



PSN COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Melathediyoor, Tirunelveli – 627152

Department of Computer Science and Engineering

COURSE PLAN
(Regulation 2018)

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Updated on:

No. of pages:

Subject Name & Code	Mobile Computing & 503022
Course Type	Core
Programme	B.E.CSE (UG)
Year/Semester/Section	IV Year / VII Semester
Nature of Course/Credit	Theory
Course Coordinator	Dr. M. Vargheese

Vision and Mission of the Institute & Department

	Vision		Mission	
Institute	To emerge as a pioneer institute inculcating engineering education, skills, research, values and ethics		IM-1	To achieve greater heights of excellence in technical knowledge and skill development through innovative teaching and learning practices.
			IM-2	To develop the state of art infrastructure to meet the demands of technological revolution.
			IM-3	To improve and foster research in all dimensions for betterment of society.
			IM-4	To develop individual competencies to enhance innovation, employability and entrepreneurship among students.
			IM-5	To instill higher standards of discipline among students, inculcating ethical and moral values for societal harmony and peace.
Department	To emerge as a preeminence program to produce quality Computer Science and Engineering graduates.		DM-1	To enhance professional and entrepreneurial skills through industry institute interaction to enable them in getting better placement
			DM-2	To promote research and continuing education
			DM-3	To train the students according to their discipline to meet dynamic needs of the society

1. Pre-requisite (if any) :

Basic idea about Computer Networks

2. COURSE DESCRIPTION:

This course will cover various topics of mobile computing, networking, and systems, including but not limited to: applications of smartphones, cellular networks, embedded sensor systems, localization systems, energy efficiency of mobile devices, wearable and vehicular mobile systems, mobile security, virtual reality.

The course will offer significant hands-on experience, i.e., students will have the opportunity to explore various features of mobile devices.

3. CAREER OPPORTUNITIES: (ONE OR TWO)

- 1) Mobile Application Developer
- 2) Networking Administrator

4. SYLLABUS

UNIT - I	INTRODUCTION	Hrs
	Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA	9
UNIT - II	MOBILE TELECOMMUNICATION SYSTEM	Hrs
	Introduction to Cellular Systems – GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS- UMTS – Architecture – Handover – Security	9
UNIT – III	MOBILE NETWORK LAYER	Hrs
	Mobile IP – DHCP – AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols – DSR, AODV, Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security.	9
UNIT - IV	MOBILE TRANSPORT AND APPLICATION LAYER	Hrs
	Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTA Architecture – WML	9
UNIT – V	MOBILE PLATFORMS AND APPLICATIONS	Hrs
	Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues	9

List of Exercises

1. Develop an application that uses GUI components, Font and Colour
2. Develop a native calculator application.
3. Develop a native application that uses GPS location information.
4. Implement an application that writes data to the SD card.
5. Implement an application that creates an alert upon receiving a message.
6. Write a mobile application that creates alarm clock

Total: 45+30 = 75 Periods

5. Course Outcomes (COs): CO1.....CO5 (should follow Bloom's taxonomy)

Course Outcomes: After successful completion of the course, the students should be able to		
COs	CO Statements	POs
CO1 :	Explain the basics of mobile telecommunication systems	1,2, 3, 4, 12
CO2 :	Illustrate the generations of telecommunication systems in wireless networks	1,2, 3, 4, 5, 12
CO3 :	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network	1,2, 3, 4, 5, 12
CO4 :	Explain the functionality of Transport and Application layers	1, 3, 4, 5, 12
CO5 :	Develop a mobile application using android/blackberry/ios/Windows SDK	1, 3, 4, 5, 12

6. Instructional Learning outcomes (unit wise/assignments/tutorials)

UNIT	LEARNING OUTCOMES
I	Students able to explain the basics of mobile telecommunication systems. This outcome will be assessed through Assignment – 1, Class Test – 1, MCQ Test, CAT-I
II	Students able to illustrate the generations of telecommunication systems in wireless networks. This outcome will be assessed through Assignment – 2, Class Test – 2, MCQ Test, CAT-I and CAT-II
III	Students able to determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network. This outcome will be assessed through Assignment – 3, Class Test – 3, MCQ Test, CAT-II
IV	Students able to explain the functionality of Transport and Application layers. This outcome will be assessed through Assignment – 4, Class Test – 4, MCQ Test, CAT-III.
V	Students able to develop a mobile application using android/ blackberry/ ios/ Windows SDK. This outcome will be assessed through Assignment – 5, Class Test – 5, MCQ Test, CAT-III.

7. Program Educational Objectives (PEOs) (max. 4)

S.No	Topic	PEOs
PEO1	Fundamental Knowledge	Graduates will be able to perform in technical and managerial roles ranging from design, development and problem solving to suit to the industrial needs
PEO2	Career Development	Graduates will be able to successfully pursue higher education and also Graduates will have the ability to adapt, contribute and innovate new technologies in different domains of Computer Science and Engineering
PEO3	Social Identity	Graduates will be ethically and socially responsible engineers in Computer Science and Engineering disciplines

8. Program Outcomes (POs) (12 attributes)

PO's No	KNOWLEDGE	STATEMENTS
1	Engineering Knowledge:	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem Analysis:	Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design / Development of Solutions:	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct Investigations of Complex Problems:	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern Tool usage:	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and

		modeling to complex engineering activities with an UN 2 of the limitations.
6	The Engineer and Society:	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and Sustainability:	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	Ethics:	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and Team Work:	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication:	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project Management and Finance:	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	Life-long Learning:	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

9. Program Specific Outcomes (PSOs) (max.3)

Graduating student shall be able to:

PSO1	Proficient and Innovative with a strong cognizance in the IOT, through the application of acquired knowledge and skills.
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PSO2	Design and Implement IOT based solutions for improving operational efficiency by investigating existing industrial environment.
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10. CO and PO mapping (3 point scale)

COURSE OUTCOMES VS PROGRAM OUTCOMES MAPPING:

Course Outcomes	Program Outcomes												Program Specific Outcomes	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2	1	1	1								2	2	
CO 2	3	2	2	2	2							2	2	
CO 3	2	2	2	1	1							2	2	
CO 4	2		2	2	1							1	2	
CO 5	3	1	2	2	1							3		2

Enter correlation levels 1, 2 & 3 define as: 1-low, 2- medium, & 3-high

11. Text Books & Reference Books

S. No.	Name of the Book	Author/Publisher/Year/ Edition	Web link
1	Mobile Computing, (Text Book)	Raj Kamal, Oxford University Press, Third Edition, 2018	https://www.academia.edu/8207054/Mobile_computing_by_dr_raj_kamal_3rd_prescribe_book
2	Mobile Communications, (R1)	Jochen Schiller, PHI, Second Edition, 2003	https://web.uettaxila.edu.pk/CMS/SP2013/teMCTTms/tutorial%5C Mobile-Communications-JochenSchiller.pdf
3	Introduction to Wireless and Mobile systems (R2)	Dharma Prakash Agarwal, Qing and An Zeng, Thomson Asia Pvt Ltd, 2005	http://ece2526.elimu.net/Books/Introduction%20to%20Wireless%20and%20Mobile%20Systems-Agrawal.pdf

12. Web Resources: (other than NPTEL, SWAYAM and other e learning resources)

S.No.	Topic	Web link
1	Wireless	https://www.tutorialspoint.com/

	transmission	<i>data_communication_computer_network/ wireless_transmission.htm</i>
2	GPRS	https://en.wikipedia.org/wiki/ General_Packet_Radio_Service
3	Vehicular Ad Hoc networks	https://www.researchgate.net/publication/258248007_Vehicular_ad-Hoc_networks_VANETs-An_overview_and_challenges
4	WAP - Architecture	https://www.tutorialspoint.com/wap/wap_architecture.htm
5	Mobile Payment System	https://www.academia.edu/2563249/Mobile_Payment_Systems_and_Services_An_Introduction

13. E – learning videos/NPTEL/ SWAYAM and other resources (IMPORTANT!)

1	Spread spectrum	https://nptel.ac.in/courses/117/105/117105136/
2	3G and 4G Mobile Communication	https://nptel.ac.in/courses/117/104/117104099/
3	Ad-hoc Networks	https://nptel.ac.in/courses/106/105/106105160/
4	WAP	https://www.youtube.com/watch?v=1e_vMwofY4o
5	Modern Application Development	https://nptel.ac.in/courses/106/106/106106156/

14. Magazines & Journals (one or two)

<https://www.hindawi.com/journals/wcmc/>

15. LESSON PLAN

S.no	Unit	Topic to be covered	Hours need	Mode of teaching (BB/PPT/Other)	Text/ Ref. book	Page no
INTRODUCTION						
1	I	Introduction to Mobile Computing	1	PPT	T1	11
2		Applications of Mobile Computing- Generations of	2	PPT	T1	13

		Mobile Communication Technologies				
3		Multiplexing	1	PPT	T1	22
4		Spread spectrum	2	PPT	T1	24
5		MAC Protocols	1	PPT	T1	27
6		SDMA – TDMA – CDMA	2	PPT	T1	34
MOBILE TELECOMMUNICATION SYSTEM						
7	II	Introduction to Cellular Systems	1	BB	T1	47
8		GSM – Services & Architecture	1	PPT	T1	49
9		Protocols – Connection Establishment	1	BB	T1	61
10		Frequency allocation	1	BB	T1	66
11		Routing	1	PPT	T1	68
12		Mobility Management	1	PPT	T1	72
13		Security	1	PPT	T1	75
14		GPRS	1	PPT	T1	79
15		UMTS – Architecture – Handover – Security	1	PPT	T1	82
MOBILE NETWORK LAYER						
16	III	Mobile IP – DHCP	2	BB	T1	102
17		AdHoc– Proactive protocol-DSDV	1	PPT	T1	112
18		Reactive Routing Protocols – DSR	1	PPT	T1	115
19		AODV, Hybrid routing	1	PPT	T1	117
20		Multicast Routing- ODMRP	1	PPT	T1	119
21		Vehicular Ad Hoc networks (VANET)	1	PPT	T1	130
22		MANET Vs VANET	1	BB	T1	135
23		Security	1	BB	T1	138
MOBILE TRANSPORT AND APPLICATION LAYER						
24	IV	Mobile TCP	1	BB	T1	189
25		WAP – Architecture	2	PPT	T1	198
26		WDP – WTLS	2	PPT	T1	203
27		WTP –WSP	1	PPT	T1	205
28		WAE	1	PPT	T1	207
29		WTA Architecture	1	PPT	T1	210
30		WML	1	PPT	T1	220
MOBILE PLATFORMS AND APPLICATIONS						

31	V	Mobile Device Operating Systems – Special Constraints & Requirements	2	BB	T1	345
32		Commercial Mobile Operating Systems	1	BB	T1	378
33		Software Development Kit: iOS	1	PPT	T1	402
34		Android, BlackBerry, Windows	2	PPT	T1	440
35		MCommerce – Structure – Pros & Cons	1	PPT	T1	447
36		Mobile Payment System	1	PPT	T1	480
37		Security Issues	1	PPT	T1	483
38		Demonstrate some small applications by using Android OS	2*	PPT		
Total Hours Needed: 45 + 2* = 47 Hours						

**Beyond the syllabus topics*

	Prepared by:	Approved by:	
Signature			
Name :	Dr. M. Vargheese	Dr. M. Vargheese	Dr. V. Manikandan
Designation:	Professor	HoD / CSE	Principal
Date:			