

SANDIP UNIVERSITY, SIJOU, MADHUBANI
I SEMESTER DIPLOMA IN ELECTRICAL ENGINEERING
Skill Based Diploma in Engineering Course
APPLIED MATHEMATICS

Subject Code EE101T	Theory				Credits	
	No. of Periods Per Week			Full Marks		
	L	T	P/S	ESE	:	70
	04	—	—	TA	:	10
	—	—	—	CT	:	20
03						

CONTENTS :THEORY

Name of Topics		Hrs/week	Marks
Unit -1	<p>Integration: Definition of integration as anti-derivative. Integration of standard function. Rules of integration (Integrals of sum, difference, scalar multiplication). Methods of Integration. Integration by substitution Integration of rational functions. Integration by partial fractions. Integration by trigonometric transformation. Integration by parts. Definite Integration. Definition of definite integral. Properties of definite integral with simple problems. Applications of definite integrals. Area under the curve. Area between two curves. Mean and RMS values</p>	12	20
Unit -2	<p>Differential Equation Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. Applications of Differential equations. Laws of voltage and current related to LC, RC, and LRC Circuits.</p>	10	15
Unit - 3	<p>Laplace Transform Definition of Laplace transform, Laplace transform of standard functions. Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by t^n, division by t. Inverse Laplace transforms. Properties- linearly first shifting, second shifting. Method of partial fractions, Convolution theorem. Laplace transform of derivatives, Solution of differential equation using Laplace transform (up to second order equation).</p>	08	14
Unit - 4	<p>Fourier Series Definition of Fourier series (Euler's formula). Series expansion of continuous functions in the intervals $(0, 2l)$, $(-l, l)$, $(0, 2\pi)$, $(-\pi, \pi)$ Series expansions of even and odd functions. Half range series.</p>	08	07

Unit - 5	Numerical Methods Solution of algebraic equations Bisection method. Regularfalsi method. Newton – Raphson method.	05	07
	Solution of simultaneous equations containing 2 and 3 unknowns Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	05	07
	Total	48	70

Titles of the Book	Name of Authors	Name of the Publisher
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.
Rajendra Pal, S.N. Malik	Applied Mathematics	Foundation Publishing

ELECTRICAL CIRCUITS & NETWORK

Subject Code EE102T	Theory						Credits 03		
	No. of Periods Per Week			Full Marks				:	100
	L	T	P/S	ESE				:	70
	03	—	—	TA				:	10
	—	—	CT			:	20		

CONTENTS:THEORY

Name of the Topic		Hrs/week	Marks
Unit -1	Review of Basic concepts of electrical Circuit Electric Circuit Elements R,L,C Energy Sources A.C. waveform and definition of various terms associated with it Response of pure R, L, and C to AC supplies. Vector Representation of alternating quantity.	06	04
Unit -2	Single phase AC Circuits Series AC circuits R-L, R-C and R-L-C circuits. Impedance, reactance, phasor diagram, impedance triangle, power factor, Average power, Apparent power, Reactive power, Power triangle (Numerical) Series Resonance, quality factor (Numerical) Parallel AC circuits R-L, R-C and R-L-C circuits. Admittance, Susceptance, Solution by admittance method, phasor diagram and complex Algebra method. (Numerical) Parallel resonance, quality factor. Comparison of series and Parallel circuits.	12	22
Unit - 3	Poly phase AC Circuits Generation of three phase e. m. f. Phase sequence, polarity marking Types of three-phase connections. Concept of unbalanced load and balanced load. Line, phase quantities and power in three phase system with balanced star and Delta connected load & their interrelationship Advantages of polyphase circuits over single phase circuits	10	16
Unit - 4	Principles of circuit Analysis (AC and DC circuits) Mesh analysis.(Numerical) Node analysis with voltage current source .(Numericals) Star/delta & Delta/star transformations.(Simple Numericals)	08	10
Unit - 5	Network Theorems (Statement, procedure, applications and areas of applications, Simple Numerical) Superposition Theorem Thevenin's Theorem Norton's Theorem Source conversion /ideal voltage and current source Maximum power transfer Theorem	10	18
Total		48	70

Text /Reference Books:

Titles of the Book	Name of Authors	Name of the Publisher
Introductory circuit Analysis.	Boylested R.L.	Wheeler, New Delhi
Schaum online series Theory and problems of Electric circuits	Edminister	T. M. G. H. , Newyork
Circuit and network	A. Sudhakar	Tata McGraw Hill
Basic Electrical Engineering.	V.N. Mittle	Tata McGraw Hill
Electrical Technology Volume-I	B. L. Theraja	S. Chand & Co.
Electrical Circuits and Network	Umesh Kumar	Foundation Publishing

ELECTRICAL MEASUREMENTS

Subject Code EE103T	Theory			Credits		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	ESE	:	70
	03	—	—	TA	:	10
	—	—	—	CT	:	20

CONTENTS :THEORY

	Name of the Topic	Hours	Marks
Unit -1	Fundamentals of Measurement Purpose of measurement and significance of measurement Various effects of electricity employed in measuring instruments. Desirable qualities of measuring instruments. Classification of Instruments. Types of errors Different types of torque in Analog Instruments.	05	08
Unit – 2	Measurement of Current and Voltage Construction and principle of PMMC, MI & Dynamometer type Instrument. Production of torque :methods. Principles of Voltage and Current measurement. Range Extension of Ammeter and Voltmeter Different Methods of range extension of Ammeter and Voltmeter. Calibration of Ammeter and Voltmeter. Instrument transformers (CT & PT)	10	14
Unit -3	Measurement of Power Concept of power in A.C. Circuit Principle and Construction of dynamometer type wattmeter. Errors and their compensation. Polyphase wattmeter. Multiplying factor of wattmeter. Measurements of power in 3 phase circuit for balanced and unbalanced load by one wattmeter method, two wattmeter method. Effect of power factor variation on wattmeter readings in two wattmeter method. Measurement of reactive power in three phase balance load by one wattmeter method and two wattmeter method. Digital Wattmeter.	10	14
Unit -4	Measurement of Electrical Energy 4.1. Concept of electrical energy. Constructional feature & principle of working of single phase and three-phase induction type energy meter. Different types of errors and their compensation. Calibration of energy meter. Electronic energy meter.	07	10
Unit -5	Constructional features and working principles of other Meters Single phase and three phase Power Factor Meter (only dynamometer type). Frequency meter (Weston and Ferro dynamic type). Sychroscope. Phase sequence Indicator.(Rotating type only) Clip-on-mmeter. Q-meter.	08	10

Unit -6	Measurement of Circuit Parameters Classification of Resistance, Low, Medium and High. Methods of Measurements of Low, Medium and High. Resistance (Kelvin Double bridge, wheatstone bridge and Megger) Measurement of Earth resistance- Earth tester (Analog & Digital) Digital Multimeter. Introduction to A.C. Bridges. L.C.R. Meter.	08	14
	Total	64	70

Text/Reference Books:		
Titles of the Book	Name of Authors	Name of the Publisher
Electric & Electronic Measurement and Instrumentation	A.K. Sawhney	Dhanpatrai & Sons
Electronic Instrumentation & measurement Techniques	Copper & Heltrick	Prentice Hall of India
Instrumentation Devices and System	Rangan Mani & Sarma	Tata McGraw Hill
Electronic Instrumentation	Kalsi	Tata McGraw Hill
Industrial Instrumentation & control	S.K.Singh	Tata McGraw Hill
Electrical Measurement & measuring Instrument	Golding	Wheeler
Electrical Measurement & measuring Instrument, Delhi.	N.V.Suryanaryan	S. Chand & Co.
Fundamental of Electrical Easurement	C.T. Baldwin	--
Electrical Measurements	S.N. Bhargava	Foundation Publishing

ENGINEERING MECHANICS

Subject Code EE104T	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks			03
	L	T	P/S	ESE	:	100	
	03	-	—	TA	:	70	
	—	—	—	CT	:	10	
			20				

Contents		Hrs/week	Marks
Unit -1	<p>Force</p> <p>a. Fundamentals: - Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units.</p> <p>b. Force: - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility.</p> <p>c. Resolution of a force: Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular components.</p> <p>d. Moment of a force: - Definition, measurement of moment of a force, S. I. unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments Varignon's theorem of moment and it's use, couple – definition, S.I. unit, measurement of a couple, properties of couple.</p> <p>e. Force system: - Definition, classification of force system according to plane and line of action</p> <p>f. Composition of Forces: - Definition, Resultant force, methods of composition of forces,</p> <p style="margin-left: 40px;">I – Analytical method:– (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution),</p> <p style="margin-left: 80px;">II – Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.</p>	12	15

Unit -2	<p>Equilibrium:</p> <p>Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram.</p> <p>Lami's Theorem – statement and explanation, Application of Lami's theorem for solving various engineering problems.</p> <p>Equilibrant – Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system.</p> <p>Beams – Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller), classification of loads, point load, uniformly distributed load. Reactions of a simply supported and over hanging beam by analytical and graphical method.</p>	10	15
Unit - 3	<p>Friction:</p> <p>Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction angle of repose and coeff. Of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction.</p> <p>Equilibrium of bodies on level plane –external force applied horizontal and inclined up and down.</p> <p>Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, horizontal and incline to inclined plane.</p> <p>Ladder friction, Wedge and block.</p>	08	15
Unit - 4	<p>Centroid and Centre Of Gravity:</p> <p>Centroid: Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure.</p> <p>Center of gravity: Definition, center of gravity. Of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids.</p>	08	10
Unit - 5	<p>Simple Machines:</p> <p>Definitions of simple machine, compound machine, load, effort, mechanical advantage, velocity ratio, input on a machine, output of a machine, efficiency of a machine, expression for mechanical advantage, velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load.</p> <p>Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine.</p> <p>Study of simple machines: Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, pulleys: First, second and third system of pulleys, gear train, hoist mechanism.</p>	10	15
Total		48	70

Text/Reference Books :-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Mechanics	Beer-Johnson	Tata McGraw Hill, Delhi
(ii)	Engineering Mechanics	Basu	Tata McGraw Hill, Delhi
(iii)	Vector Mechanics for Engineers Vol. - I & II	Joslphe F. Shelley	Tata McGraw Hill, Delhi

BASIC ELECTRONICS

Subject Code EE105T	Theory			Credits		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	ESE	:	70
	03	—	—	TA	:	10
	—	—	—	CT	:	20

CONTENTS: THEORY

	Name of the topic	Hrs/week	Marks
Unit -1	<p>Semiconductor diode Rectifying diode Review of P-type and N-type semiconductor Junction of P-type & N-type i.e. PN junction Barrier voltage, depletion region, Junction Capacitance. Forward biased & reversed biased junction Diode symbol , circuit diagram for characteristics (forward & reversed) Characteristics of PN junction diode Specifications:- Forward voltage drop , Reversed saturation current, maximum forward current , power dissipation Package view of diodes of different power ratings (to be shown during practical hours) Zener Diode: Construction (reference to doping level) Symbol , circuit diagram for characteristics (forward & reversed) 1.2.1 Avalanche & zener breakdown 1.2.3 Specifications:- Zener voltage, power dissipation, break over current, dynamic resistance & maximum reverse current. Special Diodes: Point contact diode , Schottky diode Optical Diodes: LED, IRLED, photo diode, laser diode. Symbol, operating principle & applications of each.</p>	12	14
Unit -2	<p>Rectifiers & Filters Need of rectifier, definition Types of rectifier – Half wave rectifier, Full wave rectifier (Bridge & centre tapped) Circuit operation: Input/output waveforms for voltage & Current, Average (dc) value of current & voltage (no derivation), Ripple , ripple factor , ripple frequency , PIV of diode used , transformer utilization factor , efficiency of rectifier. Comparison of three types of rectifier Need of filters Types of filters A] shunt capacitor B] Series inductor C] LC filter D] π filter Circuit operation, dc output voltage , ripple factor (formula) , ripple frequency , Dependence of ripple factor on load . Input/output waveforms , limitations & advantages</p>	10	10

Unit - 3	<p>Transistors</p> <p>Bipolar Junction Transistor(BJT)</p> <p>Introduction , Basic concept</p> <p>Types of transistors , structure & symbols Transistor operation</p> <p>Conventional current flow , relation between different currents in transistor</p> <p>Transistor amplifying action Transistor configurations:- CB , CE & CC</p> <p>Circuit diagram to find the characteristics Input / output characteristics</p> <p>Transistor parameters- input resistance, output resistance, α, β & relation between them. Comparison between three configurations</p> <p>Transistor specifications:</p> <p>$V_{CE\text{ Sat}}$, $I_{C\text{ Max}}$, V_{CEO}, I_{CEO}, α, β, $V_{CE\text{ Breakdown}}$, Power dissipation (to be explained during practical using data sheets)</p> <p>Testing of transistor using multimeter (To be shown during practical)</p> <p>Construction, working principle, characteristics of Photo Transistor</p> <p>Introduction to opto-coupler</p> <p>Unipolar Transistor (JFET)</p> <p>Construction, working principle & characteristics.</p> <p>Unijunction Transistor(UJT)</p> <p>Construction, working principle& characteristics.</p>	12	14
Unit - 4	<p>Biasing of BJT</p> <p>Introduction , need of biasing , concept of dc load line, selection of operating point (Q point) , need of stabilization of Q point, (thermal runaway concept)</p> <p>Types of biasing circuits</p> <p>A) Fixed biased circuit</p> <p>B) Base biased with emitter feed back</p> <p>C) Base biased with collector feed back</p> <p>D) Voltage divider</p> <p>E) Emitter biased</p> <p>Circuit operation of each circuit.</p> <p>Introduction to two port n/w Hybrid model for CE</p>	10	10
Unit - 5	<p>Regulated Power Supply</p> <p>What is a regulator?</p> <p>Need of regulators , voltage regulation factor</p> <p>Concept of load regulation & line regulation</p> <p>Basic zener diode voltage regulator</p> <p>Linear Regulators</p> <p>Basic block diagram of dc power supply</p> <p>Transistorised series & shunt regulator – circuit diagram</p>	08	08

Unit - 6	<p>Small Signal Amplifiers</p> <p>Concept of amplification Small signal amplifier using BJT Graphical analysis Determination of current , voltage & power gain , Input & output resistance , phase shift between input & output.</p> <p>AC Load Line Function of input & output coupling capacitors & criteria for the value selection.</p> <p>Function of emitter bypass capacitor & its value selection.</p> <p>AC equivalent circuit of transistor CE amplifier. Single stage CE amplifier with voltage divider bias. Its explanation.</p> <p>Frequency response of single stage CE Amplifier, Bel, Decibel unit. Bandwidth & its significance. Effect of coupling & emitter bypass capacitor on bandwidth.</p> <p>Introduction to CB & CC amplifier & List of applications. Cascade Amplifiers (Multistage Amplifier) Need of Multistage Amplifiers, Gain of amplifier. Types of amplifier coupling – RC, transformer & Direct coupling. Two stage amplifier circuit diagram, working, frequency Response, merits & demerits & applications of each.</p>	12	14
	Total	64	70

Titles of the Book	Name of Authors	Name of the Publisher
Basic Electronics & Linear Circuits	N.N.Bhargava, D.C. Kulashreshtha, S.C. Gupta – TTTI Chandigarh	Tata McGraw Hill
Electronic Principles	Alberrt Malvino David J.Bates	Tata McGraw Hill
Electronic Devices & Components'	Allen. Mottershead	Prentice Hall of India
Basic Electronics & Devices	NIIT	Prentice Hall of India
Basic Electronics	Grob Bernard	Tata McGraw Hill
Electronics Devices & Circuits	David J. Bell	Prentice Hall of India
Basic Electronics	Amit Kumar, D.P. Verma	Foundation Publishing

ELECTRICAL CIRCUITS AND NETWORK LAB

Subject Code EE106P	Practical			Credits		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	ESE	:	50
	—	—	02	Internal	:	15
	—	—	—	External	:	35

CONTENTS: PRACTICAL

Skills to be developed:

Intellectual Skills:

1. Interpret results
2. Calculate values of various components for given circuits
3. Select instruments

Motor Skills:

1. Connect the instruments properly.
2. Take accurate readings.
3. Draw phasor diagrams and graphs.

List of Practical:

- 1) To observe A.C. waveform on C.R.O. and calculate average & R.M.S. Values, frequency, Time Periods.
- 2) To determine impedance & Plot the phasor diagram of R-L series circuit.
- 3) To determine the current and P.F. of R.C. series circuit.
- 4) To determine the current and P.F. of R.L.C. series circuit.
- 5) To determine the current and P.F. in R.L. Parallel circuit.
- 6) To determine the current and P.F. in R.C. Parallel circuit.
- 7) To determine the current and P.F. in R.L.C. Parallel circuit.
- 8) To verify the line and phase values of voltage & current in star connected balanced load & Compare with practical situation.
- 9) To verify the line and phase values of voltage & Current in delta connected balanced load & Compare with practical situation.
- 10) To verify the superposition theorem applicable to D.C. & A.C. circuit.
- 11) To verify Thevenin's theorem applicable to D.C. & A.C. circuit
- 12) To verify Norton's theorem applicable to D.C. & A.C. circuit
- 13) To verify the maximum power transfer Theorem applicable to D.C. & A.C. circuit.
- 14) To verify conditions for Series and Parallel Resonance

LIST OF PRACTICE ORIENTED PROJECTS:

- 1) To observe Response of R; L; and C to A.C. supply. Observe the current and voltage wave forms on C. R. O. and determine magnitude and phase angle of voltage and current.
- 2) To obtain Resonance in R-L-C series circuit and study the quality factor and bandwidth. Give applications of series resonance circuit and Draw the curve showing variation of R, XL, XC, I with F.
To verify KCL, KVL, Superposition theorem, Thevenin's theorem and maximum power transfer theorem applicable to A.C. circuits.

ELECTRICAL MEASUREMENTS LAB

Subject Code EE107P	Practical			Credits		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	ESE	:	50
	—	—	02	Internal	:	15
	—	—	—	External	:	35

CONTENTS: PRACTICAL

Skills to be developed:

Intellectual Skills:

1. Identification of instruments
2. Selection of instruments and equipment for measurement

Motor Skills:

1. Accuracy in measurement
2. Making proper connections

List of Practicals:

1. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
2. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively by Using Current Transformer and potential Transformer.
3. Measurement of active and reactive power in three phase balanced load by single wattmeter method.
4. Measurement of active and reactive power in three phase balanced load by two wattmeter method and observe the effect of Power Factor variation on Wattmeter reading.
5. Calibration of Energy meter at various power factor by standard energy meter.
6. Measurement of energy in single phase & three phase balanced load using Electronic Energy Meter.
7. Measurement of Low resistance by Kelvin's Double Bridge.
8. Measurement of Medium resistance by Wheatstone bridge.
9. Measurement of Insulation Resistance by Megger.
10. a) Measurement of Resistance, Voltage, Current, Voltage, Current in A.C & D. C. Circuit by using digital multimeter.
b) Measurement of A.C. Current by Clip-on ammeter
11. Measurement of Earth Resistance by Earth Tester.
12. Measurement of Circuit Parameters by LCR meter.
13. Measurement of power factor of single phase and three phase load by PF meter and verifying through I, V and P measurement.
14. Observe the phase sequence of three phase circuit Using Rotating type phase sequence Indicator.
15. Measurement of Frequency of A.C. Supply Using Weston or Ferro dynamic type Frequency meter.

BASIC ELECTRONICS LAB

Subject Code EE108P	Practical						Credits 01
	No. of Periods Per Week			Full Marks	:	50	
	L	T	P/S	ESE	:	50	
	—	—	02	Internal	:	15	
	—	—	—	External	:	35	

CONTENTS: PRACTICAL

Skills to be developed:

Intellectual Skills:

1. Identification and selection of components.
2. Interpretation of circuits.
3. Understand working of Regulated dc power supply.

Motor skills:

1. Ability to draw the circuits.
2. Ability to measure various parameters.
3. Ability to test the components using multimeter.
4. Follow standard test procedures.

List of Practical:

- 1] To plot Forward & Reverse biased characteristics of diode.
- 2] To plot Forward & Reverse biased characteristics of Zener diode.
- 3] To Study the Rectifiers a] Half wave b] Full wave & draw i/p & o/p wave forms.
- 4] To Study the filter circuits. a] Capacitor Filter b] Inductor filter & draw wave forms.
- 5] To Plot Input & output characteristics of transistor in CE mode.
- 6] To Plot Input & output characteristics of transistor in CB mode.
- 7] To Plot Characteristics of FET.
- 8] To Plot Characteristics of UJT.
- 9] To study the Zener Diode as Regulator & calculate load regulation.
- 10] To study Transistor series and shunt regulator.
- 11] To study Single stage common emitter amplifier & plot its frequency response.
- 12] To study Two stage RC coupled amplifier & plot its Frequency response.

ELECTRICAL WORKSHOP PRACTICE

Subject Code EE109P	Practical			Credits		
	No. of Periods Per Week			Full Marks	:	50
	L	T	P/S	ESE	:	50
	—	—	03	Internal	:	15
—	—	—	External	:	35	

CONTENTS: PRACTICAL

Note: All the experiments will be performed by using casing capping or conduit wiring, prepare schedule of material for each wiring work.

1. Identify, dismantle, sketch & assemble different
Electrical accessories 10 Hrs.
2. Wire up one lamp controlled by one SPT switch 06 Hrs.
3. Wire up two lamps controlled by two independent SPT switches 06 Hrs.
4. Wire up a call bell/ buzzer 06 Hrs.
5. Wire up four power sockets controlled independently 06 Hrs.
6. Wire up a test board 06 Hrs.
7. Wire lighting circuit for a go down wiring 08 Hrs.
8. Prepare & mount the energy meter board 08 Hrs.
9. Wire up consumer's main board with ICDP & distribution fuse box & 08 Hrs. With LCB / MCB

PREPARATION OF HOUSEHOLD EQUIPMENT

Subject Code EE110P	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	02
	L	T	P/S	Internal	:	07	
—	—	04	External	:	18		

Contents :Term Work		Hrs/week
	Name of the Topic	Hours
Unit -1	Household equipments:- Introduction, objective, Classification of household equipments, Selection of household equipments, Correct use of household equipments, Care and maintenance of household equipments, Appliance recycling..	04
Unit – 2	Study of various household equipments like Air conditioner, Air- purifier, Ceiling fan, Cloths dryer, Cloths iron, Computer, DVD player, Electric water Boiler, HVAC, Light fixture, Microwave Oven, Electric Rice cooker, Electric kettle, etc.	04
Unit -3	Microwave oven: Different types of oven, study the various functions of Oven, Electric Iron:-Principle of electric iron, parts of steam iron, thermostat heat controls. Rice Cooker:-Principle of working of rice cooker, Various parts & functions of rice cooker, temperature control and timer unit..	03
Unit -4	Microwave oven:-Electrical wiring diagram of microwave oven, Identify the internal and external parts of micro wave oven, Testing of high voltage diode working of Power supply UPS/Inverter, SMPS, Washing machine.	03
Unit -5	Electric kettle:- Principle of working of electric kettle. Various parts & functions of electric kettle and temperature control unit, Mixer & Grinder:- Various parts & functions of Mixer/Grinder, speed control circuit & automatic over load protector. Fuse :-types, use of fuses and its rating, Washing M/c: different types of machines, washing technique.	02
Total		16

List of Term Work:-

1. Repairing of any one Household equipments like Air conditioner, Air- purifier, Ceiling fan.
2. Guidelines for proper care and maintenance of household equip-ments.
3. Guidelines for conservation of electricity at home.
4. Correct use of household equipments.
5. Testing of electrical parameters, cables and measurements.
6. Select the proper instrument for suitable measurement.
7. Identify and test passive and active electronics components.
8. Practice soldering and de-soldering of various types of electrical and electronics components.
9. Troubleshoot the faults in the given power supply circuits.
10. Identify various Input and output sockets/connectors of the given UPS.
11. Identify various functional blocks/major components/ICs in the given UPS.
12. Monitor, measure major test points and Test the capacity of the given UPS and rectify the faults.
13. Identify and test various mechanical and electrical modules of the given appliances.
14. Identify electronics parts/components/modules of the given appliances.
15. Aware of models of different appliances and features.
16. Use reference manuals and identify the information required to service the appliances.
17. Practice the standard troubleshooting procedures as suggested in the product manuals.

ENGINEERING GRAPHICS

Subject Code EE111P	Term Work						Credits	
	No. of Periods Per Week			Full Marks	:	25		02
	L	T	P/S	Internal	:	07		
	—	—	04	External	:	18		

Contents (Theory)		Hrs/week	Marks
Unit -1	Drawing Instruments and their uses : Letters and numbers (single stroke vertical) Convention of lines and their applications. Scale (reduced, enlarged & full size) plain scale and diagonal scale. Sheet layout . Introduction to CAD (Basic draw and modify Command). Geometrical constructions.	05	05
Unit -2	Engineering curves & Loci of Point: 1.2 To draw an ellipse by : Directrix and focus method Arcs of circle method. Concentric circles method. To draw a parabola by : Directrix and focus method Rectangle method To draw a hyperbola by : Directrix and focus method passing through given points with reference to asymptotes. Transverse Axis and focus method. To draw involutes of circle & polygon (up to hexagon): To draw a cycloid, 21 picycloids, hypocycloid To draw Helix & spiral. Loci of Points: Loci of points with given conditions and examples related to simple mechanisms.	09	08
Unit – 3	Orthographic projections : Introduction to Orthographic projections. Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only). Dimensioning technique as per SP-46.	06	06
Unit – 4	Isometric projection : Isometric scale. Conversion of orthographic views into isometric View/projection (Simple objects) Projection of Straight Lines and Planes. (First Angle Projection Method only).	05	05
Unit – 5	Lines inclined to one reference plane only and limited to both ends in one quadrant. Projection of simple planes of circular, square, rectangular, rhombus, pentagonal, and hexagonal, inclined to one reference plane and perpendicular to the other.	07	06
Total		32	30

Text/Reference Books:-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Drawing	N.D. Bhatta	Charotar Publishing House
(ii)	Engineering Drawing & Graphics +Auto CAD	K. Venugopal	New Age Publication
(iii)	Engineering Drawing	R.K. Dhawan	S. Chand Co.
(iv)	Engineering Drawing	P.J. Shah	-