AMITY UNIVERSITY
UTTAR PRADESH

Course Title: Optical Electronics

Credit Units:4

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
3	1	0	0	4

Course Level: PG **Course Code: TELE614**

Course Objectives: The aim of this course is to provide students with theoretical skills and insight into fundamentals and advance optoelectronics principle and devices.

Pre-requisites: Engineering Physics, Basic Optics

Course Contents/Syllabus:

	Weightage (%)
Module I: Wave propagation in anisotropic media	**25**
Descriptors/Topics: Plane wave in anisotropic media, optical properties of uniaxial and biaxial crystal, double refraction, wave refractive index, ray refractive index, ray velocity surface, index ellipsoid, compensators.	
Module II: Electrooptic effect	**25**
Descriptors/Topics: Pockel and Kerr effects, Electrooptic effect in KDP crystals, electrooptic effect in lithium niobate and lithium tantalite crystals, electrooptic effect in liquid crystals, modulator, switches, scanners, directional couplers, index ellipsoid in the presence of external electric field.	
Module III: Acoustooptic effect	**25**
Descriptors/Topics: Raman-Nath diffraction, Bragg diffraction, coupled wave analysis, acousticoptic devices: raman-nath acoustooptic modulator, bragg modulator, acoustooptic deflectors, acoustooptic spectrum analyser, scanners, interconnections, filters, isolators, frequency shifters.	
Module IV: Nonlinear Optics	**25**

Descriptors/Topics: Nonlinear optical media, second-harmonic generation, three wave mixing, sum and difference frequency generation, third harmonic generation and self-phase modulation, four wave mixing, parametric amplification and oscillation, Nonlinear effects in optical fibers: optical soliton, SPM, XPM and FWM, SRS & SBS	

Student Learning Outcomes: The student will be able:

- To demonstrate the advance knowledge of optical materials and their applications.
- To explain the concepts, working and applications of Electro-optic and Acousto-optic effect.
- To describe the concepts and working of nonlinear phenomena in Optics.

To explain the soliton and their potential applications in Optical Fiber Communications

Pedagogy for Course Delivery: Delivery of lectures with class notes followed by presentations and uploading course material on Amizone.

Lab/ Practicals details, if applicable: NA

Assessment/ Examination Scheme:

Theory L/T (%)	**Lab/Practical/Studio (%)**	**Total**
100%	NA	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					**End Term Examination**
Components (Drop down)	Class Test	Home Assignment	S/V/Q	Attendance	
Weightage (%)	10%	10%	5%	5%	70%

Text Reading:

1. A.K. Ghatak and K. Thyagrajan, Optical Electronics (Cambridge Univ., Cambridge Press, 1989).

2. E. A. Saleh, Malvin Carl Teich, Fundamentals of Photonics (John Wiley)