

**SEM3 - ETC - CIRCUIT THEORY [THEORY 2]
4P/Week -15 Weeks, Tot - 60P
(15.09.2022 to 22.12.2022 - Academic Year 2022-23)**

Name of the Faculty: Deepika Panda(Lecturer, Electronics)

Week	Class Day	Topics
1st	Unit-1: Circuit Elements and Energy Sources - (6P)	
	1	1.1 Circuit Elements(Resistance,Inductance,Capacitance),Scope of network analysis & synthesize
	2	1.2 Voltage Division & Current Division,Energy Sources
	3	1.3 Electric charge, electric current,Electrical energy,Electrical potential R-L-C parameters, Active & Passive Elements
	4	1.4 Energy Sources,Current and voltage sources and their transformation & mutual inductance
2nd	1	1.5 Star-Delta transformation
	2	Solving more network examples on above topics
	Unit-2: NETWORK THEOREMS(Application in dc circuits) - (12P)	
	3	2.1 Nodal & Mesh Analysis of Electrical Circuits with simple problem(contd...)
	4	2.1.Solving sample circuits on Nodal & Mesh analysis
3rd	3	2.2 Thevenin's Theorem Statement,Explanation & Applications
	4	2.2 Solving examples on thevenin's theorem
	5	2.2 Norton's Theorem Statement,Explanation & Applications
	6	2.2 Solving examples on norton's theorem
4th	1	2.2 Superposition Theorem Statement,Explanation & Applications
	2	2.2 Solving examples on superposition theorem
	3	2.2 Millman Theorem statement,explanation,example solving
	4	2.2 Reciprocity Theorem statement,explanation,example solving
5th	1	2.3 Solve more numericals and doubt's solving
	2	2.3 Solve more numericals and doubt's solving
	Unit-3: Power Relation in AC circuits & Transient Response of passive circuits - (12P)	
	3	3.1 Definition of frequency,Cycle,Time period,Amplitude

	4	3.1 Definition of Average Value,RMS value,Instantaneous power & Form Factor
6th	1	3.2 Phasor representation of alternating quantities
	2	3.3 Single Phase AC Circuit Behaviour of A.C through pure Resistor,Inductor & Capacitor(contd..)
	3	3.3 (contd..)
	4	3.1 Apparent Power,Reactive Power,Power Triangle of AC Wave
7th	1	3.4 DC Transients-Behaviour of R-L ,
	2	3.4 DC Transients-Behaviour of R-C
	3	3.4 DC Transients-Behaviour R-L-C
	4	3.5 Define Time Constants of the above Circuits
8th	1	3.6 Solve numerical simple problems of above Circuit
	2	3.6 Solve numerical simple problems of above Circuit
	Unit-4: Resonance and Coupled Circuits-(10P)	
	3	4.1 Introduction to resonance circuits & Resonance tuned circuit
	4	4.2 Series & Parallel Resonance
9th	1	4.3 Expression for series resonance,Condition for Resonance,Frequency of Resonance(contd...)
	2	4.3 (contd...) Impedance,Current,Voltage,Power,
	3	4.3(contd...)Q Factor and Power Factor of Resonance, Bandwidth in term of Q
	4	4.4 Parallel Resonance RL derive expression
10th	1	4.4 Parallel Resonance RC) derive expression
	2	4.4 Parallel Resonance (RLC) derive expression
	3	4.5 Comparison of Series & Parallel resonance & applications
	4	4.6 Sample Problems and doubt solving sessions
	Unit-5: Laplace Transform & It's Applications - (8P)	
11th	1	5.1 Laplace Transformation (Introduction),impulse and unit step signal
	2	5.1 Laplace Transformation ,Analysis and derive the equation for circuit parameteres of Step Response of R-L circuit
	3	5.2 Analysis and derive the equation for circuit parameteres of Step Response of R-C circuit
	4	5.2 Analysis and derive the equation for circuit parameteres of Impulse Response of R-L circuit
12th	1	5.2 Analysis and derive the equation for circuit parameteres of Impulse Response of R-C circuit
	2	5.1 Analysis and derive the equation for circuit parameteres of Step Response of R-L-C circuit

	3	5.2 Analysis and derive the equation for circuit parameters of Impulse Response of R-L-C circuit
	4	Solving more circuits using Laplace transform
13th	Unit - 6.Two Port Network Analysis - (5P)	
	1	6.1 Network Elements,ports in Network(One port,two port)
	2	6.2 Network Configurations(T & pie)
	3	6.3 Open Circuit(Z- Parameters),short Circuit(Y-Parameters) its conversion
	4	6.4 h- parameter representation
14th	1	6.5 Define T-network & Pie- Network
	Unit-7: Filters & Attenuators -(7P)	
	2	7.1Ideal & Practical filters & it's applications,cutoff frequency ,passband and stop band.
	3	7.2 Classification of filters LPF,HPF(Contd....)
	4	7.2 Classification of filters BPF,BSF(Contd....)
15th	1	7.2 Charactirstics of filters
	2	Butterworth Filter Design
	3	7.4 Attenuation and Gain,Bel,Decibel & neper & their relations
	4	7.5 Attenuators & its applications,Classification T-Type & PI-Type attenuators
Total No of Hrs Required For The Course: 60		

3rd SEM - ETC-Digital Electronics [THEORY 3] (4P/Week -15 Weeks, Tot - 60P) (15.09.2022 to 22.12.2021 - Academic Year 2020-21)			
Name of the Faculty: Gopal Ch. Behera(Lecturer, Electronics)			
WEEKS	No. of Days/per week Class allotted: 4	Syllabus To be Covered	
1ST WEEK	Unit - 1 : Basics of Digital Electronics [12 Period]		
	1st	1	Number System-Binary, Octal, Decimal, Hexadecimal
	2nd	2	Conversion from one system to another number system.
	3rd	3	Arithmetic Operation-Addition, Subtraction, Multiplication, Division

	4th	4	1's & 2's complement of Binary numbers & Subtraction using complements method
2ND WEEK	1st	5	Digital Code & its application & distinguish between weighted & non-weight Code, Binary codes, excess-3 and Gray codes.
	2nd	6	Logic gates: AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR--Symbol, Function, expression, truth table & timing diagram
	3rd	7	Universal Gates & its Realisation
	4th	8	Universal Gates & its Realisation
3RD WEEK	1st	9	Boolean algebra, Boolean expressions, Demorgan's Theorems.
	2nd	10	Represent Logic Expression: SOP & POS forms
	3rd	11	Karnaugh map (3 & 4 Variables) & Minimization of logical expressions
	4th	12	Karnaugh map (3 & 4 Variables) don't care conditions
4TH WEEK	Unit - 2: Combinational Logic Circuits [12 Period]		
	1st	13	Half adder
	2nd	14	Full adder
	3rd	15	Half Subtractor
	4th	16	Full Subtractor
5TH WEEK	1st	17	Parallel Binary 4 bit adder.
	2nd	18	Serial adder
	3rd	19	Multiplexer (4:1)
	4th	20	De-multiplexer (1:4)
6TH WEEK	1st	21	Decoder, Encoder
	2nd	22	Digital comparator (3 Bit)
	3rd	23	Seven segment Decoder
	4th	24	Seven segment Decoder
7TH WEEK	Unit-3: Sequential logic Circuits [12 Period]		
	1st	25	Principle of flip-flops operation, its Types,
	2nd	26	Principle of flip-flops operation, its Types,
	3rd	27	SR Flip Flop using NAND Latch (un clocked)
	4th	28	SR Flip Flop using NOR Latch (un clocked)
8TH WEEK	1st	29	Clocked SR flip-flops-Symbol, logic Circuit, truth table and applications
	2nd	30	Clocked D flip-flops-Symbol, logic Circuit, truth table and applications
	3rd	31	Clocked JK flip-flops-Symbol, logic Circuit, truth table and applications
	4th	32	Clocked T flip-flops-Symbol, logic Circuit, truth table

			and applications
9TH WEEK	1st	33	Clocked JK Master Slave flip-flops-Symbol, logic Circuit, truth table and applications
	2nd	34	Clocked JK Master Slave flip-flops-Symbol, logic Circuit, truth table and applications
	3rd	35	Concept of Racing and how it can be avoided.
	4th	36	Concept of Racing and how it can be avoided.
10TH WEEK	Unit-4: Registers, Memories & PLD [08 Period]		
	1st	37	Shift Registers-Serial in Serial -out, Serial- in Parallel-out
	2nd	38	Shift Registers-Parallel in serial out and Parallel in parallel out
	3rd	39	Universal shift registers-Applications. Types of Counter & applications
	4th	40	Binary counter, Asynchronous ripple counter (UP & DOWN)
11TH WEEK	1st	41	Binary counter : Decade counter. Synchronous counter, Ring Counter.
	2nd	42	Binary counter : Ring Counter.
	3rd	43	Concept of memories-RAM, ROM, static RAM, dynamic RAM,PS RAM
	4th	44	Basic concept of PLD & applications
12TH WEEK	Unit-5: A/D and D/A Converters [07 Period]		
	1st	45	Necessity of A/D and D/A converters.
	2nd	46	D/A conversion using weighted resistors methods.
	3rd	47	D/A conversion using weighted resistors methods.
	4th	48	D/A conversion using R-2R ladder (Weighted resistors) network.
13TH WEEK	1st	49	D/A conversion using R-2R ladder (Weighted resistors) network.
	2nd	50	A/D conversion using counter method.
	3rd	51	A/D conversion using Successive approximate method
	Unit-6: LOGIC FAMILIES [09 Period]		
	4th	52	Various logic families & categories according to the IC fabrication process
14TH WEEK	1st	53	Various logic families & categories according to the IC fabrication process
	2nd	54	Characteristics of Digital ICs- Propagation Delay, fan-out, fan-in with Reference to logic families.
	3rd	55	Characteristics of Digital ICs- Power Dissipation, Noise

			Margin with Reference to logic families.
	4th	56	Characteristics of Digital ICs- Power Supply requirement with Reference to logic families.
15TH WEEK	1st	57	Characteristics of Digital ICs- Speed with Reference to logic families.
	2nd	58	Features, circuit operation & various applications of TTL (NAND)
	3rd	59	Features, circuit operation & various applications of CMOS (NAND)
	4th	60	Features, circuit operation & various applications of CMOS (NOR)

Discipline: Electronics and Telecommunication Engineering	Semester:3	Name of the Teaching Faculty: ER. POONAM PANDA
Subject:ELECTRONIC MEASUREMENT & INSTRUMENTS	No. of Days/per week class allotted: 4	Semester From Date: 15TH SEPTEMBER 2022 To Date: 22ND DECEMBER 2022 No.of Weeks:15
Week	Class Day	Theory Topics
	CHAPTER 1:QUALITIES OF INSTRUMENT	
1st	1st (1)	DISCUSS STATIC CHARACTERSTICS
	2nd (2)	ACCURACY,SENSITIVITY,ERRORS
	3rd (3)	DYNAMIC CHARACTERSTICS
	4th (4)	ERRORS OF INSTRUMENT
2nd	1st (5)	SPEED OF INSTRUMENTS
	CHAPTER 2:INDICATING INSTRUMENT	
	2nd (6)	INTRODUCTION OF INDICATOR, TYPES
	3rd (7)	PRINCIPAL OF INDICATING INSTRUMENT
	4th (8)	PMMC INSTRUMENTS

3rd	1st (9)	MI INSTRUMENTS
	2nd (10)	AC AND DC AMMETER
	3rd (11)	AC AND DC VOLTMETER
	4th (12)	SERIES AND SHUNT OHNMETER
4th	1st (13)	ANALOG MULTIMETER AND ITS APPLICATIONS
	2nd (14)	DIGITAL TACHOMETER, MEASUREMENT OF FREQUENCY
	3rd (15)	Q METER
CHAPTER 3: DIGITAL INSTRUMENT		
	4th (16)	PRINCIPLE OF DIGITAL VOLTMETER
5th	1st (17)	RESOLUTION AND SENSITIVITY OF DVM
	2nd (18)	WORKING AND APPLICATION OF DVM
	3rd (19)	OPERATION OF DIGITAL VOLTMETER
	4th (20)	MEASUREMENT OF TIME
6th	1st (21)	DIGITAL FREQUENCY METER
	2nd (22)	OPERATION OF DIGITAL TACHOMETER
	3rd (23)	MEASUREMENT OF FREQUENCY
	4th (24)	OPERATION OF WORKING OF AUTOMATION IN DM
7th	1st (25)	BLOCK DIAGRAM OF LCR METER
CHAPTER 4: OSCILLOSCOPE		
	2nd (26)	BLOCK DIAGRAM OF CRO
	3rd (27)	OPERATION OF CRO
	4th (28)	DUAL TRACE CRO

8th	1st (29)	LISSAJOUS FIGURE
	2nd (30)	MEASUREMENT OF AMPLITUDE, FREQUENCY USING CRO
	3rd (31)	APPLICATION OF OSCILLOSCOPE
	4th (32)	BLOCK DIAGRAM OF DSO
9th	1st (33)	OPERATION OF DSO
	CHAPTER 5:BRIDGES	
	2nd (34)	TYPES OF BRIDGES
	3rd (35)	WHEATONE BRIDGE
	4th (36)	MAXWELL'S BRIDGE
10th	1st (37)	DESAUTY'S BRIDGE
	2nd (38)	SCHERING BRIDGE
	3rd (39)	HAY'S BRIDGE
	4th (40)	Q METER CIRCUIT DIAGRAM
11th	1st (41)	MEASUREMENT OF IMPEDANCE
	2nd (42)	LCR METER
	3rd (43)	APPLICATION OF BRIDGES,
	4th (44)	FREQUENCY MEASUREMENT
	CHAPTER 6 TRANSDUCER AND SENSOR	
12th	1st (45)	PARAMETER, METHOD OF SELECTING OF ELECTRICAL TRANSDUCER & RESISTIVE
	2nd (46)	WORKING PRINCIPLE OF STRAIN GAUGES, DEFINE STRAIN GAUGE
	3rd (47)	WORKING PRINCIPLE OF LVDT
	4th (48)	ADVANTAGE OF ELECTRICAL TRANSDUCER,STAIN GUAGE, LVDT

13th	1st (49)	WORKING PRINCIPLE OF CAPACITIVE TRANSDUCERS (PRESSURE)
	2nd (50)	WORKING PRINCIPLE OF LOAD CELL (PRESSURE CELL)
	3rd (51)	WORKING PRINCIPLE OF TEMPERATURE TRANSDUCER (RTD)
	4th (52)	OPTICAL PYROMETER, THERMOCOUPLE
14th	1st (53)	WORKING PRINCIPLE OF CURRENT TRANSDUCER AND KW TRANSDUCER.
	2nd, (54)	WORKING PRINCIPLE OF PROXIMITY & LIGHT SENSORS
	CHAPTER 7: SIGNAL GENERATOR AND WAVE ANALYSER	
	3rd (55)	CLASSIFICATION OF SIGNAL GENERATOR
	4th (56)	WAVE ANALYSER
15th	1st (57)	WORKING OF AF SINE
	2nd, (58)	SQUARE WAVE GENERATOR
	3rd (59)	FUNCTION OF WAVE ANALYSER
	4th (60)	BASIC CONCEPT OF DATA ACQUISITION SYSTEM (DAS)

Discipline: Electronics and Telecommunication Engineering	Semester:3rd	Name of the Teaching Faculty: Er.JYOTI PATRA & Er. KSHIRABDHEE TANAYA DORA
Subject:TH5 Environmental studies	No. of Days/per week class allotted: 4	Semester From Date: 15TH SEPTEMBER 2022 To Date: 22ND DECEMBER 2022 No.of Weeks:15
Week	Class Day	Theory Topics
		UNIT 1:The Multidisciplinary nature of environmental studies
1st	1st (1)	Definition & introduction of environment

	2nd (2)	scope of environment
	3rd (3)	importance of environment
	4th (4)	Need for public awareness
2nd		UNIT 2:Natural Resources
	1st (5)	Forest resources
	2nd (6)	water resources
	3rd (7)	Mineral & food Resources
	4th (8)	Energy & land Resources
3rd	1st (9)	Land Resources: Land resource
	2nd (10)	land degradation, man induces land slides
	3rd (11)	Soil erosion
	4th (12)	desertification
4th	1st (13)	Role of individual in conservation of natural resources.
	2nd (14)	Equitable use of resources for sustainable life styles
		UNIT 3:SYSTEM
	3rd (15)	Concept of an eco system.
	4th (16)	Structure and function of an eco system.
5th	1st (17)	Producers, consumers,
	2nd (18)	decomposers & food chain
	3rd (19)	Energy flow in the eco systems
	4th (20)	Ecological succession.
6th	1st (21)	Introduction, types, characteristic features of the Forest ecosystem
	2nd (22)	structure and function of the Forest ecosystem
	3rd (23)	Introduction, types, characteristic features of the aquatic ecosystem
	4th (24)	structure and function of the Aquatic ecosystems
7th	1st (25)	Biogeographically classification of India.
	2nd (26)	Value of biodiversity: consumptive use,
	3rd (27)	productive use, social ethical
	4th (28)	Biodiversity at global, national and local level.
8th	1st (29)	Threats to biodiversity: Habitats loss,
	2nd (30)	poaching of wild life, man wildlife conflicts.
		UNIT 5:Environmental Pollution:
	3rd (31)	Air pollution.

	4th (32)	water pollution.
9th	1st (33)	soil pollution.
	2nd (34)	marine pollution.
	3rd (35)	noise pollution.
	4th (36)	thermal pollution.
10th	1st (37)	nuclear hazards
	2nd (38)	Solid waste Management:Causes, effects
	3rd (39)	control measures of urban and industrial wastes.
	4th (40)	Role of an individual in prevention of pollution
11th	1st (41)	Disaster management:flood,drought
	2nd (42)	land slide,earth quake
		UNIT 6:Social issues and the Environment:
	3rd (43)	Form unsustainable to sustainable development
	4th (44)	Urban problems related to energy.
12th	1st (45)	water shed management
	2nd (46)	water conservation
	3rd (47)	rain water haevesting
	4th (48)	Resettlement and rehabilitation of people; its problems and concern.
13th	1st (49)	Environmental ethics: issue and possible solutions
	2nd (50)	Climate change, global warming, acid rain,
	3rd (51)	ozone layer depletion, nuclear accidents and holocaust, case studies
		unit 7:Human population and the environment
14th	4th (52)	water act,air act
	1st (53)	public awareness
	2nd (54)	Population growth and variation among nations.
	3rd (55)	Population explosion- family welfare program
15th	4th (56)	Environment and humanhealth.
	1st (57)	Human rights
	2nd (58)	value education
	3rd (59)	Role of information technology in environment .
	4th (60)	Role of information technology in human health.

**SEM3 - ETC - CIRCUIT THEORY LAB [PR-2] 4P/Week -15 Weeks, Tot - 60P
(15.09.2022 to 22.12.2022 - Academic Year 2022-23)**

Faculty: DEEPIKA PANDA, KSHIRABDHEE TANAYA DORA, DEVI PRASAD PATNAIK

WEEK	PERIODS	EXPERIMENT
1	1,2	1.(a) Measurement of Resistance, Voltage, Current in A.C & D. C. Circuit by using digital Multimeter & Clamp meter.
	3,4	1.(b) Verification of KVL.
2	5,6	1.(c) Verification of KCL.
	7,8	Evaluation and Viva
3	9,10	2. (a) Verification of Super positions Theorem
	11,12	Evaluation and Viva
4	13,14	2. (b) Verification of Thevenin's Theorem
	15,16	Evaluation and Viva
5	17,18	2. (c) Verification of Norton's Theorem
	19,20	Evaluation and Viva
6	21,22	2. (d) Verification of Milliman's Theorem
	23,24	Evaluation and Viva
7	25,26	2. (e) Verification of Maximum power theorem
	27,28	Evaluation and Viva
8	29,30	3. Determine resonant frequency of series R-L-C circuit and study the quality factor and bandwidth.
	31,32	Evaluation and Viva
9	33,34	4. Determine the resonant frequency, Q factor & Band width of parallel resonant circuit
	35,36	Evaluation and Viva
10	37,38	5. Determine the time constant of R-L-C circuit and analysis the transient response (rise time, overshoot, and damping factor from the oscilloscope)

	39,40	Evaluation and Viva
11	41,42	6. Study of Low Pass Filter and determination of cut-off frequency.
	43,44	Evaluation and Viva
12	45,46	7. Study of High Pass Filter and determination of cut-off frequency.
	47,48	Evaluation and Viva
13	49,50	8. Study of Band Pass Filter and Band Elimination Filter and determination of its cut-off frequency.
	51,52	Evaluation and Viva
14	53,54	9. Determination of Parameters of Two Port Network (T & Y)
	55,56	10.Design attenuator circuit (pie or T)
15	57,58	11.Mini Project using P-SPICE software: To collect data of catalogues and specification sheet of all the equipment & components used for performing experiment and submit the project on P-SPICE software into Analysis and Plot the graph of each measurement at the end of semester e.g. Butter Worth Filter
	59,60	Evaluation and Viva
Total=60P		

SEM3 - ETC – Digital Electronics Lab [PR-3] 4P/Week -15 Weeks, Tot - 60P (15.09.2022 to 22.12.2022 - Academic Year 2022-23) Faculty: Gopal Ch. Behera , Jyoti Patra		
WEEK	PERIODS	EXPERIMENT
1	1,2	1.Familiarization of Digital Trainer Kit & Digital ICs IE 7400, 7402, 7404, 7408, 7432 & 7486. (Draw their pin diagram and features)
	3,4	Evaluation and Viva
2	5,6	2. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates using ICs& simplifications of Boolean gates.
	7,8	Evaluation and Viva
3	9,10	2. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates using ICs& simplifications of Boolean gates.

		3. Implement various gates by using universal properties of NAND & NOR gates verify and truth table tabulate data.
	11,12	Evaluation and Viva
4	13,14	4. Construct & verify operation of Half adder and Full adder using logic gates.
	15,16	Evaluation and Viva
5	17,18	5. Construct & verify operation of Half Subtractor and Full Subtractor using logic gates.
	19,20	Evaluation and Viva
6	21,22	6. Design & Implement a 4-bit Binary to Gray code converter.
	23,24	Evaluation and Viva
7	25,26	7. Design & Implement a Single bit/ two bit digital comparator circuit.
	27,28	Evaluation and Viva
8	29,30	8. Design Multiplexer (4:1) and De-multiplexer (1:4).
	31,32	Evaluation and Viva
9	33,34	9. Study the operation of flip-flops (i) S-R flip flop (ii) J-K flip
	35,36	Evaluation and Viva
10	37,38	9. Study the operation of flip-flop (iii) D flip flop (iv) T flip flop.
	39,40	Evaluation and Viva
11	41,42	10. Realize a 4-bit asynchronous UP Counter.
	43,44	Evaluation and Viva
12	45,46	10. Realize a 4-bit asynchronous Down Counter.
	47,48	Evaluation and Viva
13	49,50	11. Study shift registers -4 bit Registers.
	51,52	Evaluation and Viva
14	53,54	12. Study display devices LCD, 7-segment displays.
	55,56	Evaluation and Viva
15	57,58	Mini Project using Software: To collect data like pin configurations, display devices, Operational characteristics, applications and critical factors etc. on all digital ICs studied in theory and compile a project report throughout and submit at the end of the semester. To assemble and tests circuits using above digital ICs with test points e.g. Digital Clock / Frequency Counter / Running Glow Light upto 999/Solar cell & Opto coupler applications.
	59,60	Evaluation and Viva
Total=60P		

SEM3 - ETC - ELECTRONICS MEASUREMENT & INSTRUMENTATION LAB [PR-4]

4P/Week -15 Weeks, Tot - 60P

(15.09.2022 to 22.12.2022 - Academic Year 2022-23)

Faculty: POONAM PANDA AND GOPAL CHANDRA BEHERA

WEEK	PERIODS	EXPERIMENT
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1	1,2	1. Study and construction of moving coil and moving iron instruments& calibrate.
	3,4	Study and construction of moving coil and moving iron instruments& calibrate.
2	5,6	2. Study of static and dynamic characteristic of PMMC & moving iron instruments.
	7,8	Study of static and dynamic characteristic of PMMC & moving iron instruments.
3	9,10	VIVA
	11,12	Evaluation of record
4	13,14	3. Study of Resolution, Sensitivity of Digital Instrument.
	15,16	Study of Resolution, Sensitivity of Digital Instrument.
5	17,18	Evaluation of record
	19,20	4. Measurement of Current by Low range ammeter and voltmeter respectively with shunt and multiplier.
6	21,22	Measurement of Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
	23,24	Evaluation and Viva
7	25,26	5.Observe the wave forms of different frequency by using Function generator and draw its diagram
	27,28	measure the amplitude and frequency & calculates average & R.M.S. Values, frequency, Time Periods using CRO
8	29,30	Evaluation and Viva
	31,32	6. Measure the unknown frequency and phase angle using CRO by Lissajous figure.
9	33,34	Measure the unknown frequency and phase angle using CRO by Lissajous figure.
	35,36	Evaluation and Viva
10	37,38	7.Measurement of resistance using Wheatstone's Bridge
	39,40	Measurement of resistance using Wheatstone's Bridge
11	41,42	Evaluation and Viva

	43,44	8. Measure the inductance by Maxwell's Bridge & Hay's Bridge.
12	45,46	Measure the inductance by Maxwell's Bridge & Hay's Bridge.
	47,48	Evaluation and Viva
13	49,50	9. Measure the Resistance, Capacitance of circuit (Series & parallel) by using LCR meter and find the Q factor of the coil.
	51,52	Measure the Resistance, Capacitance of circuit (Series & parallel) by using LCR meter and find the Q factor of the coil.
14	53,54	Evaluation and Viva
	55,56	Mini Project
15	57,58	Mini Project
	59,60	Evaluation and Viva
Total=60P		