



SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by
NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 195
Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.D.T., Narsapur-534280. (Andhra Pradesh)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
20EC7E01	Opto Electronic Devices (R20)	VII	ECE	6	2025-26	09-06-2025

COURSE OUTCOMES : After completion of the course students are able to

1	Interpret the basics of solid state physics (K3)
2	Discriminate the LED and Laser operations (K4)
3	Demonstrate the operation of optical detectors (K3)
4	Analyze the optoelectronic modulators and ICs(K4)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	CO1: Interpret the basics of solid state physics (k3)	1. ELEMENTS OF LIGHT AND SOLID STATE PHYSICS				
		1.1	Wave nature of light, Polarization	R2,T2	2	Chalk & Talk, Smart Board and PPT
		1.2	Interference	R2,T2	1	
		1.3	Diffraction	R2,T2	1	
		1.4	Review of Quantum mechanical concept	R2,T2	1	
		1.5	Review of solid state physics	R2,T2	1	
		1.6	Energy bands in solid state	R2,T2	1	
		1.7	Review of semiconductor physics	R2,T2	1	
		1.8	Basics of semiconductor physics	R2,T2	1	
		1.9	Semiconductor junction devices	R2,T2	1	
		1.10	Problems		2	
		1.11	Class Test 1		1	
Total				13		

II	CO2: Discriminate the LED and Laser operations (K4)	2.DISPLAY DEVICES AND LASERS				
		2.1	Concept of Luminescence	R2,T1	1	Chalk & Talk, Smart Board and PPT
		2.2	Photo Luminescence explanation	R2,T1	1	
		2.3	Cathode luminescence explanation	R2,T1	1	
		2.4	Explanation for Electroluminescence	R2,T1	1	
		2.5	Explanation for Injection luminescence	R2,T1	1	
		2.5	Working principle of LED display	R2,T1	1	



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		2.6	Working principle of LCD display	R2,T1	1	
		2.7	Working principle of plasma display	R2,T1	1	
		2.8	Working principle of CRT display	R2,T1	1	
		2.8	Working principle of LASERS	R2,T1	1	
		2.9	Types of Lasers	R2,T1	1	
		2.10	Problems		1	
		2.11	Class Test 2		1	
		Total			13	
III	CO3: Demonstrate the operation of optical detectors(K3)	3. OPTICAL DETECTION DEVICES				
		3.1	Concept of Thermal detectors	T1,R2	1	Chalk & Talk, Smart Board and PPT
		3.2	Concept of Photo emissive detectors	T1,R2	1	
		3.3	Photoconductive detectors	T1,R2	1	
		3.4	Photo Multipliers	T1,R2	1	
		3.4	Image Intensifiers	T1,R2	1	
		3.5	Explanation of Photo diodes	T1,R2	1	
		3.6	Principle of PIN photo diode	T1,R2	1	
		3.7	Principle of Avalanche photo diode	T1,R2	1	
		3.8	Principle of photo Transistor	T1,R2	1	
		3.9	Performance of photo detectors	T1,R2	1	
		3.10	Study of CCD design	T1,R2	1	
		3.11	Principle of Solar cell	T1,R2	1	
	3.12	Class Test 3		1		
		Total			13	
IV	CO4: Analyze the optoelectronic modulators and ICs(K4)	4. OPTO ELECTRONIC MODULATOR				
		4.1	Explanation for optic modulators	T1,T2	1	Chalk & Talk, Smart Board and PPT
		4.2	Concept of polarization, Birefringence	T2,R1	1	
		4.3	Electro optic modulators	R2,T2	1	
		4.4	Study of electro optic effect	R2,T1	1	
		4.5	IC optic modulators	R2,T1	1	
		4.6	EO Modulators	R2,T1	1	
		4.7	Kerr modulators	R2,T1	1	
		4.8	Scanning and switching	R2,T1	1	
		4.9	Magneto optic modulators	R2,T2	1	
		4.10	Concept of Faraday effect	T1,R1	1	
		4.11	Acoustic optic modulators	T1,R2	1	
		4.12	Magneto-Optic Modulators		1	
		4.13	Class Test 4		1	
		Total			13	



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5.OPTOELECTRONIC ICs AND ADVANCED TECHNOLOGIES					
V	CO4: Analyze the optoelectronic modulators and ICs(K4)	5.1	Introduction to hybrid Integration	T1,R1	1
		5.2	Introduction to monolithic Integration	T1,R1	1
		5.3	Applications of Opto electronic integrated circuits	T1,R1	1
		5.4	Explanation of Integrated Transmitters	T1,R1	1
		5.5	Explanation of Integrated Receivers	T1,R1	1
		5.6	Fabrication process of Opto electronic integrated transmitter circuit	T1,R1	1
		5.7	Introduction to LI-FI Technology-working and applications	T1,R1	1
		5.7	Introduction to LI-FI Technology-working and applications	T1,R1	1
		5.8	Flexible organic optoelectronic devices	T1,R1	1
		5.9	Wearable organic optoelectronic devices	T1,R1	1
		5.10	Carbon Nano Tubes (CNT) based optoelectronic devices	T1,R1	1
			Class Test		1
	Content Beyond Syllabus	5.11	Role of Nano technology for changing the properties of devices		1
Total					13
CUMULATIVE PROPOSED PERIODS					65



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Text Books:

S. N o.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Pallab Bhattacharya "Semiconductor Opto Electronic Devices", 3 rd Prentice Hall of India Pvt., Ltd. New Delhi, 2016.
2	Japrit Singh, "Opto Electronics – As Introduction to Materials and Devices", Mc Graw-Hill International Edition, 2018

Reference Books:

S. N o.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	S C Gupta, Opto Electronic Devices and Systems, Prentice Hal of India, 2015.
2	J. Wilson and J.Haukes, " Opto Electronics – An Introduction", Prentice Hal of India, 2019

Web Details :

1	www.nptel.ac.in
2	www.slideshare.net

	Name	Signature with Date
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