

**INDIAN INSTITUTE OF TECHNOLOGY KANPUR
DEPARTMENT OF PHYSICS**

Course Title : **Photonic Devices**
Course No. : **PHY 690V, semester: 2022-23-II**
Instructor : **Dr. R.Vijaya**
Contact details : **e-mail: rvijaya@iitk.ac.in, office: SL 217**
Course schedule : **T-Th-F (8:00-8:50)**

(Any meetings for discussion beyond lecture hours are to be requested by e-mail)

Prerequisite : Basic Electromagnetic theory and an introductory Optics/Photonics course

Level : **PG level**

Credits : L-T-P-D-[C] **3-0-0-0-[9]**

Course Contents:

The course aims at providing the knowledge base of modern photonic devices through an in-depth analysis of the underlying physical concepts and the technological challenges. The course is targeted at students who are inclined towards practical aspects of photonics along with the basics.

Tentative plan of the course is as follows:

S. No.	Broad theme	Contents	Lectures (of 50 min. duration)
1	Light-matter interaction – a review	Review of wave equation, and dispersion effects.	3
2	Light source	Need for lasers in photonic devices	2
3	Periodic structures in devices	Optical multi-layers, diffraction gratings, photonic crystals	8
4	Integrated-optic devices	Coupled-mode theory, waveguides and couplers in fiber-optic or silicon platform	8
5	Device applications	Devices for wavelength/direction/polarization selection of light	8
6	Novel devices	Plasmonic sensors, slow light devices	6
7	Characterizing devices	Time- and spectral-domain measurement techniques	5

Text books and References:

A single text-book may not *adequately* address all the topics of the course. Please refer to multiple books and other resources (review papers, tutorial papers etc) for getting the proper perspective. List will be provided in the course.

Attendance: Compulsory. Attendance will be monitored on a regular basis. Attendance less than 80% and extended absence without a valid reason will result in de-registration.

Evaluation mode: TBD.

Pass grade requires a minimum of 30% at the end of the course.

Any academic malpractice will lead to disciplinary action.
