

**DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech- Instrumentation and Control Engineering		
Course Title	Electron Devices and Circuits		
Course Code	ICPE 52	No. of Credits	3
Course Code of Pre-requisite subject(s)	NIL		
Session	July 2023	Section (if, applicable)	A and B
Name of Faculty	Dr. Geetha C	Department	ICE
Email	geethac@nitt.edu	Telephone No.	-
Name of Course Coordinator(s) (if, applicable)	NA		
E-mail	NA	Telephone No.	NA
Course Type	<input checked="" type="checkbox"/> Core course	<input checked="" type="checkbox"/> Elective course	
Syllabus			
<p>PN JUNCTION DEVICES : PN junction diode –structure, operation and V-I characteristics, diffusion and transition capacitance -Rectifiers – Half Wave and Full Wave Rectifier,– Display devices- LED, Laser diodes, Zener diode characteristics- Zener Reverse characteristics – Zener as regulator</p> <p>TRANSISTORS AND THYRISTORS: BJT, JFET, MOSFET- structure, operation, characteristics and Biasing UJT, Thyristors and IGBT -Structure and characteristics.</p> <p>AMPLIFIERS: BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response –MOSFET small signal model– Analysis of CS and Source follower – Gain and frequency response-High frequency analysis.</p> <p>MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER: BIMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers – Types (Qualitative analysis).</p> <p>FEEDBACK AMPLIFIERS AND OSCILLATORS: Advantages of negative feedback – voltage / current, series, Shunt feedback – positive feedback – Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators.</p>			
COURSE OBJECTIVES			
<ol style="list-style-type: none"> 1. To provide the structure of basic electronic devices. 2. To introduce active and passive circuit elements. 3. To provide the operation and applications of transistor like BJT and FET. 			

4. To learn the characteristics of amplifier gain and frequency response.
5. To introduce the functionality of positive and negative feedback systems.

COURSE OUTCOMES (CO)

On completion of the course, students should be able to

1. Explain the structure and working operation of basic electronic devices.
2. Able to identify and differentiate both active and passive elements
3. Analyze the characteristics of different electronic devices such as diodes and transistors
4. Choose and adapt the required components to construct an amplifier circuit and acquire knowledge in design and analysis of oscillators

Course Outcomes	Aligned Programme Outcomes (PO)
1. Explain the structure and working operation of basic electronic devices.	1,2,3,5,7,12
2. Able to identify and differentiate both active and passive elements	1,2,3,5,7,12
3. Analyze the characteristics of different electronic devices such as diodes and transistors	1,2,3,5,7,12
4. Choose and adapt the required components to construct an amplifier circuit and acquire knowledge in design and analysis of oscillators	1,2,3,5,7,12

COURSE PLAN – PART II

COURSE OVERVIEW

The course deals with the structure and working operation of basic electronic devices such as semiconductor diode, transistors and thyristors. This course also covers DC biasing and AC analysis of transistors and thyristors, feedback amplifiers and oscillators.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1 st and 2 nd week	PN JUNCTION DEVICES : PN junction diode – structure, operation and V-I characteristics, diffusion and transition capacitance	Chalk and talk
2	3 rd Week	Rectifiers – Half Wave and Full Wave Rectifier	Chalk and talk
3	4 rd Week	Display devices- LED, Laser diodes, Zener diode characteristics- Zener Reverse characteristics – Zener as regulator	Chalk and talk

4	5 th and 6 th week	TRANSISTORS AND THYRISTORS: BJT, JFET, MOSFET- structure, operation, characteristics	Chalk and talk	
Assessment – 1				
5	7 th week	Biassing UJT, Thyristors and IGBT -Structure and characteristics	Chalk and talk	
6	8 th week	AMPLIFIERS: BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response	Chalk and talk	
7	9 th and 10 th week	MOSFET small signal model– Analysis of CS and Source follower – Gain and frequency response-High frequency analysis	Chalk and talk	
Assessment – 2				
8	11 th and 12 th week	MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER: BIMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – FET input stages	Chalk and talk	
9	13 th and 14 th week	Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers –Types (Qualitative analysis)	Chalk and talk	
Assessment – 3				
10	15 th week	FEEDBACK AMPLIFIERS AND OSCILLATORS: Advantages of negative feedback – voltage / current, series, Shunt feedback – positive feedback	Chalk and talk	
Compensation Assessment				
11	16 th week	Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators	Chalk and talk	
Final Assessment				
COURSE ASSESSMENT METHODS				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment 1	2 nd week of September	1 hour	20
2	Assessment 2	1 st week of October	1 hour	20
3	Assessment 3 (In the form of Assignment, and /or Quiz)	3 rd week of November	-	20
CPA	Compensation Assessment	4 th week of November	1 hour	20

4	Final Assessment	1 st week of December	3 hours	40
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COURSE EXIT SURVEY

1. Feedback from the students during the class committee meetings and at the mid of the semester
2. Feedback before end semester examination through a questionnaire

COURSE POLICY

MODE OF CORRESPONDENCE (email/ phone etc) - Email

COMPENSATION ASSESSMENT POLICY

Compensation Assessment will be conducted for students who miss Assessment 1 or Assessment 2. But they should get permission from the faculty by giving valid reason in written form to write Compensation Assessment.

- **Grading Policy** - Relative grading will be used to decide the clusters (range) of the total marks scored. The passing minimum should be 35% or (Class average/2) whichever is greater.

Reassessment Examination

- A student may be permitted to withdraw from appearing for the End Semester Examination for valid reasons on production of valid medical certificate and with the approval of Head of the Department. Withdrawal application shall be valid only if it is made before the commencement of the examination.
- For students who miss the final semester assessment, reassessment will be conducted for 30% mark and internal marks remain same.
- Those who failed in the subject may register for reassessment examination which will be conducted for 100% mark (Absolute grading where passing minimum is 35).
- Grades for the students who have withdrawn from writing the end semester exam will be same as the regular assessment grades. For those who are failed or absent and appearing for reassessment, the maximum grade is restricted to 'E'.
- Reassessment exam will be conducted in the first week of the next semester or earlier during the vacation.
- Students who fail in reassessment exam have to register for formative assessment.

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 / valid reasons on production of valid medical certificate with the approval of Head of the Department.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- 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

- Any suggestions, queries and feedback can be communicated through email (geethac@nitt.edu)

FOR APPROVAL

Course Faculty



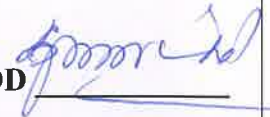
Dr. Geetha C

CC-Chairperson



Dr. Ramakalyan Ayyagari

HOD



Dr. K. Dhanalakshmi

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