

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE: **Electronics & Computer Engineering**

1. Subject Code: **EC – 612N** Course Title: **Wireless Networks**

2. Contact Hours: **L: 3 T: 0 P: 0**

3. Examination Duration (Hrs.): **Theory**

0	3
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Practical

0	0
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4. Relative Weight: **CWS**

15

PRS

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MTE

35

ETE

50

PRE

00

5. Credits:

0	3
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 6. Semester

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Autumn

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Spring

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Both

7. Pre-requisite: **EC - 413 or EC - 513 or equivalent**

8. Subject Area: **MSC**

9. Objective: To acquaint the students with the concepts and the issues involved in the design of wireless networks.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	Wireless network topologies, infrastructure and ad-hoc networks, different generations of wireless networks; The cellular concept and design fundamentals, coverage and capacity expansion techniques.	5
2.	Large scale path loss modeling and shadow fading, indoor and outdoor propagation models; Multipath and Doppler, impulse response model of multipath channel, types of small scale fading, Rayleigh and Rician fading, simulation model.	5
3.	Constant envelope modulation techniques, GMSK; OQPSK and $\pi/4$ QPSK; Spread spectrum modulation and RAKE receiver; OFDM; Performance in fading and multipath channels.	5
4.	Fixed assignment and random access; Capacity and performance of FDMA, TDMA, DS/CDMA and FH/CDMA; WCDMA and OFDMA; Access techniques for WLAN, Bluetooth and mobile data networks; Quality of service enabled wireless access, access methods for integrated services.	6
5.	Location and handoff management, classification of handoffs and handoff algorithms, mobile IP; Power control, and techniques of power control, power saving mechanisms, energy efficient designs; Security in wireless networks.	6

6.	GSM: Reference architecture, registration, call establishment, handoff mechanisms, communication in the infrastructure, GPRS; IS-95: reference architecture, physical layer, radio resource and mobility management; IMT 2000: Physical layer, handoff, power control; Introduction to cordless systems and wireless local loop technologies.	5
7.	Reference and layered architecture of IEEE 802.11 WLANs, physical layer alternatives, MAC scheme and frame format, handoff and power management; Protocol architecture, physical and MAC layer of Hiperlan-1 and Hiperlan-2; IP telephony using WLANs.	5
8.	Wireless home networking; HomeRF; Bluetooth: Protocol stack, physical and MAC layer.	3
9.	Broadband wireless access and IEEE 802.16; Next generation broadband wireless networks and navigational services.	2
Total		42

11. Suggested Books:

Sl. No.	Name of Books / Authors	Year of Publication
1.	Pahalvan, K. and Krishnamurthy, P., "Principles of Wireless Networks: A Unified Approach", Pearson Education.	2002
2.	Stallings, W., "Wireless Communications and Networking", Pearson Education.	2002
3.	Rappaport, T.S., "Wireless Communications: Principles and Practice", 2 nd Ed., Pearson Education.	2002
4.	Prasad, R. and Munoz, L., "WLANs and WPANs: Towards 4G Wireless", Artech House.	2003
5.	Haykin, S. and Moher, M., "Modern Wireless Communication", Pearson Education.	2005
6.	Pandya, R., "Mobile and Personal Communication Systems and Services", Prentice-Hall of India.	2000