GUJARAT TECHNOLOGICAL UNIVERSITY

Programme Name: Master of Engineering

Master of Engineering Syllabus

Level: PG

Subject Code : ME02000121

Subject Name : Embedded Wireless Systems

WEF Academic Year :	2024-25
Semester :	2
Category of the Course :	PEC-04

Prerequisite :	Fundamental knowledge of Wireless and digital Communication
Rationale :	This Subject Provide the students an exposure to understand wireless communication technology and learn how to implement it on embedded platform. It also helps the students to develop their own project or carried our dissertation work on embedded wireless application. This subject provides the opportunity to the student to understand real environment problem in wireless communication and motivate them to bring out with the solution by practically implementing application

Course Outcome :

After Completion of the Course, Student will be able to :

No	Course Outcomes	RBT Level*
01	Design a API using Embedded technology.	CR
02	Analyze the performance of various embedded system	AN
03	Evaluate the performance of various protocols communication standards and wireless.	EL
04	Understand the process of embedded software design and networking	UN

*RM: Remember, UN: Understand, AP: Apply, AN: Analyse, EL: Evaluate, CR: Create

Teaching and Examination Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

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Course Content :

Sr. No.	Course Content	No. of Hours	% of Weightage
1	Review of C Programming, Data Structures , Introduction to UML , Software Life Cycle Models , Embedded Systems Design, Implementation and Testing , Overview of Networking and Packet Switching Concepts, OSI Reference Model and TCP/IP Protocol Suite, LAN Protocol Suite .	12	25
2	Evolution of Wireless Communication - Radio architectures: TRF, single conversion, and dual conversion, Super-heterodyne receiver, IQ; Modulation - AM, FM, SSB, TDMA, CDMA, FDMA, OFDM, BPSK, QPSK, M-QAM; PLL – phase lock loops, Wireless Standards – IS136, IS95, 802.11(a-g), GSM, 3G, WiMax, Small Scale and large scale fading	12	25
3	Embedded Systems – Hardware, Software, Internet Access; Development and Debugging Tools - Simulators, ICE, C Compiler; RTOS – System Services, Interrupt Handling, Real Time, Scheduling; Socket Programming – Internet Architecture, UDP, TCP, client/server; Internet Application Protocols – HTTP, FTP, SNMP, Audio/Video Applications	12	25
4	Embedded systems hardware and software interfaces; Protocol Debugging & Testing Tools – PING, Sniffers, Load Generators; Development tools – SDK, simulators, debuggers; TCP/IP – architecture, socket programming and debugging	6	12
5	Wireless Technologies and Mobile Programming - Wireless LAN : 802.11 & WiMAX, RFID & Bluetooth, GSM & GPRS, MIMOm Mobile Development Platforms (Android, Symbian, OpenMoko, J2ME), Bluetooth – architecture, protocols, implementation, and programming API; WiFi – architecture, protocols, implementation, and API; ZigBee – architecture, protocols, implementation, and API	6	13
	Total	**48**	**100**

Reference Book:

1. Embedded Systems and Wireless Technology: Theory and Practical Applications, Raul A. Santos, CRC Press
2. Embedded Systems and Wireless Technology: Theory and practical applications by Dr. Raúl Aquino santos, MSc. Arthur Edwards Block (University of Colima, Mexico)

3. Fundamentals of Mobile and Pervasive Computing by Frank Adelstein, Sandeep K.S. Gupta, Golden G. Richard III, and Loren Schwiebert, Publisher: McGraw-Hill Education, 2005, ISBN-10:0071412379, ISBN13: 978-0071412377.
4. Context-Aware Pervasive Systems: Architectures for a New Breed of Applications by Seng Loke, Publisher: AUERBACH, 1st edition (December 7, 2006), ISBN-10: 0849372550, ISBN-13: 9780849372551
5. Cooperating Embedded Systems and Wireless Sensor Networks by Michel Banatre (Editor), Pedro Jose Marron (Editor), AnibalOllero (Editor), Adam Wolisz (Editor)

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