SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Electrical Engineering

Semester/Year	I /I	Program	B.Tech

Subject Category	B.Tech	Subject Code:	EEA101	Subject Name:	Basic of Electrical Engineering

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				**Practical**			Total Marks				
End Sem	Mid-Sem	Quiz	Assig	End Sem	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Basics of Physics and Mathematics
Basics of electrical and electronic components

Course Objective:

1. Familiarize with the basic concept of DC circuits.
2. Impart the knowledge of 1-ϕ and 3-ϕ AC circuits.
3. Impart the knowledge of Transformer and Rotating Machines
4. To explain the basic concepts of electronic devices and number systems.

Course Outcomes:

CO1: Acquire knowledge and able to demonstrate DC circuits.
CO2: Able to demonstrate the 1-phase and 3-phase AC circuit
CO3: Able to explain the construction, working, principle, test and losses of 1-phase transformer.
CO4: Able to explain the construction, working and principle of rotating machine(DC).
CO5: Acquire the knowledge of semiconductor devices and logic gates.

UNITs	Descriptions	Hrs.	CO's
I	**DC Circuits-** Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and Voltage laws, source conversion, DC circuits analysis using mesh & nodal method, Theorems using DC power supply Superposition, Thevenin, star-delta transformation.	10	CO1,CO4
II	**AC Circuits-** Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series). Three-phase balanced circuits, voltage and current relations in star and delta connections.	06	CO2, CO4
III	**Transformer-** Review of laws of electromagnetism, MMF, flux, and their relation, analysis of magnetic circuits. Single-phase transformer basic concepts and construction features, voltage, current and impedance transformation, equivalent circuit, losses in transformers, regulation and efficiency	09	CO2,CO3 ,CO4
IV	**Rotating Electric machines-** Constructional details of DC machine, working of induction machine and synchronous machine, working principle of DC machines, classification of DC machine, EMF equation, and characteristic of separately excited and self excited generators. Working principle of DC motor, Importance of back EMF, Starting of DC motor.	07	CO3,CO4
V	**Electronics-** Types of Resistor, Inductor and capacitor, color coding of resistor and capacitor P-type and N-type semiconductor, semiconductor diode its operation in forward and reverse bias, V-I characteristics, half wave and full wave rectification, application. Binary Number system binary addition, subtraction, multiplication and division, subtraction operation using 1's and 2's complement forms, Octal number system, hexadecimal number system conversion of number system from one number system to another number system, Logic Gates and Universal Gates and its operations.	08	CO2, CO4
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. To verify Kirchhoff's voltage law and Kirchhoff's current law
2. To verify Thenvin's Theorem by experimental Kit
3. To determine active power, reactive power, of a single phase R-L series circuit.
4. To determine the line current, phase current, line voltage, phase voltage, phase current and total power of a three phase balanced star connected load.
5. To determine the transformation ratio and perform polarity test on a single phase transformer.
6. To conduct open circuit test and short circuit test on single phase transformer and calculate iron losses and copper loss

7. To perform load test on single phase transformer and determine voltage regulation and efficiency.
8. To determine the armature circuit resistance of series field winding resistance, shunt field winding resistance of DC machines.
9. Design and verify Logic gates using diodes.
10. Design and verify Logic gates using transistors.
11. To find out resistance value using colour code.

Text Book-

- Basic Electrical & Electronics Engineering by V.N. Mittle & Arvind Mittle.
- A text book of electrical technology volume 2 by B L thereja and A K thereja.

Reference Books-

1. Engineering Circuit Analysis by William H hayt and Kimberly
2. Electrical machinery by Dr P S Bhimbra
3. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition
4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
5. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition
6. Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition

Modes of Evaluation and Rubric

Theory (60)	Midsem (20)	Assignment (10)	Quiz (10)	Total (100)
Practical (30)	LW (10)	Quiz (10)		Total (50)

List/Links of e-learning resource

- https://nptel.ac.in/courses/108/108/108108076/
- IISC banglore
- https://nptel.ac.in/courses/108/105/108105132/
- IIT kharagpur

Recommendation by Board of studies on	19/6/24
Approval by Academic council on	28/6/24
Compiled and designed by	Dr. Monika Jain
Subject handled by department	Electrical Engg. Dept.

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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Department of Electrical Engineering

Semester/Year	II /I	Program	B.Tech

Subject Category	B.Tech	Subject Code:	EEA-103	Subject Name:	**Basic Electronics**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				**Practical**			Total Marks				
End Sem	Mid-Sem	Quiz	Ass	End Sem	LW	quiz		L	T	P	
60	20	10	10	--	--	--	100	3	-	-	3

Prerequisites:

Semiconductor devices, Basic laws of electrical engineering and their application.

Course Objective:

The students will be able to,

- The objective of the subject is to provide students with the importance of Electronics as a subject.
- To provide constructional features of electronics components, their characteristics and their application in different circuit's transistor gain amplifier, special diode, diode as a rectifier diode application clipping a clamping circuit.
- To develop the ability to analyze electronic circuits.
- Students will be able to calculate the performance of the power amplifier.
- To introduce negative feedback/positive feedback generator of waveform of different frequency.
- To explain multivibrator and its application. Need of different amplifiers, calculation of common mode gain and common mode rejection ratio.

Course Outcomes:

After completing the course, the students will be able to

CO1 - Acquire knowledge and able to demonstrate construction, working principle, characteristics, different parameters related to the performance of Diode and circuits.

CO2 - Acquire knowledge and able to demonstrate the working, characterstic and designing of Transistors.

CO3 - Able to demonstrate the working of power amplifier, its types and features.

CO4 – illustrate different types of oscillators, working and applications.

CO5 – Able to apply the knowledge of different regulator and applications.

UNITs	Descriptions	Hrs.	CO's
I	Review of P-N junction diode, I-V characteristics of a diode; half-wave and full-wave rectifiers, Zener diodes, Varactor diode, PIN diode, LED, Photo diode, Tunnel diode, clamping and clipping circuits.	8	CO1,CO3
II	Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: DC-AC Load line, biasing methods, current mirror; common-emitter, common-base and common collector amplifiers; Hybrid parameter transistors, Field Effect Transistor, UJT	10	CO1, CO2, CO3
III	Power amplifiers, class A, class B, class AB efficiency and power dissipation Push Pull amplifier complimentary push pull amplifier concept of feedback amplifier, negative feedback, and its advantages, voltage series, voltage shunt, current series and current shunt feedback amplifier.	6	CO1, CO2,CO3
IV	Barkhausen criteria of oscillator Sinusoidal oscillators circuit, L-C (Hartley-Colpitts) oscillators, RC phase shift, Wien Bridge, and Crystal oscillators. Switching characteristics of diode and transistor, transistor as switch, Multivibrators, Bistable, Monostable, Astablemultivibrators, Differential amplifier, calculation of differential, common mode gain and CMRR. Darlington pair, Boot strapping technique, 555 Timer.	7	CO1, CO2, CO3
V	De Regulated Power Supplies : Introduction Voltage Regulator , Types of Voltage Regulators , Zener Diode Shunt Regulator , Working of Zener Diode Shunt Regulator , Optimum Value of Current Limiting, Disadvantages of Zener Diode Resistor ,Shunt Regulator , Transistor Shunt Regulator , Transistor Series Regulator.	9	CO3, CO4
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

NA

Text Book-

- Electronic Devices and Circuits by R.S.Sheda, S.Chand.
- Electronic Devices and Circuits by Millman & Halkias, Mcgraw-hil
- Electronic Devices and Circuits theory by Robert Boysted, PHI
- Electronic Devices and Circuits by J.B.Gupta, S.K.Kataria & Sons.

Reference Books-

- Achuthan MA and Bhatt KN; Fundamentals of semiconductor devices; TMH
- Neamen Donald; Semiconductor Physics and devices
- Bogart; Electronic Devices and Circuits; Universal Book Stall, New Delhi
- R.A. Gaikward; OP- Amp and linear Integreted circuit; PHI
- I.J. Nagrath; Electronics -Analog and Digital; PHI

Modes of Evaluation and Rubric

Theory (60)	Midsem (20)	Assignment (10)	Quiz (10)	Total (100)

List/Links of e-learning resource

- NPTEL

Recommendation by Board of studies on	19/6/24
Approval by Academic council on	28/6/24
Compiled and designed by	Prof. Deepti Jain
Subject handled by department	Electrical Engg. Dept.

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Department of Electrical Engineering

Semester/Year		II/I	Program		B.Tech
Subject Category	ESC	Subject Code:	EEA - 105	Subject Name:	Lab - Workshop

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assg	End Sem	LW	Quiz		L	T	P	
-	-	-		30	10	10	50	-	-	2	2

Prerequisites:

Physics, Basic symbols of R,L,C, Basic knowledge of Electronics Components.

Course Objective:

1. To develop specialized manpower for electrical power and energy industry.
2. To augment the student's capacity by offering projects in emerging areas of Electrical & Electronics Engineering.
3. To improve student's perspective towards environmental issues by sensitizing and building the awareness of green technologies.

Course Outcomes:

CO1: Acquire the knowledge and able to learn the basic of Soldering, wiring, different electrical & electronics elements, PCB forming.
CO2: Acquire the knowledge of grounding, protection, fuse wire etc.
CO3: Acquire the knowledge and able to demonstrate the different type of motors, their working and its application. Such as stair case wiring, a room wiring etc. useful in commercial and demostic buildings.
CO4: Demonstrate different types of testing on starter and power circuits.
CO5: Demonstrate different circuits related to diode, transistor, timer and their applications.

UNITs	Descriptions	Hrs.	CO's
I	Introduction of tools, electrical materials, symbols and abbreviations. 2 Familiarization of various types of service mains - wiring installations - accessories and household electrical appliances.	3	1,2,3
II	Importance of Neutral and Grounding and exposure to various earthing schemes Realization of different types of wiring systems like tube light wiring, staircase wiring along with the protection elements like fuse, MCB, ELCB etc.	3	1,2,3
III	Assembling and dissembling of D. C. Machine, single phase motor and its meggering. Assembling and dissembling of single phase transformer and its meggering Different faults in domestic appliances like automatic iron, mixture, Oven, washing machine and repairing of the same. Application of Tester and Test Lamp for fault finding in Electrical Systems 8 Introduction to DOL and STAR-DELTA starter with power circuit	3	1,2,3
IV	Application of Tester and Test Lamp for fault finding in Electrical Systems 8 Introduction to DOL and STAR-DELTA starter with power circuit and its control circuit Calibration of Energy meter	3	1,2,3
V	V-I characteristics of P-N junction diode and Zener diode, Light Emitting diode, gain and frequency of Colpitt oscillator, gain and frequency of Hartley oscillator, performance of IC 555 timer in Astable, Mono stable, Bistable mode, zener diode as a voltage regulator, sine wave, square wave and Triangular wave on the CRO, characteristics of Field Effect Transistor (FET).	3	1,2,3
Guest Lectures (if any)			
Total Hours		15	

Suggestive list of experiments:

- Make a circuit for one lamp controlled by one switch with PVC surface conduit system.
- Make a circuit for two lamps controlled by two switches with PVC surface conduit system.
- Make a circuit for one lamp controlled by one switch and provision of 2/3 pin socket.
- Make a circuit for stair case wiring.
- Make a circuit for godown wiring.
- Make a circuit for electrical bell connection.
- Make a circuit for ceiling fan with regulator
- Make a circuit for series connection of lamps
- Make a circuit for parallel connection of lamps
- House Wiring
- MCB Connection
- Energy meter connection and calculation
- Electricity bill calculation and analysis of bill of your on home.
- Identify the sine wave, square wave and Triangular wave on the CRO & measure voltage & frequency of the wave forms.(C01)
- To draw V-I characteristics of P-N junction diode and Zener diode (C02)
- Design the circuit using zener diode as a voltage regulator(C04)
- Evaluate performance of transistor for different transistor configuration (CO3)
- To draw characteristics of field effect transistor (FET) (C02)
- To draw V-I characteristics of Light Emitting diode (LED). (C02)
- Determine the frequency of oscillation of wien's bridge oscillator.(C03)
- Determine gain and frequency of Colpitt oscillator. (C03)
- Determine gain and frequency of Hartley oscillator. (C03)
- Evaluate performance of IC 555 timer in Astable, Mono stable, Bistable mode (C03)

Text Book-

- Electrical Engineering Drawing & Design by C R Dargan.
- Electronic Devices and Circuits theory by Robert Boysted, PHI
- Electronic Devices and Circuits by J.B.Gupta, S.K.Kataria & Sons.

Reference Books-

- Workshop Electrics by Alex Weiss

Modes of Evaluation and Rubric

Practical (30)	LW (10)	Quiz (10)		Total (50)

List/Links of e-learning resource

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Subject handled by department	Electricla Engg. Deptt.