NIRMA UNIVERSITY
School of Technology, Institute of Technology
B.Tech. Electronics & Communication Engineering
Semester - VII
Department Elective IV

L	T	P	C
3	-	-	3

Course Code	2ECDE08
Course Title	Broadband Wireless Communication

Course Outcomes (COs):

At the end of the course, students will be able to -

1. apply multi-carrier modulation in broadband wireless communication.
2. analyse MIMO system and scheduling algorithms in LTE.
3. evaluate the performance of broadband communication using LTE advanced.
4. use 5G networks for low power communication using IoT.

Syllabus **Teaching Hours: 45**

UNIT I: Multicarrier Modulation **05**

High data rate communication, frequency selective channels, Orthogonal Frequency Division Multiplexing (OFDM), Single Carrier FDMA (SC-FDMA), OFDM based multiple access (OFDMA), cyclic prefix.

UNIT II: MIMO Systems and Scheduling

Diversity techniques and spatial multiplexing in MIMO systems, scheduling, link adaptation, and Hybrid ARQ, different transmission modes in Long Term Evolution (LTE) systems. **05**

UNIT III: Long-Term-Evolution (LTE) Cellular Networks

Network architecture, physical layer, resource management, downlink physical layer processing, uplink physical layer processing, access procedures **12**

UNIT IV: LTE Advanced

Different features of Release 10 and onward, Carrier Aggregation, enhanced MIMO systems, CoMP technology, Heterogeneous networks, device-to-device communication, machine-to-machine communications, Data offloading, 3D MIMO. **09**

UNIT V: 5G Networks

Drivers for 5G, 5G Internet, Internet of Things (IoT), small cells for 5G mobile networks, mobile clouds, security in 5G networks. **09**

UNIT V: Spectrum Sensing Techniques

Spectrum Sensing Techniques in Cognitive Radio: Energy detection, Cooperative sensing, Receiver operating characteristics (RoC) **05**

Self-Study:

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings:

1. E Dahlman, S. Parkwvall, J Skold, 4G LTE/LTE Advanced for Mobile broadband, Academic Press, Elsevier
2. X. Zhang, X. Zhou, LTE Advanced Air Interface Technology, CRC Press
3. J. Rodriguez, Fundamentals of 5G Mobile Networks, John Wiley

L = Lecture, T = Tutorial, P = Practical, C = Credit