

**Department of Electronics and Communication Engineering**  
**(A proposal for M.Tech Program in ECE (*Specialization in Wireless Communication and Network Engineering* ))**

**Date: 23 August, 2021**

**Preamble:**

The M.Tech program “Mobile Communication” of the Department of ECE is quite old and needs immediate change of both the program name and the contents to make it more attractive and versatile.

The design of M.Tech Curriculum should primarily be architected on the following major principles:

1. The program should be attractive for the prospective students from the view point of potential job opportunities, research openings and be competitive with similar programs in other best Institutions within the country and abroad.
2. The choice of the contents of the curriculum and its diversity should intelligently be decided to fulfill the current trends, the evolutionary progress and the future visions of the technology that defines the M.Tech curriculum structure.
3. The curriculum design should aim at enhancing the market value of the M.Tech program in proportion to fulfilling the accelerated growth for the demand of highly skilled manpower requirement of major industries and corporate establishments.

In this regard our visions and intelligent drive should attach high priority of the directives of **Gartner’s Analysts** to explore the emerging and disruptive technologies such as Wi-Fi including Gig-Fi, 5G cellular, V2X wireless, low-power wide area networks (LPWA), enhanced location tracking, mm-wave wireless, back-scattering networking, software define network (SDR) etc. These innovative transformation would determine the significant potential and turning point of the emerging wireless technology and creates the adoption roadmap.

The current exercise in reshaping the M.Tech curriculum has adopted effectively the above useful guidelines to rename the program as “Wireless Communication and Network Engineering” and its contents have been re-structured to introduce modern subjects, advanced concepts and enhanced practices and the latest trends in technology that the Industry is working with.

This is the first draft of the curriculum that has been prepared to achieve some degree of uniqueness as well as competitiveness with similar programs existing in the best of universities within the country and abroad. The following Institutions are consulted as regards to their similar programs in wireless Communication.

A. Institutions within India

IIT, Kharagpur; IIT, Indore; IIT, Delhi; IIT, Guwahati, IIT, Jodhpur; IISC, Bangalore; IIT, Chennai, IIT, Hyderabad; GSSST (IIT,KGP), BSTTM (IIT,Delhi);

B. Foreign Universities

University of Surrey, George Washington University, Tandon School of Engineering, New York, Cardiff, UK; USC, Viterbi, Southern California; University of Pisa, University of Parma, UCL,UK; University of Southampton, University of Oulu, Tampere University, Austria; UCC, Dublin; NY University, University of Rochester, Caltech, University of Tokyo

## Curriculum Structure

### M.Tech Program in ECE (*Specialization in "Wireless Communication and Network Engineering"*)

<b>1<sup>st</sup> Semester</b>						
Sr.No.	Course Name	Type	L	T	P	Credits
1.	Advanced Wireless Communication	PC	3	0	0	3
2.	Wireless Communication Lab	PC	0	0	2	1
3.	Communication Signal Processing and Algorithms	PC	3	0	0	3
4.	Wireless and Mobile Networks	PC	3	0	0	3
5.	Program Elective 1	PE	3	0	0	3
6.	Program Elective 2	PE	3	0	0	3
Total Credit						16
<b>2<sup>nd</sup> Semester</b>						
Sr.No.	Course Name	Type	L	T	P	Credits
1.	5G Wireless Technology	PC	3	0	0	3
2.	Wireless Systems and Design Lab	PC	0	0	2	1
3.	Advanced RF Engineering	PC	3	0	0	3
4.	VLSI Circuits and Systems	PC	3	0	0	3
5.	Research Methodology and IPR	IC	2	0	0	2
6.	Program Elective 3	PE	3	0	0	3
7.	Program Elective 4	PE	3	0	0	3
Total Credit						18
<b>3<sup>rd</sup> Semester</b>						
Sr.No.	Course Name	Type	L	T	P	Credits
1.	M. Tech. Thesis I	PC	0	0	18	9
2.	Program Elective 5	PE	3	0	0	3
3.	Program Elective 6	PE	3	0	0	3
4.	Open Elective	OE	3	0	0	3
Total Credit						18
<b>4<sup>th</sup> Semester</b>						
Sr.No.	Course Name	Type	L	T	P	Credits
1.	M. Tech. Thesis II	PC	0	0	36	18
Total Credit						18
<b>Total Credit</b>						<b>70</b>

### Tentative Clusters of Program Electives

<b>CLUSTER 1</b>						
<b>Sr.No.</b>	<b>Course Name</b>	<b>Type</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
1.	Intelligent Wireless Sensor Networks	PE	3	0	0	3
2.	Software Defined Networks and Applications	PE	3	0	0	3
3.	Internet of Things	PE	3	0	0	3
4.	Error Control Coding	PE	3	0	0	3
5.	AI and Deep Learning for Wireless Communication	PE	3	0	0	3
6.	Optimization Methods in Engineering	PE	3	0	0	3
7.	Statistical Signal Processing for Communication	PE	3	0	0	3
<b>CLUSTER 2</b>						
<b>Sr.No.</b>	<b>Course Name</b>	<b>Type</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
1.	Radio Access Networks	PE	3	0	0	3
2.	Advanced Photonics, Communication and Networking	PE	3	0	0	3
3.	Wireless Network Performance Modelling and Analysis	PE	3	0	0	3
4.	Advanced Cryptography	PE	3	0	0	3
5.	Big Data Analytics	PE	3	0	0	3
6.	5G Networks for IoT	PE	3	0	0	3
7.	Detection and Estimation Theory	PE	3	0	0	3
<b>CLUSTER 3</b>						
<b>Sr.No.</b>	<b>Course Name</b>	<b>Type</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
1.	Next-generation Wireless Technology	PE	3	0	0	3
2.	Network and Service Management and Control	PE	3	0	0	3
3.	5G Network Architecture and Design	PE	3	0	0	3
4.	Cyber-Physical Systems	PE	3	0	0	3
5.	Embedded Communication	PE	3	0	0	3
6.	Cloud Computing	PE	3	0	0	3
7.	Mm-Wave Technology	PE	3	0	0	3

Note: The electives mentioned above should be chosen as marked 1, 2 from Cluster 1, as marked 3,4 from Cluster-2 and as marked 5,6 from the Cluster-3.

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