FIBER OPTIC COMMUNICATION TECHNOLOGY

PROF. DEEPA VENKITESH
Department of Electrical Engineering
IIT Madras

TYPE OF COURSE : New | Elective | UG/PG
COURSE DURATION : 12 weeks (20 Jul' 20 - 9 Oct' 20)
EXAM DATE : 18 Oct 2020

PRE-REQUISITES : Signals and Systems

INTENDED AUDIENCE : Any interested learners

INDUSTRIES APPLICABLE TO : Sterlite Technologies Ltd., Tejas Networks, BSNL - other Telecom companies, BEL,

COURSE OUTLINE :

FOCT is a graduate level course, intended to expose the students to the physical layer elements and seamlessly provide a transition from the physical layer issues to data link layer issues in optical communication systems and networks.

ABOUT INSTRUCTOR :

Prof. Deepa Venkitesh received the Ph.D. degree from the Indian Institute of Technology Bombay, Mumbai, India, in 2009. She is currently an Associate Professor with the Department of Electrical Engineering, Indian Institute of Technology Madras, Chennai, India. Her research interests include applications of nonlinear optics, optical signal processing for communication systems and fiber lasers. She has authored more than 100 publications in international peer-reviewed journals and conferences. She is a Senior Member of the Optical Society and has been a frequent reviewer of several IEEE and OSA journals. She is currently an Associate Editor for the OSA journal, Advances in Optics and Photonics.

COURSE PLAN :

Week 1**:** Motivation for fiber optic communication,overall system description, Introduction to digital modulation.

Week 2**:** Optical transmitters- LED, Laser Diodes

Week 3**:** Noise in transmitters - phase noise and intensity noise

Week 4**:** External amplitude and Phase modulation, IQ modulation, Optical Fibers-Modes

Week 5**:** Dispersion mechanism, nonlinear effects in fibers

Week 6**:** Optical Receivers - Direct detection, Coherent Detection, Noise, BER

Week 7**:** Optical Amplifiers, other optical components

Week 8**:** Single channel link design : power and timing budget

Week 9**:** WDM link design, dispersion management

Week 10**:** Digital signal processing for data in advanced modulation formats

Week 11**:** Optical networks : Topologies

Week 12**:** Passive Optical Networks, Fronthauls