



MODERN DIGITAL COMMUNICATION TECHNIQUES

PROF. SUVRA SEKHAR DAS

Department of Electrical Engineering
IIT Kharagpur

PRE-REQUISITES : Analog/Digital communications Signals and systems

INTENDED AUDIENCE : BE (EE / EC / IT)

INDUSTRIES APPLICABLE TO : All telecommunication equipment manufacturers and service providers. Defense officials, Research laboratories, ISRO, BEL etc.

COURSE OUTLINE :

Digital communications has had one of the most profound influences in the development of the mankind. It is behind the success of today's networked society. The objective of this course is to present the engineering principles, theories and practices, which are fundamental to the successful design of a digital communication system. The course will delve into the design principles of transmitter and receiver so as to establish a reliable communication link.

ABOUT INSTRUCTOR :

Prof. Suvra Sekhar Das is currently serving as Associate Professor at the G. S. Sanyal School of Telecommunications in Indian Institute of Technology Kharagpur. He has completed Ph.D. from Aalborg University, Aalborg, Denmark. He has worked as Senior Scientist with the Innovation Laboratory of Tata Consultancy Services. His research interests include cross-layer optimization of mobile broadband cellular networks, 5G, Broadband Mobile Communications, 5G Waveform design GFDM FBMC UFMC, heterogeneous networks Femto Cells Device to Device communication, Multi objective optimization for radio access networks, Green radio network design Packet Scheduling and radio resource allocation with link adaptation, MIMO communications, base-band transceiver design for broadband wireless communication systems.

COURSE PLAN :

Week 01 : Introduction to digital communication systems

Week 02 : Source Coding

Week 03 : Characterization of Communication Signals & Systems

Week 04 : Signal space Representation

Week 05 : Representation of Memory less Modulation Methods

Week 06 : Nonlinear modulation methods

Week 07 : Optimal receivers of AWGN

Week 08 : Receiver for non-ideal channel

Week 09 : Probability of error of different modulation schemes

Week 10 : Fundamentals of estimation and detection theory used in digital communication

Week 11 : Carrier phase and symbol timing synchronization techniques

Week 12 : Channel estimation and equalization techniques, Power Adaptation methods for colored noise channel