Principles of Communication systems

Course Description: Communication systems are basic workhorses behind the information age. This course aims to provide an introduction to the basic principles behind the design of these systems and get an insight into the underlying principles behind the design and analysis of communication systems.

Class Timings: Tuesday-Thursday 1100 AM-1230 PM
Instructor: Prof. Jyotsna Bapat
Text:
[1] Upamanyu Madhow, Introduction to Communication Systems, Cambridge University Press
References:
[1] Taub and Schilling, Principles of Communication Systems, McGrawHill
[2] Simon Haykin, Communication Systems, Wiley, 5th Edition

Objective: Progress in telecommunications over the past few decades has been revolutionary, with communications taken for granted in modern society to the same extent as electricity. This course is a start at understanding the principles of communication; the analog and digital parts. The associated labs are divided into Software based (Matlab) and Hardware based (Raspberry Pi).

List of topics Covered (weekly): Tentative, subject to change.

Date	Topic	Text
Week 1	Introduction to the course. Introduction to communication systems	Ch 1
Weeks 2-4	Signal and Systems: Review. Fourier Transform and Series. Complex Baseband representation (Quiz 1)	Ch 2
Week 5-7 , 10	Analog Communication, AM, FM Receivers, PLL (Quiz 2)	Ch 3
Week 8-9	**Midterm, Break**	
Week 11-14	Digital Modulation (QPSK, QAM), Orthogonal Signaling. Nyquist Criterion for ISI (Quiz 3)	Ch 4
Week 15	Review of Basic probability and random variables	Ch 5
Week 16-17	Optimum Demodulation for AWGN	Ch 6
Week 18	Review	
Week 19	Final	

Assessment:
Midterm: 30%
Final: 35%
Quizzes: 30%
Class Participation: 5%