

## Paper Code(s): ECC-209 Paper: Analog Communication

### UNIT I

The Communication Process, Review of Fourier Transforms and Dirac Delta Functions, Transmission through Linear Systems, Filters (low pass and band pass signals), Phase and Group Delay, Sources of Information.

**Amplitude Modulation:** Introduction, Double Sideband – Suppressed Carrier Modulation, Quadrature – Carrier Multiplexing, Single-Sideband and Vestigial-Sideband methods of modulation, Frequency Translation, Frequency-Division Multiplexing

### UNIT II

**Angle Modulation:** Introduction, Basic Definitions, Frequency Modulation, Phase-Locked Loop, Nonlinear Effects in FM Systems, Superheterodyne receiver.

### UNIT III

**Probability and Random Processes:** Introduction; Probability; Random Variables, Statistical Averages; Random Processes; Mean, Correlation, and Covariance functions; Transmission of a Random Process Through a Linear Filter, Power Spectral Density, Gaussian Process, Noise, Narrowband Noise

### UNIT IV

Noise: Introduction, Receiver Model, Noise in DSB-SC Receivers, Noise in AM Receivers, Noise in FM Receivers, Pre-emphasis and De-emphasis in FM.

#### **Textbook(s):**

1. Simon Haykins and Michael Moher, "Communication Systems" John Wiley & sons Inc, 5<sup>th</sup> edition, 2009.

#### **References:**

1. B P Lathi and Zhi Ding, "Modern Digital and Analog Communication Systems", OUP, 5<sup>th</sup> edition, 2019.
2. H. Taub, D. L. Schilling and Gaotam Saha, "Taub's Principles of Communication Systems", McGraw Hill Education, 4<sup>th</sup> edition, 2017.
3. J. G. Proakis, M. Salehi, "Fundamentals of Communications Systems", Pearson, 2<sup>nd</sup> Edition, 2014.
4. W. Tomasi, "Electronic communications systems (Fundamentals Through Advanced)", Pearson Education, 5<sup>th</sup> Edition, 2008.
5. G. Kennedy and B. Davis, "Electronic communication systems", TMH, 4<sup>th</sup> Edition, 2008 (reprint)