



Course Title: MICROWAVE INTEGRATED CIRCUITS

Credit Units:3

Course Level:PG

Course Code: TELE615

L	T	P/S	SW/F W	TOTAL CREDIT UNITS
3	-	-	-	3

Course Objectives: The objective is to provide the basic concepts and techniques of Microwave Integrated Circuits.

Pre-requisites: Microwave Engineering

Course Contents/Syllabus:

	Weightage (%)
Module I:	20
Introduction to Monolithic Microwave Integrated Circuits (MMICs), their advantages over discrete circuits, materials, MMIC fabrication techniques, MOSFET fabrication. Thin film formation.	
Module II:	20
Planar transmission lines for MICs. Method of conformal transformation for microstrip analysis, concept of effective dielectric constant, Effective dielectric constant for microstrip, Losses in Microstrip	
Module III:	20
Slot Line Approximate analysis and field distribution, Transverse resonance method and evaluation of slot line impedance, comparison with micro strip line	
Module IV:	15
Lumped Elements for MICs: Use of Lumped Elements, Capacitive elements, Inductive elements and Resistive elements.	
Module V:	25

Microwave semiconductor Devices & Microwave passive components	
Parametric amplifiers, tunnel diode, varactor diode, PIN diode, Gunn diode, their principle of operation, performance characteristics & applications, scattering parameter calculations of E plane-Tee, Magic Tee, Directional Coupler.	

Student Learning Outcomes: Through this course, the students:

1. Acquire knowledge about Microwave Integrated Circuits.
2. Gain knowledge of planar transmission line for MIC.
3. Gain knowledge and understanding of lumped elements for MIC.
4. Develop understanding of the fundamentals required to design & implement Integrated Circuits operating at microwave frequencies.
5. Acquire a knowledge about Microwave Semiconductor Devices.

Pedagogy for Course Delivery: Tutorial, Assignment, Discussion

Lab/ Practicals details, if applicable: NA

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
100%	NA	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	Class Test	Home Assignment	S/V/Q	Attendance	End Term Examination
Weightage (%)	10%	10%	5%	5%	70%

Text Reading:

1. Microwave Integrated circuits, K.C. Gupta.

2. Micro strip lines and Slot lines, K.C. Gupta, R. Garg. , I. Bahl, P. Bhartia

References:

1. Microwave Devices & Circuits 3/e, Samuel Y. Liao.

2. Stripline-like Transmission lines for Microwave Integrated circuits, B. Bhat, S. K. Koul, Wiley Eastern Ltd., New Delhi.

3. Microwave Integrated circuits, By Ivan Kneppo, J Fabian, P. Bezousek

4. RF MEMS and their Application Vijay K. Vardan, K. J. Vinoy, K. A. Jose