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Applied Photonics

Syllabus

- Introduction to Photonics: Optical Waveguide Theory; Interference of light waves - Numerical techniques and Simulation
- Photonic Waveguide Components: Optical Modulators and Switches Electro-optics - Acous Magneto-optics
- Photonic Band Gap Structures: Concept of photonic crystals; bandgap and band structures in 1 3D photonic crystal structures;
- Photo-refractive materials: Non-linear optics, Recent trends in bio and nano-photonics
- Optical Fiber Sensors :- Sensing using optical fibers - Types:- Amplitude, Interferometric, Wav Polarimetric - Distributed Sensors

Text Books

- Bahaa Saleh and Malvin Teich, Fundamentals of Photonics, Wiley & Sons (2007)
- Pochi Yeh and Amnon Yariv Photonics: Optical Electronics in Modern Communications 2007

References

- Francis T. S. Yu and Shizhuo Yin, Fiber Optic Sensors, Marcel Dekker, Inc 2002
- George W. Hanson, Fundamentals of Nanoelectronics Pearson Education, 1st edition, 2008
- A. Ghatak and K. Thyagarajan, Introduction to Fiber Optics, Cambridge University Press, 2006.

Course Objectives:

- To prepare the students understand the fundamental principles of light-matter interaction and photonic structures.
- To enable the students appreciate the diverse applications of fiber optic sensors.

Course Outcomes:

Students are able to

- CO1: Understand the interference of light and optical waveguide theory.
- CO2: Understand the significance of photonic bandgap structures and their application
- CO3: Analyse the different types of optical modulators.
- CO4: Compare the merits and demerits of different types of fiber optic sensors.
- CO5: Understand the application of nonlinear optics in bio and nano photonics.

Mrs. RB/SM for Senate