EC837

Course Code	:	
Course Title	:	Optical Antennas
Number of Credits	:	3
Course Type	:	Elective

Course Learning Objective

- To understand the techniques involved in the design and fabrication of optical antennas for spectroscopy, energy harvesting and bio-photonic applications.

Course Content

Introduction - From near field optics to Optical antennas, Optical antenna theory, Impedance of a nanoantenna, Active nanoparticles as nanoantennas.

Optical antennas for field-enhanced spectroscopy, Directionality, Polarization and enhancement, small and planar antennas, quantum optics and near-field microscopy, Non-linear optical antennas, Coherent control of nano-optical excitations.

Computational electrodynamics for optical antennas, First-principles simulations near field effects, Field distribution near optical antennas at the sub-nanometer scale.

Fabrication and characterization of nanoantennas and arrays, Probing and imaging of optical antennas with PEEM, Novel fabrication methods for optical antennas, Plasmonic properties of colloidal clusters : towards new metamaterials and optical circuits.

Applications - Information technology, Energy harvesting, Refractive-index sensing, Nanoimaging, Aperture optical antennas for bio-photonic applications.

Text Book

1.Mario Agio, Andre Alu, "Optical Antennas", Cambridge University Press, 2013.

2.Matthias Dominik Wissert, "Optical Antennas: Linear and Nonlinear Excitation and Emission", KIT Scientific Publishing, 2012.

3.Shah Nawaz Burokur, Andre de Lustrac Jianjia Yi, Paul-Henri Tichit, Transformation Optics based antennas, ISTE Press and Elsevier Ltd., 2016.

4.Alexei A. Maradudin, J. Roy Sambles, William L. Barnes, "Modern Plasmonics -Handbook of Surface Science, Volume 4", Elsevier, 2014.

Course outcomes

At the end of the course student will be able

CO1: learn and understand the optical antenna fundamental phenomena.
CO2: understand the theory of near-field microscopy.
CO3: understand the computational electrodynamics for optical antennas.
CO4: learn the design of optical antennas for various applications.
CO5: discuss the plasmonic properties and fabrication of optical antennas.

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(Research Course)