

## **DCE–33 RADAR ENGINEERING**

1. Prediction of range performance, Minimum Detectable signal, Receiver Noise, probability. Density function, signal to noise ratio, section of target, cross section fluctuation, pulse repetition freq. and range ambiguities.
2. CW and freq. Modulated radar, MTI, pulses Doppler radar, Tracking radar phased array radar Transmitter power , Various transmitter tubes and their characteristics, modulators, line type modulator, hard tube modulator solid state transmitter.
3. Radar Antenna: Antenna parameters, Antenna radiations patterns Aperture distribution pattern synthesis, effects of errors on radiation patterns stabilization of antenna parabolic reflected antenna, scanning feed reflector antenna, lense antenna, electronically steered phased array antenna.
4. Detection of Radar signal in Noise, Detection Criteria, matched filter receiver correlation detection.
5. **Echo cancellation**: Synthetic and coded speech quality assessment ; Selection of recognition unit ; Model- based recognition ; Language modeling; Speaker Identification; Text analysis and text -to- speech Synthesis

### **SUGGESTED TEXT BOOKS AND REFERENCES:**

1. E.L. Giunzton, “Microwave Measurements”, McGraw Hill Book Co. Inc. 957.
2. SR Adams, “Microwave theory and applications”, Prentice Hall Inc. 1969.

## **DCE– 42 SATELLITE COMMUNICATION**

### **1. Orbital Aspects of Satellite Communications**

Orbital mechanics- Equations of the orbit- Satellite orbit location- Orbital elements- Look Angle determination- Sub-satellite point- Elevation, azimuth, calculations, Earth space Geometrical consideration- Satellite antenna coverage calculation- Effects of sun and moon- Eclipse duration- Sun transit outage- Launches and launch vehicles- Mechanics of launching a satellite- ELV and STS vehicle- Selection consideration for a launch vehicle.

### **2. Space Craft**

Space craft sub systems- AOCS, TT& C, power systems, communications subsystems- Space craft antennas- Thermal control- Propulsion subsystem- Generation storage and conditioning of power systems.

### **3. Satellite Link Design**

Basic transmission theory- system noise temperature, noise figure and G/T ratio- Design of down links- up link design- Link budget analysis- Design of satellite links for specified performance.

### **4. Multiple Station Technology**

Frequency division multiple access- preassigned FDM/FM/FDMS- SPADE operation- Time division multiple access- High rate TDMA frame Operation- INTEL SAT TDMA operation- Code division multiple access- Direct sequence and FH systems- Comparison of the various accessing techniques.

### **5. Earth Station Technology**

Factors influencing the choice and location of an Earth station- Equipment for earth stations- Antenna systems- overall block Diagram. Satellite communication application- FSS, MSS, BSS, RDSS and RNS.

#### **TEXT BOOK:**

T.Pratt and C.Bostain, Satellite Communications, New York, Wiley 1986.

G.Maral, M.Bousquet, Communications Satellite Systems, Wiley, 1985.

#### **REFERENCE BOOKS:**

K.Miya, Satellite Communications Technology RDD Engineering, Tokyo, Japan, 1982.

W.Morgan and G.D.Gordon, Communication satellite Hand book New York, Wiley, 1989.

D.C.Agarwal, Satellite Communications, Khanna Publishers, 1992.

K.Feher, Digital Communications: Satellite/Earth Station Engg. Prentice hall, Englewood Cliffs, NJ, 1983.