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:	**Electrical & Electronics Engineering**

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	20	30	20	150	3	0	2	4

Prerequisites:

Basics of Physics, Mathematics
Basics of electrical and electronic elements

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 apply the concept of DC circuits in complex solving.
CO2: Understand and apply the concept of AC circuits for solving the circuits.
CO3: Accquire and able to evaluate the performance parameters of transformer.
CO4: Understand able to analysis the different types of Dc motor and Generator.
CO5: Understand and able to apply logic gates for mimimization of circuits.

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.	8	CO2, CO4

	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.		
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. To verify Kirchhoff's voltage law and Kirchhoff's current law and Thenvin's Theorem (CO4)
2. To determine active power, reactive power, of a single phase R-L series circuit. (C02)
3. To determine the line current, phase current, line voltage, phase voltage, phase current and total power of a three phase balanced star connected load. (CO2)
4. To determine the transformation ratio and perform polarity test on a single phase transformer. (CO2)
5. To conduct open circuit test and short circuit test on single phase transformer and calculate iron losses and copper loss (C02)
6. To perform load test on single phase transformer and determine voltage regulation and efficiency. (C03)
7. To determine the armature circuit resistance of series field winding resistance, shunt field winding resistance of DC machines. (C02)
8. Design and verify Logic gates using diodes. (CO2, CO4)
9. Design and verify Logic gates using transistors. (CO2, CO4)
10. Resistance Code chart.

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.
- Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.

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

Modes of Evaluation and Rubric

Theory	Attendance (5)	Midsem (10)	Performance (5)	Total (20)
	Attendance (5)	Assignmet (5)	-	Total (10)
		Quiz (10)	-	Total (10)

Practical	Attendance (5)	Lab Work (5)	Total (10)
		Quiz (10)	Total (10)

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	14/6/22
Approval by Academic council on	16/6/22
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		I/I	Program		B.Tech
Subject Category	BSC	Subject Code:	EEA102	Subject Name:	**Electronics Instrumentation**

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks				
End Sem	Mid-Sem	Quiz&Ass	End Sem	Lab-Work		L	T	P	
60	20	20	-	-	100	3	-	-	3

Prerequisites:

Fundamental of Electrical Engineering, Laws of Electrical Engineering and their application, Measurements & Measuring Instruments, Boolean Algebra Gates.

Course Objective:

1. To understand CRO and practical application
2. To understand the different types of AC bridges for measurement of resistance, inductance, capacitance & frequency and quality actor.
3. To understand and study transducers and multiplexing, A/D & D/A.
4. To understand digital instruments such as LED, LCD & Recorders.

Course Outcomes:

CO1: Understand and distinguish the different types of transducers.

CO2: Apply the knowledge and identify different types of signal generators used in different applications.

CO3: Apply the knowledge and identify different types of wave analyzer used in harmonics elimination.

CO4: Demonstrate different types of digital instruments used in day to day applications.

CO5: illustrate different types and parts of CRO.

UNITs	Descriptions	Hrs.	CO's
I	**Transducers** Transducers definition and classification, Characteristic & choice of Transducers, Resistive inductive and capacitive transducers, strain gauge and gauge factor, Thermistor, Thermo couples, LVDT, Piezo-Electric transducers, Hall effect transducers, Opto-electronic transducers.	9	1,2,3
II	**Signal Generators** Fixed & variable frequency AF oscillators, Sine wave generators, Standard signal generator, AF Sine and Square wave generator, Function generator, Square and pulse generator, Random noise generator, Sweep generator, TV Sweep generator, Marker generator, Sweep- Marker generator, Beat frequency oscillator.	9	1,2,3

III	**Wave analyzer** Basic wave analyzer, Frequency selective wave analyzer, Heterodyne wave analyzer, Harmonic distortion, analyzer, spectrum analyzer digital Fourier analyzer.	5	1,2,3
IV	**Digital Instruments** Advantages of Digital instruments over analog instruments, resolution and sensitivity of Digital meters.Digital Voltmeter - Ramp type, Dual slope integration type, Integrating type, Successive approximation type, Continuous balance DVM or Servo balancing potentiometer type DVM,Digital Multimeter, Digital frequency meter, Time period measurement, High frequency measurement, Electronic counter, Digital tachometer, Digital PH meter, Digital phase meter, Digital capacitance meter.	9	1,2,3
V	**Introduction to CRO/DSO** Different parts of CRO, Its Block diagram, Electrostatic focusing, Electrostatic deflection, post deflection acceleration, Screen for CRTs, Vertical & Horizontal deflection system, Time base circuit, Oscilloscope probes and transducers, Attenuators, Application of CROs, Lissajous patterns, Special purpose CROs- Multi input, Dual trace, Dual beam, Sampling, Storage (Analog & Digital) Oscilloscopes.	8	1,2,3
Guest Lectures (if any)			
Total Hours		40	

Text Book-

1. Kalsi H.S., "Electronic Instrumentation", TMH
2. Electronics & Electrical Measurements & Instrumentation, S.K. Kataria & Sons., J.B. Gupta.
3. Sawhney A.K. Instrumentation & Measurement –Dhanpat Rai & Co.
4. Rajput R.K. Electronic Instrumentation-S.Chand.

Reference Books-

1. Albert. D. Helfrick, W.D. Cooper, "Modern Electronic Instrumentation and measurement techniques", PHI.
2. Morris A.S., "Principles of Measurement & Instrumentation", PHI
3. Rangan C.S., G.R. Sarma, Mani, "Instrumentation : Devices & systems", TMH
4. Murthy BVS, "Transducers and Instrumentation", PHI.
5. Doeblin D.O., "Measurement Systems- Applications and Design".

Modes of Evaluation and Rubric

Theory	Attendance (5)	Midsem (10)	Performance (5)	Total (20)
	Attendance (5)	Assignmet (5)	-	Total (10)
		Quiz (10)	-	Total (10)

List/Links of e-learning resource

NPTEL

Recommendation by Board of studies on	14/6/22
Approval by Academic council on	16/6/22
Compiled and designed by	Dr. Jitendra singh Shakya
Subject handled by department	Electrical Engg.

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:	EEA103	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	20	--	--	150	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,	7	CO1, CO2, CO3

	Multivibrators, Bistable, Monostable, Astablemultivibrators, Differential amplifier, calculation of differential, common mode gain and CMRR. Darlington pair, Boot strapping technique, 555 Timer.		
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	Attendance (5)	Midsem (10)	Performance (5)	Total (20)
	Attendance (5)	Assignmet (5)	-	Total (10)
		Quiz (10)	-	Total (10)

List/Links of e-learning resource

- NPTEL

Recommendation by Board of studies on	14/6/22
Approval by Academic council on	16/6/22
Compiled and designed by	Prof. Deepti 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	ESC	Subject Code:	EEA106	Subject Name:	Electrical & Electronics Workshop

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks				
End Sem	Mid-Sem	Quiz	End Sem	LW&Quiz		L	T	P	
-	-	-	30	20	50	1	-	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 circuit.
CO5: Demonstrate different circuits related to diode, transistor, timer and 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 2/3pin 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	Attendance (5)	Viva/lab performance (15)	Total (20)

List/Links of e-learning resource

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Recommendation by Board of studies on	14/6/22
Approval by Academic council on	16/6/22
Compiled and designed by	Prof. Deepti Jain / Prof. Anusha Lahoti
Subject handled by department	Electricla Engg. Deptt.