

# Government Polytechnic, Pune

## '180OB' – Scheme

Programme	Diploma in Computer Engineering
Programme code	01/02/03/04/05/ <b>06</b> /07/08/15/16/17/18/19/21/22/23/24/ <b>26</b>
Name of Course	<b>Android Application Programming</b>
Course Code	<b>CM5104</b>
Prerequisite course code and name	NA
Class Declaration	Yes

### 1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)		Examination Scheme				
					Theory		Practical		Total Marks
L	T	P	C		ESE	PA	*ESE	PA	
02	00	04	06	Marks	#40	10	50	50	150
				Exam Duration	2 Hrs	1/2 Hr			

**Legends:** L- Lecture, P- Practical, T- Tutorial, C- Credit, ESE-End Semester Examination, PA- Progressive Assessment (Test I, II/Term Work), \*- Practical Exam, \$- Oral Exam, #- Online Examination each Lecture/Practical period is of one clock hour

### 2. RATIONALE

The use of mobile communication and android based applications are increasing day by day. It is therefore necessary for students to know how to build mobile applications for android operating system. This course covers the necessary concepts which are required to develop Android applications. After completing this course students will be able to design and built various applications using android framework.

### 3. COMPETENCY

The aim of this course is to attend following industry identified competency through various teaching learning experiences:

- **Develop android applications.**

### 4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Describe Android architecture and features.
2. Configure android environment and development tools.
3. Design graphical user interface layouts.
4. Develop android application using user interface components.
5. Create android application to perform database operations.
6. Deploy android application including security parameters.

## 5. SUGGESTED PRACTICALS/ EXERCISES

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
1.	2	Install and configure java development kit (JDK), android studio and android SDK with android virtual device	1,2	2
2.	2	Develop a program to display Hello World on screen	1,2	2
3.	3	Develop a program to implement Linear Layout, Frame Layout, Relative Layout, Table Layout	3	4
4.	4	Develop a program to implement Text View and Auto Complete Text view and Edit Text.	4	4
5.	4	Develop a program to implement Button, Image Button and Toggle Button.	4	2
6.	4	Develop a program to implement Checkbox.	4	2
7.	4	Develop a program to implement Radio Button and Radio Group.	4	2
8.	4	Develop a program to implement Progress Bar.	4	2
9.	4	Develop a program to implement List View, Grid View, Image View and Scroll View.	4	4
10.	4	Develop a program to implement Custom Toast Alert.	4	2
11.	4	Develop a program to implement Date and Time Picker.	4	4
12.	5	Develop a program to implement new activity using explicit intent and implicit intent.	4	4
13.	5	Develop a program to implement horizontal and vertical fragments.	4	2
14.	5	Develop a program to implement service.	4	2
15.	5	Develop a program to implement Broadcast receiver.	4	2
16.	3,4,5	Create a login form with all necessary validations (On success or unsuccessful login, display appropriate toast Message )	3,4	4
17.	5	Develop a program to perform (Insert and delete) database operations using SQLite Database.	5	4
18.	5	Develop a program to perform (Search and Update) database operations using SQLite Database.	5	4
19.	6	Develop a program to send SMS.	6	2
20.	All	Micro-project (Refer point 11 for micro project list)	1 to 6	10
		<b>Total Hrs</b>		<b>64</b>

S.No.	Performance Indicators	Weightage in %
a.	Correctness of user interface design	20
b.	Correctness of programming logic applied	30
c.	Debugging ability	20
d.	Answer to questions	20
e.	Submission of assignment with in time	10
<b>Total</b>		<b>100</b>

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practical, as well as aid to procure equipment by authorities concerned.

Sr. No.	Major Equipment/ Instruments Required	Experiment Sr. No.
1	Computer System with minimum 4 GB RAM	All
2	Any open source tool (Android Studio / Eclipse IDE), JDK, SQLite or any other equivalent database	All

## 7. THEORY COMPONENTS

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
<b>Section - I</b>	
<b>UNIT I Introduction to Android Operating System (Weightage-6 marks, Hrs-4)</b>	
<b>1a.</b> Compare various android versions. <b>1b.</b> List needs of android Operating system. <b>1c.</b> Explain android architecture with its features.	1.1 Introduction to Android Operating System, Android Ecosystem, Android versions. 1.2 Need of Android, Android Activity. 1.3 Features Of Android, Android Architecture.
<b>UNIT II Installation and configuration of Android Environment (Weightage-6 marks, Hrs-6)</b>	
<b>2a.</b> Installation of application development environment and its configuration. <b>2b.</b> Explain android lifecycle. <b>2c.</b> Develop a simple android application.	2.1 Java JDK, Android SDK. 2.2 Android Development Tools (ADT), Android Virtual Devices (AVDs), Emulators. 2.3 Dalvik Virtual Machine, Difference between JVM and DVM. 2.4 Steps to install and configure Android Studio and SDK. 2.5 Android lifecycle: Introduction and lifecycle phases.
<b>UNIT III Fundamental of UI Components and Layouts (Weightage-8 marks, Hrs-6)</b>	

<b>Unit Outcomes (UOs)</b> (in cognitive domain)	<b>Topics and Sub-topics</b>
<b>3a.</b> Describe android directory structure. <b>3b.</b> Identify various screen components. <b>3c.</b> Design GUI using layouts.	3.1 Directory Structure and understanding components of a screen. 3.2 Fundamental UI Design. 3.3 Linear Layout. 3.4 Absolute Layout. 3.5 Frame Layout. 3.6 Relative Layout. 3.7 Table Layout.
<b>Section - II</b>	
<b>UNIT IV Designing User Interface(Weightage-6 marks, Hrs-6)</b>	
<b>4a.</b> Describe various user interface components. <b>4b.</b> Develop android application using various user interface components.	4.1 Text View, Edit Text and Auto complete Text View. 4.2 Button, Image Button and Toggle Button. 4.4 Radio Button and Radio Group. 4.5 Checkbox. 4.6 Progress Bar. 4.7 List View. 4.8 Grid View. 4.9 Image View. 4.10 Scroll View. 4.11 Custom Toast Alert. 4.12 Time and Date Picker.
<b>UNIT V Activity, Multimedia and Databases(Weightage-8 marks, Hrs-6)</b>	
<b>5a.</b> Explain Intents and its use while developing android application. <b>5b.</b> Develop application using activities, fragments, intents and services. <b>5c.</b> Perform database transactions.	5.1 Intent, its types and Intent. Filter. 5.2 Activity Lifecycle. 5.3 Broadcast Lifecycle. 5.4 Content Provider. 5.5 Fragments and Service. 5.6 Play audio and video, text to speech and speech to text. 5.7 SQLite Database, necessity of SQLite, Creation and connection of the database, extracting values from cursors and transactions.
<b>UNIT VI Security and Application Deployment(Weightage-6 marks, Hrs-4)</b>	
<b>6a.</b> Develop application to send SMS. <b>6b.</b> Explain android permissions and security model. <b>6c.</b> Deploy android application.	6.1 SMS Telephony. 6.2 Understanding the android Security Model, declaring and using Permissions, understanding and using Custom Permission. 6.3 Application Deployment: Creating small application, signing of application and steps of deploying app on Google Play Store.

## 8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
Section - I						
I	Introduction to Android Operating System	4	4	2	--	6
II	Installation and configuration of Android Environment	6	2	4	--	6
III	Fundamental of UI Components and Layouts	6	2	2	4	8
Total (A)		16	8	8	4	20
Section - II						
IV	Designing User Interface	6	2	2	2	6
V	Activity, Multimedia and Databases	6	2	2	4	8
VI	Security and Application Deployment	4	2	2	2	6
Total (B)		16	6	6	8	20
Total (A+B)		32	14	14	12	40

## 9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Prepare journal of practical.
- Undertake micro-projects.
- Develop applications based on real world scenario.

## 10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- Massive open online courses (MOOCs) may be used to teach various topics / sub topics.
- About 15-20% of the topics/sub-topics which is relatively simpler or descriptive in nature is to be given to the students for self-directed learning and assess the development of the COs through classroom presentations.
- With respect to item No.09, teachers need to ensure to create opportunities and provisions for co-curricular activities.
- Use different Audio/Video media for understanding of concepts.
- Guide students in undertaking micro-projects.
- Ensure tools used are of latest version.

- g. Encourage students to refer various web sites / Mobile applications to have detail understanding of advanced concepts.
- h. Observe continuously the performance of students in laboratory.

## 11. SUGGESTED MICRO-PROJECTS

**Only one micro-project** is planned to be undertaken by a student that needs to be assigned to him/her. In special situations where groups have to be formed for micro-projects, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. (Affective Domain Outcomes). Each student will have to maintain activity chart consisting of individual contribution in the project work and give a seminar presentation of it before submission.. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

- a. Develop an android application on Housing Societies Management System.
- b. Develop an android application on file converters.
- c. Develop an android application for scientific calculator.
- d. Develop an android application for simple game.

## 12. SUGGESTED LEARNING RESOURCES

Sr.No.	Title	Author	Publisher, Edition and Year of publication, ISBN Number
1	ANDROID	Prasanna Kumar Dixit	Vikas Publications, First Edition, 2014 • 9789325977884
2	Android Programming for Beginners	John Hontan	Packet Publication, First Edition • 2015978-1-78588-326-2

## 13. SOFTWARE/LEARNING WEBSITES

- 1. <https://www.tutorialspoint.com/android>
- 2. [https://www.tutorialspoint.com/android/android\\_advanced\\_tutorial.pdf](https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf)
- 3. <http://developer.android.com>

**14. PO - COMPETENCY- CO MAPPING**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	1	3	1	1	2
CO2	2	2	1	3	1	1	2
CO3	2	3	3	3	1	1	2
CO4	2	3	3	3	1	1	2
CO5	2	3	3	3	3	3	2
CO6	2	3	3	3	3	3	2

	PSO1	PSO2
CO1	-	2
CO2	-	2
CO3	-	2
CO4	-	2
CO5	-	3
CO6	-	3

<p>Sign:</p>     <p>Name: Shri T.P. Sharma Smt S.P. Panchakshari (Course Expert /s)</p>	<p>Sign:</p>     <p>Name: Mr. U.V. Kokate Dr. S.B.Nikam (Head of Department) (Department of Computer Engineering)</p>
<p>Sign:</p>     <p>Name: Mr. U.V. Kokate Dr. S.B.Nikam (Programme Head) (Department of Computer Engineering)</p>	<p>Sign:</p>     <p>Name: Mr. A.S. Zanpure (CDC In-charge)</p>

