



DEPARTMENT OF ELECTRICAL AND ELECTRONICS
ENGINEERING

COURSE PLAN – PART I					
Name of the programme and specialization	B.Tech- Electrical & Electronics Engineering				
Course Title	Electron Devices				
Course Code	EEPC13	No. of Credits	3		
Course Code of Pre-requisite subject(s)	---				
Session	July 2023	Section (if, applicable)	2 nd year Section B		
Name of Faculty	Dr. Ankur Singh Rana	Department	EEE		
Official Email	ankur@nitt.edu	Telephone No.	9910478111		
Name of Course Coordinator(s) (if, applicable)					
Official E-mail		Telephone No.			
Course Type	Core course				
Syllabus (approved in BoS)					
<ul style="list-style-type: none"> Semi-conductors – charge carriers, electrons and holes in intrinsic and extrinsic semi-conductors –Hall effect. <ul style="list-style-type: none"> Diodes – PN junction – current equation – Junction Capacitance – breakdown characteristics of Zener diode, Tunnel diode, Schottky diode. Bipolar junction transistors – Characteristics – Analysis of CB, CE, CC amplifier configurations. Unipolar devices – FET, MOSFET, UJT and Opto-Electronic devices – theory and characteristics. Rectifiers and switched mode power supplies – theory and design, filter circuits, applications. 					
COURSE OBJECTIVES					
To educate on the construction and working of common electronic devices and to prepare for application areas.					
MAPPING OF Course Outcomes (COs) with Programme Outcomes (POs)					
Course Outcomes	(POs)				
Upon completion of the course, the student will be able to					
1. Understand the semiconductor physics of the intrinsic, p and n materials and various devices and characteristics.	PO	CO ₁	CO ₂	CO ₃	CO ₄
2. Analyze simple diode circuits under DC and AC excitation.	1	2	3	3	2
3. Analyze and design simple amplifier circuits using BJT in CE, CC and CB configurations.	2	3	3	3	2
4. Understand the analysis and salient features of CE, CC & CB amplifier circuits.	3	1	2	2	1
5. Understand the construction and characteristics of FET, MOSFET and UJT.	4	1	2	2	1
	5	1	2	2	1
	6	2	1	1	2
	7	1	1	1	1
	8	2	2	2	2
	9	3	3	3	3
	10	2	2	2	2
	11	1	1	1	1
	12	2	2	2	2



COURSE PLAN – PART II

COURSE OVERVIEW

The basic understanding of electronics devices is established by studying the semiconductor material like p-type and n-type material. After knowing the material, PN junction semiconductor devices will be discussed which is necessary to understand the construction of devices like diode, BJT, FET. Operation of these devices along with its input and output characteristics will be discussed. After understanding the devices, some of its applications like rectifiers, switched mode power supplies, filter circuit etc. will be discussed

COURSE TEACHING AND LEARNING ACTIVITIES

S.No	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1 31 Jul- 4 Aug 2023 (3 Contact hour)	Introduction to the course, semiconductor	Chalk & Talk/PPT
2.	Week 2, 07-11 Aug 2023 (3 Contact hours)	Charge carrier, intrinsic and extrinsic semiconductor	Chalk & Talk/PPT
3.	Week 3 14 - 18 Aug 2023 (3 Contact hours)	Transportation of carrier: Drift and diffusion, Hall effect	Chalk & Talk/PPT
4.	Week 4 21 - 25 Aug 2023 (3 Contact hour)	PN Junction, Current equation diode, characteristics	Chalk & Talk/PPT
5.	Week 5 28 Aug - 1 Sep 2023 (3 Contact hours)	Small signal model of diode, junction capacitance	Chalk & Talk/PPT
6.	Week 6 4- 8 Sep 2023 (3 Contact hours)	Zener diode: break down characteristics, tunnel diode, Schottky diode, Application of diode	Chalk & Talk/PPT
7.	Week 7 11 – 15 Sep 2023 (3 Contact hours)	Introduction to BJT, types of BJT, its operation and characteristics 1st Assessment	Chalk & Talk/PPT
8.	Week 8 18 – 22 Sep 2023 (3 Contact hour)	BJT: Analysis of CB, CE, CC amplifier configuration	Chalk & Talk/PPT
9.	Week 9 25 -29 Sep 2023 (0 Contact hours)	Academic Break	Chalk & Talk/PPT
10.	Week 10 2 – 6 Oct 2023 (3 Contact hours)	Introduction to FET, MOSFET,	Chalk & Talk/PPT
11.	Week 11 9 – 13 Oct 2023 (3 Contact hours)	construction Operation of MOSFET and its characteristics	Chalk & Talk/PPT
12.	Week 12 16 – 20 Oct 2023 (3 Contact hours)	Opto-Electronic devices – theory and characteristics	Chalk & Talk/PPT
13.	Week 13 23 – 27 Oct 2023 (3 Contact hours)	Rectifiers and switched mode power supplies	Chalk & Talk/PPT
14.	Week 14 30 Oct – 3 Nov 2023 (3 Contact hours)	Rectifiers and switched mode power supplies theory and design 1st Assessment	Chalk & Talk/PPT



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15.	Week 15 6 – 10 Nov 2023 (3 Contact hours)	Filter circuits, Rectifiers applications	Chalk & Talk/PPT
16.	Week 16 13 – 17 Nov 2023 (3 Contact hours)	Rectifiers applications Compensation Assessment (CPA)	Chalk & Talk/PPT
17.	Week 17 20 – 24 Nov 2023	-----	
18.	Week 18 & 19 27 Nov – 07 Dec 2023	End Semester Examination (Final Assessment)	

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week	Duration	% Weightage
1	I st Class Test	Week 7 11 – 15 Sep 2023	60 minutes	20
2	II nd Class Test	Week 14 30 Oct – 03 Nov 2023	60 minutes	20
3	Assignments: 1 Surprise-quiz: 2	Throughout semester <ul style="list-style-type: none"> Assignment: Solutions for the questions (from first class to last class) needs to be submitted in Week 17 Surprise-quiz: Out of 2, best 1 will be considered for evaluation of marks Note: No compensation for surprise-quiz		5+15=20
CPA	Compensation Assessment	Week 16 20 – 24 Nov 2023	60 minutes	20
4	Final Assessment	Week 18/19	120 minutes	40

ESSENTIAL READINGS: Textbooks, Reference books, website address, journals, etc

Text Books:

- David, A. Bell, 'Electronic Devices and Circuits', PHI, 5th Edition, 2008.
- Millman and Halkias 'Electronic Devices and Circuits', McGraw - Hill International Student, 2nd Edition, 2007.
- Robert L. Boylestad and Louis Nashelsky, 'Electronic Devices and Circuit Theory', Pearson Prentice Hall, 10th Edition, 2009.
- Thomas L. Floyd, 'Electronic Devices', Pearson Education Limited, 9th Edition, 2013.

Reference Books:

- Allen Mottershead, 'Electronic Devices and Circuits - An Introduction', PHI, 18th Reprint, 2010.
- Albert Malvino and David J Bates, 'Electronic Principles', McGraw Hill, 7th Edition, 2007.

COURSE EXIT SURVEY

- Feedback from the students during class committee meetings
- Anonymous feedback through questionnaire (Mid of the semester & End of the semester)
- End semester feedback on course outcomes

COURSE POLICY (including compensation assessment to be specified)

- Attending all the assessments mandatory for every student
- One compensation assessment will be conducted for those students who are being physically



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- absent for the assessment 1 and/or 2, only for the valid reason.
- 3. At any case CPA will not be considered as an improvement test.
- 4. Absolute/Relative grading will be adopted for the course.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

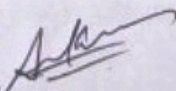
- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
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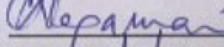
ACADEMIC DISHONESTY & PLAGIARISM

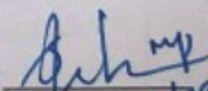
- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

FOR APPROVAL

Course Faculty 
DR. ANISUR SINGH RAMA

CC- Chairperson 
2/P/23

HOD 
02/08/23