13-EC505 RF & MICROWAVE SYSTEM DESIGN

SYLLABUS

Introduction: Importance of RF and Microwave Concepts and Applications- and Units-Frequency Spectrum, RF and Microwave Circuit Design, Dimensions - RF Behavior of Passive Components: High Frequency Resistors, High Frequency Capacitors, High Frequency Inductors, General Introduction, Types of Transmission Lines-Equivalent Circuit representation. **The Smith Chart:** Introduction, Derivation of Smith Chart, Description of two types of smith chart, Z-Y Smith chart, Distributed Circuit Applications, Lumped Element Circuit Applications. SINGLE AND MULTIPORT NETWORKS: Basic Definitions, Interconnecting Networks. **Scattering Parameters:** Scattering Parameters: Definition, Meaning, Chain Scattering Matrix, Conversion Between S- and Z-parameters, Signal Flow Chart Modelling. **Stability and Gain Considerations – RF Design** RF Source, Transducer Power Gain, Additional Power Relations-Stability Considerations: Stability Circles, Unconditional Stability, and Stabilization Methods-Unilateral and Bilateral Design for Constant Gain- Noise Figure Circles- Constant VSWR Circles. **Rf Filters, Amplifiers And Oscillators Design** Generalization-Basic Resonator and Filter Configurations: Low Pass, High Pass, Band Pass and Band Stop type Filters-Filter Implementation using Unit Element and Kuroda's Identities Transformations. Introduction, Types and Characteristics of Amplifiers, Small Signal Amplifiers, Design of different types of amplifiers (NBA, HGA, MGA, LNA, MNA, BBA), Design of Large Signal Amplifiers Oscillator vs Amplifier Design, Design procedure of Transistor Oscillators.

TEXT BOOKS

1.Mathew M. Radmanesh, “Radio Frequency & Microwave Electronics”, Pearson Education Asia, Second Edition,
2.Reinhold Ludwig and Powel Bretchko,” RF Circuit Design – Theory and Applications”, Pearson Education Asia, First Edition.

REFERENCES

1.Joseph . J. Carr, “Secrets of RF Circuit Design”, McGraw Hill Publishers, Third Edition.
2.Ulrich L. Rohde and David P. New Kirk, “RF / Microwave Circuit Design”, John Wiley & Sons USA, 2000.
3.Roland E. Best, “Phase - Locked Loops: Design, simulation and applications”, McGraw Hill Publishers 5TH
4.Devendra K.Misra ,”Radio Frequency and Microwave Communication Circuits – Analysis and Design “John Wiley & Sons, Inc.
5. Jon B. Hagen, " Radio Frequency Electronics ", Cambridge university press, Cambridge, 1996.
6. James Hardy, " High Frequency Circuit Design ", Resto Publishing Co., NewYork, 1979.
7. Ian Hickman, " RF HandBook ", Butter Worth Heinemann Ltd., Oxford, 1993.
8. Ulrich L.Rohde, T.T.N.Bucher, " Communication Recievers ", McGraw-Hill, New York, 1998.