

<b>5G MOBILE COMMUNICATION</b>	
<b>Course Code : 20NHOP623A</b>	<b>Credits:</b> <b>3</b>
<b>L:T:P:S : 3:0:0:0</b>	<b>CIE Marks: 50</b>
<b>Exam Hours : 03</b>	<b>SEE Marks: 50</b>

**COURSE OUTCOMES: At the end of the Course, the Student will be able to:**

<b>CO1</b>	Understand 5G spectrum requirement, its channel model and use cases
<b>CO2</b>	Familiarize with 5G architecture options and physical layer concepts
<b>CO3</b>	Examine the multicarrier techniques and new waveform options for 5G communication
<b>CO4</b>	Appraise the current research avenues in 5G domain
<b>CO5</b>	Illustrate the concept of network slicing and V2V Communication
<b>CO6</b>	Interpret the Interference and Mobility management in 5G networks

**Mapping of Course Outcomes to Program Outcomes:**

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>20NHOP623A</b>	<b>5G MOBILE COMMUNICATION</b>											
<b>CO1</b>	3	2	-	-	-	3	3	-	-	-	-	2
<b>CO2</b>	3	3	3	3	3	-	-	-	3	3	-	3
<b>CO3</b>	3	3	3	3	3	-	-	-	2	2	-	3
<b>CO4</b>	3	3	3	3	3	2	2	2	3	3	-	3
<b>CO5</b>	3	3	2	2	-	3	-	-	-	-	-	2
<b>CO6</b>	3	3	2	-	-	-	-	-	-	-	-	-

Correlation levels:1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

Module No	Module Contents	Hours	COs
1	<p><b>5G RADIO SPECTRUM:</b> 5G spectrum landscape and requirements, Spectrum access modes and sharing scenarios, 5G spectrum technologies.</p> <p><b>5G CHANNEL MODEL:</b> The 5G wireless Propagation Channels: Channel modeling requirements, propagation scenarios and challenges in the 5G modeling.</p> <p><b>5G USE CASES AND SYSTEM CONCEPT:</b> Use cases and requirements, 5G system concept.</p> <p>Textbook 1: 12.2,12.3,12.4, 13.1,13.2,13.3, 2.1,2.2</p>	8	CO1, CO4
2	<p><b>RADIO INTERFACE ARCHITECTURE:</b> 5G architecture options, core network architecture, RAN architecture.</p> <p><b>5G PHYSICAL LAYER:</b> Physical channels and signals, 5G frame structure, physical layer procedures (MIMO, Power control, link adaptation, beam forming).</p> <p>Textbook 3: 5.1,5.2,5.3,5.4, 6.3,6.4,6.11,6.12</p>	8	CO2
3	<p><b>5G RADIO-ACCESS TECHNOLOGIES:</b> Access design principles for multi-user communications, multi-carrier with filtering: a new waveform, non-orthogonal schemes for efficient multiple access</p> <p>Textbook 1: 7.1,7.2,7.3</p>	8	CO3, CO4
4	<p><b>INTRODUCTION TO 5G NETWORK SLICING:</b> Network Slicing, E2E Slicing, SDN and NFV Slicing</p> <p><b>VEHICULAR COMMUNICATIONS:</b> From V2V to AV2X, key standards, VC architectures, V2X Use cases</p> <p>Textbook 2: 5.7</p>	8	CO4, CO5
5	<p><b>MOBILITY AND HANDOFF MANAGEMENT IN 5G:</b> Network deployment types, Interference management in 5G, Mobility management in 5G, Dynamic network reconfiguration in 5G.</p> <p>Textbook 1: 11.1,11.2,11.3,11.4</p>	8	CO6

#### TEXTBOOKS:

1. Afif Osseiran, Jose F Monserrat, Patrick Marsch, "5G Mobile and Wireless Communications Technology", Cambridge University Press, 2016
2. Saad Z. Asif, "5G Mobile Communications Concepts and Technologies", CRC Press, Taylor & Francis Group, First Edition, 2018
3. Harri Holma, Antti Toskala, Takehiro Nakamura, "5G Technology 3GPP NEW RADIO", John Wiley & Sons, First Edition, 2020

## REFERENCES:

1. Gordon L. Stuber, "Principles of Mobile Communication", KLUWER ACADEMIC PUBLISHERS, 2<sup>nd</sup> Edition, 2002
2. Joseph C. Liberti, Theodore S. Rappaport, "Smart Antennas for Wireless Communications", Prentice Hall PTR, 1999
3. Ying Zhang, "Network Function Virtualization Concepts and Applicability in 5G Networks", John Wiley & Sons, 2018

## Mapping of CO v/s PSO:

CO	PSO1	PSO2
20NHOP623A	5G MOBILE COMMUNICATION	
CO1	3	3
CO2	3	3
CO3	3	3
CO4	3	3
CO5	3	3
CO6	3	3

### Assessment Pattern

### CIE-Continuous Internal Evaluation

### Theory (50marks)

Bloom's Taxonomy	Tests	Assignments	Quizzes
Marks	25	15	10
Remember	-	-	-
Understand	10	-	-
Apply	10	7.5	5
Analyze	5	7.5	5
Evaluate	-	-	-
Create	-	-	-

## SEE-Semester End Examination

### Theory (50Marks)

<b>Bloom's Taxonomy</b>	<b>SEE Marks</b>
<b>Remember</b>	-
<b>Understand</b>	15
<b>Apply</b>	20
<b>Analyze</b>	15
<b>Evaluate</b>	-
<b>Create</b>	-