EC415: Nanophotonic Devices for Communications

Details of course:

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Nanophotonic Devices for Communications	3	1	0	Basics of Electromagnetic Theory

Course Objective:To introduce nanophotonic phenomenon and make the students understand the working and applications of devices based on nanophotonics

Course Outcomes:

CO1: Define the fundamentals of nanophotonics and light-matter interaction at nanoscale
CO2:Apply the fundamental principles of photonic crystals to understand the working of photonic-crystal based devices such as waveguides and resonators
CO3:Illustrate the phenomena of surface plasmon resonance and localized surface plasmon resonance and apply them to make devices
CO4:Design devices based on nanophotonics for energy conversion and data storage Applications
CO5: Explain the nanofabrication processes used for the fabrication of nanophotonic devices

S. No.	Content	Contact Hours
Unit 1	Fundamentals of Nanophotonics, Review of Maxwell's equations, Light-Matter Interaction, Diffraction limit	6
Unit 2	1-D, 2-D and 3-D Photonic Crystals, Omni directional Reflector, Photonic Crystal Waveguides and other applications	8
Unit 3	Surface Plasmon Polaritons, Localized Surface Plasmon Resonance, Transmission through nano-aperture, Plasmonic Waveguides, Plasmonic Sensors	10
Unit 4	Broadcast Devices, Energy conversion, Data storage applications; Additional Applications	10
Unit 5	Materials, Fabrication of Nanophotonic Devices: Nanolithography techniques, Wet Etching and Reactive Ion Etching, Lift-off, Sputter deposition, E-beam evaporation etc.	8
	Total	42

Books:

S. No	Name of Books/Authors/Publisher
1	'Principles of Nano-Optics' by Lukas Novotny and Bert Hecht, Cambridge, 2006
2	'Nanophotonic Devices' by Zeev Zalevsky and Ibrahim Abdulhalim, Elsevier, 2014