature of seminar coordinator

Lect. PhD. Dan Cojocar

Date of approval

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Signature of the head of department

Prof. PhD. Anca Andreica