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**FIRST SEMESTER 2022-2023**

# Course Handout Part II

Date: 29th August 2022

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

*Course No.* : *CS F314*

## Course Title : *Software development for portable devices*

## Instructor-in-Charge : Dr. Manik Gupta (manik@hyderabad.bits-pilani.ac.in)

**Scope and Objectives of the Course:**

The main objective of the course is to introduce concepts of mobile computing while acquiring skills for creating and deploying mobile applications using existing development platforms and tools. The main focus of the course will be on Android mobile application development platform with emphasis on underlying concepts as well as hands on experience in developing mobile apps. Essential Android programming concepts will be covered and exposure to build a variety of apps using Java will be provided. Advanced features like user experience, localization, working with device sensors will also be covered.

At the end of the course, the student will be able to:

CO1 Understand mobile computing technology and challenges in developing for a ubiquitous environment.

CO2 Understand mobile application software architecture and design components

CO3 Learn an application development platform for portable devices and gain practical hands on experience

Please note that this is an ***advanced undergraduate*** course and requires a ***good working knowledge of Object oriented programming/Java***. It is strongly advised students who have already undertaken courses on Object oriented programming and software engineering should take this course.

**Reference Books:**

* + R1**.** Mobile Computing 3rd Edition by Raj Kamal, Oxford University Press (2018)
  + R2. Android Application Development 2nd Edition by Barry Burd, Wiley Publications (2015)
  + R3. Android Programming The big nerd ranch guide 4th Edition by Kristin Marsicano, Brian Gardner, Bill Phillips and Chris Stewart, Big Nerd Ranch Publications (2019)
  + R4. Head first Android Programming 2nd Edition by Dawn Griffiths and David Griffiths, Oreilly

Publications (2017)

* + R5. Mobile Design and Development: Practical Concepts and Techniques for Creating Mobile Sites and Web Apps by Brian Fling, Oreilly Publications (2009)

Note: Official Android documentation and online resources will be used as study materials during the course.

**Course Plan:**

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| --- | --- | --- | --- |
| **Lecture No.** | **Learning objectives** | **Topics to be covered** | **Chapters in Reference Text Books** |
| L1-2 | * To learn about mobile computing along with novel applications and various design considerations for mobile computing * To get an insight into features, limitations and design constraints of mobile devices | * Brief introduction to mobile computing * Mobile client devices and pervasive computing - Classification and characterization of mobile devices, Device design constraints | R1- Chapter 2,3 |
| L3-4 | * To understand about different computing environments for smartphones – platforms, application frameworks * To understand basic Android application and its various features | * Mobile Platforms, Operating Systems, Development Environments * Introduction to Android Application Development Platform | R1- Chapter 16  R5 – Chapter 1,2,3,6 |
| L5-7 | * To learn about android activities and how to use them in app development * To get an understanding of the complete activity lifecycle * To learn about explicit and implicit intents | * Android Activities * Activity lifecycle * Intents and Intent Filters * Persistent Data | R2- Book 3, Chapter 1  R2- Book 3, Chapter 2 |
| L8-9 | * To understand different layout concepts and widget organization * To learn to create various user interaction elements, add themes and styles to create delightful user experience | * Creating User interfaces with Layouts and Widgets * Styles and Themes * User Experience | R2- Book 4, Chapter 1  R3 – Chapter 21 |
| L10-11 | * To understand how database processing works in Android | * Working with Databases * Cursors and Cursor adaptors * Room Library | R2- Book 3, Chapter 5  R3 – Chapter 11 |
| L12-13 | * To learn how to program using fragments and manage multi panel activities * To learn how to develop apps that work on both phone and tablets | * Fragments * Building Apps for Tablets | R2- Book 5, Chapter 1 |
| L14-15 | * To gain an understanding of various Android Architectural Patterns | * MVC, MVP, MVVM | R3 – Chapter 2, 19 |
|  | Project Mid Sem Demo and Mid Sem Exam | | |
| L16 | * To learn to connect to device hardware sensors and use them in app development * To learn how to create a basic wearable app * To learn to run an Android app on wearable | * Working with Device Sensors * Developing for Android Wear | R2- Book 4, Chapter 3  R2- Book 5, Chapter 2 |
| L17-18 | * To learn how to run services * To learn how to create and use a broadcast receiver | * Services * Broadcast Receivers | R2- Book 3, Chapter 3,4 |
| L19-20 | * To learn how Background processing works in Android | * Background Threads * Asynctasks | R3 – Chapter 11 |
| L21-22 | * To learn to adapt the app based on user specific language settings and vision/hearing/mobility impairments | * Localization * Accessibility | R3 – Chapter 17, 18 |
| L23-24 | * To learn how to publish and launch apps | * Preparing and publishing your own apps | R2 – Book 6 Chapter 1, 2 |
| L25-27 | * Buffer lectures for invited guest lectures and revision | * Industry Guest Lectures * Course Revision | - |
| Project Final Demo and Comprehensive Exam | | | |

**Evaluation Scheme:**

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| --- | --- | --- | --- | --- |
| **Component** | **Duration** | **Weightage (%)** | **Date & Time** | **Nature of Component** |
| Mid Term Exam | 1.5 hours | 20 | 04/11 3.30 - 5.00PM | Closed Book |
| Lab Project (Mid and End semester demos) | -- | 30 | TBA | Open Book |
| Lab (Quizzes/ Submissions) | -- | 20 | TBA | Open Book |
| Comprehensive Exam | 3 Hours | 30 | 28/12 AN | Closed Book |

Note: minimum 40% of the evaluation to be completed by midsem grading.

**Chamber Consultation Hour:**

H-126, Tuesday 12pm-1pm

**Notices:**

All notices and announcements pertaining to this course will be displayed on the CMS/Google Classroom.

**Make-up Policy:**

1. No make-up requests for lab quizzes/submissions will be catered to.
2. Prior permission of the Instructor-in-Charge is required to get make-up for the mid-semester and comprehensive exams. Only on producing documentary proof of absence (before the examination), proving that student would be unable to appear for the exam the decision of granting the make-up will be taken.

**Academic Honesty and Integrity Policy:**

Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**INSTRUCTOR-IN-CHARGE**

**CS F314**

**Proposed Lab Schedule**

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| Lab 1 | Android Studio and Hello World |
| Lab 2 | Building an Interactive Application |
| Lab 3 | Multiple Activities and Intents |
| Lab 4 | List Views and Array Adapters |
| Lab 5 | Styles, Themes, and Action bars |
| Lab 6 | Databases |
| Lab 7 | Fragments |
| Lab 8 | Fragments for Larger Interfaces |
| Lab 9 | Android Architecture Patterns |
| Lab 10 | Android Wear Development and Working with Device Sensors |