Course Code & Name	26CAPC8003 Mobile Computing		
Teaching Hours /week (L: T:P: R)	3:1:0:0	Credits	4
CIE Marks	40	ESE Marks	60
Course Type	Theory (PCC)	Exam Hours	3
Prerequisites (if any)	-		

Course Objectives:

1. To learn the concepts of Mobile Communication and Computing Technologies and mobile OS concepts.
2. To develop and deploy effective mobile applications.

Course Outcomes (COs)

At the end of the course students should be able to:

	Course Outcome	Bloom's Knowledge Level (KL)
CO 1	Explain the basic concepts and architecture of mobile communication systems and wireless networks.	K2
CO 2	Describe the design issues and challenges in developing mobile applications considering mobility, security, and energy constraints	K2
CO 3	Explain the architecture, features, and functionalities of various mobile operating systems	K2
CO 4	Apply concepts of mobile computing to solve real-world problems.	K3

Note: *K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	2	3	3	3	-	-	-	-
CO 2	2	3	2	3	-	-	-	-
CO 3	2	3	3	3	-	2	2	2

CO 4	2	3	2	3	2	2	2	2

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), - : No Correlation*

Course Assessment Method

(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE)

Attendance	Assignment/ Micro-project	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
8	**12**	**10**	**10**	**40 Marks**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

PART A	PART B	TOTAL
■ 2 Questions from each module. ■ Total of 8 Questions, each carrying 3 marks **(8x3 =24 marks)**	■ Each question carries 9 marks. ■ Two questions will be given for each module, of which 1 should be answered. ■ Each question can have a maximum of 3 subdivisions. **(4x9 = 36 marks)**	**60 Marks**

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Introduction to Communication technologies -Mobile handsets, wireless communications and server applications - Components of a wireless Communication system - Architecture of a Mobile telecommunication system – Wireless Standards-Wireless Local Area Networks (WLANs) -Bluetooth Technology - Bluetooth low energy (BLE), NFC, VoLTE, Mobile Hardware(ARM) and Sensors.	**8**
2	Cellular Mobile Communication – Global System for Mobile	**12**

	Communication (GSM) – Services, General Packet Radio Service (GPRS) -Services, Basic idea of 1G, 2G, 3G, 4G LTE, and 5G, 5G use cases, Mobile Cloud, AI in Mobile and Edge Computing.	
3	Operating Systems for Mobile Computing: OS Responsibilities in mobile devices – Concepts of Mobile OS – Special Constraints and requirements of Mobile OS, iOS, and Android OS. Mobile Network Architecture. Pros & Cons of Mobile Payment System Security Issues.	**10**
4	Introduction to Flutter 3.x, Dart 3.x, Features of Flutter- Advantages of Flutter- Disadvantages of Flutter. Architecture of Flutter Applications. Widgets- Gestures- Concept of State- Layers- Introduction to Dart Programming-Variables and Data types- Decision Making and Loops. Functions- Object Oriented Programming. Introduction to Widgets- Widget Build Visualization, Cross Platform Developement	**15**

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Fundamentals of Mobile Computing	Prasanth Kumar and Pattnaik, Rajib Mall	PHI	Second Edition , (2012)
2	Mobile Networks Architecture	Perez, Andre	John Wiley & Sons	First Edition, 2013
3	Mobile Communications	Jochen Schiller	Techno series	Second Edition , (2024)

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Flutter for Beginners -An introductory guide to building cross-platform mobile applications with Flutter	Alessandro Biessek And Thomas Bailey	Packt Publishing	Second Edition 2021
2	Beginning Flutter: A Hands-On Guide to App Development	Marco L. Napoli	Apress	2019

Web References/ Video Links (NPTEL, SWAYAM…)	
Sl.No	**Link ID**
1	https://www.tutorialspoint.com/mobile_computing/index.htm
2	http://kosmi.snubi.org/APAMI/resource/Tutorials/T2-Leong.pdf
3	https://www.geeksforgeeks.org/wireless-mobile-computing-technologies/

Course Level Assessment Questions

Course Outcome 1 (CO1):

1. What are the major challenges in wireless communication compared to wired communication?
2. Explain the meaning of handoff (handover) and describe the difference between *hard* and *soft* handoff.
3. List and explain the different types of propagation models used in mobile communication.

Course Outcome 2 (CO2):

1. Compare the technologies used in 1G, 2G, 3G, 4G, and 5G mobile systems in terms of data rate, modulation, and services offered.
2. Draw and explain the architecture of a GSM system, including MS, BSS, NSS, and OSS.
3. Describe the role of Base Transceiver Station (BTS) and Mobile Switching Center (MSC) in mobile networks.

Course Outcome 3 (CO3):

1. How a Mobile Operating System is different from a traditional desktop OS?
2. Why do mobile devices need efficient power management? Explain with examples.
3. Discuss the constraints faced by mobile OS.

Course Outcome 4 (CO4):

1. Draw and explain the architecture of a Flutter application, including Framework, Engine, and Embedder.
2. What is Widget Build Visualization and how does it help in UI design?
3. What is the purpose of the Widget Tree in Flutter?

Model Question Paper

Reg No.:_____ Name:_____

FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY

MCA S2 (R,S) Examination ……2026 (2026 Scheme)

Course Code: 26CAPC8003

Course Name: Mobile Computing

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

		CO	Marks
1	What are the components of a wireless communication system?	CO1	(3)
2	Why it is said that mobile computing is ubiquitous computing?	CO1	(3)
3	What services are provided by GSM?	CO2	(3)

4	Compare any three important features of 4G and 4G LTE.	CO2	(3)
5	What are the responsibilities and constraints of a Mobile Operating Systems?	CO3	(3)
6	Explain the features provided by iOS operating system.	CO3	(3)
7	What is a widget in Flutter? Distinguish between StatelessWidget and StatefulWidget.	CO4	(3)
8	How Flutter is different from traditional cross-platform frameworks?	CO4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module I

9	a) With the help of a neat diagram explain how mobile telecommunication system works.	CO1	(6)
	b) What is NFC?	CO1	(3)
	OR		
10	a)What is Bluetooth?	CO1	(3)
	b)Explain Bluetooth Protocol stack	CO1	(6)

Module II

11	Explain the architecture of GSM.	CO2	(9)
	OR		
12	Discuss the network elements in GPRS that are different from GSM with a suitable diagram. Also discuss the advantages of GPRS.	CO2	(9)

Module III

13	What is a microkernel operating system? Why microkernel based design being preferred for developing a mobile OS?	CO3	(9)
	OR		
14	Explain the pros and cons of Mobile Payment System Security Issues.	CO3	(9)

Module IV

15	a) Explain the architecture of Flutter applications.	CO4	(5)
	b) What do you understand by State and Gestures in Flutter applications?	CO4	(4)
	OR		
16	Explain the basic concepts of Dart programming	CO4	(9)

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