DEPARTMENT OF _____

NATIONAL INSTITUTE OF TECHNOLOGY

TIRUCHIRAPPALLI - 620 015, TAMIL NADU, INDIA

COURSE PLAN (PART I)							
Name of the programme and specialization	B. Tech Electrical & Electronics Engineering						
Course Title	**Electron Device**						
Course Code	**EEPC13**		**No. of Credits**	3			
Course Code of Pre-requisites	-						
Session	**July 2025**		**Section (if, applicable)**	A			
Name of the Faculty	Dr. Ankur Singh Rana		**Department**	EEE			
E-mail	ankur@nitt.edu		**Telephone No.**	9910478111			
Course Coordinator(s) (if, applicable)	-						
E-mail of Course Coordinator (s)	-		**Telephone No.**	-			
Course Type (tick)	IR	Core	Programme Elective	Open Elective	Minor	Honours	Laboratory
		✓					

COURSE CONTENT (as in latest curriculum)

Semi-conductors – charge carriers, electrons and holes in intrinsic and extrinsic semiconductors –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.

References

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

COURSE LEARING OBJECTIVES

To educate on the construction and working of common electronic devices and to prepare for application areas.

COURSE OUTCOMES (CO)

Course Outcomes	
After successful completion of the course, the students should be able to:	
CO1	Understand the semiconductor physics of the intrinsic, p and n materials and various devices and characteristics.
CO2	Analyze simple diode circuits under DC and AC excitation.
CO3	Analyze and design simple amplifier circuits using BJT in CE, CC and CB configurations
CO4	Understand the analysis and salient features of CE, CC & CB amplifier circuits
CO5	Understand the construction and characteristics of FET, MOSFET and UJT.

Aligned Programme Outcomes (PO) (Assign level – 1 or 2 or 3 or blank)

	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	2	1	1	1	2	1	2	3	2	1	2
CO2	3	3	2	2	2	1	1	2	3	2	1	2
CO3	3	3	2	2	2	1	1	2	3	2	1	2
CO4	3	3	3	2	3	1	1	2	3	3	1	2
CO5	2	2	1	1	1	2	1	2	3	2	1	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

Sl. No.	Week	Topic	Mode of Delivery
1.	(Week 1) 07.07.25 to 11.07.25 (3 Contact hours)	Introduction to the course, Semiconductor	PPT/Chalk & Talk
2.	(Week 2) 14.07.25 to 18.07.25 (3 Contact hours)	Charge carrier, intrinsic and extrinsic semiconductors	PPT/Chalk & Talk
3.	(Week 3) 21.07.25 to 25.07.25 (3 Contact hours)	Transportation of carrier: Drift and diffusion, Hall effect	PPT/Chalk & Talk
4.	(Week 4) 28.07.25 to 01.08.25 (3 Contact hours)	PN Junction, Current equation diode, characteristics	PPT/Chalk & Talk
5.	(Week 5) 04.08.25 to 08.08.25 (3 Contact hours)	Small signal model of diode, junction capacitance	PPT/Chalk & Talk
6.	(Week 6) 11.08.25 to 15.08.25 (2 Contact hours)	Zener diode: breakdown characteristics, tunnel diode, Schottky diode, Application of diode	PPT/Chalk & Talk
7.	(Week 7) 18.08.25 to 22.08.25 (3 Contact hours)	Introduction to BJT, types of BJT. Its operation and characteristics	PPT/Chalk & Talk
8.	(Week 8) 25.08.25 to 29.08.25 (1 Contact hours)	BJT: Analysis of CB, CE, CC amplifier configuration	PPT/Chalk & Talk
9.	(Week 9) 01.09.25 to 05.09.25 (2 Contact hours)	Introduction to FET, MOSFET.	PPT/Chalk & Talk
10.	(Week 10) 08.09.25 to 12.09.25 (3 Contact hours)	Construction Operation of MOSFET and its characteristics	PPT/Chalk & Talk
11.	(Week 11) 15.09.25 to 19.09.25 (2 Contact hours)	Opto-Electronic devices – theory and characteristics	PPT/Chalk & Talk
12.	(Week 12) 22.09.25 to 26.09.25 (3 Contact hours)	Rectifiers and switched mode power supplies	PPT/Chalk & Talk
13.	(Week 13) 29.09.25 to 03.10.25 (2 Contact hours)	Rectifiers and switched mode power supplies theory and design	PPT/Chalk & Talk
14.	(Week 14) 06.10.25 to 10.10.25 (3 Contact hours)	Filter circuits, Rectifiers applications	PPT/Chalk & Talk
15.	(Week 15) 13.10.25 to 17.10.25 (3 Contact hours)	Rectifier applications	PPT/Chalk & Talk
16.	(Week 16) 20.10.25 to 24.10.25 (3 Contact hours)	Rectifier applications	PPT/Chalk & Talk
17.	(Week 17) 27.10.25 to 28.10.25 (0 Contact hours)		PPT/Chalk & Talk

COURSE ASSESSMENT METHODS

Sl. No.	Mode of Assessment	Week / Date	Duration	% Weightage
1.	Class test -1	(Week 7) 18.08.25 to 22.08.25	60 minutes	15 %
2.	Class test -2	(Week 15) 13.10.25 to 17.10.25	60 minutes	15 %
3.	Assignment Surprise Quiz	Throughout Semester	**Assignment** : solutions for the questions (from first class to last class) need to be submitted in week 16 **Surprise quiz** : Out of N, (N-1) will be considered for evaluation of marks **Note:** No compensation for surprise quiz	5 + 15 = 20%
CPA	Compensation Assessment	(Week 17) 27.10.25 to 28.10.25	60 minutes	15%
4.	Final Assessment	As per institute schedule	180 minutes	50%

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

- 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

COMPENSATION POLICY

- Only one instance of absence is acceptable in continuous assessment, and a compensation assessment for such cases will be conducted only once.
- Compensation assessments are restricted to genuine reasons, like severe illness, and require valid proof in the form of a medical certificate issued by the NITT hospital medical officer.
- In situations where students anticipate missing assessments due to unavoidable reasons, prior intimation to the faculty is essential. If a student is unable to provide advance notice due to sudden illness or emergencies, they must communicate the reason and submit valid proof of the absence within one week of the assessment.

ATTENDANCE POLICY

- 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. Students awarded 'V' grade must compulsorily redo the course.

ACADEMIC DISHONESTY AND PLAGIARISM

Academic Dishonesty

a) Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty
b) Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
c) The department disciplinary committee constituted with the faculty member, PAC Chairperson, and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student found guilty.

ADDITIONAL COURSE INFORMATION

FOR APPROVAL

07/07/2025
Dr. ANKUR SINGH RANA
Course Faculty

08-07-2025
Chairperson (Class Committee)

9/7/2025
HoD