Course Title	**Analog Communications**
Course Code	**EE3307**
No. of Credit Hrs (Lecture + Tutorial + Lab)	**3 (2+0+1)**
No. of Contact Hrs (Lecture + Tutorial + Lab)	**4 (2+0+2)**
Level-Year	**6-3**
Prerequisite (if any)	**EE3302**

1) Course Objectives:

The objectives of this course are to develop an understanding of signal analysis in time and frequency domain, analog modulation (AM) techniques and their performance in the presence of channel noise. Moreover, it provides experimental foundation for the theoretical concepts of the AM. The students will become familiar with pulse modulation techniques.

2) Expected Learning Outcomes:

Upon completion of this course, student will be able to:

1. Identify and explain the fundamental principles and techniques used in analog communication systems. PLO1 [1]
2. Investigate and analyze theoretical and practical results to validate analog communication system performance. PLO3 [6]
3. Apply signal analysis in time and frequency domains to interpret the characteristics of communication signals. PLO1 [1]
4. Design and implement analog communication systems considering practical constraints such as power and bandwidth. PLO2 [2]
5. Communicate technical findings and experimental results effectively through structured reports and presentations. PLO8 [3]
6. Collaborate effectively in multidisciplinary teams to carry out small projects in analog communications. PLO7 [5]

3) Course Contents:

1. Review of spectrum for periodic and aperiodic signals – continuous and line spectra.
2. Linear modulation: Need for modulation, Expression for AM wave, power and BW, expression for DSB-SC/SSB, power and BW, comparison
3. Modulation and Demodulation of AM – Rectifier detector, envelope detector, Product Modulation and demodulation of DSB-SC, SSB – Frequency discrimination method, Hilbert transform, Phase discrimination method
4. Angle Modulation: FM expression, Bessel function analysis, power and BW considerations, Carson's rule for BW approximation, PM expression, relationship between FM and PM, Armstrong method of FM generation, PLL and FM demodulation using PLL
5. Introduction to Information theory – Entropy, Source coding: Huffman code, Shannon Fano code

4) Lab experiments:

- AM Modulation/Demodulation
- DSB-SC/SSB Modulation/Demodulation.
- Frequency Division Multiplexing

- FM Modulation/ Demodulation.
- PAM generation and Reconstruction
- PWM and PPM: Generation and Reconstruction

5) Teaching Methods:

- Lectures and Discussion
- Videos
- Self-learning
- Laboratory demonstrations

6) Mode of Evaluation: Course Assessment Methods

- Quizzes , Assignment, Homeworks, Reports, Presentations etc.
- Lab Work
- Mid Exam
- Final Exam

Evaluation

No	Assessment Activities *	Percentage
1.	Assignments/Quizzes/HomeWorks/Mini-Projects/Presentations/Reports+Quizzes	15%
2.	Mid Exam	25%
3.	Lab/Tutorial (Lab Exam)	10%
4.	Lab/Tutorial (Lab Reports)	10%
5.	Final Exam	40%

7) Textbook(s):

- Simon Haykin, Communication Systems, John Wiley & Sons, Inc., New York, 4th Edition, 2001.
- Lab Notes

8) References:

- Bruce Carlson, Paul B. Crilly, and Janet C. Rutledge, Communication Systems, McGraw Hill, Boston, 4th Edition, 2002.
- B. P. Lathi, Modern Digital and Analog Communication Systems, Oxford University Press, New York, 3rd Edition, 1998.