

Proposal for M.Tech. ECE (Microwave and Communication Engineering)

Preamble:

The transmission of information data through Radio Frequency (RF) energy has become the most efficient way of communication from one point to another in present scenario. For many years, RF technology has been used in defense and commercial applications. Other major application areas of Radio and Communication Engineering include Mobile, Satellite, Radar, Optical, remote communication and Astronomy. Modern technologies like Wi-Fi, WiMax, Bluetooth, GPS, RFID, GPRS and LTE used Radio communication link to transmit/receive high speed data.

Motivation:

Modern society depends to a large extent on reliable and efficient communication. There is a nearly unlimited demand for more affordable, faster and advanced Radio communication technologies, indicating that there will be large industrial opportunities in the future. Smart phones, Tablets PC, Smart TVs, Internet through Wi-Fi, WiMax, and GPRS, are just a few examples of today's radio communication systems that constantly improve in functionality, performance and cost. In addition, a growing number of concepts and technologies are emerging which will significantly improve areas such as healthcare, safety and security of people, the efficiency of industry and comfort of our homes.

Having the core theme of “**IT-enabled design and manufacturing**” and remarkable emphasis on ‘**multidisciplinary academic environment**’ the PDPM IITDM Jabalpur requires a program that can support many initiatives of the Govt. of India In the field of information and communication, health sector, energy harvesting, and product development.

Objectives:

- To produce Radio and communication engineers to meet the increasing demand of manpower in communication and information technology (CIT) sectors.

- To provide the deep insight about Radio and Communication system by exposing students to various fields like Radiating systems, Computational electromagnetics, Signal Processing, Advanced Communication, RF Active and Passive circuits, RF MEMS, and MMIC technology.
- To train the students in the simulation, design, fabrication and characterization of RF systems/subsystems.
- To provide hands-on experience to use software tools like CST, Matlab and Lumerical FDTD for RF System design.
- To develop an ability to interpret user requirements and component specifications, to engineer effective designs within the constraints imposed by the available resources and the fundamental physical limits.
- To prepare innovators and technocrats with advanced knowledge of their respective field so that they can serve the industry and R&D organizations in better way.

Job Opportunities:

- Telecommunication
- Intelligent transport systems
- Automotive technologies and aerospace
- Mobile communication
- Sensors for health, environment, automation, industry
- Biological and bio-chemical interfaces
- Health care

Eligibility for Admission:

Candidates with a Bachelor's Degree in Electronics and Communication/ Telecommunication, Electronics Engineering or equivalent with having valid Gate Score are eligible for M.Tech in Radio and Communication Engineering.

Course Structure

The core subjects provide a broad, yet in-depth background aimed at wireless communications techniques (Communication and Radio Engineering). Track-specific core subjects provide an up-to-date knowledge in Communications, Signal Processing and RF engineering. Main subjects include advanced communication, photonics, and microwave active/passive circuits. Lab courses provide practical training in experimental and simulation methods, while the one year (Total duration is two years) Master's thesis gives a thorough exposure to doing research in Radio and Communication Engineering areas.

Semester I		
1.	Professional and Communication Skill**	1-0-2-2
2.	Core1: EC*** Advanced Communication Systems	3-0-0-4
3.	Core2: EC*** Computational Electromagnetics	3-0-0-4
4.	Core3: EC*** RF and Microwave Circuits Design	3-0-0-4
5.	Elective I: EC*** List is given Appendix I	3-0-0-4
6.	Lab1: EC*** High Frequency Circuits Design Lab	0-0-3-2
Semester II		
1.	Core 4: Multirate signal processing	3-0-0-4
2.	Core 5: Photonics Communication	3-0-0-4
3.	Elective 2: List is given Appendix I	3-0-0-4
4.	Elective 3: List is given Appendix I	3-0-0-4
5.	Lab 2: EC*** Advanced Communication Engg. Lab	0-0-3-2
Semester III		
1.	Thesis Credit	0-0-0-16
2.	Graduate Seminar 1	3-0-0-4
Semester IV		
1.	Thesis Credit	0-0-0-16
2.	Graduate Seminar 1	3-0-0-4

List of Elective Courses for M.Tech:

Course Number	Course Name	C
EC	Advanced Engineering Mathematics	4
EC	Industrial Microwave	4
EC	Wavelet Transform and Applications	4
EC	Signal Processing for Communication	4
EC	Antenna and Wave Propagation	4
EC	Nano-Photonics and Plasmonics	4
EC	Advanced Digital Signal Processing	4
EC	RF and Microwave Active Circuits	4
EC	Radar Communication	4
EC	Optical and Satellite Communication	4
EC	Wireless Mobile Communication	4
EC	Selected Topics in Wireless Communication	4
EC	Electromagnetic Interference and Compatibility	4
EC	Wavelet and Filter Banks	4
EC	Detection and Estimation Theory	4
EC	Digital Signal Compression	4
EC	MMIC and RFIC Design	4
EC	Advanced Digital Filter Design	4
EC	Adaptive Signal Processing	4
EC	RF MEMS Design	4
EC	Biomedical Signal Processing	4