Department of Information and Communication Engineering

Noakhali Science and Technology University

Course Code: ICE 3103 Course Title: Microwave Engineering

Term Final Syllabus Transmission Line-Waveguide; Session: 2020-21

Reference:

1. Microwave Engineering, 4th edition, David M. Pozar
2. Field and Wave Electromagnetics, 2nd edition, David K. Cheng

Topics/ Articles:

- Chapter 1 ELECTROMAGNETIC THEORY [1]
  - 1.1 Introduction to Microwave Engineering
    - Applications of Microwave Engineering
  - 1.2 Maxwell's Equations
  - 1.3 Fields in Media and Boundary Conditions
    - Fields at a General Material Interface
    - Fields at a Dielectric Interface
    - Fields at the Interface with a Perfect Conductor (Electric Wall)
    - The Magnetic Wall Boundary Condition
  - 1.4 The Wave Equation and Basic Plane Wave Solutions
    - The Helmholtz Equation
    - Plane Waves in a Lossless Medium
    - *Example 1.1* Basic Plane Wave Parameters
    - Plane Waves in a General Lossy Medium
    - Plane Waves in a Good Conductor
    - *Example 1.2* Skin Depth in Microwave Frequencies

- Chapter 2 TRANSMISSION LINE THEORY [1]
  - 2.1 The Lumped-Element Circuit Model for a Transmission Line
    - Wave Propagation on a Transmission Line
    - The Lossless Line
  - 2.2 Field Analysis of Transmission Lines
    - Transmission Line Parameters
    - Example 2.1 Transmission Line Parameters of a Coaxial Line
  - 2.3 The Terminated Lossless Transmission Line [Figure 2.4, 2.5, 2.7, 2.9]
    - Special Cases of Lossless Terminated Lines
  - 2.4 The Smith Chart
    - Example 2.2 Basic Smith Chart Operations
    - The Slotted Line
    - Example 2.4 Impedance Measurement with a Slotted Line
  - 2.7 Lossy Transmission Lines
    - The Low-Loss Line
    - The Distortionless Line

- Chapter 3 TRANSMISSION LINES AND WAVEGUIDE [1]
  - 3.1 General solutions for TEM, TE and TM waves
    - Wave Propagation on a Transmission Line
    - The Lossless Line
  - 3.3 Rectangular waveguide
    - [TE mode, mode number, cutoff frequency, dominant mode, boundary condition]
    - [Example 3.1]
  - 3.4 Circular waveguide
    - [TE mode, mode number, cutoff frequency, dominant mode, boundary condition]
    - [Example 3.2]

- Chapter 9 Theory and Applications of Transmission Lines[2]
  - 9.1 Introduction
    - Wave Propagation on a Transmission Line
    - The Lossless Line
  - 9.6 The Smith Chart
    - Example 9.13
    - Example 9.14
    - Example 9.15