1.4.2 How the feedback obtained is being analysed and utilized for overall development of the institution?

Collected curriculum feedback is represented through the Board of Studies Members (BOS) and syllabus framing committee members. Based on the Institutional Hierarchical Framework, Feedback can be broadly classified in to two levels

- The department level feedback that are discussed in the department meeting and necessary initiatives and measures that are taken with the consent of the principal.
- The college level feedback analyzed by the Academic Council Members (ACM) headed by the principal. On a regular basis our Institute connects with all its stake holders to collect feedback to utilize them for overall development of the institution.

Different types of Feedback taken throughout the Academic Year with Stakeholders given as follows: Feedback is collected from the following groups identified as stakeholders

1. Current students
2. Alumni
3. Faculty
4. Parents
5. Employers

Based on the inputs taken from the Stake holders, the data is processed. Below is the action taken on the feedback for the Academic year **2021-22**

S.no	Stakeholder	Feedback	Action taken	Page No
1	**Teacher**	Suggested to remove Old Microprocessor topics and add the advanced processor like Arm processor in Microcontrollers Theory course and Lab course	As per the inputs taken from the Employers, MPPC (R-18) lab(VI sem) is changed to Microcontrollers & Applications(R-20) lab (V sem)in which Microprocessor experiments are removed along with that Microcontrollers and Applications-Arm processor(LPC 2148) are included Micro Controllers and Applications lab- Arm processor(LPC 2148) related experiments are added	3-6

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2	**Employer**	Suggested to include Digital Protection in Power Systems	Upon suggestions received form the Employers and Alumni,Power Systems Protection Theory course (R-20) topics related to Digital Protection are included.	7-8
	Alumni	Suggested to incorporate Advanced Power Systems Protection topics like Digital Protection		
3	**Teacher**	Suggested to Remove Transient analysis of RL, RC circuits in Basic Electrical Engineering	Upon form the suggestions form the teachers, syllabus is modified in R22 Syllabus of Basic Electrical Engineering	9-11
4	**Teacher**	Suggested to Remove Transient analysis of RL, RC circuits and some experiments in Basic Electrical Engineering Laboratory	Suggested suggestions were incorporated in R22 Syllabus of Basic Electrical Engineering Laboratory.	12-13

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CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)

AICTE MODEL CURRICULUM

B.E. (ELECTRICAL AND ELECTRONICS ENGINEERING)

SEMESTER-VI

Sl. No.	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			
			Hours per week			Duration in Hours	Maximum Marks		Credits
			L	T	P		CIE	SEE	
THEORY									
1	**18EEC20**	Control Systems	3	-	-	3	30	70	3
2	**18EEC21**	Microprocessors and Microcontrollers	3	-	-	3	30	70	3
3	**18EEC22**	Power Systems Operation and Control	3	-	-	3	30	70	3
4	**18EEEXX**	Core Elective-3	3	-	-	3	30	70	3
5	**18EEEXX**	Core Elective-4	3	-	-	3	30	70	3
6	**18XXOYY**	Open Elective-1	3	-	-	3	30	70	3
PRACTICALS									
7	**18EEC23**	Control Systems Lab	-	-	2	2	15	35	1
8	**18EEC24**	Microprocessors Lab	-	-	2	2	15	35	1
		Total	**18**	**-**	**4**	**22**	**210**	**490**	**20**

L: Lecture T: Tutorial P: Practical

CIE - Continuous Internal Evaluation SEE - Semester End Examination

Course Code	Core Elective-3
18EEE09	Power Quality
18EEE10	Advanced Power Converters
18EEE11	Electrical Distribution Systems
18EEE12	HVDC Transmission Systems

Course Code	Core Elective-4
18EEE13	AI Techniques In Electrical Engineering
18EEE14	Electric Hybrid Vehicles
18EEE15	FACTS
18EEE16	Special Electrical Machines

Course Code	Open Elective-1
18ECO06	Principles of Embedded Systems (PES)
18CSO07	Basics of Cyber Security (BCS)
18BTO01	Basics of Biology
18PYO01	History of Science and Technology

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18EEC21 MICROPROCESSORS AND MICROCONTROLLERS

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To familiarise the fundamental concepts and Internal functions of microcontrollers & Embedded Systems
2. To demonstrate Programming using 8051 Microcontroller.
3. To illustrate interfacing of 8051 Microcontroller to external devices and various communication protocols.

Course Outcomes: After the completion of this course, students will be able to:

1. Understand the basic concepts of Microcontrollers and Embedded Systems
2. describe the architecture and different modes of operations of 8051 Microcontroller
3. Apply knowledge of instruction set and addressing modes for writing Assembly Language Programming using 8051 Microcontroller.
4. Develop application circuits by interfacing peripherals like A/D, D/A, display and motors to 8051 Microcontroller.
5. Develop Systems using 8051 Microcontroller with the help of Communication Protocols like blue-tooth.

UNIT- I

Fundamentals of Microprocessors: Fundamentals of Microprocessor, Basic Block Diagrams of Microprocessor and Microcontroller, Comparison of 8-bit Microcontrollers, 16-bit and 32-bit Microcontrollers. Role of Microcontrollers in IoT.

UNIT- II

The 8051 Architecture: Internal Block Diagram, Pin diagram CPU, ALU, address, data and control bus, working registers, SFRs, Clock and RESET circuits, Stack and Stack Pointer, Program Counter, I/O ports, timers, counters Memory Structures, Data and Program Memory.

UNIT-III

Instruction Set and Programming: Introduction, Instruction syntax, Data types, Subroutines Addressing Modes. 8051 Instruction set, Instruction timings.. Assembly language programs, C language programs. Assemblers and compilers. Programming and debugging tools.

UNIT-IV

Memory and I/O Interfacing 6 Hours): Memory and I/O expansion. Interfacing of peripheral devices such as General Purpose I/O, ADC, DAC, memory devices. LED, LCD and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing

UNIT-V

External Communication and Introduction to embedded systems: Synchronous and Asynchronous Communication. RS232, SPI, I2C. Introduction and interfacing to protocols like Blue-tooth and Zig-bee. Definition of embedded system and its characteristics, Role of Microcontrollers in embedded Systems. Functional building block of embedded system, Characteristics of embedded system applications.

Text Books:

1. M. A. Mazidi, J. G. Mazidi and R. D. McKinlay, "The8051Microcontroller and Embedded Systems: Using Assembly and C", Pearson Education, 2007.
2. K. J. Ayala, "8051 Microcontroller", Delmar Cengage Learning,2004.
3. D. V. Hall, "Microprocessors & Interfacing", McGraw Hill Higher Education, 1991.

Suggested Readings:

1. R. Kamal, "Embedded System", McGraw Hill Education,2009.
2. R. Kamal, "Embedded System", McGraw Hill Education,2009.
3. R. S. Gaonkar, "Microprocessor Architecture: Programming and Applications with the 8085", Penram International Publishing, 1996.

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AICTE Model Curriculum with effect from AY 2022-23

B.E (Electrical and Electronics Engineering)

SEMESTER – V

S.no	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
			Hours per week			Duration of SEE in Hours	Maximum Marks		
			L	T	P		CIE	SEE	
THEORY									
1	20 EE C17	**Core – 10** Electrical Machines-II	3	-	-	3	40	60	3
2	20 EE C18	**Core -11** Power Systems -II	3	-	-	3	40	60	3
3	20 EE C19	**Core -12** Microcontrollers and Applications	3	-	-	3	40	60	3
4	20 EE C20	**Core -13** Control Systems	3	-	-	3	40	60	3
5	20 EE Exx	**PE- I**	3	-	-	3	40	60	3
6	20 EE Exx	**PE-2**	3	-	-	3	40	60	3
7	20 xx Oxx	OE-1	3	-	-	3	40	60	3
PRACTICALS									
8	20 EE C21	Control Systems Lab	-	-	2	3	50	50	1
9	20 EE C22	Electrical Machines- II Lab	-	-	2	3	50	50	1
10	20 EE C23	Microcontrollers and Applications Lab	-	-	2	3	50	50	1
11	20EGCO3	Employability Skills	-	-	2	3	50	50	1
12	20 EE I02	Industrial / Rural Internship	3-4 Weeks/90 Hours				50	--	2
Total			**21**	**-**	**08**	**-**	**530**	**620**	**27**
Clock Hours Per Week: 29									

L: Lecture **P: Practical/Project Seminar/Dissertation** **CIE: Continuous Internal Evaluation**

T: Tutorial **SEE: Semester End Examination**

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20EE C23

MICROCONTROLLERS AND APPLICATIONS LAB

(Semester-V)

Instruction	2 P Hours per Week
Duration of SEE	3Hours
SEE	50 Marks
CIE	50 Marks
Credits	1

Prerequisite: Students should have basic knowledge of programming in C language.

Course Objectives: This course aims to:

1. Develop and understand the 8051 and ARM7 C programming
2. Understand the usage of Integrated Development Environment (Keil)
3. Control the operation of various peripherals using 8051 and ARM7 microcontroller

Course Outcomes: After completion of this course, students will be able to:

1. Develop the programs of 8051 and ARM using their respective instruction set.
2. Understand the usage of various debugging tools available to program different microcontrollers
3. Build code for 8051 and ARM7 to interface various input/output modules
4. Analyze the hardware and software interaction and integration.
5. Design and develop the 8051 and ARM 7 based embedded systems for various applications

LAB EXPERIMENTS

(Any 5 experiments. are to be conducted in each cycle)

I. 8051 Programming

1. Familiarity and use of 8051 microcontroller trainer kit, Keil IDE and simple programs under different addressing modes.
2. Assembly programming using instruction set
3. Timer and counter operations and programming using 8051.
4. Interfacing applications using LED, switch, relay and buzzer.
5. Generation of waveforms using DAC by interfacing it with 8051.
6. Stepper motor interfacing.
7. LCD interfacing.
8. Development of Embedded 'C' Code based on the module specifications. (under Structured enquiry)

II. ARM7 Programming

1. Studyand use of LPC214x Microcontroller trainer kit and simple programs using its instruction set
2. Interfacing applications using LED, switches
3. Interfacing applications using relay and buzzer.
4. DC Motor interfacing.
5. Programming on-chip ADC.
6. Waveform generation using internal DAC.
7. Development of Embedded 'C' Code based on the module specifications

III. Design an experiment related to the Embedded Application of your choice using 8051/ARM based architectures. (under Open ended enquiry)

Suggested Reading:

1. Mazidi M.A, Mazidi JG &Rolin D. Mckinlay, "The 8051 Microcontroller & Embedded Systems using Assembly and C", 2/e, Pearson Education, 2007.
2. Philips semiconductors, "ARM 7 (LPC 214x) user manual", 2005

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AICTE Model Curriculum with effect from AY 2022-23

B.E (Electrical and Electronics Engineering)

SEMESTER – VI

S.no	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			Credits
			Hours per week			Duration of SEE in Hours	Maximum Marks		
			L	T	P		CIE	SEE	
THEORY									
1	20 EE C24	**Core -13** Power System Protection	3	-	-	3	40	60	3
2	20 EE C25	**Core -14** Power System Operation and Control	3	-	-	3	40	60	3
3	20 EE C26	**Core -15** Electrical Drives	3	-	-	3	40	60	3
4	20 EE C27	**Core -16** IoT for Electrical Engineering	3	-	-	3	40	60	3
5	20 EE Exx	**PE- 3**	3	-	-	3	40	60	3
6	20 EG M01	Indian Constitution& Fundamental Principles	2	-	-	2	-	-	NC
PRACTICALS									
7	20 EE C28	Power Systems Lab	-	-	2	3	50	50	1
8	20 EE C29	Electrical Simulation Lab	-	-	2	3	50	50	1
9	20 EE C30	Electrical Drives Lab	-	-	2	3	50	50	1
10	20 EE C31	IoT Lab	-	-	2	3	50	50	1
Total			**17**	**-**	**08**	**30**	**440**	**510**	**22**
Clock Hours Per Week: 25									

L: Lecture **P: Practical/Project Seminar/Dissertation** **CIE: Continuous Internal Evaluation**

T: Tutorial **SEE: Semester End Examination**

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20EE C25

Power System Operation and Control

(Semester-VI)

Instruction	3 L Hours per Week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Prerequisite: Power Systems, Control Systems, Synchronous Machines

Course Objectives:

1. To understand the importance of Economic Operation of power system
2. To understand the load frequency control of Power Systems
3. To gain the knowledge of power system stability

Course Outcomes: After completion of this course, students will be able to:

1. Demonstrate the Economic operation of power system without and with Losses
2. Illustrate the concept of Unit Commitment
3. Analyze the Load Frequency Control for single and two area systems
4. Examine the rotor angle stability of a power system under any disturbance.
5. Identify and Explain the Voltage Stability problems.

UNIT-I

Economic Operation of Power System: Input-Output curves, Heat rate and Incremental Cost curves, Economic Operation neglecting Transmission Losses, with and without Generator Limits, Derivation of B_{mn} Coefficients, Economic Operation including transmission losses, Numerical problems.

UNIT-II:

Unit Commitment (UC): Introduction, Constraints in UC, Thermal unit constraints and other constraints, Solution Methods: Priority-list method, Dynamic Programming solution, Lagrange Relaxation Solution, Numerical problems.

UNIT-III:

Control of Frequency: Introduction to Automatic Generation Control (AGC), Frequency control, Concept of Single-area Load Frequency control, Modeling of Single-area control, Steady state and Dynamic Analysis on Single-area, PI Control for Single-area, Introduction to Two-Area Load Frequency control, Modeling of Two-area control,

Control of Voltage:

Conventional Methods for Reactive power Generation and Absorption, Automatic Voltage Regulators, Flexible AC Transmission Systems.

UNIT-IV

Rotor Angle Stability: Introduction to Rotor Angle Stability, Classification, Steady state stability, Steady state stability Limit, Factors affecting the Steady state stability, Introduction to Transient Stability, Swing Equation, Equal-area Criterion, Critical Clearing Angle, Critical Clearing Time, Application of equal area criterion, Factors affecting the Transient stability

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22EEC01

BASIC ELECTRICAL ENGINEERING

Instruction	2L + 1T Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Course Objectives:

1. To understand the behaviour of different circuit elements R, L & C, and the basic concepts of electrical AC circuit analysis
2. To comprehend the basic principle of operation of AC and DC machines
3. To infer about different types of electrical wires and cables, domestic and industrial wiring. safety rules and methods of earthing.

Course Outcomes: After the completion of this course, the student will be able to

1. Understand the concepts of Kirchhoff's laws and their application various theorems to get solution of simple dc circuits.
2. Predict the steady state response of RLC circuits with AC single phase/three phase supply.
3. Infer the basics of single phase transformer
4. Describe the construction, working principle of DC machine and 3-phase Induction motor.
5. Acquire the knowledge of electrical wires, cables, earthing, Electrical safety precautions to be followed in electrical installations and electric shock and its safety and energy calculations.

UNIT-I

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation, Superposition, Thevenin's and Norton's Theorems.

UNIT-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, series RL and RC. Three phase balanced circuits, voltage and current relations in star and delta connections

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UNIT-III

Single Phase Transformer: Construction, Working principle, EMF Equation, Ideal and Practical transformer, Equivalent circuit of Transformer, OC and SC tests on a transformer, Efficiency and Regulation

UNIT-IV

DC and AC Machines: DC Generators: Construction, Principle of operation, EMF equation, Classification, Characteristics of shunt generators. DC Motors: Classification, Torque Equation, Characteristics and Speed control of DC Shunt and Series Motors, Losses and efficiency Three - Phase Induction Motors: Principle of operation, Applications

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UNIT-V

Electrical Installations: Electrical Wiring: Types of wires and cables, Electrical Safety precautions in handling electrical appliances, electric shock, first aid for electric shock, safety rules. Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, Earthing (Elementary Treatment only), Elementary calculations for energy consumption

Text Books:

1. L. S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, 2011.
2. E. Hughes, Electrical and Electronics Technology, Pearson, 2010.

Suggested Reading:

1. D. P. Kothari & I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
2. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989
3. D.C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009
4. P.V. Prasad, S. Sivanagaraju, R. Prasad, "Basic Electrical and Electronics Engineering" Cengage Learning, 1st Edition, 201

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20EEC01

BASIC ELECTRICALENGINEERING

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Course Objectives:

1. To understand the behaviour of different circuit elements R, L & C, and the basic concepts of electrical AC circuit analysis
2. To understand the basic principle of operation of AC and DC machines
3. To know about different types of electrical wires and cables, domestic and industrial wiring. safety rules and methods of earthing

Course Outcomes: After the completion of this course, the student will be able to

1. Understand the concepts of Kirchhoff's laws and to apply them in superposition, Thevenin's and Norton's theorems to get the solution of simple dc circuits
2. Obtain the steady state response of RLC circuits with AC input and to acquire the basics, relationship between voltage and current in three phase circuits.
3. Understand the principle of operation, the EMF and torque equations and classification of AC and DC machines
4. Explain various tests and speed control methods to determine the characteristic of DC and AC machines.
5. Acquire the knowledge of electrical wiring, types of wires, cables used and Electrical safety precautions to be followed in electrical installations.
6. Recognize importance of earthing, methods of earthing and various low-tension switchgear used in electrical installations

UNIT-I

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation, Superposition, Thevenin and Norton Theorems, Time-domain analysis of first-order RL and RC circuits.

UNIT-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. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III

Transformers: Construction, Working principle, EMF Equation, Ideal and Practical transformer, Equivalent circuit of Transformer, OC and SC tests on a transformer, Efficiency and Regulation

UNIT-IV

DC and AC Machines: DC Generators: Construction, Principle of operation, EMF equation, Classification, Characteristics of shunt, series and compound generators.
DC Motors: Classification, Torque equation, Characteristics, Efficiency, Speed Control of Series and Shunt Motors.
Three - Phase Induction Motors: Principle of operation, Applications,

UNIT-V

Electrical Installations: Electrical Wiring: Types of wires and cables, Electrical Safety precautions in handling electrical appliances, electric shock, first aid for electric shock, safety rules.
Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, Earthing (Elementary Treatment only), Elementary calculations for energy consumption

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With effect from the Academic Year 2022-2023

22EEC02

BASIC ELECTRICAL ENGINEERING LAB

Instruction	2P Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
CIE	50 Marks
Credits	1

Course Objectives:

1. To acquire the knowledge on different types of electrical elements and to verify the basic electrical circuit laws and theorems.
2. To determine the parameters and power factor of a coil, calculate the time and frequency responses of RLC circuits and to familiarize with measurement of electric power & energy.
3. To determine the characteristics of Transformers, dc, ac machines and switch gear components

Course Outcomes: At the end of the course, the students are expected to

1. Comprehend the circuit analysis techniques using various circuital laws and theorems.
2. Analyse the parameters of the given coil and measurement of power and energy in AC circuits
3. Determine the turns ration/performance parameters of single-phase transformer
4. Infer the characteristics of DC shunt motor different tests.
5. Illustrate different parts and their function of electrical components, equipment and machines.

List of Laboratory Experiments/Demonstrations:

1. Verification of KCL and KVL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Charging and discharging of Capacitor.
5. Determination of parameters of a choke or coil by Wattmeter Method.
6. Power factor improvement of single-phase AC System.
7. Active and Reactive Power measurement of a single-phase system using
   (i) 3-Ammeter method (ii) 3-Voltmeter method
8. Measurement of 3-Phase Power in a balanced system
9. Calibration of single-phase energy meter.
10. Verification of Turns/voltage ratio of single-phase Transformer.
11. Open Circuit and Short Circuit tests on a given single phase Transformer
12. Brake test on DC Shunt Motor
13. Speed control of DC Shunt Motor
14. Demonstration of Measuring Instruments and Electrical Lab components.
15. Demonstration of Low-Tension Switchgear Equipment/Components
16. Demonstration of cut - out section of Machines like DC Machine, Induction Machine etc.

Note: TEN experiments to be conducted to cover all five Course Outcomes.

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20EEC02

BASIC ELECTRICAL ENGINEERING LAB

Instruction	2 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
CIE	50 Marks
Credits	1

Course Objectives:

1. To acquire the knowledge of different types of electrical elements and to verify the basic electrical circuit laws and theorems.
2. To determine the parameters and power factor of a coil, calculate the time and frequency responses of RLC circuits and to familiarize with measurement of electric power & energy.
3. To determine the characteristics of Transformers, dc, ac machines and switch gear components

Course Outcomes: At the end of the course, the students are expected to

1. Get an exposure to common electrical components, their ratings and basic electrical measuring equipment.
2. Make electrical connections by wires of appropriate ratings and able to measure electric power and energy.
3. Comprehend the circuit analysis techniques using various circuital laws and theorems.
4. Determine the parameters of the given coil and calculate the time response of RL & RC series circuits.
5. Recognize the basic characteristics of transformer and components of switch gear.
6. Understand the basic characteristics of dc and ac machine by conducting different types of tests on them.

List of Laboratory Experiments/Demonstrations:

1. Demonstration of Measuring Instruments and Electrical Lab components.
2. Verification of KCL and KVL.
3. Time response of RL and RC series circuits.
4. Determination of parameters of a choke or coil by Wattmeter Method
5. Verification of Thevenin's and Norton's theorems
6. Turns ratio /voltage ratio verification of single phase Transformers
7. Open Circuit and Short Circuit tests on a given single phase Transformer
8. Observation of Excitation Phenomenon in Transformer
9. Measurement of three phase power in a balanced system using two Wattmeter method.
10. Measurement of 3-Ph Energy by an Energy Meter (Demonstration of Principle)
11. Load test on DC Shunt motor
12. Speed control of DC Shunt motor
13. Demonstration of Low Tension Switchgear Equipment/Components
14. Demonstration of cut - out section of Machines like DC Machine, Induction Machine etc.

Note: TEN experiments to be conducted from the above list.

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