

II SEMESTER

Speaking

- 1 Expressing Obligations
- 2 Fixing and Cancelling
Appointments
- 3 Extending and Accepting
Invitations
- 4 Giving Instructions
- 5 Asking for and Giving Directions

Listening

- 6 The Here and Now!

Reading

- 7 An Environmental Challenge
- 8 Education as Empowerment
- 9 Waiting for Mr Clean

Grammar

- 10 Reported Speech
- 11 Error Analysis - 1
- 12 Error Analysis - 2
- 13 Error Analysis - 3

Writing

- 14 Resume
- 15 Cover Letter
- 16.1 Note Taking
- 16.2 Note Making
- 17 Summarizing
- 18 Report Writing - 1
- 19 Report Writing - 2
- 20 Report Writing - 3

(Common to all specializations)

Subject title : **Engineering Mathematics-II**
Subject code : **BM/CN/CP/ES/EV/IE-2102**
Periods / week : **5**
Total Periods/ Semester : **75**

Time Schedule with BLUEPRINT

S. No	Major Topic	No of Periods		Weightage of Marks	Short Type			Essay Type		
		Theory	Practice		R	U	App	R	U	App
	Unit-I Co-ordinate Geometry									
1	Straight Lines	4	2	6	2	0	0	0	0	0
2	Circle	4	2	6	1	1	0	0	0	0
3	Conic Sections	10	4	26	1	1	0	1	1/2	1/2
	Unit -II Differential Calculus									
4	Limits and Continuity	4	2	6	1	1	0	0	0	0
5	Differentiation	15	8	36	2	0	0	1	2	0
	Unit -III Applications of Differentiation									
6	Geometrical Applications	4	2	10	0	0	0	0	0	1
7	Physical Applications	3	2	5	0	0	0	0	0	1/2
8	Maxima and Minima	3	4	10	0	0	0	0	0	1
9	Errors and Approximations	2	0	5	0	0	0	0	0	1/2
	Total	49	26	110	7	3	0	2	2 1/2	3 1/2
	Marks				21	9	0	20	25	35

R: Remembering type : 41 marks
U: Understanding type : 34 marks
App: Application type : 35 marks

Objectives

After completion of the subject the student shall be able to –

UNIT - I

Coordinate Geometry

1.0 Solve the problems on Straight lines

1.1 Write the different forms of a straight line – point slope form, two point form, intercept form, normal form and general form

1.2 Solve simple problems on the above forms

1.3 Find distance of a point from a line, acute angle between two lines, intersection of two non parallel lines and distance between two parallel lines.

2.0 Solve the problems on Circles

- 2.1 Define locus of a point – circle and its equation.
- 2.2 Find the equation of a circle given (i) center and radius, (ii) two ends of a diameter (iii) Centre and a point on the circumference (iv) three non collinear points and (v) centre and tangent
- 2.3 Write the general equation of a circle and find the centre and radius.
- 2.4 Write the equation of tangent and normal at a point on the circle.
- 2.5 Solve the problems to find the equations of tangent and normal.

3.0 Appreciate the properties of Conics in engineering applications

- 3.1. Define a conic section.
- 3.2 Explain the terms focus, directrix, eccentricity, axes and latus rectum of a conic with illustrations.
- 3.3 Find the equation of a conic when focus, directrix and eccentricity are given
- 3.4 Describe the properties of Parabola, Ellipse and Hyperbola
- 3.5 Solve engineering problems in simple cases of Parabola and Ellipse.

UNIT - II

Differential Calculus

4.0 Use the concepts of Limit and Continuity for solving the problems

- 4.1 Explain the concept of limit and meaning of $\lim_{x \rightarrow a} f(x) = l$ and state the properties of limits .

- 4.2 Mention the Standard limits $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$, $\lim_{x \rightarrow 0} \frac{\sin x}{x}$, $\lim_{x \rightarrow 0} \frac{\tan x}{x}$, $\lim_{x \rightarrow 0} \frac{a^x - 1}{x}$, $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$,

$$\lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}}, \lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x \text{ (All without proof).}$$

- 4.3 Solve the problems using the above standard limits

- 4.4 Evaluate the limits of the type $\lim_{x \rightarrow l} \frac{ax^2 + bx + c}{\alpha x^2 + \beta x + \gamma}$ and $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)}$

- 4.5 Explain the concept of continuity of a function at a point and on an interval with some examples whether a given function is continuous or not.

5.0 Appreciate Differentiation and its meaning in engineering situations

- 5.1 State the concept of derivative of a function $y = f(x)$ – definition, first principle as $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ and also provide standard notations to denote the derivative of a function.

- 5.2 State the significance of derivative in scientific and engineering applications.

- 5.3 Find the derivatives of elementary functions like x^n , a^x , e^x , $\log x$, $\sin x$, $\cos x$, $\tan x$, $\text{Sec}x$, $\text{Cosec}x$ and $\text{Cot}x$ using the first principles.

- 5.4 Find the derivatives of simple functions from the first principle .

- 5.5 State the rules of differentiation of sum, difference, scalar multiplication, product and quotient of functions with illustrative and simple examples.

- 5.6 Explain the method of differentiation of a function of a function (Chain rule) with illustrative examples such as

$$\text{i) } \sqrt{t^2 + \frac{2}{t}} \quad \text{ii) } x^2 \sin 2x \quad \text{iii) } \frac{x}{\sqrt{x^2 + 1}} \quad \text{iv) } \log(\sin(\cos x)).$$

- 5.7 Find the derivatives of Inverse Trigonometric functions and examples using the Trigonometric transformations.

- 5.8 Explain the method of differentiation of a function with respect to another function and also differentiation of parametric functions with examples.
- 5.9 Find the derivatives of hyperbolic functions.
- 5.10 Explain the procedures for finding the derivatives of implicit function with examples.
- 5.11 Explain the need of taking logarithms for differentiating some functions with examples like $[f(x)]^{g(x)}$.
- 5.12 Explain the concept of finding the higher order derivatives of second and third order with examples.
- 5.13 Explain the concept of functions of several variables, partial derivatives and difference between the ordinary and partial derivatives with simple examples.
- 5.14 Explain the definition of Homogenous function of degree n
- 5.15 Explain Euler's theorem for homogeneous functions with applications to simple problems.

UNIT – III

Applications of the Differentiation

6.0 Understand the Geometrical Applications of Derivatives

- 6.1 State the geometrical meaning of the derivative as the slope of the tangent to the curve $y=f(x)$ at any point on the curve.
- 6.2 Explain the concept of derivative to find the slope of tangent and to find the equation of tangent and normal to the curve $y=f(x)$ at any point on it.
- 6.3 Find the lengths of tangent, normal, sub-tangent and sub normal at any point on the curve $y=f(x)$.
- 6.4 Explain the concept of angle between two curves and procedure for finding the angle between two given curves with illustrative examples.

7.0 Understand the Physical Applications of Derivatives

- 7.1 Explain the derivative as a rate of change in distance-time relations to find the velocity and acceleration of a moving particle with examples.
- 7.2 Explain the derivative as a rate measurer in the problems where the quantities like volumes, areas vary with respect to time- illustrative examples.

8.0 Use Derivatives to find extreme values of functions

- 8.1 Define the concept of increasing and decreasing functions.
- 8.2 Explain the conditions to find points where the given function is increasing or decreasing with illustrative examples.
- 8.3 Explain the procedure to find the extreme values (maxima or minima) of a function of single variable- simple problems yielding maxima and minima.
- 8.4 Solve problems on maxima and minima in applications like finding areas, volumes etc.

9.0 Use Derivatives to find Errors and Approximations

- 9.1 Find the absolute error, approximate error, relative error and percentage error in functions of single variable.

COURSE CONTENT

UNIT-I

Coordinate geometry

- 1 Straight lines: various forms of straight lines, angle between lines, perpendicular distance from a point, distance between parallel lines-examples.
2. Circle: locus of a point, Circle, definition-Circle equation given (i) center and radius, (ii) two ends of a diameter (iii) centre and a point on the circumference (iv) three non collinear points and (v) centre and tangent equation - general equation of a circle -finding center, radius: tangent, normal to circle at a point on it.
3. Definition of a conic section, equation of a conic when focus directrix and eccentricity are given. properties of parabola, ellipse and hyperbola ,standard forms - applications of parabola and ellipse to engineering situations.

UNIT-II

Differential Calculus

4. Concept of Limit- Definition- Properties of Limits and Standard Limits -Simple Problems- Continuity of a function at a point- Simple Examples only.
5. Concept of derivative- definition(first principle)- different notations-derivatives of elementary functions- problems. Derivatives of sum, product, quotient, scalar multiplication of functions - problems. Chain rule,derivatives of inverse trigonometric functions, derivative of a function with respect to another function, derivative of parametric functions, derivative of hyperbolic, implicit functions, logarithmic differentiation – problems in each case. Higher order derivatives - examples – functions of several variables - partial differentiation, Euler's theorem-simple problems.

UNIT-III

Applications of Derivatives:

6. Geometrical meaning of the derivative, equations of Tangent and normal to a curve at any point. Lengths of tangent, normal, subtangent and subnormal to the curve at any point . Angle between the curves - problems.
7. Physical applications of the derivative – velocity, acceleration, derivative as a rate Measure -Problems.
8. Applications of the derivative to find the extreme values – Increasing and decreasing functions, finding the maxima and minima of simple functions - problems leading to applications of maxima and minima.
9. Applications of derivative in finding errors and approximations of functions and simple problems.

Reference Books :

1. Co-ordinate Geometry, by S.L Loney
2. Thomas Calculus, Pearson Addison-Wesley publishers
3. Calculus – I, by Shanti Narayan and Manicavachgam Pillai, S.V Publications

ENGINEERING PHYSICS - II
(Common to all Specializations)

Subject Title : **Engineering Physics**
Subject Code : **BM/CN/CP/ES/EV/IE-2103**
Periods / week : **04**
Total periods/ Semester : **60**

TIME SCHEDULE WITH BLUE PRINT

S.No	Major Topics	No. of Periods	Weightage of Marks	Remembering	Understanding	Applying	Analyzing	Short Answer Type	Essay Type
1.	Simple Harmonic Motion	12	26	4	12	6	4	2	2
2.	Waves	12	26	4	10	4	8	2	2
3.	magnetism	8	13	4	7	2		1	1
4	Electromagnetic theory	10	16	6	8		2	2	1
5.	Modern Physics	10	16	4	10	2		2	1
6	Basics of Solid state Physics	8	13	5	6	2		1	1
		60	110	27	53	16	14	10	8

OBJECTIVES:

On completion of the study of the subject a student should be able to comprehend the following:

1. SIMPLE HARMONIC MOTION

- 1.1. Introduction to types of motions-translatory, rotatory and oscillatory motions
- 1.2. To define periodic motion
- 1.3. To define S. H. M
- 1.4. To state examples of S. H. M
- 1.5. To state the conditions of S. H. M
- 1.6. To show that projection of a particle executing uniform circular motion on any diameter is in SHM
- 1.7. To derive expression for displacement
- 1.8. To derive expression for velocity
- 1.9. To derive expression for acceleration
- 1.10. To derive expression for period and frequency of S H M
- 1.11. To define amplitude and phase of S H M
- 1.12. To derive expression for period of simple pendulum
- 1.13. To explain the experiment for determination of acceleration due to gravity by using simple pendulum.
- 1.14. To define seconds pendulum
- 1.15. To solve problems

2. WAVES

- 2.1. To understand the concept of disturbance as wave with examples in nature.
- 2.2. To understand different types of waves: mechanical waves and electromagnetic waves with examples.
- 2.3. To explain mathematical description of wave characteristics.

- 2.4. To explain properties of transverse, longitudinal and stationary waves.
- 2.5. To derive the wave equation.
- 2.6. To derive the formula for Speed of a transverse wave on a string.
- 2.7. To State the formulae Speed of a longitudinal wave in air (analogy).
- 2.8. To explain graphical representation of waves.
- 2.9. To understand the relation between Path difference and Phase difference.
- 2.10. To explain principle of superposition of waves.
- 2.11. To explain Interference of waves.
- 2.12. To distinguish between musical sound and noise.
- 2.13. To explain noise pollution and state SI unit for noise.
- 2.14. To explain causes of noise pollution.
- 2.15. To explain effects of noise pollution.
- 2.16. To explain methods of minimizing noise pollution.

3. MAGNETISM

- 3.1. Introduction to magnetism
- 3.2. To define pole strength and magnetic moment
- 3.3. To explain coulombs inverse square law
- 3.4. To define magnetic field
- 3.5. To explain uniform and non uniform magnetic field with Examples
- 3.6. To state the properties of magnetic lines of force
- 3.7. To explain magnetic induction field strength
- 3.8. To derive the expression for moment of couple on a bar magnet placed in a uniform magnetic field
- 3.9. To explain the types of magnetic materials with examples
- 3.10. To state the properties of Ferro, Para and Dia magnetic materials
- 3.11. To solve problems

4. ELECTROMAGNETIC THEORY

- 4.1 To explain Gauss law in electrostatics.
- 4.2 To explain Gauss law in magneto statics.
- 4.3 To explain Faraday's law of electromagnetic induction.
- 4.4 To explain Ampere's law.
- 4.5 To explain conduction current.
- 4.6 To explain displacement current.
- 4.7 To explain Maxwell's equations in integral form
- 4.8 To explain physical significance of Poynting vector.
- 4.9 To state unit and dimensional formula of Poynting vector.
- 4.10 To explain sources of electromagnetic waves.
- 4.11 To explain properties of electromagnetic waves.
- 4.12 To explain electromagnetic spectrum.
- 4.13 To explain the uses of different electromagnetic rays.

5. MODERN PHYSICS

- 5.1. To understand Photo-electric effect
- 5.2. To state Einstein 's Photoelectric equation
- 5.3. To state laws of photoelectric effect
- 5.4. To understand working of photoelectric cell
- 5.5. To state the applications of photoelectric effect
- 5.6. To understand reflection and refraction of light
- 5.7. To define Critical angle
- 5.8. To understand Total Internal Reflection
- 5.9. To know the principle and working of Optical Fiber
- 5.10. To know types of optical fibers
- 5.10 To List the applications of optical fiber
- 5.11 To explain concept of superconductor and superconductivity with examples.
- 5.12 To explain meissner effect.

5.13 To know the applications of super conductors

6. BASICS OF SOLID STATE PHYSICS

6.1 Introduction to crystal structure

6.2 To define lattice points and basis

6.3 To know different types of crystal structures

6.4 To explain crystal structure of NaCl, Ge and Si.

6.5 To derive Bragg's law

6.6 To explain X-ray diffraction for structural determination of the crystal

COURSE CONTENTS

1. SIMPLE HARMONIC MOTION:

Introduction- Conditions of SHM- Definition- Examples- Expressions for displacement, velocity, acceleration, Time period, frequency, amplitude and phase in SHM- Time period of a simple pendulum- Experimental determination of acceleration due to gravity-seconds pendulum- Problems

2. WAVES:

Introduction to waves- -types of waves- mechanical waves and electromagnetic waves with examples- mathematical description of wave - characteristics i.e. wave length, wave number, amplitude, time period, frequency and phase -properties of transverse, longitudinal and stationary waves – differential equation for wave motion- calculation of transverse wave speed in a string and speed of longitudinal wave in air (velocity of sound by analogy)- Graphical representation of wave with different amplitudes and frequencies-relation between Path difference and Phase difference-principle of superposition of waves- interference of waves by mathematical approach- Musical sound and noise- Noise pollution – Causes & effects- Methods of reducing noise pollution.

3. MAGNETISM:

Introduction to magnetism-Pole strength and magnetic moment- Coulomb's inverse square law - magnetic field-uniform and non uniform fields - properties of magnetic lines of force-Magnetic induction field strength- moment of couple on a bar magnet placed in a uniform magnetic field- types of magnetic materials - properties of Ferro, Para and Dia magnetic materials - problems.

4. Electromagnetic theory:

Introduction to steady and varying fields – Review of Gauss law in electrostatics and magneto statics – Faraday law of electromagnetic induction and ampere's law. – conduction current and displacement current – Maxwell's equations in integral form – define pointing vector – explanation- units and dimensional formula of Poynting vector - Electromagnetic waves –properties - Electromagnetic spectrum –uses.

5. MODERN PHYSICS:

Photoelectric effect –Einstein's photoelectric equation-laws of photoelectric effect - photoelectric cell –Applications of photo electric effect-Reflection and refraction- critical angle – Total internal reflection- fiber optics- -principle and working of an optical fiber-types of optical fibers - Applications of optical fibers- super conductor and Super conductivity- examples of superconducting materials - meissner effect – applications

6. BASICS OF SOLID STATE PHYSICS:

Introduction to crystal structures– lattice points and basis-Types of crystal structure – Crystal structure of NaCl, Ge, Si-bragg's law - determination of crystal structure by X-ray diffraction.

Recommended Books

1. Intermediate Physics Volume 1 and 2 Telugu academy.

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|----|-----------------------------------------|------------------------------|
| 2. | Intermediate Physics Volume 1 and 2 | Deepthi Publications |
| 3. | NCERT text books for class XI and XII | |
| 4. | Text book of Physics Volume 1 and 2 | Resnik and Halliday |
| 6. | Fiber optics | D.A. Hill |
| 7. | Solid state Physics | Azroff |
| 8. | Text Book of Physics | Serwey and Jewitt |
| 9. | Crystallography for solid state physics | A.R.verma and O.N.Srivastava |

ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES-II
(Common to all specializations)

Subject Title : Engg. Chemistry & Environmental Studies-II
 Subject Code : BM/CN/CP/ES/EV/IE-2104
 No. of periods/week : 04
 Total periods/ semester : 60

TIME SCHEDULE

S.No	Major topic	No of Periods	Weight age of marks	Short type (3marks)			Essay type (10 marks)			remarks
				R	U	A	R	U	A	
1	Electrochemistry	15	26	1	1	0	1	1/2	1/2	
2	Corrosion	9	16	1	0	1	0	1		
3	Water Technology	14	26	0	1	1	1/2	1	1/2	
4	Polymers	12	16	1	1	0	1	0	0	
5	ENVIRONMENTAL STUDIES	10	26	1	1	0	1	0	1	
	total	120	110	4	4	2	3 1/2	2 1/2	2	
		Marks	110	12	12	6	35	25	20	

Remembering: 47

Understanding: 37

Application: 26

OBJECTIVES: After the completion of the study of these units the student should be able to comprehend the following

1.0 Electrochemistry

- 1.1 Define conductor, Insulator, Electrolyte and Non – electrolyte
- 1.2 Distinguish between metallic conduction and Electrolytic conduction
- 1.3 Explain Arrhenius theory of electrolytic dissociation
- 1.4 Define and explain electrolysis by taking example fused NaCl
- 1.5 Explain Faraday's laws of electrolysis
- 1.6 Define chemical equivalent and electrochemical equivalent
- 1.7 Numerical problems based on Faraday's laws of electrolysis
- 1.8 Define Galvanic cell and explain its construction and working
- 1.9 Distinguish between electrolytic cell and galvanic cell
- 1.10 Understand the standard electrode potentials
- 1.11 Understand electrochemical series and its significance
- 1.12 Understand emf of a cell
- 1.13 Numerical problems on emf of cell

2.0 Corrosion

- 2.1 Define corrosion
- 2.2 Factors influencing the rate of corrosion
- 2.3 Understand the concept of electrochemical theory of corrosion
- 2.4 Describe the formation of a) composition cells b) stress cells c) concentration cells
- 2.5 Understand rusting of iron
- 2.6 Explain the mechanism of rusting of iron
- 2.7 Explain the methods of prevention of corrosion a) protective coatings b) cathodic protection (Sacrificial anode process and Impressed – voltage process)

3.0 Water Technology

- 3.1 Sources of water
- 3.2 Define soft and hard water
- 3.3 Understand temporary and permanent hardness and the compounds causing hardness (with Formulae)
- 3.4 State the disadvantages of using hard water in industries
- 3.5 Define Degree of hardness, units of hardness (ppm)
- 3.6 Explain the methods of softening of hard water: a) Permutit process b) Ion-Exchange process
- 3.7 Know the essential qualities of drinking water
- 3.8 Describe the method of municipal treatment of water for drinking purpose.
- 3.9 Explain Osmosis and Reverse Osmosis. Advantages of Reverse Osmosis

4.0 Polymers

- 4.1 Basic concepts of polymerization
- 4.2 Describe the methods of polymerization a) addition polymerization of Ethylene b) condensation polymerization of phenol and formaldehyde (Only flow chart i.e. without chemical equations)
- 4.3 Define the term plastic
- 4.4 Classification of plastics with examples
- 4.5 Distinguish between thermo and thermosetting plastics
- 4.6 Characteristics of plastics
- 4.7 Advantages of plastics over traditional materials
- 4.8 Disadvantages of using plastics.
- 4.9 Methods of preparation and uses of the following plastics: 1. Polythene 2. PVC 3. Teflon 4. Polystyrene 5. Urea formaldehyde
- 4.10 Know the term natural rubber
- 4.11 State the structural formula of Natural rubber
- 4.12 Explain the processing of Natural rubber from latex
- 4.13 Characteristics of natural rubber
- 4.14 Explain the process of Vulcanization
- 4.15 Characteristics of Vulcanized rubber
- 4.16 State the term Elastomer
- 4.17 Describe the preparation and uses of the following synthetic rubbers a) Butyl rubber, b) Buna-s c) Neoprene rubber

5.0 ENVIRONMENTAL STUDIES

- 5.1 Define air pollution
- 5.2 Classification of air pollutants- based on origin and state of matter
- 5.3 State and explain the causes of air pollution
- 5.4 Explain the use and over exploitation of forest resources and deforestation
- 5.5 Explain the effects of air pollution on human beings, plants and animals
- 5.6 Explain the green house effect- ozone layer depletion and acid rain
- 5.7 Understand the methods of control of air pollution
- 5.8 Define water pollution
- 5.9 Explain the causes of water pollution
- 5.10 Explain the effects of water pollution on living and non living things
- 5.11 Understand the methods of control of water pollution.
- 5.12 Define E-waste
- 5.13 Materials used in desktop computer
- 5.14 Disposal of E- waste
- 5.15 Hazards of land filling.
- 5.16 Hazards of recycling.

1. Electrochemistry

Conductors, insulators, electrolytes - Arrhenius theory of electrolytic dissociation – electrolysis – Faraday's laws of electrolysis- numerical problems –

Galvanic cell – standard electrode potential – electro chemical series –emf and numerical problems on emf of a cell

2. **Water technology**

Introduction –soft and hard water – causes of hardness – types of hardness –disadvantages of hard water – degree of hardness (ppm) – softening methods – permutit process – ion exchange process – numerical problems related to degree of hardness – drinking water – municipal treatment of water for drinking purpose – Osmosis, Reverse Osmosis - advantages of Reverse osmosis

3. **Corrosion**

Introduction - factors influencing corrosion - electrochemical theory of corrosion - composition, stress and concentration cells– rusting of iron and its mechanism – prevention of corrosion by coating methods, cathodic protection

4. **Polymers**

Introduction – polymerization – types of polymerization – addition, condensation with examples – plastics – types of plastics – advantages of plastics over traditional materials – Disadvantages of using plastics – preparation and uses of the following plastics: 1. Polytehene 2. PVC 3. Teflon 4. Polystyrene 5. Urea formaldehyde – Rubber – Natural rubber – processing from latex –Vulcanization – Elastomers – Butyl rubber, Buna-s, Neoprene rubber and their uses.

5. **ENVIRONMENTAL STUDIES**

air pollution - causes-Effects – forest resources : uses and over exploitation, deforestation, acid rain, green house effect –ozone layer depletion – control of air pollution – Water pollution – causes – effects – control measures. **E-Waste**- definition - hazardous waste - parameters – materials used in desktop computer- lead, cadmium, mercury, chromium, plastics- disposal – hazards of land filling – hazards of recycling.

REFERENCE BOOKS

- | | | |
|----|----------------------------------|-----------------------|
| 1. | Intermediate Chemistry Vol 1& 2 | Telugu Academy |
| 2. | Intermediate Chemistry Vol 1& 2 | Vikram Publishers |
| 3. | Intermediate Chemistry Vol 1 & 2 | Vignan Publishers & |
| 4. | Engineering Chemistry | Jain and Jain |
| 5. | Engineering Chemistry | O.P.Agarwal, Hi-Tech. |
| 6. | Engineering Chemistry | M.S.N.Raju, etc, Hi- |
| 7. | Applied Chemistry | V.Subrahmanyam |
| 8. | Engineering Chemistry | Sharma |
| 9. | Environmental chemistry | A.K. De |

ELECTRICAL TECHNOLOGY
(Common to all Specializations)

Subject Title : Electrical Technology
 Subject Code : BM/CN/CP/ES/EV/IE-2205
 Periods / week : 04
 Periods / semester : 60

TIME SCHEDULE WITH BLUE PRINT

S. No	Major Topics	No. of Periods	Weightage of Marks	Short type	Essay type	Remembering	Understanding	Applying	Analysing
1	Electrostatics	20	34	3	2 ^{1/2}	9	10	15	-
2	A.C Fundamentals	20	34	3	2 ^{1/2}	9	10	15	-
3	Poly Phase Circuits	10	21	2	1 ^{1/2}	3	8	10	--
4	Batteries	10	21	2	1 ^{1/2}	6	10	5	--
	Total	60	110	10	8	27	38	45	

OBJECTIVES:

Up on the completion of the course student shall be able to:

1.0 Appreciate the concept of Electrostatics

- 1.1 State coulomb's laws of electrostatics
- 1.2 Define absolute permittivity and relative permittivity of a medium.
- 1.3 Solve problems on inverse square laws as applied to electrostatics.
- 1.4 Explain electrostatic induction
- 1.5 Comprehend electrostatic field and electrostatic lines of force.
- 1.6 List the properties of electrostatic lines of force.
- 1.7 Define field strength in terms of force per unit charge
- 1.8 Define electric flux, flux density and derive the relation $D = \epsilon_0 \epsilon_r E$
- 1.9 State Gauss Theorem (proof is not required).
- 1.10 Explain the charge residing outside the surface of a sphere.
- 1.11 Solve problems on field strength (or field intensity or electric intensity) and flux density
- 1.12 Define electric potential, potential difference in electric fields and obtain an expression for potential due to point charge.
- 1.13 Explain the dielectric strength and state the importance of dielectric constant.
- 1.14 Define capacitance and give its S.I. Unit.
- 1.15 Obtain the expressions for capacitance of a parallel plate capacitor with Uniform dielectric medium and Parallel with Composite Medium.
- 1.16 Derive equivalent capacitance of series, parallel and series parallel combinations of capacitors.
- 1.17 Calculate the energy stored in a capacitor.
- 1.18 Solve the problems on calculation of equivalent capacitance and energy stored in a capacitor.

2.0 Comprehend the A.C Fundamentals:

- 2.1 Define the terms pertaining to alternating quantities (i) wave form, (ii) cycle, (iii) time period, (iv) frequency, (v) amplitude and ect.
- 2.2 Explain single loop generator concept.
- 2.3 State the relation between poles, speed and frequency.
- 2.4 State the instantaneous value in terms of maximum value, frequency and time.

- 2.5 State and calculate the average value, R.M.S. value, form factor and peak factor for sine wave.
- 2.6 Explain the terms phase and phase difference.
- 2.7 Use J. Operator to perform phasor algebra (addition, subtraction, multiplication and Division)
- 2.8 Convert polar quantities to rectangular quantities and vice versa.
- 2.9 Explain the concepts of single phase A.C. Circuits.
- 2.10 Derive relationship between voltage and current, power consumed in pure Resistive, inductive and capacitive circuits with vector diagrams.
- 2.10 Derive relationship between voltage and current, power consumed and power factor in R - L, R-C, R - L-C series circuits.
- 2.11 Simple problems on R-L, R-C and R-L-C series circuits.

3.0 Appreciate the concept of Poly Phase Circuits:

- 3.1 Explain the concept of poly phase system.
- 3.2 Advantages of poly phase systems over single phase system.
- 3.3 Explain the working of different types of poly phase systems
- 3.4 Give the relation between phase and line value of current and voltage in 3-phase star and delta circuit
- 3.5 Give the equation for power in 3- phase circuits in terms of line values for balanced load
- 3.6 Explain measurement of power in three phase circuits i.e in Star and Delta connected Systems by Two watt meter method.
- 3.7 Solve numerical example in balanced and unbalanced 3-phase circuits.

4.0 Comprehend the working of Batteries:

- 4.1 Define storage batteries.
- 4.2 Give battery or cell Classification, Differences between Primary and Secondary Cell
- 4.3 Explain the working of Lead – Acid Cell; give the chemical reactions during charging and discharging.
- 4.4 Explain the working of Nickel Iron cell; give the chemical reactions during charging and discharging.
- 4.5 Explain the working of Nickel Cadmium Cell; give the chemical reactions during charging and discharging.
- 4.6 Give and explain the different types of charging methods (constant voltage, constant current and trickle charging).
- 4.7 Define the Ampere Hour efficiency and Watt Hour efficiency.
- 4.8 Solve Problems on efficiency.
- 4.9 List the applications of rechargeable batteries.

COURSE CONTENTS:

1. Appreciate the concept of Electrostatics:

Laws of electrostatics, permittivity – relative and absolute, electric fields, potential and potential difference, Gauss theorem, flux, flux density, Electric intensity, Dielectric strength, concept of capacitance, capacitances in series, parallel and series parallel combination, energy stored in a condenser.

2. Comprehend the A.C Fundamentals:

Single loop generator concept, poles, speed and frequency, RMS value, average value and terms associated with sine wave, j-notation, polar to rectangular conversions and vice versa, RL, RC, LC, RLC series circuits.

3. Appreciate the concept of Poly Phase Circuits::

Definition of the term poly phase, poly phase system. Method of generation of 3-phase circuit in terms of line values for balanced load. Relation between phase and line values of current and voltage in 3-phase star and delta circuits and measurements of power in 3- Φ circuits-problems.

4. Comprehend the working of Batteries:

Introduction, Battery or Cell classification, Difference between Primary and Secondary Cells, Types of Storage Cells, Lead – Acid Cell, methods of charging, Nickel - Iron Cell, Nickel – Cadmium Cell ,indications of fully charged cell, introduction to maintenance free batteries.

REFERENCE BOOKS

1. Electrical Technology by H. Cotton
2. A Text Book of Electrical Technology, Vol.I – B.L.Theraja & A.K. Teraja
3. Introduction to Basic Elec. Engg. By V.K. Mehta
4. Basic Electrical Engineering by J.B. Gupta.
5. Electrical Technology by P.S. Duggal

ELECTRONIC DEVICES
(Common to all Specializations)

Subject Title : **Electronic Devices**
Subject Code : **BM/CN/CP/ES/EV/IE-2206**
Periods / week : **04**
Periods / Semester : **60**

TIME SCHEDULE WITH BLUE PRINT

S.No	Major Topic	No. of Periods	Weight age of Marks	Remembering	Understanding	Applying	Analyzing	Short Qns	Essay Qns
1	Transistor and its Characteristics	15	29	16	10	-	-	3	2
2	Transistor Biasing Circuits	12	26	03	16	10		2	2
3	Field Effect Transistors and Special Semiconductor Devices	20	29	03	03	10	-	3	2
4	Analysis of transistor amplifier	13	26	06	10	10		2	2
	Total	60	110	28	39	33	10	10	08

OBJECTIVES:

On completion of the study of the subject a student should be able to comprehend the following:

1.0 Understand Basics of a Transistor and its characteristics

- 1.1 Name the terminals of the transistor
- 1.2 Explain the purpose of emitter, base and collector
- 1.3 Draw the Symbols of NPN and PNP transistors.
- 1.4 Explain construction and working of NPN and PNP transistor.
- 1.5 Give the specifications of Transistor
- 1.6 Mention 3 basic different packaging and encapsulation used for Transistor
- 1.7 List the configurations of a transistor.
- 1.8 Identify the Circuits for C.B, C.E and C.C configurations.
- 1.9 Define Alpha, Beta factors of a transistor. explain their significance
- 1.10 Derive the relation between Alpha and Beta
- 1.11 Explain the input and output characteristics of transistors in CB, CE and CC mode .
- 1.12 Derive the expressions for the collector current in CB and CE configurations in- terms of I_C , I_b and I_{cbo} and I_{ceo} .
- 1.13 Compare the characteristics of CB, CE and CC

2.0 Understand function of Transistor biasing circuits.

- 2.1. Explain Transistor as an Amplifier
- 2.2. Explain load line analysis. a) dc load line b) ac load line
- 2.3. Explain the Concept of stability of operating point
- 2.4. Explain the need for transistor biasing.
- 2.5. List out the different biasing techniques
- 2.6. Draw the transistor amplifier circuits with fixed bias, collector to base bias, potential divider bias .

- 2.7. Explain how biasing is provided in the above circuits.
- 2.8. Define stability factor
- 2.9. Explain the compensating methods of bias stability.

3.0 Understand Field Effect Transistors and Special Semiconductor devices.

- 3.1 Draw symbol of FET explain terminals
- 3.2 Explain construction of JFET
- 3.3 Describe the working of a JFET
- 3.4 Draw the drain characteristics for JFET
- 3.5 State the merits and demerits of FET over bipolar transistors
- 3.6 Define 'g_m' factor of a FET
- 3.7 Give the applications of FET
- 3.8 Describe the working of a MOSFET(enhancement mode and Depletion mode)
- 3.10 Explain the working principle of Tunnel diode .
- 3.11 Sketch the Symbol of Tunnel diode and its applications.
- 3.12 Draw the equivalent CKT of UJT and explain its operation.
- 3.13 Draw and explain UJT characteristics and significance of negative resistance region.
- 3.14 State the applications of UJT.
- 3.15 Sketch the symbol of SCR.
- 3.16 Explain the SCR construction and explain its operation
- 3.17 Draw and explain V – I characteristics of SCR (Forward and Reverse)
- 3.18 State the applications of SCR.

4.0 Understand analysis of transistor amplifier

- 4.1 Classify the amplifier on the basis of active device used, configuration, frequency range, function of the circuit(voltage & power), types of coupling, types of load, period of conduction.
- 4.2 Define h- parameters
- 4.3 Sketch the h-parameter model for transistor in CE,CB,CC configuration.
- 4.4 Sketch the approximate h-parameter model
- 4.5 Derive expression for voltage gain, current gain, input impedance and output impedance for CE,CB,CC configuration by using approximate model.
- 4.6 Solve simple problems.
- 4.7 Limitations of h- parameters
- 4.8 Sketch the hybrid pi-model for transistor at high frequencies.
- 4.9 Define alpha cut off frequency and Beta cut off frequency.

COURSE CONTENTS

1.0 Transistor characteristics.

Constructional details, Operation, Specifications and Applications of Transistors I/P and O/P characteristics of transistors in C.B, C.E and C.C configurations. Expressions for the collector current. Alpha, Beta factors of a transistor, Compare CB and CE, CC Configurations.

2.0 Transistor biasing circuits.

Transistor as an Amplifier, Load line analysis, Concept of stability of operating point, Need for transistor biasing Amplifier circuits with fixed bias, collector to base bias, potential divider bias Stability factor, Compensating methods.

3.0 Field Effect Transistors and Special Semiconductor devices.

Working of a JFET and MOSFET (enhancement mode and Depletion mode) with transfer characteristics. Working principle of Tunnel diode, UJT, SCR.

4.0. Analysis of transistor Amplifier

Classification of amplifiers, h-parameter model for CE, CB, CC configuration, approximate h-parameter model, hybrid pi-model, alpha cut off frequency and Beta cut off frequency.

REFERENCE BOOKS

1. Electronic Components and materials by D.V.Prasad.
2. Fundamentals of Electronic Devices by David A. Bell.
3. Electronic circuits by Malvino.
4. Basic Electronics and Linear circuits by N.N. Bhargava, D.C. Kulshreshtha, S.C. Gupta (T.T.T.I), Chandigarh
5. Electronic Components and materials by Madhuri A. Joshi.
6. Integrated Electronics – Milliman & Halkias
7. Electronic Devices and Circuits - Milliman & Halkias.
8. Solid State Electronic Devices – Streetman

ENGINEERING DRAWING - II
(COMMON FOR ALL BRANCHES)

Subject Title : **Engineering Drawing - II**
Subject Code : **BM/CN/CP/ES/EV/IE-2107**
Periods/Week : **06**
Periods Per Year : **90**

TIME SCHEDULE

S. No	Major Topics	No. Of Periods	Weightage of marks	Short Answer Questions	Essay type Questions	Remembering	Understanding	Applying	Analyzing
1	Orthographic Projection	25	20		2		20		
2	Sectional views	15	15	1	1	5		10	
3	Auxiliary views	15	5	1			5		
4	Pictorial drawing	20	15	1	1		5	10	
5	Development of surfaces	15	15	1	1	5	10		
Total		90	70	04	05	10	40	20	

OBJECTIVES:

On completion of the study of this subject the student should be able to comprehend the following

1.0 Apply the principles of Orthographic Projections

- 1.1 Explain the principles of Orthographic projections with simple sketches.
- 1.2 Prepare an Engineering Drawing of a given simple Engineering part in first angle projection.
- 1.3 Draw the orthographic view of an object, given its pictorial drawing.
- 1.4 Sketch the minimum number of views needed to represent a given object fully.
- 1.5 Identify the object from a number of orthographic views given.
- 1.6 Supply the missing view when given two other views of an object.
- 1.7 Projections of the solids when the axis of the solid is perpendicular to H.P
- 1.8 Projections of the solids when the axis of the solid is perpendicular to V.P
- 1.9 Projections of the solids when the axis of the solid is parallel to both H.P & V.P
- 1.10 Projections of the solids when the axis of the solid is inclined to H.P and parallel to V.P
- 1.11 Projections of the solids when the axis of the solid is inclined to V.P and parallel to H.P
- 1.12 Sections of solids – simple cases

2.0 Appreciate the need of Sectional Views

- 2.1 Explain the need to draw sectional views.
- 2.2 Select the section plane for a given component to reveal maximum information.
- 2.3 Draw sectional view for the component in 8.2.
- 2.4 Apply conventional practices and identify the parts, which should not be shown in section while drawing sectional views.
- 2.5 Make conventional representation of engineering materials as per the latest B.I.S.Code.
- 2.6 Apply principles of hatching.
- 2.7 Draw simple sections (full, half, revolved and removed part) for a range of simple Engineering objects.
- 2.8 Draw the component from a given set of sectional views.
- 2.9 Explain crystals of materials.
- 2.10 Explain different crystal systems.

3.0 Understand the need for Auxiliary Views

- 3.1 State the need of Auxiliary views for a given Engineering Drawing.
- 3.2 Sketch the auxiliary views of a given Engineering component to Indicate the true shape and size of component.
- 3.3 Draw the auxiliary views of a given Engineering drawing.

4.0 Prepare Pictorial Drawings

- 4.1 State the need for commonly used type of pictorial drawings.
- 4.2 Given the objects, draw their orthographic views.
- 4.3 State the need of isometric scale and isometric projection.
- 4.4 Prepare Isometric projections for the given orthographic drawings.
- 4.5 Prepare oblique drawing cavalier, cabinet of simple Engineering Objects from the given data.
- 4.6 Identify the correct pictorial views from a set of Orthographic Drawings.

5.0 Prepare Development Drawings

- 5.1 State the need for preparing development drawing.
- 5.2 Prepare development of simple Engineering objects using parallel line and radial line method.
- 5.3 Prepare development of Surface of Engineering components like trays, funnel, 90° elbow, rectangular duct etc.,

COURSE CONTENTS

NOTE

1. **I.S. / B.S Latest Specification should invariably be followed in all the topics.**
2. **A-2 Size Drawing Sheets are to be used for all Drawing Practice Exercises.**

1.0 Orthographic Projections

Meaning of Orthographic Projection -Using a viewing Box and a model – Number of views obtained on the six faces of the box, - Neat sketches of only 3 views for describing object -Concept of front view, top views, and sides view sketching these views for a number of Engineering objects -Explanation of “First angle projection”. – Positioning of three views in First angle projection - Projection of points as a means of locating the corners of the surfaces of an object – Use of miter line in drawing a third view when other two views are given -Method of representing hidden lines -Selection of minimum number of views to describe an object fully.

Projections of solids – When the axis of the solid is perpendicular to H.P, when the axis of the solid is perpendicular to V.P, when the axis of the solid is parallel to both H.P & V.P, when the axis of the solid is inclined to H.P and parallel to V.P and when the axis of the solid is inclined to V.P and parallel to H.P.

Sections of solids – simple cases covering all the above cases of projections of solids.

Drawing Plate 5: (Consisting of 10 to 12 Number of exercises)

Given an engineering object to sketch the three views.

Given the pictorial view of simple objects to sketch the three views in First and third angle projections.

Given the object (pictorial drawing) and 3 views identifying the surface on the views with reference to the object.

Given two views and a simple object – Draw the missing third view.

Drawing Plate 6: (Consisting of 6 to 8 exercises)

Given the engineering objects (Pictorial views) Drawing the three views in First angle projection.

Identifying the object, when given a number of objects and the orthographic views (matching exercises).

Drawing Plate 7: (Consisting of 6 to 8 exercises) - When the axis of the solid is perpendicular to H.P

Drawing Plate 8: (Consisting of 6 to 8 exercises) - when the axis of the solid is perpendicular to V.P

Drawing Plate 9: (Consisting of 6 exercises) - when the axis of the solid is parallel to both H.P & V.P

Drawing Plate 10: (Consisting of 6 to 8 exercises) - when the axis of the solid is inclined to H.P and parallel to V.P

Drawing Plate 11: (Consisting of 6 to 8 exercises) - when the axis of the solid is inclined to V.P and parallel to H.P

Drawing Plate 12: (Consisting of 6 to 8 exercises) - Sections of solids

2.0 Sectional views

Need for drawing sectional views – what is a sectional view - Location of cutting plane – Purpose of cutting plane line – Selection of cutting plane to give maximum information (vertical and offset planes) -Meaning of Full, half revolved and removed, local or partial sections - Hatching – adjacent components (two or more) large areas, a part in different parallel planes-Conventional practices to represent sections of ribs, shafts, bolts, nuts, screws, rivets, spokes, webs, keys, cotters, thin sections etc., as per B.I.S. specifications – **Conventional representation of materials as per B.I.S. Standards.**

Explain crystal, crystal systems - cubic, tetragonal, orthorhombic,

Rhombohedral,

hexagonal, monoclinic and triclinic.

Drawing Plate 13:

Preparing conventional representation of a materials as per latest B.I.S. Code. Representation of different crystal systems viz., cubic, tetragonal, orthorhombic, Rhombohedral, hexagonal, monoclinic and triclinic.

Drawing Plate 14: (Consists of 8 to 10 exercises)

Given the object (pictorial or orthographic view) and cutting plane line to draw sectional view.

Given the object to select the correct cutting plane line and then to draw the sectional view.

To identify the object when given number of objects and number of sectional views (Matching exercise.)

3.0 Auxiliary views

Need for drawing auxiliary views -Explanation of the basic principles of drawing an auxiliary views explanation of reference plane and auxiliary plane -Partial auxiliary view.

Drawing plate No.15: (Consisting of 8 exercises)

Given a set of objects, state whether an auxiliary view is needed – if required sketch the same.

Given the object and its auxiliary view (partial or full, to sketch the auxiliary plane on the pictorial view)

4.0 Pictorial Drawings

Brief description of different types of pictorial drawing viz., Isometric, oblique, and perspective – Use of these - Isometric drawings: Iso axis, angle between them, meaning of visual distortion in dimensions - Need for an isometric scale, difference between Isometric scale, and ordinary scale difference between Isometric drawing (or view, and Isometric Projection) and orthographic drawing - Isometric and non-Isometric lines -Isometric drawing of common features like rectangles, circular - shapes, non-isometric lines, Use of box and offset construction -Oblique drawings: Their use - Cavalier and cabinet drawings – Oblique drawing of common features like rectangular, circular and inclined, surfaces -Selection of the face of the object to be included in the front view.

Draw plate 16: (Consists of 10 to 12 exercises)

Given the Orthographic views to draw isometric views,

5.0 Development of Surfaces

Need for preparing development of surface with reference to sheet metal Work - Concept of true length of a line with reference to its Orthographic projection when the line is (i) parallel to the plane of projection (ii) When it is inclined to one principal and parallel to the other -Development of simple Engineering common solids like Cubes, prisms, Cylinders, Cones, Pyramid (sketches only) -Types of Development: Parallel line and radial line development -Procedure of drawing development, drawings of trays funnels, 90° elbow pipes and rectangular ducts.

Drawing plate No. 17: (Consists of 10 exercises)

Development drawings by "Parallel – line" method for prisms and Cylinders (including Truncated solids).

Development drawing by "Radial – line" method for cones and pyramids (including Truncated solids)

Development drawings of a tray, funnel, 90° elbow, rectangular duct etc.,

REFERENCE BOOKS

1. First Year Engineering Drawing – B.R. Gupta.
2. Engineering Drawing by N.D.Bhatt.
3. "A First Year Engineering Drawing" – A.C. Parkinson (Metric Edition).
4. T.S.M. & S.S.M on " Technical Drawing" prepared by T.T.T.I., Madras.
5. SP-46-1998 – Bureau of Indian Standards.
6. Introduction to Engineering Drawing R.C.Mouli – V.Rama Rao – M. Venkateswarlu.

Electrical Workshop Practice

Subject title : **Electrical Workshop Practice**
Subject code : **BM/CN/CP/ES/EV/IE-2208**
Periods per week : **4**
Periods / Semester : **60**

TIME SCHEDULE

SI NO	Major Topics	Periods
1	Identification of different Tools and Materials and their working	20
2	Identification of different wires, cables and House wiring	20
3	Soldering practice & Preparation of PCB	20
Total Periods		60

List of the Experiments

Exp No	Name of the Experiment	Objectives	Key competencies
1	Know the safety precautions and first aid	a) Precautions to be followed in the laboratory ,(starting and Stopping of equipment / Machinery) b) symbols and their meaning c) Clear understanding of emergencies , b) Sequence of actions to be carried out c) basic first aid procedure	a) Take precautions to prevent accidents in the laboratory b) Alerting under emergency situations c) Basic first aid.
2	Cleaning the equipment and Work Tables including Visual inspection -reporting any physical damage (3)	Keeping work area clean Familiarization with equipment Procedure for cleaning Use of Detergents, Shampoos and solvents. Precautions to be taken (use of masks, Gloves etc) Precautions to be taken a) Handling the equipment b) Personal (Washing hands with soda after cleaning the equipment)	Should be able to clean the equipment with appropriate cleaning agent. Report any damage to the power cords , missing fuses , Low battery in DMMS etc.
3	Identifying and practicing with Measuring and Marking Tools (3)	1Measuring Tape 2. Steel rule 3.Trysquare 4. Center Punch 5. Plumb A) Handling the equipment B)Use the measuring tape to measure a distance of 6 feet and above accurately and mark. B) Use the steel rule to measure an odd length given in inches and in millimeters accurately and mark. c) Use the Try square to mark perpendicular lines by selecting a finished edge. d) Use the centre punch to mark centre points as per the drawing e) Use the plumb to observe 1) inclination of wall ii) mark two horizontal points on a wall at a given height and at a given	

		distance.	
4	<p>Working with different type of screw Drivers .</p> <p>(3) a) Identifying 1. Screw Driver</p> <p>a) b) Flat Head Screwdrivers c) Ratcheting Screwdrivers</p> <p>b) Use the Screw Driver to Remove and Fix wooden Screws</p> <p>C) Fixing and Removing screws of Metal cabinets using correct screw Driver</p>		
5	<p>Working With Basic tools</p> <p>(6) a) Identify 1.Hacksaw frame/Blade 2. Ball peen hammers 3. Sledge hammer. 4 Claw hammer 5 Anvil 6 Chisels 7. Bench vice</p> <p>b) Fix the Hacksaw blade in the frame and use it to cut a) Conduit pipe b) Cut the Wooden piece with hacksaw frame by fixing it in the bench vice.</p> <p>c) Use a cold chisel to cut the 6mm Rod to required length.</p> <p>d) Use the sledge hammer to bend a 6mm Rod into a ring by striking it on the Anvil</p> <p>e) Drive nails in to a wooden piece with ball peen hammer.</p> <p>f) Remove the Nails using claw hammer</p>	<p>a) to identify and know the usage b) To develop skills in using the above instruments</p>	<p>Select Right tool for a particular situation b) Use the above tool with skill</p>
6	<p>Working with Tools used in Electrical Wiring (3) A)</p> <p>Identifying 1. wire stripper . 2. Insulation remover 3. Pocket knife 5.Electrical Tester 4.Phillips Head Screwdrivers 5. Mallet 6. Rawl plug jumper 7.Standard wire Gauge</p> <p>b) Use the above tools to remove the insulation.</p> <p>c) Use the mallet to straighten the cable/ Conductor</p> <p>d) Measure the gauge of wire using Standard Wire Gauge.</p> <p>e) Make a hole in the wall for fixing a Screw/ Nail using Raw plug Jumper and ball peen Hammer.</p>	<p>Identification of above tools, know their purpose and usage</p>	<p>identifying the tools by their shape and size b) Identifying the tool by their name . Select correct tool for a particular operation c) measure the wire Gauge d) Fix a screw in the wall.</p>
7	<p>Working with different fastening devices, spanners, wrenches and Allen/ Hex keys (3)</p> <p>1. Identification of different types of fastening devices like Screws, Bolts and Nuts, Rivets, and know their specifications</p> <p>b) Tightening the bolts and nuts</p>	<p>To identify various fastening devices by their name and shape</p> <p>Know the usage and selection of the tools</p>	<p>Use the fastening devices</p> <p>Use the tools.</p>

	using correct type and number of spanner a) Normal b) Ring type , c) Use the Monkey Wrench and Pie wrench to Tighten GI pipe coupling		
8	Identifying and Working with Pliers (3) a) Identify and Know the various functions of cutting pliers, Nose pliers, Pipe pliers, Flush cutter, top cutting pliers, Electronics pliers, Insulated cutting pliers b) perform the following operations 1. Holding 2. Wire cutting 3. Component bending 4. Twisting the wire	To identify various types of {Pliers by their name and shape Know the usage and selection of the tools	Use the suitable pliers For a given job
9	Working with Drilling Machine . (3) 1. Identify the parts of Drilling Machine and drill bits used with hand drilling machine b) Use the Hand drill to make holes in the wood c) use Electrical hand held hammer drill to make holes in the wall. C . Identify Electrical drilling machine and observe how holes are made in Mild steel Plates	Know the purpose and types of drilling machines Fix the drilling bit in the chuck Safety precautions to be taken	Use the drilling machine to make holes
10	Identification of Grinding machine 3.Lathe machine 4. Milling machine 5. Blower. (3) a) Identify Grinding machines and observe its usage to sharpen cutting tools and Drill bits and for cutting operation on metals. b) Identify Lathe machine and observe various operations like turning , taper turning , Knurling , Boring Etc c) Identify the milling machine and Know its usage. d) identify the Electric Blower and use it for Removing dust and cleaning	Identification of different5 machines and their use in the workshop	Identify the machine and its function.
11	Working with Adhesives (3) a) Practice the use of adhesives like Araldite , Feviquick, Fevicol, Mseal, to join Non metals b) Using PVC cement to join PVC Pipes	To know and practice joining using different adhesives Know the use of adhesives in Fixing components on PCBs	Join the parts using Araldite, Mseal etc.
12	Identifying conductors insulating materials semiconductors and magnetic materials like (1 ½) 1. Copper , Aluminum , Tin ,Solder Metal . 2. Plastics, Teflon, PVC, glass, porcelain, ceramic Bakelite, Mica,	Identify the Copper , aluminum , iron and other metals by physical observation Identify the Insulating materials by their name and physical observation	To identify conductors and Insulators

	<p>Paper, Cotton sleeves, Prespahn sheet, Transformer Oil. Etc</p> <p>3. Carbon rods</p> <p>4. Iron , Steel, Ferrites</p>		
13	<p>. Identification of different wires and cables (1 ½)</p> <p>a) Identifying different wires and cables used in the industry</p> <p>1.Hookup wires a. PVC wire b. Teflon wires c.single strand d. multi strand</p> <p>B) Wires used for electrical wiring</p> <p>a) Service wire b.. TRS wires /PVC Wires (Al and Cu)</p> <p>c .single strand d. Multi strand</p> <p>e. twisted Flexible pair wires f. Enameled copper wire</p> <p>B) 1. Power cord. 2. UTP cables</p> <p>4.Co axial cables 5. Flat ribbon cable for antennas 6. 9.Telephone cable 10.Ethernet cable 11. Ribbon cables 12 . Optical fiber</p>	<p>Knowing the technical names of the wires</p> <p>Knowing the gauge of the wire</p> <p>Knowing the insulation used and its purpose</p> <p>Identifying the difference between single strand and Multistrand wire</p> <p>Selecting a wire for a particular application</p> <p>Finding the current carrying capacity from the gauge of wire (refer to the standard tables)</p>	<p>Identifying the type of wire and its current carrying capacity</p>
14	<p>Practice of wire joints</p> <p>6</p> <p>To perform the following wire joints operations</p> <p>a) Twisting b) Splicing c) Insulating d) Western union joint e) Married joint f) Britania (straight Joint) g) Tee joint h) Joining running cables ,Pigtail or rat tail joint</p>	<p>To know the types of joints and their purpose.</p> <p>Removing the insulation</p> <p>Taping the joint</p>	<p>Make the joint professionally and tape</p>
15	<p>.Practice Termination of wires</p> <p>3</p> <p>a) Using lugs Using screws , nuts</p> <p>Terminal blocks Fixing Fuse wire</p>	<p>Know the usage of terminal blocks</p> <p>Making connections</p>	<p>Use the terminal Block</p>
16	<p>Identifying the Electrical accessories</p> <p>a) SPST Switch ,SPDT switch , Two pin and 3pin Sockets and plugs ,Power Socket and Power plugs</p> <p>Lamp holders, Ceiling rose, Mains Switch,MCB ,Kitkat Fuse – Fuse wire ratings</p>	<p>Know the names of different electrical accessories</p> <p>Identify the item by its shape</p> <p>Know the purpose of electrical accessories</p>	<p>Connect the Electrical accessories.</p>

17	<p>. Know the mains supply Phase ,Neutral ,Ground Voltage and frequency specifications, Precautions Identification of socket phase and neutral by observation (standard Practices) Standard wire colours Testing phase, neutral and ground with Electrical tester &Test lamp b) Repairing /preparing 2pin and 3pin power cords</p>	<p>Knowledge of mains supply- Precautions to be taken Identification Phase and Neutral terminals in mains supply</p> <p>Know the purpose of earthing</p> <p>2pin and 3pin Plug connections</p>	<p>Identifying phase and Neutral terminals in mains supply with tester Identifying Earth connections with Test lamp</p>
18	<p>Understand the difference between AC and DC by demonstration</p> <ol style="list-style-type: none"> 1. Experiment with 12 V battery 2. Demonstrate unidirectional current flow 3. Importance of polarity 4. Determination of polarity using a Voltmeter /LED 5. Demonstrate reversal of current using battery and DPDT switch 6. Demonstrate AC using a Low voltage Transformer 7. Show AC waveform on CRO 	<p>To understand the behaviour of Direct Current To Check the polarity of DC voltage source Know the importance of polarity in DC circuits</p> <p>Observing the AC signal on CRO</p>	<p>Distinguish between AC and DC</p> <p>Know the importance of polarity in DC circuits</p>
19	<p>. Know the electrical symbols And identify the corresponding component /item</p>	<p>Identify the physical component from the symbol</p>	<p>Identify the physical component from the symbol</p>
20	<p>Make simple switch connections using low voltage transformer</p> <ol style="list-style-type: none"> 1. Connecting a 6V lamp to a switch (toggle) 2. 2 way switch connections 3. Series and parallel connection of lamps 	<p>To understand Switch connections To know the use of two way switch for stair case wiring Series and parallel connection of lamps</p>	<p>Know the switch connections Make stair case wiring</p>
21	<p>..Making either of a lamp glow by two way switch 5. Bright and Dim light arrangement (using a series lamp / using a Diode) 6.either two lamps bright or two lamps dim</p>	<p>To understand Switch connections To know the use of two way switch for controlling lamps.</p>	<p>Know the usage of two way switch</p>
22	<p>Tube light connections (To be done in the presence of Instructor) Make the tube light connections as per the circuit and Test a) Investigate the reason for the</p>	<p>Identifying the parts of tube light set To understand tube light connections</p>	<p>Make tube light connections</p>

	<p>flickering in tube light</p> <p>b) Effect of Low Voltage On tube light (Instructor applies low voltage With an auto Transformer)</p> <p>c) Observe whether tubelight goes off when starter is removed.</p> <p>d) check whether the tube light will light up without starter</p> <p>e) Short the terminals of starter and insert in the starter holder and check whether the tube light will work</p> <p>f) Remove the starter and repeatedly open and short the starter terminals with a short wire and check whether you can make the tube light glow.</p> <p>Open the choke cover and observe the construction .</p> <p>Know the type of laminations b) observe the small airgap c) Observe the Winding</p> <p>h) connect a CFL Lamp and draw comparision</p>	<p>Know the purpose of Choke and starter</p> <p>Observe the behavior of tubelight under low voltage conditions</p> <p>Study the construction of choke</p> <p>Know the purpose of starter</p> <p>Observe the CFL lamp</p>	
23	<p>Troubleshooting/wiring electrical /</p> <p>a) Electric Iron b) heating coil c) Electric Heater d) Air cooler</p>	<p>Identify the problem in Electrical gadgets by testing it with</p> <p>a) physical observation</p> <p>b) Using tester</p> <p>c) Using test Lamp</p>	<p>Identifying and rectifying the problem in Electrical Gadgets</p>
24	<p>Winding coils using winding machine</p> <p>.a) Making an Electromagnet and testing it on a DC power supply.</p>	<p>To use Coil winding Machine and wind a coil of required number of turns</p> <p>Making an electromagnet</p> <p>Observing the relation between Current , Number of turns and Power of magnet</p>	<p>Wind the coil and Test it</p>
25	<p>Black box testing</p> <p>a) identify the given component concealed in a box with two terminals available for testing using multimeter</p>	<p>Identifying a given component only by testing</p> <p>Develop cognitive and Motor skills</p>	<p>Test the given component using Multimeter</p>
26	<p>Identifying different switches</p> <p>a) Identify different types of switches and their symbols</p> <p>b) Toggle switches Rotary switches, Push button switches, DIP switches</p> <p>b). Controlling a small Tape - recorder motor with a DPDT switch to run in forward and Reverse Directions.</p>	<p>Identifying different types of switches by observation , By name and symbol</p> <p>Using DPDT switch to reverse the Direction Tape recorder motor</p> <p>Observing the constructional details and ratings of tape recorder motor</p>	<p>Identify the type of switch and its name</p> <p>Use DPDT switch</p>
27	<p>. Connect a Fan regulator to ceiling fan and observe the rotary witch connections and power Resistors</p>	<p>Identifying and Using the Rotary switch</p> <p>Know the Fan Regulator connections</p> <p>Understand the working of Fan Regulator</p>	<p>Know the Fan Regulator connections</p>

		Identify the type of Resistors used in the Fan Regulator	
28	Testing the relay a) Use of NO and NC Contacts b) Using the relay to control a lamp load c) Using the double pole relay to control a fan motor d) Making a simple relay motor control using double pole relay and push button switches	Know the constructional details of Relay Testing/identifying the coil connections with Multimeter Understand the purpose of Relay experimentally Use the relay in practical circuits	Testing and using the relay
29	Identify the Bimetallic strip (used in Iron box) and observe its construction a) Open the tube light starter and observe its construction. b) Connect a tubelight starter in series with an incandescent lamp and observe the operation of bimetallic strip	Identification of Bimetallic Strip Understanding the behavior of Bimetallic strip Know the constructional details of tube light starter Application of bimetallic strip in practical circuits	Identifying Bimetallic strips Use the Bimetallic strips in applications.
30	. Soldering practice a. Making wire tips b. joining wires c. joining components d. populating simple circuits like, Audio amplifier) on a breadboard e. testing the soldered connections using multimeter	Know the metals which can be soldered Know the solder specifications Know the use of Flux in soldering Practice the soldering Practice Desoldering using Desoldering Wick and Desoldering Pump	Practicing soldering and Desoldering Populating PCBs
31	Practice Desoldering using Desoldering Wick and Desoldering Pump		
32	Using General purpose PCB a) Populating the circuits b) Making necessary cuts and joints c) Use of jumper wires d) Terminating all end connections near an edge. e) Following the colour code for connecting wires. f) Using solderless bread board	Bending the components Designing the component layout Use of common Ground Populating the circuit Cutting and joining the tracks wherever necessary Knowing the colour code for wires Using solderless bread board	Solder the circuit on a general purpose PCB and Testing Using solderless Bread board
33	Identifying different types of connectors a) Identifying power connectors b) Molex connectors c) Edge connectors d) Terminal blocks e) Wire to Board, Board to Board , Flat cable connectors Keyed connectors for microphone Male and Female types f) Lugs , Blade connectors, Ring and spade terminals etc	Identifying different types of connectors used in electronic circuits by their name Know the choice of connector based on the requirements	Identifying different types of connectors used in electronic circuits by their name and use them in the circuits
34	Amplifier- Speaker and microphone connections	To know the amplifier and speaker connections Impedance matching	Connect the amplifier , microphone and speakers

		Knowing the various front panel and back panel controls	
35	<p>Connecting audio video equipment and LCD projector Tuning TV</p> <p>a) Identifying user controls on the equipment b) Setting up the projector using menu control/ Remote control c) Identifying audio video sockets on LCD projector /TV monitor/DVD player d) Connecting audio video cable to the Monitor/ Projector to the DVD / Settop box and testing</p>	<p>Connecting LCD Projector/TV monitor to the DVD player Identifying audio video cable Tuning the TV receiver/ settop box</p>	Connect Audio video Equipment
36	<p>Connecting computer keyboard mouse etc</p> <p>a) Identifying Computer Power switch b) Identifying various ports on CPU c) Identifying computer cables Connecting mouse d) Connecting keyboard e) Connecting headphones/speakers/ Microphone f) Identifying the volume Control g) Connecting the monitor/ LCD Projector using VGA /HDMI cable</p>	<p>Know the basic computer Hardware and their connections CPU , Keyboard , Mouse etc Know the names of the ports on CPU Connect Speakers to the computer</p>	Connect external hardware to the CPU
37	<p>Group Project: Assemble and test a small 0 to 12V , 500mA DC Power supply using Multi tapped transformer and a Rotary switch with enclosure</p>	<p>To reinforce the skills of</p> <p>a. Reading the circuit diagram b. Using the Electronic components c. Populating on General purpose PCB d. Reinforce mechanical skills e. Learn testing skills f. Building creativity</p>	Complete the project and Test it

ELECTRONIC DEVICES LAB PRACTICE
(Common to all Specializations)

Subject Title : **Electronic Devices Lab practice.**
Subject Code : **BM/CN/CP/ES/EV/IE-2209**
Period/week : **04**
Period/Year : **60**

TIME SCHEDULE

S.No	Major Topic	No. of Periods
1	Identification of transistor	04
2	Characteristics of CB configuration	12
3	Characteristics of CE configuration	12
4	Transistor as a switch	04
5	Characteristics of FET	04
6	Characteristics of UJT	04
7	Characteristics of SCR	04
8	Characteristics of LED	04
9	Characteristics of LDR	04
10	Determination of h-parameters	08
	Total	60

LIST OF EXPERIMENTS:

- 1 Identify the transistor and its leads, test(PNP/NPN)transistor with multimeter
- 2 Obtain the input and output characteristics of CB configuration and Calculate the dynamic resistance and current gain of NPN / PNP transistors
- 3 Obtain the input and output characteristics of CE configuration and Calculate the dynamic resistance and current gain of NPN / PNP transistors
4. Transistor as a switch
- 5 Identification of leads of FET & Obtain the FET drain characteristics and calculate the drain resistance, and the trans-conductance
6. Identify UJT leads& Obtain UJT characteristics and calculate intrinsic stand off ratio.
7. Obtain the SCR Characteristics.
8. Obtain the LED Characteristics.
9. Obtain the LDR Characteristics.
10. Calculate the transistor h-parameters CB,CE Configuration

EXP .NO	Experiment	Competencies	Key Competencies
1	Familiarization of Transistor	<ol style="list-style-type: none"> 1. Identify Transistor –different types. 2. Identify the leads 3. Drawing the symbols of Transistors 3. Finding the transistor type by using multimeter (PNP or NPN). 4. Identify the specifications through datasheets. 5. Know the package and differences between BC148A, 148B, 148C and BF194 from the data sheets. 	<ol style="list-style-type: none"> 1. Identifying Transistor Terminals and Type 2. Reading Data sheets
2	Transistor Characteristics in CB Configuration	<ol style="list-style-type: none"> 1. . Identify Transistor and Test the Transistor terminals with multi meter 2. Connect the CB configuration circuit 3. observe emitter current I_E and emitter to base voltage V_{EB} by varying input bias 4. Draw the input characteristics-keeping V_{CB} constant for different values. 5. Calculate the dynamic resistance by graph = 	<ol style="list-style-type: none"> 1. . Draw the input and output characteristics of CB Configuration 2. Calculate the input and output dynamic resistance 3. Calculate $\alpha = I_C/I_E$.

		$\Delta V_{EB}/\Delta I_E$. 3. Note I_C by varying V_{CB} (should not cross max. 20V). 6. Draw the output characteristics-keeping I_E constant for different values. 7. Calculate the output dynamic resistance= $\Delta V_{CC}/\Delta I_C$ 8. calculate $\alpha = I_C/I_E$. 9. Draw dc load line.	
3	Transistor Characteristics in CE Configuration	1. . Identify Transistor and Test the Transistor terminals with multi meter 2. Connect the CE configuration circuit 2. Observe base current I_B and base to emitter voltage V_{BE} by varying input bias 3. Draw the input characteristics-keeping V_{CE} constant for different values. 4. Find the dynamic resistance by graph $I/P = \Delta V_{BE}/\Delta I_B$. 3. Note I_C and V_{CE} by varying output bias (should not cross max. 20V). 4. Draw the output characteristics-keeping I_B constant for different values. 5. Calculate the output dynamic resistance= $\Delta V_{CE}/\Delta I_C$ 5. calculate $\beta = I_C/I_B$. 6. Draw dc load line.	1. . Draw the input and output characteristics of CE Configuration 2. Calculate the input and output dynamic resistance 3. Calculate $\beta = I_C/I_B$.
4	Turn on and turn off a relay using Transistor(BC148 as a switch.)	1. Identification of Transistor terminals by observation 2. Test the Transistor terminals with multi meter and DMM 3. Identification of meters and equipment 4. measure the collector and base currents when transistor in saturation and cutoff regions 5. Connect a 6v lamp in series with BD139 and observe the effect of base current variation on lamp brightness	1. Measure the collector and base currents when transistor in saturation and cutoff regions 2. Observe the switch action of transistor
5	Draw the input and output characteristics of JFET. b) Show that a FET can be used as a constant current source with appropriate bias	1. Drawing the symbols of FET, 2. Reading the circuit Diagram 3. Identification of FET terminals 4. Identification of meters and equipment 5. Observe drain current I_D and source to drain voltage V_{DS} by varying bias 3. Draw the drain characteristics-keeping V_{GS} constant for different values. 4. Measure pinch off voltage and transconductance 5. Apply -2 volts to the gate circuit through resistors of value 10k, 100k and 1M separately and measure the output current and analyse. 4. Study MMBFJ175L(P channel FET) data sheet	1. Assembling the circuit as per the circuit diagram 2. Identifying the ground, drain, gate and source terminals using multimeter (DMM and Analogue) also by physical observation 3. Observing the pinch off voltage accurately 4. Calculate trans conductance
6	To plot the characteristics of UJT and determine the intrinsic standoff ratio	1. Identify ujt and its package 2. Interpret specifications from datasheets 3. identify the terminals by observation and by multi meter 4. Observe base current I_B and base to emitter voltage V_{BE} by varying V_{BB} 5. draw the characteristics of UJT	1. Plot the characteristics and interpret the graph. Of UJT 2. Determine intrinsic standoff ratio of UJT

		6. Calculate intrinsic standoff ratio of UJT	
7	To plot the characteristics of SCR	<ol style="list-style-type: none"> 1. Identify scr and its package 2. Identify the terminals by observation and by testing with multi meter 3. Connect the cir circuit and keep zero gate triggering current. 4. observe diode current and voltage across SCR 5. Plot the characteristics of SCR for different gate triggering currents. 6. measure the break down voltages 	<ol style="list-style-type: none"> 1. Plot the characteristics and interpret the graph. 2. Determine holding current and triggering current. 3. measure the break down voltages
8	To plot the characteristics of LED	<ol style="list-style-type: none"> 1. Identifying the device and terminals 2. Drawing the symbols 3. Connect the circuit 4. Observe and note down the diode current and voltage across the diode by varying bias voltage 5. Measure the cut in voltage 6. plot the characteristics of LED 7. Repeat the above steps for different color LEDs 	<ol style="list-style-type: none"> 1. Draw the characteristics of LED 2. Measure the cut in voltage 3. compare characteristics of LED different color
9	To plot the characteristics of LDR	<ol style="list-style-type: none"> 1. Identifying the device and terminals 2. Drawing the symbols 3. Connect the circuit 4. Observe and note down the current and voltage across the LDR by varying the illumination of light 6. plot the characteristics of LDR 	<ol style="list-style-type: none"> 1. Draw the characteristics of LDR
10	h-parameters CB,CE Configuration	<ol style="list-style-type: none"> 1. Connect the transistor in CB configuration 2. Keep the output short circuited measure input current, input voltage and output current 3. Keep the input open circuited measure input current, output voltage and output current 4. Calculate h-parameters 5. Repeat above steps for CE Configuration 	<ol style="list-style-type: none"> 1. measure input current, input voltage ,output voltage and output current for output short circuited and input open circuited 2. Calculate h-parameters

Information Technology Lab Practice

Subject Title	:	Information Technology Lab Practice
Subject Code	:	BM/CN/ES/EV/IE-2410 / CP-2210
Periods/Week	:	04
Periods per Semester	:	60

1 BASICS

- 1.1. Exercise on creation of Text Files using Notepad, WordPad
- 1.2. Exercise on creation of .jpeg, .bmp Files using MS Paint
- 1.3. Exercise on searching of files and folders

2. MS-WORD

- 2.1. Open MS-word and Identify the components on the screen
- 2.2. Create a document using MS-word and save it in .docx or .doc
- 2.3. Create a table using MS-Word and save it
- 2.4. Insertion of new rows and columns in the existing table
- 2.5. Changing the background colour of the table
- 2.6. Merging and splitting of cells in a Table
- 2.7. Changing the formatting of font
- 2.8. Exercise with Headers and Footers
- 2.9. Create mailing letters using mail merge tool of MS-word

3. MS-EXCEL

- 3.1. Open MS-Excel and identify the components on the screen
- 3.2. Create a Worksheet in MS-Excel and save it in .xls or .xlsx format
- 3.3. Inserting column and row in Excel
- 3.4. Creation of new worksheet in the existing Excel Book file
- 3.5. Generate a Chart using the data in Excel-worksheet
- 3.6. Automate calculations in a worksheet using formula
- 3.7. Sort and filter data in a worksheet

4. MS-POWERPOINT

- 4.1. Create a simple Power point presentation for a small topic and saving in .ppt or pptx format
- 4.2. Inserting a new slide in the existing PowerPoint file
- 4.3. Inserting chart or image in a PowerPoint slide
- 4.4. Exercise with animation and sound features in PowerPoint
- 4.5. Exercise with Rehearse Timings feature in PowerPoint
- 4.6. Exercise in printing the PowerPoint file in (a) Slides (b) Handout

5. EMAIL

- 5.1. Creation of e-Mail account
- 5.2. Compose an email and send the email to different email ids
- 5.3. Working with internet in searching for information using Search engines (Google)

6. BACKUP

- 6.1. Backup required files and folders onto a CDROM / DVD

OBJECTIVES AND KEY COMPETENCIES

SNo	Name of Experiments	Objectives	❖ Key Competencies
1.	Creation of Text Files using Notepad, Wordpad	<ul style="list-style-type: none"> ✚ Able to Create text file using Notepad ✚ Able to create text file using wordpad 	<ul style="list-style-type: none"> ❖ Check whether able to create a text file using Notepad ❖ Check whether able to create a text file using wordpad ❖ Check Whether able to use cut/copy/paste the text file using wordpad ❖ Check whether able to use cut/copy/paste the text file using notepad
2.	Exercise on creation of .jpeg, .bmp Files using MS Paint	<ul style="list-style-type: none"> ✚ Able to create picture file in .jpeg format ✚ Able to create picture file in .bmp format 	<ul style="list-style-type: none"> ❖ Check whether able to create picture file .jpeg format properly ❖ Check whether able to create picture file in .bmp format properly
3.	Exercise on searching of files and folders	<ul style="list-style-type: none"> ✚ Able to search of files and folders 	<ul style="list-style-type: none"> ❖ Check searching of files and folders
4.	Exercise on using of Run from Start button – accessing Calculator, MS-Word	<ul style="list-style-type: none"> ✚ Able to use of Run from Start button – accessing Calculator, MS-Word 	<ul style="list-style-type: none"> ❖ Check use of Run from Start button – accessing Calculator, MS-Word
5.	Change resolution, color, appearance, screen server options of Display	<ul style="list-style-type: none"> ✚ Able to change resolution, color, appearance, screen server options of Display 	<ul style="list-style-type: none"> ❖ Check resolution, color, appearance, screen server options of Display
6.	Change the system date and time	<ul style="list-style-type: none"> ✚ Able to change system date and time 	<ul style="list-style-type: none"> ❖ Check change system date and time
7.	Open MS-word and Identify the components on the screen	<ul style="list-style-type: none"> ✚ Able to Open MS-word and Identify the components on the screen 	<ul style="list-style-type: none"> ❖ Check whether able to Identify the components on the screen ❖ Check whether able to Identify all components on the screen of MSWORD are identified and learnt thoroughly
8.	Insertion of new rows and columns in the existing table	<ul style="list-style-type: none"> ✚ Able to Insert new rows and columns in the existing table 	<ul style="list-style-type: none"> ❖ Check whether able to Insert new rows and columns in the existing table ❖ Check whether able to Insert new rows and columns as per requirement
9.	Changing the background colour of the table	<ul style="list-style-type: none"> ✚ Able to Change the background color of the table 	<ul style="list-style-type: none"> ❖ Check whether able to Change the background color of the table
10.	Merging and splitting of	<ul style="list-style-type: none"> ✚ Able to Merge and split cells in a Table 	<ul style="list-style-type: none"> ❖ Check whether able to Merge and split cells in a

	cells in a Table	using right click method	Table using right click method
11.	Changing the formatting of font	<ul style="list-style-type: none"> ✚ Able to Change the formatting of font using right click menu ✚ Able to Change the formatting of font using menu options 	<ul style="list-style-type: none"> ❖ Check whether able to Change the formatting of font using right click menu ❖ Check whether able to Change the formatting of font using menu options
12.	Exercise with Headers and Footers	<ul style="list-style-type: none"> ✚ Able to change Headers and Footers using menu option ✚ Able to change Headers and Footers by clicking top and bottom document 	<ul style="list-style-type: none"> ❖ Check whether Able to change Headers and Footers using menu option ❖ Check whether able to change Headers and Footers by clicking top and bottom document
13.	Create mailing letters using mail merge tool of MS-word	<ul style="list-style-type: none"> ✚ Able to use mail merge tool of MS-word using start mail merge option in mail menu 	<ul style="list-style-type: none"> ❖ Check whether Able to use mail merge tool of MS-word in creating letter using mail merge option in mail menu
14.	Open MS-Excel and identify the components on the screen	<ul style="list-style-type: none"> ✚ Able to Open MS-Excel and identify the components on the screen 	<ul style="list-style-type: none"> ❖ Check whether Able to Open MS-Excel and identify the components on the screen ❖ Check whether all components are known on screen
15.	Create a Worksheet in MS-Excel and save it in .xls or .xlsx format	<ul style="list-style-type: none"> ✚ Able to Create a Worksheet in MS-Excel ✚ Able to save it in .xls or .xlsx format 	<ul style="list-style-type: none"> ❖ Check whether Able to Create a Worksheet in MS-Excel ❖ Check whether Able to save it in .xls or .xlsx format
16.	Inserting column and row in Excel	<ul style="list-style-type: none"> ✚ Able to Insert column and row in Excel using menu options ✚ Able to Insert column and row in Excel by right clicking rows or columns appropriately 	<ul style="list-style-type: none"> ❖ Check whether able to Insert column and row in Excel using menu option ❖ Check proper addition rows and columns in given sheet ❖ Check whether able to Insert column and row in Excel by right clicking rows or columns appropriately
17.	Creation of new worksheet in the existing Excel Book file	<ul style="list-style-type: none"> ✚ Able to create worksheet in the existing Excel Book file by using Insert worksheet option besides existing sheets 	<ul style="list-style-type: none"> ❖ Verify whether able to create worksheet in the existing Excel Book file by using Insert worksheet option
18.	Generate a Chart using the data in Excel-worksheet	<ul style="list-style-type: none"> ✚ Able to Generate a Chart using the data in Excel-worksheet 	<ul style="list-style-type: none"> ❖ Check whether able to Generate a Chart using the data in Excel-worksheet ❖ Verify whether chart prepared is as per the data given
19.	Automate calculations in a worksheet using formula	<ul style="list-style-type: none"> ✚ Able to Automate calculations in a worksheet using fx formula ✚ Able to use sigma 	<ul style="list-style-type: none"> ❖ Check whether Able to Automate calculations in a worksheet using fx formula ❖ Verify whether Able to use sigma function

		<p>function</p> <ul style="list-style-type: none"> ✚ Able to use function library option in formula menu 	<ul style="list-style-type: none"> ❖ Check whether Able to use function library option in formula menu
20.	Sort and filter data in a worksheet	<ul style="list-style-type: none"> ✚ Able to Sort data in a worksheet using sort option in Data menu ✚ Able to Sort data in a worksheet using sort option in right click ✚ Able to filter data in a worksheet in data menu ✚ Able to filter data in a worksheet in right click 	<ul style="list-style-type: none"> ❖ Verify whether Able to Sort data in a worksheet using sort option in Data menu ❖ Verify whether Able to Sort data in a worksheet using sort option in right click ❖ Check whether Able to filter data in a worksheet in data menu ❖ Check whether Able to filter data in a worksheet in right click
21.	Inserting a new slide in the existing powerpoint file	<ul style="list-style-type: none"> ✚ Able to Insert a new slide in the existing powerpoint file using newslide option in home menu ✚ Able to Insert a new slide in the existing powerpoint file using slide layout option in home menu 	<ul style="list-style-type: none"> ❖ Check whether Able to Insert a new slide in the existing powerpoint file using newslide option in home menu ❖ Check whether Able to Insert a new slide in the existing powerpoint file using slide layout option in home menu
22.	Create a simple Power point presentation for a small topic and saving in .ppt or pptx format	<ul style="list-style-type: none"> ✚ Able to create a simple Power point presentation for a given topic ✚ Able to Save the presentation in both .ppt or pptx format 	<ul style="list-style-type: none"> ❖ Check Able to create a simple Power point presentation for a given topic ❖ Check Able to Save the presentation in both .ppt or pptx format
23.	Inserting chart or image in a power point slide	<ul style="list-style-type: none"> ✚ Able to Insert chart in a power point slide using Insert menu option ✚ Able to Insert image in a power point slide using insert menu option 	<ul style="list-style-type: none"> ❖ Check Able to Insert chart in a power point slide ❖ Check Able to Insert image in a power point slide
24.	Exercise with animation and sound features in powerpoint	<ul style="list-style-type: none"> ✚ Able to work with animation and sound features in power point using custom animation option in Animations menu ✚ Able to work with Media clip options in insert menu 	<ul style="list-style-type: none"> ❖ Check Able to work with animation and sound features in power point using custom animation option in Animations menu ❖ Check Able to work with Media clip options in insert menu
25.	Exercise with Rehearse Timings feature in powerpoint	<ul style="list-style-type: none"> ✚ Able to work with Rehearse Timings feature in powerpoint using slide show menu rehearse option 	<ul style="list-style-type: none"> ❖ Check able to work with rehearse timings features
26.	Exercise in printing the powerpoint file in (a)	<ul style="list-style-type: none"> ✚ Able to print the powerpoint file in Slides using File 	<ul style="list-style-type: none"> ❖ Check to print the powerpoint file in Slides using File menu Print option

	Slides (b) Handout	<ul style="list-style-type: none"> menu Print option ✚ Able to print the powerpoint file in Handout using file menu print option 	<ul style="list-style-type: none"> ❖ Check Able to print the powerpoint file in Handout using file menu print option
27.	Creation of e-Mail account	<ul style="list-style-type: none"> ✚ Connect computer system to Internet ✚ Open any popular email website ✚ Follow the steps in creation of email login account with password ✚ Log in with newly created email account 	<ul style="list-style-type: none"> ❖ Check whether computer system is being connected to the Internet ❖ Check whether chosen website has email service ❖ Check whether email login account is created successfully ❖ Check whether email login is successfully done
28.	Compose an email and send the email to different email ids	<ul style="list-style-type: none"> ✚ Login with email account ✚ Compose an email ✚ Send the email to by giving different email ids in To, cc, bcc ✚ Able to distinguish between To, cc, bcc clearly 	<ul style="list-style-type: none"> ❖ Check whether email login is successfully done ❖ Check whether appropriate option chosen for composing an email ❖ Check whether email is sent to different email ids in To, cc, bcc ❖ Check whether email ids are given in To,cc, bcc with proper understanding
29.	Working with internet in searching for information using Search engines (Google)	<ul style="list-style-type: none"> ✚ Use popular search engines ✚ Search for the required information using keywords in Search engine website 	<ul style="list-style-type: none"> Check whether able to distinguish between usual websites and Search Engine websites ❖ Check whether popular Search engine is chosen ❖ Check whether able to search for the new information using keywords
30.	Backup required files and folders onto a CDROM / DVD	<ul style="list-style-type: none"> ✚ Use CDROM / DVD Burning software ✚ To choose the required files and folders for burning ✚ Able to burn the required files / folders on the CDROM/DVD 	<ul style="list-style-type: none"> ❖ Check whether able to choose the Burning software ❖ Check whether able to burn the files / folders onto CDROM / DVD