DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA,BHOPAL

SCHEME OF STUDIES & EXAMINATIONS (IMPLEMENTED FROM SESSION : JULY-2023)

SECOND SEMESTER - GROUP 'B'

: NAME OF THE PROGRAMME :

Cement Technology, Civil Engg. ,CTM, Electrical Engineering, IC Manufacturing,Mine Surveying, PRPC, Plastic Technology,Printing Technology, Production Engineering ,Textile Technology

S.N.	PAPER CODE	SUBJECT CODE	SUBJECT NAME	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDITS	TOTAL MARKS
				HRS PER WEEK	CREDITS	TERM WORK				THEORY PAPER		HRS PER WEEK	CREDITS	LAB WORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7357	201	MATHEMATICS - II	4	4	10	10	10	30	70	03 Hrs.	0	0	0	0	0	4	100
2	7358	202	APPLIED PHYSICS - II	4	4	10	10	10	30	70	03 Hrs.	4	2	20	30	3 Hrs.	6	150
3	7352	203	APPLIED CHEMISTRY	4	4	10	10	10	30	70	03 Hrs.	4	2	20	30	3 Hrs.	6	150
4	7353	204	COMMUNICATION SKILLS IN ENGLISH	4	4	10	10	10	30	70	03 Hrs.	2	1	20	30	3 Hrs.	5	150
5			ENGINEERING GRAPHICS	0	0	0	0	0	0	0	0	4	2	40	60	3 Hrs.	2	100
6			ENGINEERING WORKSHOP PRACTICE	0	0	0	0	0	0	0	0	4	2	40	60	3 Hrs.	2	100
7			LIBERARY	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
TOTAL				16	16				120	280		20	9	140	210		25	750

NOTE - (1)* Two Best, out of Three Mid Term Tests (Progressive Tests) Marks should be entered here.

GRAND TOTAL OF CREDITS
25

GRAND TOTAL OF MARKS
750

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER II – GROUP 'B'

COURSE TITLE	:	MATHEMATICS - II
PAPER CODE	:	7357
SUBJECT CODE	:	201
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	00

Course Objectives:

This course is designed to give a comprehensive coverage at an introductory level to the subject of matrices, Integral Calculus coordinate geometry, Basic elements of vector algebra and First Order Differential Equations.

Course Content:

UNIT - I: Determinants and Matrices

Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.

UNIT - II: Integral Calculus

Integration as inverse operation of differentiation. Simple integration by substitution, by parts and by partial fractions (for linear factors only). Use of formulas

$$\int_0^{\pi/2} \sin^n x\,dx \quad , \quad \int_0^{\pi/2} \cos^n x\,dx \quad \text{and} \quad \int_0^{\pi/2} \sin^m x \cos^n x\,dx$$

for solving problems Where m and n are positive integers.

Applications of integration for i. Simple problem on evaluation of area bounded by a curve and axes. ii. Calculation of Volume of a solid formed by revolution of an area about axes. (Simple problems).

UNIT - III: Co-Ordinate Geometry

Equation of straight line in various standard forms (without proof), inter section of two straightlines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

General equation of a circle and its characteristics. To find the equation of a circle, given:

i. Centre and radius,

ii. Three points lying on it and

iii. Coordinates of end points of a diameter;

Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Problems on conics when their foci, directories or vertices are given.

UNIT - IV: Vector Algebra

Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar and vector products of 2 vectors. Simple problems related to work, moment and angular velocity.

UNIT-V: Differential Equations

Solution of first order and first degree differential equation by variable separation method (simple problems). MATLAB – Simple Introduction.

References:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition,2007.
2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
3. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
4. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
5. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna PublishingHouse, New Delhi

Course Outcomes:

By the end of the course the students are expected to learn

(i) the students are expected to acquire necessary background in Determinants and Matrices so as to appreciate the importance of the Determinants are the factors that scale different parameterizations so that they all produce same overall integrals, i.e. they are capable of encoding the inherent geometry of the original shape.

(ii) the cumulative effect of the original quantity or equation is the Integration

(iii) the coordinate geometry provides a connection between algebra and geometry throughgraphs of lines and curves.

(iv) Tell the difference between a resultant and a concurrent force to model simple physical problems in the form of a differential equation, analyze and interpret the solutions.

DIPLOMA WING
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SEMESTER II – GROUP 'B'

COURSE TITLE	:	APPLIED PHYSICS - II
PAPER CODE	:	7358
SUBJECT CODE	:	202
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	02

Course Objectives

Applied Physics aims to give an understanding of this world both by observation and by prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. The course will help thediploma engineers to apply the basic concepts and principles to solve broad-based engineering prob-lems and to understand different technology based applications.

Teaching Approach

Teachers should give examples from daily routine as well as, engineering/technology applications on various concepts and principles in each topic so that students are able to understand and grasp these concepts and principles. In all contents, SI units should be followed.

Use of demonstration can make the subject interesting and develop scientific temper in the students. Student activities should be planned on all the topics.

Activity- Theory - Demonstrate/practice approach may be followed throughout the course sothat learning may be outcome and employability based.

Course Content

UNIT - 1: Wave motion and its applications

Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship, Sound and light waves and their properties, wave equation ($y = r \sin\omega t$) amplitude, phase, phase difference, principle of superposition of waves and beat formation.

Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc. Simple harmonic progressive wave and energy transfer, study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.

Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications, Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.

UNIT - 2: Optics

Basic optical laws; reflection and refraction, refractive index, Images and image formation by mirrors, lens and thin lenses, lens formula, power of lens, magnification and defects. Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber.

Optical Instruments; simple and compound microscope, astronomical telescope in normal adjustment, magnifying power, resolving power, uses of microscope and telescope, optical projection systems.

UNIT - 3: Electrostatics

Coulombs law, unit of charge, Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference, Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor, plane charged sheet and charged sphere.

Capacitor and its working, Types of capacitors, Capacitance and its units. Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical), dielectric and its effect on capacitance, dielectric break down.

UNIT - 4: Current Electricity

Electric Current and its units, Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance, Series and parallel combination of resistances. Factors affecting resistance of a wire, carbon resistances and colour coding.

Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications (slide wire bridge only), Concept of terminal potential difference and Electro motive force (EMF)

Heating effect of current, Electric power, Electric energy and its units (related numerical problems), Advantages of Electric Energy over other forms of energy.

UNIT - 5: Electromagnetism

Types of magnetic materials; dia, para and ferromagnetic with their properties, Magnetic field and itsunits, magnetic intensity, magnetic lines of force, magnetic flux and units, magnetization.

Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor, force on rectangular coil placed in magnetic field.

Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.

UNIT - 6: Semiconductor Physics

Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier – half wave and full wave rectifier (centre taped).

Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only).

Photocells, Solar cells; working principle and engineering applications.

UNIT - 7: Modern Physics

Lasers: Energy levels, ionization and excitation potentials; spontaneous and stimulated emission; population inversion, pumping methods, optical feedback, Types of lasers; Ruby, He-Ne and semiconductor, laser characteristics, engineering and medical applications of lasers.

Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture, fiber types, applications in; telecommunication, medical and sensors.

Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials, properties at na-noscale, nanotechnology, nanotechnology based devices and applications.

Learning Outcome:

After undergoing this subject, the student will be able to;

a) Describe waves and wave motion, periodic and simple harmonic motions and solve simple problems. Establish wave parameters: frequency, amplitude, wavelength, and velocity and able to explain diffraction, interference, polarization of waves.

b) Explain ultrasonic waves and engineering, medical and industrial applications of Ultrasonics. Apply acoustics principles to various types of buildings for best sound effect.

c) State basic optical laws, establish the location of the images formed by mirrors and thin con-verging lens**,** design and assemble microscope using lenses combination.

d) Describe refractive index of a liquid or a solid and will be able to explain conditions for totalinternal reflection.

e) Define capacitance and its unit, explain the function of capacitors in simple circuits, and solve simple problems.

f) Differentiate between insulators, conductors and semiconductors, and define the terms: po-tential, potential difference, electromotive force.

g) Express electric current as flow of charge, concept of resistance, measure of the parameters: electric current, potential difference, resistance.

h) List the effects of an electric current and its common applications, State Ohm's law, calculate the equivalent resistance of a variety of resistor combinations, distinguish between AC and DC currents, determine the energy consumed by an appliance,

i) State the laws of electromagnetic induction, describe the effect on a current-carrying conductor when placed in a magnetic field.

j) Explain the operation of appliances like moving coil galvanometer, simple DC motors.

k) Apply the knowledge of diodes in rectifiers, power adapters and various electronic circuits. Use the knowledge of semiconductors in various technical gadgets like mobile phones, computers, LED, photocells, solar lights etc.

l) Illustrate the conditions for light amplification in various LASER and laser based instruments and optical devices.

m) Appreciate the potential of optical fiber in fields of medicine and communication.

n) Express importance of nanoscience and nanotechnology and impact of nanotechnology to the society.

References:

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
4. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi.
5. Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.
6. A Textbook of Optics, N Subramanyam, Brij Lal, MN Avahanulu, S Chand and Company Ltd.
7. Introduction to Fiber Optics, Ajoy Ghatak and K Thyagarajan, Cambridge University PressIndia Pvt. Ltd, New Delhi.
8. Nanoscience and Nanotechnology, KK Choudhary, Narosa Publishing House, Pvt. Ltd. NewDelhi.
9. Nanotechnology: Importance and Applications, M.H. Fulekar, IK International PublishingHouse Pvt. Ltd, New Delhi.
10. e-books/e-tools/ learning physics software/websites etc.

APPLIED PHYSICS – II LAB

Course Objectives:

Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

List of Practicals/Activities: (To perform minimum 12 Practicals)

1. To determine and verify the time period of a cantilever.
2. To determine velocity of ultrasonic in different liquids using ultrasonic interferometer.
3. To verify laws of reflection from a plane mirror/ interface.
4. To verify laws of refraction (Snell's law) using a glass slab.
5. To determine focal length and magnifying power of a convex lens.
6. To verify Ohm's law by plotting graph between current and potential difference.
7. To verify laws of resistances in series and parallel combination.
8. To find the frequency of AC main using electrical vibrator.
9. To verify Kirchhoff's law using electric circuits.
10. To study the dependence of capacitance of a parallel plate capacitor on various factors anddetermines permittivity of air at a place.
11. To find resistance of a galvanometer by half deflection method.
12. To convert a galvanometer into an ammeter.
13. To convert a galvanometer into a voltmeter.
14. To draw V-I characteristics of a semiconductor diode (Ge, Si) and determine its knee volt-age.
15. To verify inverse square law of radiations using a photo-electric cell.
16. To measure wavelength of a He-Ne/diode laser using a diffraction grating.
17. To measure numerical aperture (NA) of an optical fiber.
18. Study of an optical projection system (OHP/LCD) - project report.

Suggested Student Activities & Strategies

Apart from classroom and laboratory learning following are the suggested student related activitieswhich can be undertaken to accelerate the attainment of various outcomes of the course.

a. Make survey of different physical products and compare the following points
   - Measurements of dimensions
   - Properties
   - Applications

b. Library survey regarding engineering materials/products used in different industries

c. Seminar on any relevant topic.

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler or descriptive in nature should be given to the students for self-learning and assess the development of competency through classroompresentations/projects.
- Micro-projects on relevant may be given to group of students for hand-on experiences.

Learning Outcome:

After undergoing this subject, the student will be able to;

a) Apply concept of vibrations and determine the time period of vibrating objects.

b) Use of equipment for determining velocity of ultrasonics in different liquids.

c) Verify optical laws; reflection, refraction from plane interfaces and surfaces.

d) Apply knowledge of optics to determine focal length and magnifying power of opticallenses.

e) Understand uses of electrical components and meters and verify Ohm's law for flow of current.

f) Quantify resistances and verify laws of series and parallel combination of resistances.

g) Apply concept of electrical vibrations in determine frequency of AC main.

h) Analyse electrical circuits and verify Kirchhoff's law governing electrical circuits.

i) Measure resistance of a galvanometer and how it is converted into an ammeter and volt-meter.

j) Investigate characteristics of semiconductor diodes, photoelectric cells and determine op-erational parameters associated with their performance.

k) Work with laboratory lasers and understand method to measure the wavelength of the light emitted from a laser.

l) Handle optical fibers and determine numerical aperture of given optical fiber.

m) Understand construction and working of an optical projection system.

Recommended Books:

1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
3. Practical Physics by C. L. Arora, S. Chand & Company Ltd.
4. e-books/e-tools/ learning physics software/you Tube videos/ websites etc.

DIPLOMA WING
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SEMESTER II – GROUP 'B'

COURSE TITLE	:	APPLIED CHEMISTRY
PAPER CODE	:	7352
SUBJECT CODE	:	203
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	02

Course Objectives:

There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. On successful completion of this course content will enable technicians to understand, ascertain and analyse and properties of natural raw materials require for producing economical and eco-friendly finished products.

- Solve various engineering problems applying the basic knowledge of atomic structure andchemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications
- Solve the engineering problems using concept of Electrochemistry and corrosion.

Course Content:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

  Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers – orbital concept. Shapes of s,p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.

  Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond (H_2, F_2, HF hybridization in $BeCl_2$, BF_3, CH_4, NH_3, H_2O), coordination bond in NH_4^+, and anomalous properties of NH_3, H_2O due to hydrogen bonding, and metallic bonding.

  Solution – idea of solute, solvent and solution, methods to express the concentration of solution- molarity (*M* = mole per liter), ppm, mass percentage, volume percentage and mole fraction.

- **Unit 2: Water**

  Graphical presentation of water distribution on Earth (pie or bar diagram). Classification ofsoft and hard water based on soap test, salts causing water hardness, unit of hardness andsimple numerical on water hardness.

  Cause of poor lathering of soap in hard water, problems caused by the use of hard water inboiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

  i). Water softening techniques – soda lime process, zeolite process and ion exchange process.

ii). Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.

Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).

- **Unit 3: Engineering Materials**

  Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag, metallurgy – brief account of general principles of metallurgy.

  Extraction of - iron from haematite ore using blast furnace, aluminium from bauxite along with reactions. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.

  General chemical composition, composition based applications (elementary idea only detailsomitted):

  Port land cement and hardening, Glasses Refractory and Composite materials.

  Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite), rubber and vulcanization of rubber.

- **Unit 4: Chemistry of Fuels and Lubricants**

  Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.

  Proximate analysis of coal solid fuel

  petrol and diesel - fuel rating (octane and cetane numbers),

  Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

  Lubrication – function and characteristic properties of good lubricant, classification with examples, lubrication mechanism – hydrodynamic and boundary lubrication, physical proper-ties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.

- **Unit 5: Electro Chemistry**

  Electronic concept of oxidation, reduction and redox reactions.
  Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.
  Industrial Application of Electrolysis –
    - Electrometallurgy
    - Electroplating
    - Electrolytic refining.

  Application of redox reactions in electrochemical cells –
    - Primary cells – dry cell,
    - Secondary cell - commercially used lead storage battery, fuel and Solar cells.Introduction to Corrosion of metals –
    - definition, types of corrosion (chemical and electrochemical), H_2 liberation and O_2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.

  Internal corrosion preventive measures –
    - Purification, alloying and heat treatment and

  External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.

Suggested Sessional work:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

  Assignments: Writing electronic configuration of elements up to atomic number 30 (Z= 30). Numerical on molarity, ppm, mass percentage, volume percentage and mole fractionof given solution.

  Seminar: 1. Quantum numbers,

  2. Discuss the metallic properties such as malleability, ductility, hardness, high melting point, conductance of heat and electricity, magnetic propertiesof metals.

  Projects: Model of molecules $BeCl_2$, BF_3, CH_4, NH_3, H_2O.

- **Unit 2: Water**

  Assignments: Simple problems on hardness calculation.

  Seminar: 1. Quality and quantity requirement of water in house and industry.

  2. Quality of control measures of effluents (BOD & COD).

  Projects: Collect water samples from different water sources and measure of hardness of water.

- **Unit 3: Engineering Materials**

  Assignments: Preparation of table showing different ores of iron, copper and aluminium metals along with their chemical compositions and classify in to oxide sulphide halide ores.

  Seminar: Discuss the chemical reactions taking place in blast furnace in extraction of Fe, Cu and Al metals.

  Projects: Make table showing place of availability of different ores in India and show places on India map.

- **Unit 4: Chemistry of Fuels and Lubricants**

  Assignments: Calculation of HCV and LCV of fuel using fuel composition in Dulong's for-mula.

  Seminar: Chemical structure of fuel components influence on fuel rating.

  Projects: Mapping of energy recourses in India. Collection of data of various lubri-cants available in the market.

- **Unit 5: Electro Chemistry**

  Assignments: Simple problems on Faradays laws of electrolysis.Seminar: 1. Corrosion rate and units.

  2. Corrosion preventions.

  Projects: Mapping of area in India prone to corrosion. Collection of data of various electrochemical cells batteries used in equipment and devices and avail-able in market. Visit to sites such as Railway station to watch corrosion area in railways and research establishment in and around the institution.

Learning Outcomes

At the end of the course student will be able to

1. Understand the classification and general properties of engineering materials such as metal, alloys, glasses, cement, refractory and composite materials using knowledge of chemicalbonding.
2. Understand and assess the suitability of water source for domestic and industrial application, effluents and minimize water pollution.
3. Qualitatively analyze the engineering materials and understand their properties and appli-cations.
4. Choose fuel and lubricants suitable for economical industrial processing to obtain eco-friendly finished products.
5. a) Ascertain construction, mechanism efficiency of electrochemical cells, solar cell fuel cells

   b) Understand corrosion and develop economical prevention techniques.

References/Suggested Learning Resources:

(a) Books :

1) Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2) Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
3) C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
4) Dara, S. S. & Dr.S.S.Umare, Engineering Chemistry, S.Chand. Publication, New Delhi, New Del-hi, 2015.
5) Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
6) Dr. Vairam, S., Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
7) Dr. G. H. Hugar & Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II,NITTTR, Chandigarh, Publications, 2013-14.
8) Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

(b) Open source software and website address:

1 www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
2 www.visionlearning.com (Atomic structure and chemical bonding)
3 www.chem1.com (Atomic structure and chemical bonding)
4 https://www.wastewaterelearning.com/elearning/ (Water Treatment)
5 www.capital-refractories.com (Metals, Alloys, Cement, and Refractory Materials)
6 www.em-ea.org/guide%20books/book-2/2.1%20fuels%20and%20combustion.pdf (Fu eland Combustion)
7 www.chemcollective.org (Metals, Alloys)
8 www.wqa.org(Water Treatment)

APPLIED CHEMISTRY LAB

Course Objectives:

There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles insolving engineering problems.

LIST OF PRACTICALS:

Perform any 12 (twelve) Laboratory Practicals.

Volumetric and Gravimetric analysis:

1 Preparation of standard solution of oxalic acid or potassium permanganate.

2 To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.

3 Standardization of $KMnO_4$ solution using standard oxalic acid and Determine the percentage of iron present in given Hematite ore by $KMnO_4$ solution.

4 Iodometric estimation of copper in the copper pyrite ore.

5 Volumetric estimation of total acid number (TAN) of given oil.

6 Volumetric estimation of

a) Total hardness of given water sample using standard EDTA solution.

b) Alkalinity of given water sample using 0.01M sulphuric acid

7 Proximate analysis of coal

a) Gravimetric estimation moisture in given coal sample

b) Gravimetric estimation ash in given coal sample

Instrumental analysis

8. Determine the conductivity of given water sample.
9. Determination of the Iron content in given cement sample using colorimeter.
10. Determination of calorific value of solid or liquid fuel using bomb calorimeter.
11. Determination of viscosity of lubricating oil using Redwood viscometer.
12. Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
13. To verify the first law of electrolysis of copper sulfate using copper electrode.
14. Construction and measurement of emf of elector chemical cell (Daniel cell).
15. To study the effect of dissimilar metal combination.

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to sites such as Railway station and research establishment around the institution.
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Learning Outcomes:

At the end of the course student will be able to

- To express quantitative measurements accurately.
- To practice and adapt good measuring techniques.
- To use various apparatus for precise measurements.
- To understand and differentiate different methods of quantitative analysis.
- To know and understand principles of quantitative analysis using instruments.
- To construct different electrochemical cells used in developing batteries.
- To understand and appreciate methods of corrosion abetments.

Reference Books:

1. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II,NITTTR, Chandigarh, Publications, 2013-14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
4. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER II – GROUP 'B'

COURSE TITLE	:	COMMUNICATION SKILLS IN ENGLISH
PAPER CODE	:	7353
SUBJECT CODE	:	204
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	01

Course Objectives:

Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus, the main objectives of this course are:

1. To develop confidence in speaking English with correct pronunciation.
2. To develop communication skills of the students i.e. Listening, Speaking, Reading and Writing skills.
3. To introduce the need for Personality Development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges like self-awareness, inter personal skills, empathy, motivation, team spirit, leadership skills etc.

Course Content

Unit-I Communication: Theory and Practice (6 lectures) 14 Marks

1.1 Basics of Communication: Introduction, Meaning and Definition, Process of Communication.

1.2 Types of Communication: **Verbal** (Oral, Written) and **Non-verbal**–Signs, Symbols, Maps, Body Language (Kinesics) Para Language.

1.3 Channels: Formal (Upward, Downward, Horizontal and Diagonal) and Informal (Grapevine).

1.4 Principles of Effective Written and Oral Communication (including 7 C's)

1.5 Barriers to Effective Communication (Semantic, Physical, Psychological, Organizational) and ways toovercome them.

Unit-II Soft Skills for Professional Excellence (5 lectures) 12 Marks

2.1 Introduction: Soft Skills and Hard Skills.

2.2 Importance of Soft Skills as Life skills : Self-awareness and Self-analysis, Interpersonal effectiveness, Adaptability, Resilience, Emotional Intelligence, Empathy, Assertiveness, Conflict management, Problem Solving, Decision Making, Leadership, Motivation, Time Management and Team spirit.

Unit-III: Reading Comprehension (14 lectures) **16 Marks**

Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts:

Section-1-Prose

3.1.1 'An Astrologer's Day' from Malgudi Days by R. K. Narayan
3.1.2 'The Gift of the Magi' by O'Henry
3.1.3 'Uncle Podger Hangs a Picture' by Jerome K. Jerome

Section-2-Poetry

3.2.1 'Night of the Scorpion' by Nissim Ezekiel
3.2.2 'Stopping by Woods on a Snowy Evening' by Robert Frost
3.2.3 'Where the Mind is Without Fear' by Rabindranath Tagore

Unit-IV: Professional Writing and Business Communication (10 lectures) **14 Marks**

4.1 Précis writing and Comprehension exercises based on Unseen Passages.

4.2 E-mail etiquette, format of e-mail.
- 4.2.1 Draft a short email message requesting for one day leave from your workplace due tosickness.
- 4.2.2 Draft a short email message informing that you have resumed your duty after availing leave.
- 4.2.3 Draft a short email message informing about inferior/defective quality of goods supplied.

4.3 Drafting Letters
- 4.3.1 Parts of letters, mechanics, style and format.
- 4.3.2 Application for Job or Covering letter with Resume
- 4.3.3 Letters related to purchase: Enquiry, Order and Complaints (damaged or defectivegoods or for shortage in supply)

Unit-V: Vocabulary and Grammar (10 lectures**)** **10 Marks-Grammar + 4 Marks-Vocabulary**

5.1 Vocabulary of commonly used words, Synonyms, Antonyms and usage of same words asdifferent parts of speech.
5.2 One-word substitutions from the prescribed prose and poetry.

5.3 Determiners, Auxiliary verbs, Subject-verb agreement, Tense, Prepositions, Active and Passive Voice.

Course outcomes:

At the end of this course, the students will be able to:

1. Formulate grammatically correct sentences in English using appropriate vocabulary, to develop basicSpeaking and Writing skills.
2. Demonstrate Reading skills with correct pronunciation and comprehension.
3. Understand the importance of personality development with reference to soft skills to handle personal andprofessional challenges.
4. Apply principles of effective communication in oral and written professional communication.

References:

1. Anjana Tiwari, Communication Skills in English, Khanna Publishing House, New Delhi, 2022.
2. TTTI Bhopal, Communication Skills for Technical Students, Book I, Somaiya Publication Mumbai, New Delhi.
3. Raymond Murphy, Essentials of English Grammar, Cambridge University Press, 2000.
4. Rajendra Pal and J.S. Korlahalli, Essentials of Business Communication, S. Chand & Sons New Delhi, 2019.
5. J. D. O'Connor, Better English Pronunciation, Cambridge University Press, 1980.
6. Lindley Murray, An English Grammar, Comprehending Principles and Rules, Wilson and Sons, London, 1908.
7. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Edition2018)
8. Margaret M. Maison, Examine your English, Orient Longman, New Delhi, 1964.
9. M. Ashraf Rizvi, Effective Technical Communication, Mc-Graw Hill, Delhi, 2002.
10. John Nielson, Effective Communication Skills, Xlibris, 2008.
11. Oxford Advanced Learners Dictionary
12. Roget's Thesaurus of English Words and Phrases
13. Levine, Levine & Levine, The Joy of Vocabulary
14. Collin's English Dictionary

Web Sources:

https://agendaweb.org/listening-

exercises.htmlwww.grammarly.com/

Suggested Further Reading (to enhance reading skills of students):

1. R.K Narayan : "Malgudi Days" (32 Short Stories), "Swami And His Friends"(novel)
2. O Henry : Short Stories : 'The Last Leaf', 'After Twenty Years'
3. Rabindranath Tagore : Poems from "Geetanjali" 'Freedom', 'Last Curtain'
4. Ruskin Bond : Short Stories : 'The Cherry Tree', 'The Thief', 'The Kite Maker'.
   "The Room on the Roof " (novel)

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COMMUNICATION SKILLS IN ENGLISH LAB

Course Objectives:

Communication skills play an important role in career development. This lab/practical course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:

1. To develop Listening Skills for enhancing communication.
2. To develop Speaking and Reading Skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality Development- Focus will be on developing Soft Skills whichwill aid students in handling personal and career challenges. For that purpose group discussion, extempore and other activities to be conducted during practical classes and technology enabled learning should be integrated for effective learning.

Course Content:

Unit I Listening Skills (6 lectures)

1.1 Listening Process and Practice
1.2 Listening to recorded lectures, conversations, poems, interviews and speeches, Listeningcomprehension tests.

Unit II Reading Skills with correct Pronunciation (6 lectures)

2.1 Phonetics :Articulation of Sounds - Consonant, Vowels and Diphthongs.
2.2 Division of Words into Syllables, Practice of Word stress and Intonation.
2.3 Reading the prescribed text with correct pronunciation, intonation and comprehension.

Unit III Speaking Skills (6 lectures)

3.1 Introducing self, Introducing others (each student will also have to write the content of this activityduring exam which will be submitted for record purpose)
3.2 Conversation practice in routine situations (greeting, thanking, apologizing, requesting,congratulating, inviting, expressing likes and dislikes, etc.
3.3 Role Play-
  3.3.1 Making Enquiries at important public places.
  3.3.2 Question Tags and giving short answers for ease of conversing.

Unit IV Professional Skills (6 lectures)

4.1 Delivering formal short- speech, extempore (of 2 minutes duration)
4.2 Making **Oral presentation** of Mini Project* before external examiner in Practical exam(Written content of presentation (along with tools or aids), also to be submitted by eachStudent / group for the purpose of record)
4.3 Telephonic Conversations, Video Conferencing, Describing Telephone manners and Netiquette.(watching videos, role play and demonstrations)
4.4 Mock interviews for Jobs (videos and demonstrations)
4.5 Group Discussions (videos and demonstrations)

Unit V Building Vocabulary (6 lectures)

5.1 Phrasal verbs
5.2 Idioms and phrases, Administrative terms (English and Hindi)
5.3 Word exercises (homonyms), words with silent letters, commonly misspelled andmispronounced words.
5.4 Word games such as crosswords, scrabble, quiz, spell-it, etc. to enhance self-expression andvocabulary of participants.
5.5 Punctuation Exercises

Note:

*__Mini Project__: Topics of Mini-projects may be assigned individually; or the whole batch of students may bedivided into groups of 4-5 students each. Each student/group has to be assigned a topic for Mini-Project in the beginning of the semester. Each student/group will prepare a short presentation using various aids and tools e.g., charts, graphics, models, flow charts, examples and illustrations, power point, dialogues, role play etc. during the semester and submit it before the last teaching day after planning and rehearsing the oral presentation under supervision of the teacher. Each group will orally deliver this presentation of five to six minutes duration, using the prepared aids and tools during practical exam. Each student individually or as part of a group must participate in oral presentation for at least 1-2 minutes. The suggested topics for Mini- Project are-

1. (i)Describe Process of Communication (ii) Verbal and Non-verbal communication (iii) Oral and Written Communication (iv)Principles of Effective Communication (any four principles) (v) Explain Barriers to Communication (any one category of barriers) and ways to overcome them. Unit 1

2. Explain any three of these soft skills -Time Management, Grooming, Stress Management, Team Work, Self-analysis, Interpersonal effectiveness, Adaptability, Resilience, Emotional Intelligence, Empathy, Assertiveness, Conflict management, Problem Solving, Decision Making, Leadership, Motivation. Unit 2

3. Prepare a Phonetic Chart of Sounds of English. Unit 2

4. Read short stories of famous writers and present a summary along with sharing the new wordslearnt with their usage (any one short story may be chosen from 'suggested further reading'). Unit 3

5. Compose short poems and write stories on topics of your choice. (Any One Story or Poem)-Unit 3

6. Enumerate Qualities of a good letter, present different formats. Unit 4

7. Demonstrate the format of e-mail, and enlist email etiquette. Unit 4

8. (i)Describe Importance of Netiquette (ii) Describe Telephone Manners. Unit 5

9. Preparing for an Interview – Do's and Don'ts. Unit 5

10. Any other relevant topic considered appropriate by the teacher according to students' interest.

Learning Outcome:

At the end of this course the students will be able to:

1. Demonstrate Reading with correct Pronunciation and Comprehension.
2. Ask and Answer relevant questions orally after Listening to the spoken /delivered content intechnologically enabled learning environment.
3. Introduce themselves orally, introduce others, converse in routine and professional situationswith proper usage of language and vocabulary.
4. Prepare, organize and effectively deliver an oral presentation using digital or other tools.

Recommended Readings:

1. T. Balasubramanian, A text Book of English Phonetics for Indian Students, 3rd Ed.2022
2. Daniel Jones, English Pronouncing Dictionary, Cambridge, Cambridge University Press, 1956.
3. James Hartman & etal. English Pronouncing Dictionary, Cambridge, Cambridge University Press, 2006.
4. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, NewDelhi (RevisedEd.2018)
5. J. D. O'Connor, Better English Pronunciation, Cambridge, Cambridge University Press,1980.
6. Lindley Murray, English Grammar: Comprehending Principles and Rules,.London,Wilson and Sons,1908.
7. Margaret M. Maison, Examine your English, Orient Longman, New Delhi,1964.
8. J.Sethi & etal, A Practice Course in English Pronunciation, New Delhi, Prentice Hall,2004.

Web Sources For Speaking Skills

http://7esl.com

https://agendaweb.org/listening-exercises.html

http://grammarly.com

https://www.duolingo.com

https://learnenglish.britishcouncil.o

rghttp://www.ummoapp.com

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER II – GROUP 'B'

COURSE TITLE	:	ENGINEERING GRAPHICS
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

Course Objectives:

- To understand the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.
- To develop drafting and sketching skills, to know the applications of drawing equipments, and get familiarize with Indian Standards related to engineering drawings.
- To develop skills to visualize actual object or a part of it, on the basis of drawings.
- To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.
- To understand the basic commands and develop basic skills related to computer aided drafting, of how to draw, modify, and edit basic shapes (2D), using AUTOCAD.

Course Content

Unit – I Basic elements of Drawing

Drawing Instruments and supporting materials: method to use them with applications.

Convention of lines and their applications.

Representative Fractions – reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale.

Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning.

Geometrical and Tangency constructions. (Redraw the figure)

Unit – II Orthographic projections

Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. (No question to be asked in examination).

Introduction to orthographic projection, First angle and Third angle method, their symbols.

Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method only)

Unit – III Isometric Projections

Introduction to isometric projections.

Isometric scale and Natural scale.

Isometric view and isometric projection.

Illustrative problems related to objects containing lines, circles and arcs shape only.

Conversion of orthographic views into isometric view/projection.

Unit – IV Free Hand Sketches of engineering elements

Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, washer, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching)

Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)

Unit – V Computer aided drafting interface

Computer Aided Drafting: concept.

Hardware and various CAD software available.

System requirements and Understanding the interface.

Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon.

File features: New file, Saving the file, Opening an existing drawing file, Creating templates, Quit.

Setting up new drawing: Units, Limits, Grid, Snap.

Undoing and redoing action.

Unit – VI Computer aided drafting

Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, PolyLine.

Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates.

Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers.

Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions.

Dim scale variable.

Editing dimensions.

Text: Single line Text, Multiline text.

Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview.

S. No.	Practical Exercises	Unit No.	Approx. Hrs
1	Draw horizontal, Vertical, 30 degree, 45 degree, 60 and 75 degrees lines, different types of lines, dimensioning styles using Tee and Set squares/ drafter. (do this exercise in sketch book)	I	02
2	Write alphabets and numerical (Vertical only) (do this exercise in sketch book)	I	02
3	Draw regular geometric constructions and redraw the given figure (do this exercise in sketch book) Part I	II	02
4	Draw regular geometric construction and redraw the given figure (do this exercise in sketch book) Part II	II	02
5	Draw a problem on orthographic projections using first angle method of projection having plain surfaces and slanting. Part I	III	02
6	Draw another problem on orthographic projections using first angle method of projection having slanting surfaces with slots. Part II	III	02

7	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs. Part I	III	02
8	Draw two problems on Isometric view of simple objects having plain and slanting surface by using natural scale. Part I	IV	02
9	Draw some problems on Isometric projection of simple objects having cylindrical surface by using isometric scale. Part I	IV	02
10	Draw free hand sketches/ conventional representation of machine elements in sketch book such as thread profiles, nuts, bolts, studs, set screws, washers, Locking arrangements. Part I	V	02
11	Problem based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views in sketch book. Part I	III, II, V	02
12	Draw basic 2D entities like: Rectangle, Rhombus, Polygon using AutoCAD (Print out should be a part of progressive assessment). Part I	V	02
13	Draw basic 2D entities like: Circles, Arcs, circular using AutoCAD (Printout should be a part of progressive assessment). Part II	V	02
14	Draw basic 2D entities like: Circular and rectangular array using AutoCAD (Printout should be a part of progressive assessment). Part III	V	02
15	Draw blocks of 2D entities comprises of Rectangle, Rhombus, Polygon, Circles, Arcs, circular and rectangular array, blocks using AutoCAD (Print out should be a part of progressive assessment). Part IV	V	02
16	Draw basic branch specific components in 2D using AutoCAD (Print out should be a part of term work). Part I	VI	02
17	Draw complex branch specific components in 2D using AutoCAD (Print should be a part of progressive assessment). Part I	VI	02
	Total		**34**

SUGGESTED LEARNING RESOURCES

1. Bureau of Indian Standards. *Engineering Drawing Practice for Schools and Colleges IS: Sp-46.* BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.
2. Bhatt, N. D. *Engineering Drawing*. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93-80358-17-8.
3. Jain & Gautam, Engineering Graphics & Design, Khanna Publishing House, New Delhi (ISBN: 978-93-86173-478)
4. Jolhe, D. A. *Engineering Drawing*. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07-064837-1
5. Dhawan, R. K. *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.
6. Shah, P. J. *Engineering Drawing*. S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.
7. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. *Engineering Graphics with AutoCAD*. PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.
8. Jeyapoovan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD*. Vikas Publishing HousePvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
9. Autodesk. *AutoCAD User Guide*. Autodesk Press, USA, 2015.
10. Sham, Tickoo. *AutoCAD 2016 for Engineers and Designers*. Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-9351199113.

Software/Learning Websites

1. https://www.youtube.com/watch?v=TJ4jGyD-WCw
2. https://www.youtube.com/watch?v=dmt6_n7Sgcg
3. https://www.youtube.com/watch?v=_MQScnLXL0M
4. https://www.youtube.com/watch?v=3WXPanCq9LI
5. https://www.youtube.com/watch?v=fvjk7PlxAuo
6. http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf
7. https://www.machinedesignonline.com

Course Outcomes

Following outcomes will be achieved:

1) Select and construct appropriate drawing scales, use drawing equipment's, and understand Indian Standards of engineering drawing

2) Draw views of given object and components 3) Sketch orthographic projections into isometric projections and vice versa.

3) Apply computer aided drafting tools to create 2D engineering drawings

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

SEMESTER II – GROUP 'B'

COURSE TITLE	:	ENGINEERING WORSHOP PRACTICE
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

Course Objectives:

- To understand basic engineering processes for manufacturing and assembly.
- To understand, identify, select and use various marking, measuring, and holding, striking and cutting tools and equipment's
- To understand and interpret job drawings, produce jobs, and inspect the job for specified dimensions
- To understand the various types of wiring systems and acquire skills in house wiring
- To understand, operate, control different machines and equipment's adopting safety practices

Course Content:

S.No.	Details Of Practical Content
I	**Carpentry:** i) Demonstration of different wood working tools / machines. ii) Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. iii) One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
II	**Fitting:** i) Demonstration of different fitting tools and drilling machines and power tools ii) Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc. iii) One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc
III	**Welding:** i) Demonstration of different welding tools / machines. ii) Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding. iii) One simple job involving butt and lap joint
IV	**Sheet Metal Working:** i) Demonstration of different sheet metal tools / machines. ii) Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering, brazing, and riveting. iii) One simple job involving sheet metal operations and soldering and riveting.
V	**Electrical House Wiring:** Practice on simple lamp circuits (i) one lamp controlled by one switch by surface conduit wiring, (ii) Lamp circuits- connection of lamp and socket by separate switches, (iii) Connection of Fluorescent lamp/tube light, (iv) simple lamp circuits-install bedroom lighting. And (v) Simple lamp circuits- install stair case wiring.
VI	**Demonstration:** i) Demonstration of measurement of Current, Voltage, Power and Energy. ii) Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. iii) Tools for Cutting and drilling

References:

1. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
2. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
3. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
4. Kents Mechanical Engineering Hand book, John Wiley and Sons, New York

Course outcomes

At the end of the course, the student will be able to:

CO1	Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines
CO2	Understand job drawing and complete jobs as per specifications in allotted time
CO3	Inspect the job for the desired dimensions and shape
CO4	Operate, control different machines and equipment's adopting safety practices