

<b>Program</b>	BS. Software Engineering
<b>Course Title</b>	Software for Mobile Devices
<b>Credit Hours</b>	3
<b>Prerequisites by Course(s) and Topics</b>	<ul style="list-style-type: none"> <li>➤ Basic programming knowledge.</li> <li>➤ Programming Languages and Algorithms.</li> </ul>
<b>Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments etc.)</b>	<ul style="list-style-type: none"> <li>➤ Quizzes 10%</li> <li>➤ Assignments 10%</li> <li>➤ Project 15 %</li> <li>➤ Midterm 25%</li> <li>➤ Final 40%</li> </ul>
<b>Course Coordinator</b>	Rana Waqas Ali
<b>Course Instructor</b>	Rana Waqas Ali
<b>Office Hours</b>	
<b>Plagiarism Policy</b>	<p>Cheating is not only unethical; it is also against the University rules and will not be tolerated. Any form of cheating in programming assignments, homework problems, quizzes, and exams will result in strict action. Plagiarism detection tools will be used to determine who has cheated in programming assignments.</p> <p><b>All the parties involved will be awarded Zero in first instance. Second offense will result in three instruments being marked zero and on third offense case be forwarded to Disciplinary committee for an F grade in course.</b></p>
<b>Course Tools</b>	Android Studio, Android SDK, Flutter SDK
<b>Course Description</b>	<p>The course will cover beginner level Android Application development using Android Studio. The objective of this course is to introduce students to the necessary concepts of Android Development that can then be used by the students to create Android Applications of their own. The course is designed for students who have a basic understanding of programming concepts and wish to learn professional development of Android Apps. The course is technical in nature, with a strong emphasis on doing hands-on coding assignments in the classroom. Android Studio will be used as the choice of IDE for developing the apps. Java will be the primary language being taught. Throughout the duration of the course, students will work in groups, tackling programming challenges and creating their own apps using state of the art Android Development tools.</p>
<b>Course Objectives</b>	<p>Students who complete this course successfully are expected to:</p> <ol style="list-style-type: none"> <li>1. Fundamental understanding of Mobile Application Components and functions in general.</li> <li>2. Have skills like debugging and testing of Android apps.</li> <li>3. Develop practical Android Apps using Android Studio.</li> </ol>

<b>Course Goals</b>	By the end of this course, students will be able to: <ol style="list-style-type: none"> <li>1. Understand the basic concepts of Android Development</li> <li>2. Use Google's Official tool for Android Development</li> <li>3. Code at ease in Java</li> <li>4. Create any app in Android Studio, given functional requirements</li> <li>5. Create a complete App of their own that will be deployable on Google's play store</li> </ol>								
<b>Grading</b>	All the grading will be posted on portal within a week of evaluation. Numbers posted will be deemed final after 1 week of posting (i.e. can be contest within 7 days)								
<b>Textbook</b>	➤ Android Studio 3.0 Development Essentials								
<b>Reference Material</b>	<a href="https://developer.android.com">https://developer.android.com</a>								
<b>Programming Assignments Done in the Course</b>	Yes (Java Programs for Android development)								
<b>Class Time Spent on (in credit hours)</b>	<table border="1"> <thead> <tr> <th>Theory</th> <th>Problem Analysis</th> <th>Solution Design</th> <th>Social and Ethical Issues</th> </tr> </thead> <tbody> <tr> <td>0.5</td> <td>1</td> <td>1</td> <td>0.5</td> </tr> </tbody> </table>	Theory	Problem Analysis	Solution Design	Social and Ethical Issues	0.5	1	1	0.5
Theory	Problem Analysis	Solution Design	Social and Ethical Issues						
0.5	1	1	0.5						
<b>Oral and Written Communications</b>	Yes								

<b><u>CLO NO</u></b>	<b><u>CLO STATEMENT</u></b>	<b><u>PLO</u></b>	<b><u>Taxonomy LEVEL</u></b>
1	Create Android mobile apps with expertise in both frontend design and backend programming.	4	C6
2	Analyze code for error-free and stable mobile apps.	3	C4
3	Use modern data storage tools and techniques in mobile apps for optimized functionality.	5	C2

<b>Assessment tools</b>	<b>CLO_1</b>	<b>CLO_2</b>	<b>CLO3</b>
Quizzes	25%	25%	25%
Assignments	25%	25%	25%
Midterm Exam	50%		
Final Exam		50%	50%

Week	Lecture	Topics	Evaluation Used	CLO
1 <sup>st</sup>	1 <sup>st</sup>	<b>Introduction to course</b> <b>Division of marks</b> <b>Brief introduction of:</b> <ul style="list-style-type: none"> <li>• Android OS</li> <li>• Android Studio</li> </ul> <b>Linux Vs Android</b>		C1
	2 <sup>nd</sup>	<b>Introduction to Java Programming Language</b> <b>Syntax of Java including:</b> <ul style="list-style-type: none"> <li>• A basic Java program e.g. main function</li> <li>• Variables</li> <li>• Data types</li> <li>• Conditional statements</li> <li>• <b>Loops:</b> <ul style="list-style-type: none"> <li>While loop</li> <li>For loop</li> <li>Different variations of for loop in Java</li> </ul> </li> <li>• Lists and Arrays in Java</li> <li>• Classes in Java</li> <li>• Data members and member functions</li> <li>• <b>Constructors:</b> <ul style="list-style-type: none"> <li>Default constructor</li> <li>Parameterized constructor</li> </ul> </li> </ul>		C1
2 <sup>nd</sup>	3 <sup>rd</sup>	<b>Introduction to Android studio IDE</b> <ul style="list-style-type: none"> <li>• Creating First android studio project</li> <li>• Introduction to:</li> <li>• Manifest File</li> <li>• Layouts</li> <li>• Back-end coding e.g. Java (.java) files</li> <li>• Gradle files</li> <li>• Dependencies</li> <li>• Running first android studio project</li> </ul>		C1
	4 <sup>th</sup>	<b>Setting up a Virtual device</b> <ul style="list-style-type: none"> <li>• Introduction to an Emulator:</li> <li>• Android studio's own virtual device/emulator</li> <li>• Using 3rd party emulator e.g. Memu, NoX, or BlueStack</li> <li>• Using physical phone to Run and Test an android app</li> </ul> <b>Introduction to Views:</b> <ul style="list-style-type: none"> <li>• Button</li> <li>• TextView</li> <li>• EditText</li> <li>• Auto-complete TextView</li> <li>• ListView</li> </ul>		C1
3 <sup>rd</sup>	5 <sup>th</sup>	<b>Introduction to layouts:</b> <ul style="list-style-type: none"> <li>• Constraint Layout</li> <li>• LinearLayout</li> <li>• RelativeLayout</li> </ul> <b>Layout Designing</b> <ul style="list-style-type: none"> <li>• Introduction to XML language</li> </ul>	Quiz 1	C1

		<ul style="list-style-type: none"> <li>• Drag &amp; Drop option for layout designing</li> <li>• Creating layout with XML code</li> </ul>		
	6 <sup>th</sup>	<p><b>Creating First Android app</b></p> <ul style="list-style-type: none"> <li>• Understanding of click events</li> <li>• Button click listener</li> <li>• Button Long click listener</li> <li>• Displaying a Toast Message</li> <li>• Displaying an AlertDialog Message</li> </ul> <p><b>A simple Calculator application</b></p>	Assignment 1	C1
4 <sup>th</sup>	7 <sup>th</sup>	<p><b>Introduction to Activities</b></p> <ul style="list-style-type: none"> <li>• Creating Multiple activities</li> <li>• Passing data to an activity</li> <li>• Shifting among multiple activities</li> <li>• Receiving data in new activity (Passed by previous activity)</li> </ul> <p><b>Activity Life Cycle</b></p> <ul style="list-style-type: none"> <li>• Lifecycle of an activity</li> <li>• Different call back methods: onCreate() onStart() onResume() onPause() onStop() onRestart() onDestroy()</li> </ul>	Project Proposals	C1
	8 <sup>th</sup>	<p><b>GSM Services</b></p> <ul style="list-style-type: none"> <li>• Sending SMS (GSM) using SmsManager API</li> <li>• Sending E-mails</li> <li>• Making a phone call application</li> </ul> <p><b>Permissions in android</b></p> <ul style="list-style-type: none"> <li>• What is a permission</li> <li>• Manifest permission Vs Run time permission (android SDK &gt;= 6.0)</li> <li>• Writing manifest permission</li> <li>• Writing a run time permission</li> </ul>	Quiz 2	C1, C2
5 <sup>th</sup>	9 <sup>th</sup>	<p><b>Animations</b></p> <ul style="list-style-type: none"> <li>• What is an animation</li> <li>• Creating an animation in android</li> <li>• Loading an animation</li> </ul> <p><b>Splash Screen</b></p> <ul style="list-style-type: none"> <li>• What is a splash screen</li> <li>• Creating a Splash screen</li> </ul> <p><b>Fragments and their Lifecycle</b></p>		C1, C2
	10 <sup>th</sup>	<p><b>Wi-Fi</b></p> <ul style="list-style-type: none"> <li>• How to Enable / Disable Wi-Fi</li> <li>• Scanning and getting a list of available Wi-Fi networks</li> </ul> <p><b>Bluetooth</b></p> <ul style="list-style-type: none"> <li>• How to Enable / Disable Bluetooth</li> <li>• Scanning and getting a list of available Bluetooth devices</li> </ul> <p><b>Camera</b></p> <ul style="list-style-type: none"> <li>• How to access Camera</li> <li>• Taking pictures with camera</li> </ul>	Assignment 2	C1, C2
6 <sup>th</sup>	11 <sup>th</sup>	<p><b>Data Storage</b></p> <ul style="list-style-type: none"> <li>• Introduction to SharedPreferences, a data storage mechanism in Android development</li> <li>• Storing data in sharedPreferences</li> <li>• Retrieving data from SharedPreferences</li> </ul>		C3

		<b>Introduction ScrollView and TabView</b>		
	12 <sup>th</sup>	<b>ListView</b> <ul style="list-style-type: none"> <li>• Introduction to ListView in android</li> <li>• Setting up data on a list view</li> <li>• Using custom layout for listview</li> <li>• Customizing adapter for a ListView</li> </ul>	Quiz 3	C1, C2
7 <sup>th</sup>	13 <sup>th</sup>	<b>RecyclerView</b> <ul style="list-style-type: none"> <li>• Introduction to RecyclerView in android</li> <li>• Setting up data on a RecyclerView</li> <li>• Using custom layout for RecyclerView</li> <li>• Customizing adapter for a RecyclerView</li> </ul>	Assignment 3	C1, C2
		<b>A partial ContactsApp without database implementation</b>		
	14 <sup>th</sup>	<b>Locations in Android</b> <ul style="list-style-type: none"> <li>• GPS location Vs Network provided location</li> <li>• Introduction to Latitude and Longitude</li> <li>• Getting GPS location</li> <li>• Progress dialogue</li> <li>• Converting GPS location to Actual/physical address using GeoCoder API</li> </ul>		C1, C2
8 <sup>th</sup>	15 <sup>th</sup>	• <b>Revision</b>		
	16 <sup>th</sup>	• <b>Revision</b>		
9 <sup>th</sup>		<b>Midterm Examination</b>		
10 <sup>th</sup>	17 <sup>th</sup>	<b>SQLite Database</b> <ul style="list-style-type: none"> <li>• What is SQLiteDatabase</li> <li>• Creating SQLiteDatabase</li> <li>• Storing data in SQLiteDatabase</li> </ul>		C2, C3
	18 <sup>th</sup>	<b>SQLite Database</b> <ul style="list-style-type: none"> <li>• Retrieving data from SQLite Database</li> <li>• Applying different filters on data</li> </ul>	Quiz 4	C2, C3
11 <sup>th</sup>	19 <sup>th</sup>	<b>Firebase Database</b> <ul style="list-style-type: none"> <li>• Introduction to Firebase SDK</li> <li>• Setting up a firebase project</li> <li>• Connecting firebase application with firebase server</li> <li>• Different settings on Firebase Server</li> </ul>		C2, C3
	20 <sup>th</sup>	<b>Firebase Database</b> <ul style="list-style-type: none"> <li>• Creating a user with email and password</li> <li>• Signing in to Firebase database using Account credentials</li> <li>• Storing single data item in Firebase database</li> </ul>		C2, C3
	21 <sup>st</sup>	<b>Firebase Database</b> <ul style="list-style-type: none"> <li>• Storing complete objects in Firebase database</li> <li>• Introduction to Snapshot</li> <li>• Retrieving data from Firebase</li> </ul>	Assignment 4	C2, C3
12 <sup>th</sup>	22 <sup>nd</sup>	<b>A complete Contacts App</b> <b>Services &amp; Broadcast Receiver</b> <ul style="list-style-type: none"> <li>• What is a service</li> <li>• Comparison of a service and an activity</li> <li>• Creating a service</li> <li>• Running a service</li> <li>• Destroying / stopping a service</li> <li>• What is Broadcast Receiver</li> <li>• How to register a broadcast receiver for system events</li> <li>• Unregister a receiver</li> </ul>	Quiz 5	C1, C2, C3
13 <sup>th</sup>	23 <sup>rd</sup>	<b>Introduction to React Native framework</b>		

		<ul style="list-style-type: none"> <li>• Native app development vs hybrid app development</li> <li>• Configuring VS Code for hybrid app development</li> </ul>		C1
	24 <sup>th</sup>	<b>Creating first react native application</b> <ul style="list-style-type: none"> <li>• React JS</li> <li>• Components</li> <li>• States vs Props</li> <li>• Arrow functions</li> <li>• Basic calculator app in react native</li> </ul>	Assignment 5	C1
14 <sup>th</sup>	25 <sup>th</sup>	<b>Login and registration activities in react native</b>	Quiz 6	C1
	26 <sup>th</sup>	<b>Connecting react native application with Firebase</b> <b>Save and read data to/from Firebase</b>		C1
15 <sup>th</sup>	27 <sup>th</sup>	<b>Releasing an Android apps through Android Studio and VS Code</b>	Project Evaluation	C2, C3
	28 <sup>th</sup>	<b>Deployment of an Android App onto the Play-store</b>	Project Evaluation	C2, C3
16 <sup>th</sup>	29 <sup>th</sup> 30 <sup>th</sup>	<b>Revision</b>	Project Evaluations	
<b>Final term Examination</b>				