PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

Paper - 8 OPTOELECTRONICDEVICES

Offered to : M.Sc.(PHYSICS)	Course Code : 22PH4S1
Course Type : SEC	Course : OPTO ELECTRONIC DEVICES
Year of Introduction : 2004	Year of offering : 2022
Year of Revision : 2022	Percentage of Revision : Nil
Semester : IV	Credits : 3
Hours Taught : 60 hrs. per Semester	Max.Time : 3 Hours

CourseDescription:

OptoelectronicDevicescourseintroducesthestudentswiththefundamentalsofoptoelectronics and principles of the optoelectronic devices operation such as light emitting diodes, laserdiodes and photodiodes

CourseObjectives:

1. Tolearntheprincipleofopticaldetectionmechanismindifferentdetectiondevices.
2. Tounderstanddifferentlightmodulationtechniquesandtheconceptsandapplication sofopticalswitching.
3. Tostudytheintegrationprocessandapplicationofoptoelectronicintegratedcircuitsi ntransmittersandreceivers.
4. To study different modulation techniques
5. To study different optoelectronic integrated circuits

Course Outcomes: Attheendofthiscoursethestudentsshouldbeableto:

CO1:Explain electron theory of solids in terms of motion of electron in a periodic lattice and electrical properties of matter.

CO2:Explainoopticaltransitionsinsemiconductorsandphotovoltaiceffect.

CO3:Able to measure the semiconductor electronic parameters using different techniques

CO4: Apply different modulation techniques

CO5: Design different optoelectronic integrated circuits.

CO-POMATRIX								
22PH4S1	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
	CO1		H					
	CO2		H					
	CO3						H	
	CO4						H	
	CO5						M	

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**ElementsOfLightAndSolidStatePhysics** Wavenatureoflight,Polarization,Interference,Diffraction,LightSource,reviewofQuantumMechanicalconcept,ReviewofSolidStatePhysics,ReviewofSemiconductorPhysicsandSemiconductorJunction Device.	12
II	**DisplayDevicesAndLasers** Introduction,PhotoLuminescence, Cathode Luminescence,ElectroLuminescence,InjectionLuminescence,InjectionLuminescence, LED,PlasmaDisplay,LiquidCrystalDisplays,NumericDisplays,LaserEmission, Absorption,Radiation,PopulationInversion, Optical Feedback,Thresholdcondition,LaserModes,ClassesofLasers,ModeLocking,laserapplications.	12
III	**OpticalDetectionDevices** Photodetector,Thermaldetector, PhotoDevices, PhotoConductors,Photodiodes, DetectorPerformance.	12
IV	**OptoelectronicModulator** Introduction, Analog andDigitalModulation,Electro-opticmodulators,MagnetoOpticDevices,Acoustopticdevices,Optical,SwitchingandLogic Devices.	12
V	**OptoelectronicIntegratedCircuits** Introduction,hybridandMonolithicIntegration,ApplicationofOptoElectronic IntegratedCircuits,IntegratedtransmittersandReceivers,Guidedwavedevices.	12

TextBooks:

1. J.WilsonandJ.Haukes,"OptoElectronics–AnIntroduction",PrenticeHallofIndiaPvt.Ltd.,NewDelhi,1995.
2. Bhattacharya"SemiconductorOptoElectronicDevices",PrenticeHallofIndiaPvt.,Ltd.,NewDelhi,1995.
3. JaspritSingh,"OptoElectronics –AsIntroductiontomaterialsanddevices",McGraw-HillInternationalEdition,1998.