



# OPTICAL SENSORS

**PROF. SACHIN KUMAR SRIVASTAVA**

Department of Physics  
IIT Roorkee

**TYPE OF COURSE** : Rerun | Elective | UG/PG

**COURSE DURATION** : 4 weeks (18 Jan' 21 - 12 Feb' 21)

**EXAM DATE** : 21 Mar 2021

**PRE-REQUISITES** : Basic knowledge of Optics (Geometrical optics, Interference, Diffraction, polarization, etc.)

**INTENDED AUDIENCE** : Physics, Nanotechnology, Biosciences, Electrical Engineering, Electrooptic Engineering, Photonics

**INDUSTRIES APPLICABLE TO** : Photonic System

## **COURSE OUTLINE :**

This course provides detailed insight of the field of optical biosensors and their basic working principles. Starting with the introduction of basic components, characteristics, performance parameters and fabrication techniques, this course brings the learner to the mesmerizing field of sensors based on basic principles of optics. The basic optical phenomena/characteristics and their sensing applications have been discussed in detail. The optical properties of tissues and optics in the biomaterials has been discussed providing some further insights into optical biosensing applications. The course also ends with notes on terahertz sensing applications and future directions of research.

## **ABOUT INSTRUCTOR :**

Prof. Srivastava is an Assistant Professor in Physics Department of IIT Roorkee. He has more than 10 years of research experience in various dimensions of optical biosensors, starting from evanescent waves, SPR, SERS, EOT, LSPR, SEF, ESP-LSP coupling, GMR and other optical phenomena. He teaches applied Physics course at IIT Roorkee and has taught Basic optics course at AcSIR. Apart from aforementioned details, he worked as In-charge of technical operations of Photonicsys company in Asia. He is a member of Optical Society of America (OSA) Optical Biosensors and OSA- Nanophotonics executive committees. He is also an Editor of the "Journal of Sensors".

## **COURSE PLAN :**

**Week 1:** Introduction to sensors and biosensors, Basic optics for optical biosensing-I

**Week 2:** Basic optics for optical biosensing-II, Basic optics for optical biosensing-III,  
Basic optics for optical biosensing-IV

**Week 3:** Plasmonic sensors, Basic optics for optical biosensing-V

**Week 4:** Review of biomaterial optics, Review of sensing applications