**Department of Information and Communication Engineering**

Noakhali Science and Technology University

Course Code: ICE 3103 Course Title: Microwave Engineering

Term Final Syllabus [Radar]; Session: 2020-21

Reference:

1. Microwave Engineering, 4th edition, David M. Pozar
2. Introduction to Radar System by Merrill L

Skolnik Topics/ Articles:

- Chapter 14 Introduction to Microwave Systems [1]
  - 14.3 RADAR SYSTEMS
    - The Radar Equation [*Example 14.7*]
    - Pulse Radar
    - Doppler Radar
    - Radar Cross Section

- Chapter 1 An Introduction to Radar [2]
  - 1.1 Basic Radar
    - Range to a Target
    - Maximum Unambiguous Range
    - Radar Waveforms
  - 1.2 The Simple Form of the Radar Equation
  - 1.3 Radar Block Diagram [*Figure 1.4*]
  - 1.4 Radar Frequencies
  - 1.5 Applications of Radar

- Chapter 2 The Radar Equation [2]
  - 2.1 Introduction
  - 2.2 Detection of Signals in Noise
    - Threshold Detection [*Figure 1.4*]
    - False Alarm
    - Missed Detection
  - 2.3 Receiver Noise and the Signal-to-Noise Ratio
  - 2.4 Probability Density Functions
  - 2.5 Probabilities of Detection and False Alarm
    - Envelop Detector [*Figure 2.3*]
    - Probability of False Alarm [*Figure 2.4*]
  - 2.7 Radar Cross Section of Targets
    - Simple Targets [*Figure 2.8*]
    - Rayleigh Region
    - Optical Region
    - Resonance Region
  - 2.13 Other Radar Equation Considerations
    - Prediction of Radar Range

- Chapter 3 MTI and Pulse Doppler Radar [2]
  - 3.1 Introduction to Doppler and MTI Radar
    - MTI Radar and Pulse Doppler Radar
    - Doppler Frequency Shift [*Figure 3.1*]
    - Simple CW Doppler Radar [*Figure 3.3*]
    - Pulse Radar That Extracts the Doppler Frequency-Shifted Echo Signal
    - Sweep-to-Sweep Subtraction and Delay-Line Canceler [*Figure 3.4 and 3.5*]
    - MTI Radar Block Diagram [*Figure 3.6 and 3.7*]