



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 2021	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. • 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 COs with Pos	
Course Outcomes Upon completion of the course, the student will be able to	Programme Outcomes (PO)
1. Understand the semiconductor physics of the intrinsic, p and n materials and various devices and characteristics.	2,3,8,9
2. Analyze simple diode circuits under DC and AC excitation.	1,2,8,9
3. Analyze and design simple amplifier circuits using BJT in CE, CC and CB configurations.	1,2,8,9
4. Understand the analysis and salient features of CE, CC & CB amplifier circuits.	1,2,3,8,9
5. Understand the construction and characteristics of FET, MOSFET and UJT.	1,2,3,8,9

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>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</p>			
8COURSE TEACHING AND LEARNING ACTIVITIES			
S.No	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1 2-6 Aug 2021 (3 Contact hour)	Introduction to the course, semiconductor	Online Mode
2.	Week 2 9-13 Aug 2021 (3 Contact hours)	Charge carrier, intrinsic and extrinsic semiconductor	Online Mode
3.	Week 3 16 - 20 Aug 2021 (3 Contact hours)	Transportation of carrier: Drift and diffusion, Hall effect	Online Mode
4.	Week 4 23 – 27 Aug 2021 (3 Contact hour)	PN Junction, Current equation diode, characteristics	Online Mode
5.	Week 5 30 Aug - 3 Sep 2021 (3 Contact hours)	Small signal model of diode, junction capacitance	Online Mode



6.	Week 6 6- 10 Sep 2021 (2 Contact hours)	Zener diode: break down characteristics, tunnel diode, Schottky diode, Application of diode	Online Mode
7.	Week 7 13 – 17 Sep 2021 (3 Contact hours)	Introduction to BJT, types of BJT. its operation and characteristics <i>Ist Assessment</i>	Online Mode
8.	Week 8 20 – 24 Sep 2021 (3 Contact hour)	BJT: Analysis of CB, CE, CC amplifier configuration	Online Mode
9.	Week 9 27 Sep -1 Oct 2021 (2 Contact hours)	Introduction to FET, MOSFET, construction	Online Mode
10.	Week 10 4 – 8 Oct 2021 (3 Contact hours)	Operation of MOSFET and its characteristics	Online Mode
11.	Week 11 11 – 15 Oct 2021 (2 Contact hours)	Operation of MOSFET and its characteristics	Online Mode
12.	Week 12 18 – 22 Oct 2021 (2 Contact hours)	Opto-Electronic devices – theory and characteristics <i>IInd Assessment</i>	Online Mode
13.	Week 13 25 – 29 Oct 2021 (3 Contact hours)	Rectifiers and switched mode power supplies	Online Mode
14.	Week 14 1 – 5 Nov 2021 (3 Contact hours)	Rectifiers and switched mode power supplies theory and design	Online Mode
15.	Week 15 8 – 12 Nov 2021 (3 Contact hours)	Filter circuits.	Online Mode
16.	Week 16 15 – 19 Nov 2021 (2 Contact hours)	Rectifiers applications	Online Mode
17.	Week 17 22 – 26 Nov 2021 (2 Contact hours)	<i>Compensation Assessment (CPA)</i>	Online Mode
18.	Week 18	-----	



19.	Week 19 & 20	End Semester Examination (Final Assessment)	Online Mode
-----	--------------	--	-------------

COURSE ASSESSMENT METHODS

S.No	Mode of Assessment	Week	Duration	% Weightage
1	I st Class Test	Week 7 13 – 17 Sep 2021	75 minutes	25
2	II nd Class Test	Week 12 18 – 22 Oct 2021	75 minutes	25
3	Assignments/Surprisetest/ projects/seminar	Throughout semester		20
CPA	Compensation Assessment	Week 17 22 – 26 Nov 2021	75 minutes	25
4	Final Assessment	Week 19/20 2 – 13 Dec 2021	120 minutes	30

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

Text Books:

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

Reference Books:

1. Allen Mottershead, 'Electronic Devices and Circuits - An Introduction', PHI, 18th Reprint, 2010.
2. 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)

1. Attending all the assessments mandatory for every student
2. One compensation assessment will be conducted for those students who are being physically 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.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

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 *[Signature]* 03/08/21 CC- Chairperson *Josephine RL* HOD *Approved Via Mail*



Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.