Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NECC5 43.	Microwave Devices and Circuits	3	1	0	4

Course Objective

The course aims to make a bridge between the different practical requirements of communication in microwave frequency and the design of microwave circuits and networks. So, students can understand the application domain of different microwave components, which they study extensively.

Learning Outcomes

1. Understanding the behavior of non-linear RF/Microwave Devices.
2. Familiarize with various Microwave sources.
3. Understanding the design concept of various RF/Microwave Devices and Circuits.
4. Ability to design various RF/Microwave Devices and Circuits.

Module No.	Topics to be Covered	Lecture + Tutorial Hours	Learning Outcome
1	**Active Microwave Devices:** Tunnel diode, TRAPATT diode, PIN diode, Varactor diode, introduction to parametric amplifier, Manley-Rowe power relation, HEMT, HBT, Hybrid MIC, MMIC	10L+2T	Students will be familiarized with basic microwave devices and their physics, and microwave integrated circuits
2	**Microwave Sources:** Reflex klystron, two cavity klystron, Helix TWT, Coaxial Magnetron, Inverted coaxial magnetron and linear magnetron.	5L+1T	Students will be familiarized with the fundamentals of the klystron and magnetron, and understand relevant mathematical modelling and physical descriptions.
3	**Microwave Amplifier Design:** Two-Port Power gains, Stability, Transistor amplifier design, Maximum gain amplifier design, Low Noise Amplifier design, Power Amplifier.	12L+5T	Students will be familiarized with different transistor amplifiers and also learn to synthesize.
4	**Oscillators and Mixers:** Transistor oscillator, dielectric resonator oscillators, frequency multiplier, mixers	10L+4T	Students will be familiarized with oscillators, frequency multipliers, mixers and also learn to synthesize.
5	**Transceivers:** RF Transceiver block diagram and general considerations, Transceiver architectures, non-ideal aspects in transceivers, Link budget	5L+2T	Students will be familiarized with the RF Transceiver and its architecture.
	Total	**42L+14T**	

Text Book:

1. Microwave Engineering, by David M. Pozar, Wiley International, Fourth Edition, 2012.

Reference Book:

1. Foundation of Microwave Engineering, by R. R. Collin, Wiley International, Second Edition, 2001.
2. Microwave Devices and Circuits, by Samuel Liao, 3rd edition, 1990.
3. Gonzalez, G., "Microwave Transistor Amplifiers Analysis and Design" 2nd Ed.", Prentice Hall, 1994.
4. Microwave devices, circuits and subsystems for communications engineering, by Ian A. Glover, Steve Pennock, Peter Shepherd, 1st edition, 2007.