



Course Title: Optoelectronic Instrumentation

Credit Units: 4

Level: PG

Course Code: TELE714

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

Course Objectives: Aim of this course is to teach the fundamentals of instruments based on optoelectronic principles and their potential applications.

Prerequisites: Optics and Lasers.

Course Contents / Syllabus:

Module I: Basics of Electronics	% Weightage
Introduction to test and measuring instruments, instrumentation amplifier, analog signal processing: active filter, A/D, D/A converters, sample & hold, multiplexer, peakdetector, zero crossing detector etc.	40
Module II: Digital Design	% Weightage
Digital design: PALs, FPGA, signal analyser: superheterodyne spectrum analyzer, DFT and FFT analyzer, digital filters and computer interface, microcontrollers: introduction to microcontroller and applications such as 8031, 8085.	20
Module III: Optical Instrumentation	% Weightage
Optoelectronic circuits: circuit design for LD transmitter and PIN receiver, OTDR, optical spectrum analyzer, sensors: fiber optic and radiation sensors, their noise and error analysis, applications in physical sensors, chopper stabilised amplifier.	40

Student Learning Outcomes:

After completion of course, students will be able:

- To describe the concept used in the designing of instruments.
- To explain the working principle of various optoelectronic instruments.
- To explain the applications of various types of optical instruments.

Pedagogy for Course Delivery:

Delivery of lectures with class notes followed by presentations and uploading course material on Amizone

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
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 & References :

1. Patrick J. O'Higgins, Basic instrumentation, McGraw-Hill.
2. A.K.Sawhney, Electronic Measurement and Instrumentation, Dhanpat Raj and Sons.
3. S. Nagabhushana & N. Sathyanarayana, Lasers and Optical Instrumentation, I. K. International Pvt Ltd.
4. Benjamin King Johnson, Optics and Optical Instruments, Courier Dover Publications.