SEMESTER: S4

ANALOG CIRCUITS

Course Code	**PEICT413**	**CIE Marks**	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	Introduction To Electrical and Electronics Engineering GYEST104	**Course Type**	Theory

Course Objectives:

1. To develop knowledge of small signal analysis of BJTs
2. To design wave shaping circuits according to requirements and to develop an in-depth understanding of communication systems and power devices

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SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Small Signal Analysis of BJT**: CE Configuration Using Small Signal Hybrid-Pi Model For Mid Frequency And Low Frequency. (Gain, Input And Output Impedance). High Frequency Equivalent Circuits Of BJT, Miller Effect, Analysis Of High Frequency Response Of CE Amplifier.	**9**
2	**Wave Shaping Circuits**: Clippers And Clampers Multivibrators:Types of multivibrators- Monostable, Bistable and Astable multivibrators- duty cycle, frequency Schmidt Trigger Circuit Oscillators:Barkhausen's Criterion For Oscillation - Types Of Oscillators - Phase Shift, Wien Bridge, Hartley, Colpitt's And Crystal Oscillators.	**9**
3	**Power Devices**: Thyristor Family: UJT, SCR, Triac, Diac- Operation And VI Chara. Transferred Electron Devices, Hot Electron Devices, Varactor Diode, Power Diodes, Power Transistors, IGBT and GTO- Operation and VI Characterstics	**9**

4	**Linear Voltage Regulators:** load & line regulation, types of voltage regulators, , Block diagram of a series voltage regulator, series voltage regulator (working principle and design for a specific output voltage and current), Short circuit protection and fold back protection, Output current boosting using Darlington pair transistor.	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Understand CE configuration using small signal hybrid-pi model, high frequency equivalent circuits, Miller effect, and CE amplifier response.	**K2**
CO2	Understand clippers, clampers, multivibrators , Schmidt trigger, and various oscillators	**K2**
CO3	Comprehend operation and VI characteristics of UJT, SCR, Triac, Diac, transferred electron devices, hot electron devices, varactor diode, power diodes, power transistors, IGBT, and GTO.	**K2**
CO4	Understand load and line regulation, types of voltage regulators, and design series voltage regulators with protection and output current boosting.	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

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CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											2
CO2	3											2
CO3	3											2
CO4	3											2
CO5	3											2

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Microelectronic Circuits	A.S.Sedra and K.C.Smith	Oxford University Press	6/e, 2006
2	Electronic Devices and Circuits	R.L. Boylestad and Louis Nashelsky	Prentice Hall of India	9/e, 2006
3	Semiconductor Physics and Devices	Donald A Neaman	Tata Mc Graw Hill	4/e, 2012
4	Electronic devices and circuits	Millman and Halkias	McGraw Hill Publication	4/e, 2015

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Electronic Devices	Thomas L. Floyd	Pearson Education Inc.	8th edition, 2007
2	The Art of Electronics	Paul Horowitz, Winfield Hill	Cambridge University Press	3rd edition, 2011
3	Schaum's Outline Of Electronic Devices And Circuits	Jimmy J Cathey	McGraw-Hill Education	2nd edition, 2002

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Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://nptel.ac.in/courses/108105158
2	https://nptel.ac.in/courses/108105158, https://nptel.ac.in/courses/108101094
3	https://nptel.ac.in/courses/108101094
4	https://nptel.ac.in/courses/117105143, https://nptel.ac.in/courses/117102059