

**FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING**

Father Agnel Ashram, Bandstand, Bandra-west, Mumbai-50

**Department of Information Technology****B.E. (I.T.) (Semester VI) (2020-2021)****Lesson Plan**

Subject: Wireless Network

Credits:4

Subject-In Charge: Prof. Monali Shetty

**Syllabus**

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral & Practical	Tutorial	Total
ITC604	Wireless Network	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Oral & Practical	Total
		Internal assessment			End Sem. Exam			
		Test1	Test2	Avg. of two Tests				
ITC604	Wireless Network	20	20	20	80	--	--	100

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Modulation and Demodulation Techniques, PSTN	02	
I	Fundamentals Wireless Communication	Fundamentals of Wireless Communication, Advantages, limitations and application, wireless media, Infrared Modulation Techniques, DSSS and FHSS, Frequency Spectrum: Radio and Infrared; Wireless generations: 1G: Cellular, 2G: Mobile Radio, 3G: UMTS- Security related Encryption Algorithm, 4G	07	CO1

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II	Evolution of Wireless Technologies	Multiple Access Technique: TDMA, FDMA, CSMA, CDMA  Wireless Technologies: GSM, GPRS, EDGE, CDMA, LTE, UMTS	10	CO1  CO2
III	Types of Wireless Networks	Ad-hoc: MANET & VANET, Application, Advantage and limitations; Wireless Sensor Network: Application, advantages and limitations	09	CO1  CO3
IV	Emerging Wireless Technologies and standards	WLL , WLAN- 802.11 (Wi-Fi), WPAN- 802.15.1/3/4 (Bluetooth, Zigbee), WMAN-802.16a (Wi-max) , Wi-max and LTE /3GPP comparison, Mi-fi, Ly-fi,	10	CO1  CO2  CO4
V	Wireless Network Design Considerations	Wireless technology, Cisco Unified Wireless Network, Designing Wireless Networks with Lightweight Access Points and Wireless LAN Controllers	07	CO1  CO2  CO3  CO4  CO5
VI	Wireless Network Security	The need, attacks, security serviced, WEP, Mobile IP, VPN( PPTP, LLTP, IPSec), Network Layer Security, Transport Layer Security, Email Security: PGP, S/ MIME, Internet Firewalls for Trusted System	07	CO1  CO2  CO3  CO6

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**Text Books:**

1. Cellular Communications: A Comprehensive and Practical Guide, Nishith Tripathi, Jeffery H Reed, Wiley
2. Wireless Mobile Internet Security, 2<sup>nd</sup> Edition, Man, Young Rhee, Wiley- IEEE press
3. Designing for Cisco Internetwork Solutions (DESGN), 2<sup>nd</sup> Edition, CCDA, Diane Teare, cisco Press.

**References:**

1. Introduction to Digital mobile communication, 2<sup>nd</sup> Edition, Yoshihiko Akaiwa
2. "Wireless Communications and networks", William Stallings, Pearson / Prentice Hall
3. Wireless communication and networking, Vijay Garg

**Assessment:**

**Internal Assessment for 20 marks:**

Consisting of **Two Compulsory Class Tests**

Approximately 40% to 50% of syllabus content must be covered in First test and remaining 40% to 50% of syllabus contents must be covered in second test.

**End Semester Examination:** Some guidelines for setting the question papers are as:

- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total **six questions, each carrying 20 marks.**
- **Q.1** will be **compulsory** and should **cover maximum contents of the syllabus.**
- **Remaining question will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)
- Total **four questions** need to be solved.

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**CO Statements**

CO1	Explain the basic concepts of wireless network and wireless generations.
CO2	Demonstrate the different wireless technologies such as CDMA, GSM, GPRS, etc.
CO3	Appraise the importance of Ad-hoc networks such as MANET and VANET and Wireless sensor networks.
CO4	Describe and judge the emerging wireless technologies standards such as WLL, WLAN, WPAN, WMAN.
CO5	Explain the design considerations for deploying the wireless network infrastructure.
CO6	Differentiate and support the security measures, standards, services and layer wise security considerations.

**CO-PO and CO-PSO Mapping**

Course Name	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	2					2					2	2	3
CO2	1	2	3			2	2					2	3	1
CO3	1	2	3				2		2	2		2	2	1
CO4	1	2	3				2			2		2	2	2
CO5	1	2					2			2		2	2	2
CO6	1	2	3				2		2	3		2	1	3

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**CO Assessment tools with target**

	Direct Methods									Indirect Methods
	Test1	Assig1	Lab Work	Quiz	Test2	Assig2	University Theory Result	University Oral Result	MCQ	Course Exit Survey
CO1	25%		20%	20%	-	-	10%	25%	-	100%
CO2	40%		20%	10%	-	-	20%	10%	-	100%
CO3	-		20%	20%	30%		30%	20%	-	100%
CO4	-		20%		30%		30%	20%	-	100%
CO5	-		20%		20%	10%	30%	20%	-	100%
CO6	-		20%		20%	10%	30%	20%	-	100%

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**Curriculum Gap/Content beyond syllabus (if any).**

Conducted Experiments

No.	Name
1	To simulate Fixed Time Division Multiplexing.
2	Study different WSN Open Source Simulators like ContikiCooja, Cupcarbon.
3	Installation of ContikiCooja.
4	Run Basic programs of cooja (Hello_world).
5	To implement Code Division Multiple Access (CDMA)
6	Installation of cupcarbon and Run basic Hello_World Program using cupcarbon.
7	Implementation of Mobile Network (MANET) using Network Simulator (NS2)
8	Mini Project : IOT+Cloud

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**Lecture Plan**

<b>No of classes Planned:</b>	44	<b>No of Classes taken:</b>		
<b>Sr. No.</b>	<b>Topic Planned</b>	<b>Planned Date</b>	<b>Actual Date</b>	<b>Delivery Mechanisms</b>
1.	Fundamentals of Wireless Communication, Advantages, Limitations and applications	25/01/2021	25/01/2021	Online, PPT
2.	Wireless media, Infrared, Modulation Techniques	27/01/2021	27/01/2021	Online, PPT
3.	DSSS and FHSS	29/01/2021	29/01/2021	Online, PPT
4.	Frequency Spectrum, Wireless Generations: 1G, 2G, 3G, 4G	1/2/2021	1/2/2021	Online, PPT
5.	UMTS Security Related Encryption Algorithm	2/2/2021	2/2/2021	Online, PPT
6.	Multiple Access Techniques: TDMA, FDMA	3/2/2021	3/2/2021	Online, PPT
7.	Multiple Access Techniques: SDMA, CDMA	5/2/2021	5/2/2021	
8.	CSMA	8/2/2021	8/2/2021	

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9.	Cellular Concept, Cell Splitting, Cell Sectorization	9/2/2021	9/2/2021	
10.	Frequency Reuse Concept, Handoff Strategies	10/2/2021	10/2/2021	
11.	Adjacent Channel and Co-Channel Interference	12/2/2021	12/2/2021	
12.	Numericals on Cellular Concept	15/2/2021	15/2/2021	
13.	Numericals on Frequency Reuse	16/2/2021	16/2/2021	
14.	Numericals on S/I Ratio	17/2/2021	17/2/2021	
15.	GSM Architecture, GSM services	1/3/2021	1/3/2021	
16.	GSM Channel Types and GSM Burst Structure	2/3/2021	2/3/2021	
17.	GPRS, EDGE	3/3/2021	3/3/2021	
18.	CDMA Architecture, CDMA Channels	5/3/2021	5/3/2021	
19.	LTE, UMTS	12/3/2021	15/3/2021	
20.	MANET, Applications, Advantages and Limitations	15/3/2021	16/3/2021	
21.	VANET, Applications, Advantages and Limitations	17/3/2021	19/3/2021	
22.	WSN, Applications, Advantages and Limitations	29/3/2021		
23.	WSN Protocols	30/3/2021		



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24.	WLL Architecture, LMDS and MMDS	31/3/2021		
25.	WLAN 802.11 (Wi-Fi): PHY Layer	2/4/2021		
26.	WLAN 802.11 (Wi-Fi): MAC Layer	5/4/2021		
27.	WPAN-802.15.1 (Bluetooth architecture and Protocol Stack)	6/4/2021		
28.	Bluetooth Attacks	7/4/2021		
29.	WPAN-802.15.4 (Zigbee Architecture)	9/4/2021		
30.	WMAN 802.16a (Wi-max)	19/4/2021		
31.	Wi-max and LTE/3GPP Comparison	20/4/2021		
32.	Mi-fi, Ly-fi	21/4/2021		
33.	Wireless Network Design Considerations	23/4/2021		
34.	Cisco Unified Wireless Network	26/4/2021		
35.	Designing wireless networks with Lightweight Access Points	27/4/2021		
36.	Designing wireless networks with Wireless LAN Controllers	28/4/2021		
37.	The need of Wireless Network Security, Attacks	30/4/2021		
38.	Security Services	10/5/2021		

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39.	WEP, Mobile IP	11/5/2021		
40.	VPN (PPTP, LLTP, IPSec)	12/5/2021		
41.	Network Layer Security	14/5/2021		
42.	Transport Layer Security	17/5/2021		
43.	Email Security: PGP,S/MIME	18/5/2021		
44.	Internet Firewalls for Trusted System	19/5/2021		
45.	Remedial			
46.	Remedial			
47.	Remedial			
48.	Remedial			

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**Lab Plan**

<b>No.</b>	<b>Name</b>	<b>Batch A</b>	<b>Batch B</b>	<b>Batch C</b>	<b>Batch D</b>
1	To simulate Fixed Time Division Multiplexing.	24/2	23/2	22/2/2 021	25/2
2	Study different WSN Open Source Simulators like ContikiCooja, Cupcarbon.	24/3	23/3	22/3	25/3
3	Installation of ContikiCooja.	24/2	23/2	22/2	25/2
4	Run Basic programs of cooja (Hello_world).			12/4	
5	To implement Code Division Multiple Access (CDMA)	24/3	23/3	22/3	25/3
6	Installation of cupcarbon and Run basic Hello_World Program using cupcarbon.				
7	Implementation of Mobile Network (MANET) using Network Simulator (NS2)			12/4	
8	Mini Project : IOT+Cloud				