



GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING (Autonomous)

Approved by AICTE & Affiliated to Andhra University, Visakhapatnam from 2022-23

(Affiliated to JNTUK, Kakinada upto 2021-22)

Re-accredited by NAAC twice with 'A' Grade with a CGPA of 3.47/4.00

Madhurawada, Visakhapatnam - 530048

SCHEME OF COURSE WORK

Course Details:

Course Title	Electronic Devices and Circuits
Course Code	22EC11D3
Program	B.Tech
Branch	Electrical & Electronics Engineering
Semester	I
Prerequisites	Basic Electrical Engineering, Electrical circuit Analysis, Engineering Physics and Basics of Mathematics
Course to which it is prerequisite	All Advanced courses in electronics.

Course outcomes (CO's): At the end of the course the student will be able to

CO 1: demonstrate the characteristics of PN Junction diodes and Zener Diode (L3)

CO 2: examine the V-I characteristics in different types of transistors (L3).

CO 3: apply biasing techniques to achieve thermal stabilization (L4)

CO 4: analyze the performance of a transistor using h-parameters (L4)

CO 5: illustrate the function of feedback amplifiers and oscillators (L3)

Program Outcomes (POs):

The student of Electrical and Electronics Engineering at the end of the program will be able to:

PO-1	Apply the knowledge of basic sciences and electrical and electronics engineering fundamentals to solve the problems of power systems and drives.
PO-2	Analyze power systems that efficiently generate, transmit and distribute electrical power in the context of present Information and Communications Technology.
PO-3	Design and develop electrical machines and associated controls with due considerations to societal and environmental issues.
PO-4	Design and conduct experiments, analyze and interpret experimental data for performance analysis.
PO-5	Apply appropriate simulation tools for modeling and evaluation of electrical systems.
PO-6	Apply the electrical engineering knowledge to assess the health and safety issues and their consequences.
PO-7	Demonstrate electrical engineering principles for creating solutions for sustainable development.
PO-8	Develop a techno ethical personality that help to serve the people in general and Electrical and Electronics Engineering in particular.
PO-9	Develop leadership skills and work effectively in a team to achieve project objectives.
PO-10	Communicate effectively in both verbal and written form.
PO-11	Understand the principles of management and finance to manage project in multi disciplinary environments.
PO-12	Pursue life-long learning as a means of enhancing the knowledge and skills.



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Course Outcome/Program Outcomes:

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	3	2	2		2	2	2		2
CO-2	2	2		3	2	2	2	3	2	2	2	2
CO-3	2	2	2		2	2			2	2	2	2
CO-4	2	2	2		2	2	2			2		
CO-5	2	2	2	2	2	2		2	2	2	2	2

3 - Strongly correlated, 2- Moderately correlated, 1- weak correlated Blank - No correlation

Assessment Methods:

Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	Topic/Contents	Course Outcomes	Sample questions	Teaching Learning Strategy	Assessment Method & Schedule
1	Introduction to Semiconductor materials, VI Characteristics of Diode, Zener diode Characteristics, Zener diode as Voltage Regulator, Tunnel diode , LED	CO-1	Define energy gap and explain the differences for insulators, conductors and semiconductors materials Explain the VI Characteristics of a diode and compare Ge and Si Diode characteristics. Design a zenerregulator to meet the following specifications: Load voltage $V_L=7.5V$, source voltage $V_s= 25V$ and load current $I_L= 30mA$.	Lecture/ Discussion	Mid-Test 1 (Week 9)



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2	Rectifiers- Half wave rectifier, Full wave rectifier Advantages of full wave rectifier Over half wave rectifier	CO-1	<p>1. A single phase full – wave rectifier uses semiconductor diodes. The voltage drop and internal resistance of the diodes may be neglected. Assume an ideal transformer.</p> <p>2. Prove that one diode conducts for one half cycle and that the other diode conducts for the remaining half cycle of the input line voltage if the load consists of a resistor R in series with an inductor L.</p> <p>3. What are the advantages of full wave rectification over half wave rectification?</p>	Lecture/ Power Point Presentation	Mid-Test 1 (Week 9)
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3	C-Filter Inductor filter LC- Filter,	CO-1	1. Write about some of the applications of diodes. 2. What are the applications of LC Filters	Lecture/ Power Point Presentation	Mid-Test 1 (Week 9)
4	Transistor Characteristics Bipolar Junction transistor (BJT) -input characteristics of transistor in CB, CE, CC Configuration,	CO-2	1. Explain CB and CE configuration of a transistor 2. A Transistor has a power rating of 600mW. If the collector-to-emitter voltage is 10mA, what would happen to the transistor?	Lecture/ Problem Solving	Mid-Test 1 (Week 9)
5	Relations between the gains	CO-2	1. Explain the relations Between gains	Lecture/ Discussion	Mid-Test 1 (Week 9)
6	Characteristics of JFET, MOSFET Enhancement and depletion), characteristics of UJT	CO-2	1. Obtain the characteristics of JFET 2. Explain the characteristics of UJT	Lecture/ PowerPoint Presentation	Mid-Test 1 (Week 9)
7	Biasing and Stability Need for biasing, Criteria for fixing the operating point, thermal run away	CO-3	1. Define biasing 2. Explain the criteria for fixing the operating point	Lecture/ Discussion	Assignment & case study (Week 7 - 8)
8	Thermal stability, stabilization techniques	CO-3	1. What is meant by thermal stability in a transistor? 2. A better thermal stability can be achieved in the emitter-feedback bias circuits than the fixed-bias circuits. Why?	Lecture/ Discussion	Quiz (Week 1 - 7)
9	MID EXAMINATIONS				
10	SMALL SIGNAL AMPLIFIERS: h-parameter representation of Transistor, Analysis of single stage transistor amplifier using h-parameters	CO-4	Obtain the h parameters of the transistor	Lecture/ Discussion	Mid-Test 2 (Week 18)
11	Comparison of transistor configurations in terms of A_v , A_i , R_i , R_o	CO-4	compare configuration of transistor in terms of A_v , A_i , R_i , R_o	Lecture/ Discussion	Assignment (Week 12 - 13)



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12	FEEDBACK AMPLIFIERS: Concept of feedback, classification of feedback amplifiers,	C0-5	1. What is the ratio of the half-power frequencies with feedback to those without feedback 2. What are the basic characteristics of an ideal operational amplifier?	Lecture/ Problem Solving	Mid-Test 2 (Week 18)
13	General characteristics of negative feedback amplifiers,	C0-5	1. Since negative amplifier in an amplifier reduces transfer gain, why is it used? 2. Define the input and output offset voltages of a practical operational amplifier.	Lecture/ Problem solving	Mid-Test 2 (Week 18)
14	effect of negative feedback on input and output Resistances	C0-5	1. For an output of 36 V with 1 percent second harmonic distortion what is the input voltage 2. How does the negative feedback in an amplifier reduce the effect of noise in the amplifier circuit?	Lecture/ Discussion	Mid-Test 2 (Week 18)
15	OSCILLATORS: Condition for oscillations, RC Phase shift oscillator with Transistor	C0-5	1. Explain the working of a RC Phase shift oscillator	Lecture/ Discussion	Quiz (Week 10- 14)
16	Wein Bridge Oscillator,	C0-5	1. Explain the working of a Wein bridge oscillator 2.	Lecture/ Problem Solving	Seminar (Week 16)
17	Hartley and Colpitts Oscillators		1. Describe the working of Hartley oscillator 2. Explain the working of Colpitts oscillator	Lecture/ Discussion	
18	MID EXAMINATIONS				
19 & 20	END EXAMINATIONS				