

C.V. Raman Global University

Bhubaneswar - 752 054 (Odisha)

Department of Electronics and Communication Engineering	
SUBJECT: Introduction to Electronics Engineering	
Course Code	EC101
Teaching Hours/Week (L-P-T-E)	(3-0-0-0)
Credits	03
Total Contact Hours	42
Course offering department	Department of Electronics and Communication Engineering
Course objectives: 1) To understand PN Junction, diodes and their applications. 2) To comprehend BJT, FET and their bias configurations. 3) To analyze feedback in amplifier circuits, op amp and its applications. 4) To analyze different number system, Logic Gates and applications of Boolean algebra. 5) To understand fundamentals of communication networks & its applications	
Module – 1 (10hrs.)	
Semiconductor Diodes and their Applications: Introduction to Electronics Engineering, PN junction diodes; Characteristics and Calculation of diode-resistance, temperature dependence, diode-capacitance; Zener Diode – Operation and Applications; Diode as a Rectifier, Diode Clipper and Clamper	
Module – 2 (10 hrs.)	
Bipolar Junction Transistors (BJT): PNP and NPN Transistors, Construction and Characteristics of CB, CE and CC Configurations, dc and ac load line analysis, operating point, Transistor biasing: Fixed bias, emitter bias/self-bias, Junction Field Effect Transistors: Construction, Characteristics, Operations	
Module – 3 (07 hrs.)	
Sinusoidal Oscillators: Concept of positive and negative feedback, Barkhausen criterion, Determination of Frequency and Condition of oscillation, RC Phase Shift and Wein bridge oscillator. Operational Amplifiers: Characteristics, Applications of Inverting and non-inverting amplifiers.	
Module – 4 (07 hrs.)	
Introduction to Digital Electronics: Boolean Algebra, Symbolic representation, Boolean algebraic function, Realization of Basic logic gates using universal gates, Adder, Subtractor.	
Module-5 (08 hrs.)	
Introduction to electronic communication system: Electromagnetic Communication spectrum band and applications, Elements of Electronic Communication System, analog vs. digital communication, Need for modulation; Introduction to IoT, Evolution of 1G to 5G and beyond.	

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Text Books:

1. Electronic Circuits Analysis and Design, Third Edition, Donald A Neamen, The McGraw-Hill Companies
2. MICROELECTRONIC CIRCUITS, Seventh Edition, A. S. Sedra and K.C. Smith, Oxford University Press, India, 2017
3. Millman J., Halkias C.C., Parikh Chetan, "Integrated Electronics: Analog and Digital Circuits and Systems", Tata McGraw-Hill, 2/e.
4. Mano M.M., "Digital Logic and Computer Design", Pearson Education, Inc, Thirteenth Impression, 2011.
5. Singal T. L., "Analog and Digital Communications", Tata McGraw-Hill, 2/e.
6. Haykin S., Moher M., "Introduction to Analog & Digital Communications", Wiley India Pvt. Ltd., 2/e.

Reference Books:

1. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education, 10th Edition, 2009
2. Malvino and Brown, "Digital Computer Electronics," Tata McGraw - Hill Education, 2001.
3. R. A. Gayakwad, "Op-Amps and Linear Integrated Circuits," PHI Learning, 2009.
4. T.L. Floyd, "DIGITAL FUNDAMENTALS", Pearson Education, 11th Edition.

Open Sources:

1. Prof. Mahesh B. Patil, "Basic Electronics", NPTEL – IIT Bombay.
<https://nptel.ac.in/courses/108/101/108101091/>

COURSE OUTCOME:

Outcome	At the end of the course, the learner will be able to	Bloom's Level	Expected proficiency percentage	Expected Attainment percentage
CO-1	Apply the concept of working principle of diode(s) in the Rectifiers, Clippers, Clampers, Voltage Regulator, and LED circuits	3	70%	65%
CO-2	Analyse simple amplifier circuits using the concepts of BJT, JFET, and OP-AMP and their applications.	4	70%	60%
CO-3	Design simple logic circuits by using the concept of number systems, logic gates, numeric codes, and Boolean algebra minimization	4	70%	70%
CO-4	Understand the fundamentals of communication technology & its applications	2	70%	60%

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MAPPING OF COURSE OUTCOME ONTO PROGRAM OUTCOME (CO –PO MAPPING)

Course Outcome	PO1-Engineering knowledge	PO2- Problem analysis	PO3-Design/development of solutions	PO4-Conduct investigations of complex problems	PO5- Modern tool usage	PO6-The engineer and society	PO7-Environment and sustainability	PO8-Ethics	PO9-Individual and team work	PO10-Communication skill	PO11-Project management and finance	PO12 Life-long learning
CO-1	3	3	1	1	1	0	0	1	2	1	0	1
CO-2	3	3	1	1	1	0	0	1	2	1	0	1
CO-3	3	3	1	1	1	0	0	1	2	1	0	1
CO-4	3	3	1	1	2	1	1	1	2	1	0	1

Understand the fundamentals of communication technology & its applications **Course Utilization Plan / Lesson Plan**

Module No	Module Name	Required contact Hours	COs addressed	References book Used
Module-1	Semiconductor Diodes and their Applications	10		
	Introduction to Electronics Engineering	1	1	1, 2, 3
	PN junction diodes	1	1	1, 2, 3
	PN junction diode's Characteristics	1	1	1, 2, 3
	diode-resistance	1	1	1, 2, 3
	temperature dependence of diode	1	1	1, 2, 3
	diode-capacitance	1	1	1, 2, 3
	Zener Diode – Operation and Applications	1	1	1, 2, 3
	Diode as a Rectifier	1	1	1, 2, 3
	Diode Clipper	1	1	1, 2, 3
	Diode Clamper	1	1	1, 2, 3
Module-2	Bipolar Junction Transistors (BJT) and Junction Field Effect Transistors (JFET)	10		
	PNP and NPN Transistors	1	2	1, 2, 3
	Construction and Characteristics of CB Configuration	1	2	1, 2, 3
	Construction and Characteristics of CE Configuration	1	2	1, 2, 3
	Construction and Characteristics of CC Configuration	1	2	1, 2, 3
	dc and ac load line analysis	1	2	1, 2, 3
	operating point	1	2	1, 2, 3
	Transistor biasing: Fixed bias, emitter bias/self-bias	2	2	1, 2, 3
	Field Effect Transistors: Construction, Characteristics	1	2	1, 2, 3
	JFET Operations	1	2	1, 2, 3

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MODULE-3	Sinusoidal Oscillators and Operational Amplifier (OPAMP)	7		
	Concept of positive and negative feedback	2	2	1, 2, 3
	Determination of Frequency and Condition of oscillation	1	2	1, 2, 3
	RC Phase Shift and Wein bridge oscillator	2	2	1, 2, 3
	Characteristics, Applications of Inverting and non-inverting amplifiers.	2	2	1, 2, 3
	Introduction to Digital Electronics	7		
MODULE-4	Boolean Algebra	2	3	4
	Symbolic representation	1	3	4
	Boolean algebraic function	2	3	4
	Realization of Basic logic gates using universal gates	1	3	4
	Adder, Subtractor	1	3	4
	Introduction to electronic communication system	8		
MODULE-5	Electromagnetic Communication spectrum band and applications	1	4	5,6
	Elements of Electronic Communication System	2	4	5,6
	analog vs. digital communication	1	4	5,6
	Need for modulation	2	4	5,6
	Introduction to IoT	1	4	5,6
	Evolution of 1G to 5G and beyond.	1	4	5,6
	TOTAL	42 HOURS		

Learning Assessments

Bloom's Level of Cognitive Task		Teacher Assessment / Formative Assessment (40 %)				Summative Assessment (60 %)	
		Quiz (10%)	Assignment (10%)	Experiential learning * (10%)	Attendance (10%)	Mid Sem (20%)	End Sem (40%)
Level-1	Remember	40%	40%	10%		40%	30%
	understand						
Level-2	Apply	60%	40%	40%		60%	50%
	Analyze						
Level-3	Evaluate		20%	50%			20%
	Create						
Total		100%	100%	100%			100%

***NOTE: Experiential Learning: class test/simulation project/survey paper/ case study presentation/team project**

Course Prepared By: Dr. Kaushik Bhattacharyya, & Dr. Ajaya Yadav, Asst. Professor, ECE, CGU-Odisha

Course Verified By: Dr. Tusar Kanti Dash, HOD, ECE



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