क्र. / रा.गां.प्रौ.वि.वि. / शैक्ष. / 2022 / **1853**   भोपाल, दिनांक **21/10/22**

GROUP 'B'

प्रति,

प्राचार्य

समस्त सहशिक्षा / महिला / निजी पॉलीटेक्निक महा. (द्वितीय पारी सहित)

मध्यप्रदेश।

विषय :– AICTE द्वारा विकसित आदर्श पाठ्यक्रम (Model Curriculum) लागू करने के लिये चयनित ब्रांचों को GROUP 'A' तथा GROUP 'B' में बांटने विषयक।

संदर्भ :– इस कार्यालय के पत्र कमांक :–

(01) रा.गां.प्रौ.वि.वि. / शैक्ष. / 2022 / 1657 भोपाल, दिनांक 19 / 09 / 2022

(02) रा.गां.प्रौ.वि.वि. / शैक्ष. / 2022 / 1711 भोपाल, दिनांक 26 / 09 / 2022

(03) रा.गां.प्रौ.वि.वि. / शैक्ष. / 2022 / 1826 भोपाल, दिनांक 18 / 10 / 2022

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उपरोक्त विषय एवं संदर्भ में लेख है कि इस कार्यालय के संदर्भित पत्रों द्वारा डिप्लोमा इंजीनियरिंग में शैक्षणिक सत्र 2022–23 के जुलाई 2022 से प्रारंभ हो रहे प्रथम शैक्षणिक उपसत्र से AICTE द्वारा विकसित इंजीनियरिंग डिप्लोमा पाठ्यक्रम लागू किये जाने संबंधी सूचना प्रसारित की गयी थी। इस संबंध में विभिन्न संस्थाओं / शिक्षकों से पत्र, दूरभाष, वाट्सएप से प्राप्त फीडबैक पर विचार करने के लिये गठित वरिष्ठ प्राचार्यों की समिति द्वारा लिये गये निर्णय के अनुसार इस आदर्श पाठ्यक्रम (Model Curriculum) को इंजीनियरिंग डिप्लोमा की अन्य ब्रांचों में भी समान रूप से लागू करने संबंधी सूचना संदर्भित पत्र क्रमांक (03) द्वारा प्रसारित की गयी थी तत्पश्चात पुनः विभिन्न संस्थाओं द्वारा निवेदन किया गया कि कुछ विषयों में शैक्षणिक लोड अधिक हो जायेगा अतः ब्रांचों को GROUP 'A' तथा GROUP 'B' में बांटने से काफी हद तक समस्या का समाधान निकल आयेगा। अतः क्रियान्वयन में सुविधा की दृष्टि से नवीन पाठ्यक्रम लागू करने के लिये चयनित ब्रांचों को GROUP 'A' तथा GROUP 'B' में विभाजित किया जा रहा है।

GROUP 'B' में

Cement Tech., Civil, CTM, Electrical, PRPC, Plastic Tech., Printing Tech., Production Engg., तथा Textile Technology ब्रांच रहेंगी।

उपरोक्तानुसार सभी ब्राचों के प्रथम सेमेस्टर तथा द्वितीय सेमेस्टर से संबंधित SCHEME OF STUDIES एवं AICTE द्वारा विकसित एक समान पाठ्यचर्या संलग्न है। GROUP 'A' तथा GROUP 'B' के अतिरिक्त अन्य पाठ्यक्रमों में स्कीम (SCHEME) अपरिवर्तित रहेगी।

सचिव,
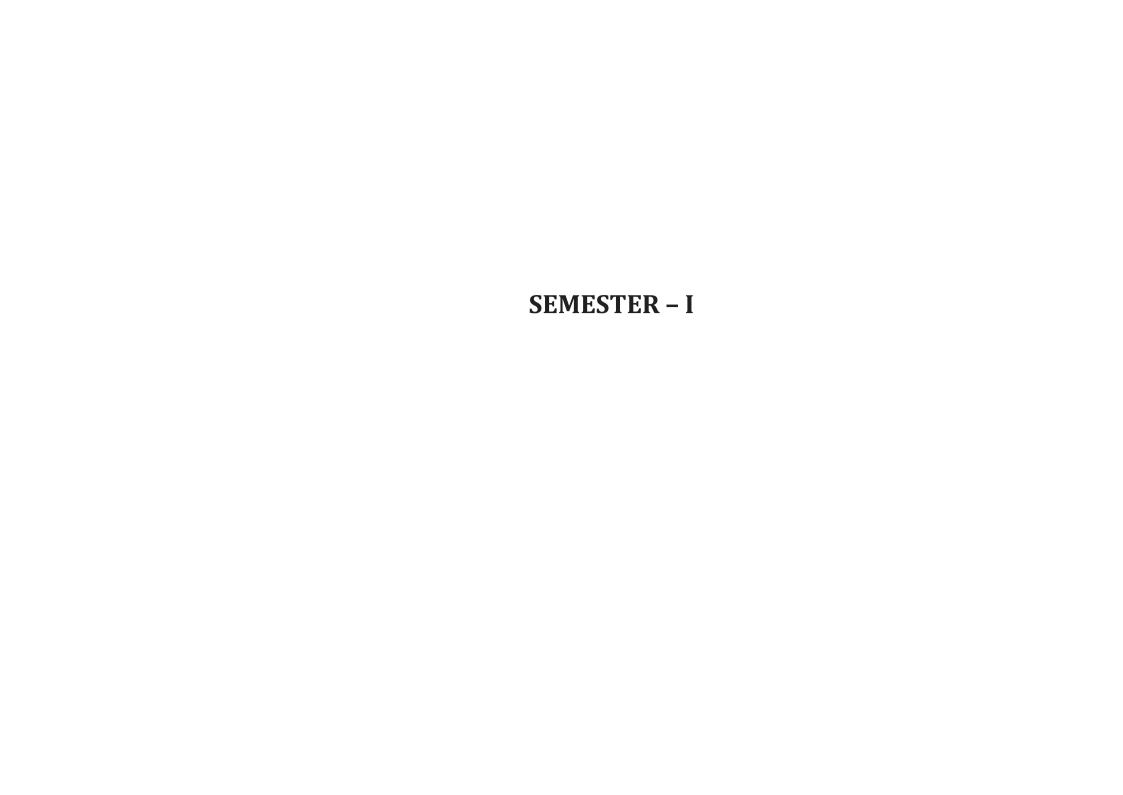राजीव गांधी प्रौद्योगिकी विश्वविद्यालय,
भोपाल
भोपाल दिनांक

पृ0 क्रमांक / रागांप्रौवि / शैक्ष / 2022 /

प्रतिलिपिः–

1. निज सचिव , माननीय कुलपति जी, राजीव गांधी प्रौद्योगिकी विश्वविद्यालय, भोपाल ।

2. आयुक्त ,संचालानालय, तकनीकी शिक्षा, म0प्र0, सतपुडा भवन, चतुर्थ तल,भोपाल।

3. कुल सचिव, रागांप्रौविवि, गांधी नगर भोपाल की ओर सूचनार्थ अग्रेषित ।

सचिव,
राजीव गांधी प्रौद्योगिकी विश्वविद्यालय
भोपाल

GROUP 'B'

-: Common to :-

NAME OF DIPLOMA COURSE
CEMENT TECHNOLOGY
CIVIL ENGINEERING
CONSTRUCTION TECHNOLOGY & MANAGEMENT
ELECTRICAL ENGINEERING
REFINERY & PETRO-CHEMICAL ENGINEERING
PLASTIC TECHNOLOGY
PRINTING TECHNOLOGY
PRODUCTION ENGINEERING
TEXTILE TECHNOLOGY

SEMESTER – I

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
Scheme of Studies & Examinations for the GROUP 'B' FIRST SEMESTER
Implemented from Session: JULY-2022
---: NAME OF THE PROGRAMMES: ---
Cement Tech., Civil, CTM, Electrical,
PRPC, Plastic Tech., Printing Tech., Production Engg., Textile Technology

COURSE TITLE	THEORY COMPONENT								PRACTICAL COMPONENT						TOTAL CREDIT	GRAND TOTAL OF MARKS
	LECTURE Hrs. Per Week	TERM WORK QUIZ, ASSIG-NMENT	MID TERM TESTS (BEST TWO, OUT OF THREE)		THEORY PAPER			THEORY CREDIT	PRACTICAL Hrs. Per Week	CONTINUOUS EVALUATION LAB. WORK QUIZ, ASSIG-NMENT	END OF THE TERM / SEMESTER EVALUATION PRACTICAL / ORAL EXAMINATION (VIVA)			PRACTCAL CREDIT		
			I	II	NO.	MARKS	DURATION (Hrs)				NO.	MARKS	DURATION (Hrs.)			
Mathematics – I	03	10	10	10	01	70	03	03	--	--	--	--	--	--	03	100
Applied Physics – I	04	10	10	10	01	70	03	04	04	20	01	30	03	02	06	150
Introduction to IT System	02	10	10	10	01	70	03	02	04	20	01	30	03	02	04	150
Fundamentals of Electrical & Electronics Engineering	03	10	10	10	01	70	03	03	04	20	01	30	03	02	05	150
Engineering Mechanics	03	10	10	10	01	70	03	03	04	20	01	30	03	02	05	150
Environmental Science	01	25	25	25	--	--	--	00	--	--	--	--	--	--	00	75
Sports and Yoga	--	--	25	25	--	--	--	--	02	25	--	--	--	01	01	75
Professional Development - I	--	--	25	25	--	--	--	--	02	25	--	--	--	01	01	75
TOTAL	16							15	20					10	25	

Course Title	:	Mathematics- I
Number of Credits	:	3 (L:3, P: 0)
Prerequisites	;	NIL

Course Objectives:

This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus and Basic elements of algebra.

Course Content:

UNIT - I: Trigonometry

Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e^x.

Differential Calculus

Definition of function; Concept of limits. Four standard limits $\lim\limits_{x \to a} \frac{x^n - a^n}{x-a}$, $\lim\limits_{x \to 0} \frac{\sin x}{x}$, $\lim\limits_{x \to a} \left(\frac{a^x - 1}{x}\right)$ and $\lim\limits_{x \to a} \left(\frac{a^x - 1}{x}\right)$

Differentiation by definition of x^n, sin x cos x, tan x, e^x and $\log_a x$. Differentiation of sum, prod-uct and quotient of functions. Differentiation of function of a function. Differentiation of trig- onometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.

UNIT - III: Algebra

Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian,representation of a complex number and its conversion from one form to other, conjugate of a com-plex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division

of a complex number. De-movier's theorem, its application.

Partial fractions: Definition of polynomial fraction proper & improper fractions and definitionof partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors.To resolve improper fraction into partial fraction.

Permutations and Combinations: Value of ^nP_r and ^nC_r.

Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomialapproximation with applications to engineering problems

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. Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)
4. V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vikas Publishing House.
5. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House,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 Trigonometry to appreciate the importance of the geometric study as well as for the calculation and the mathematical analysis.

(ii) The ability to find the effects of changing conditions on a system.

(iii) Complex numbers enter into studies of physical phenomena in ways that most people cannot imagine.

(iv) The partial fraction decomposition lies in the fact that it provides an algorithm for computing the antiderivative of a rational function.

Course Title	:	Applied Physics –I
Number of Credits	:	4 (L: 4, P: 0)
Prerequisites	:	High School Level Physics

Course Objectives:
Applied Physics includes the study of a large number of diverse topics all related to materials/thingsthat exist in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which such 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 the diploma engineers to apply the basic concepts and principles to solve broad-based engineering problems and to understand different technology based applications.

Teaching Approach:

- Teachers should give examples from daily routine as well as, engineering/technology appli-cations on various concepts and principles in each topic so that students are able to under- stand 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: **Physical world, Units and Measurements**

Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units),

Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Lim- itations of dimensional analysis.

Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect), Errors in measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.

Unit 2: Force and Motion
Scalar and Vector quantities – examples, representation of vector, types of vectors. Additionand Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vec-tor Product, Resolution of a Vector and its application to inclined plane and lawn roller.

Force, Momentum, Statement and derivation of conservation of linear momentum, its appli-cations such as recoil of gun, rockets, Impulse and its

applications.

Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period, Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical), Centripetal and Centrifugal forces with live exam- ples, Expression and applications such as banking of roads and bending of cyclist.

Unit 3: Work, Power and Energy
Work: Concept and units, examples of zero work, positive work and negative work
Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction andits engineering applications, Work done in moving an object on horizontal and inclined planefor rough and plane surfaces and related applications.

Energy and its units, kinetic energy, gravitational potential energy with examples and deriva-tions, mechanical energy, conservation of mechanical energy for freely falling bodies, trans- formation of energy (examples).

Power and its units, power and work relationship, calculation of power (numerical prob- lems).

Unit 4: Rotational Motion
Translational and rotational motions with examples, Definition of torque and angular mo- mentum and their examples, Conservation of angular momentum (quantitative) and its ap- plications.

Moment of inertia and its physical significance, radius of gyration for rigid body, Theorems of parallel and perpendicular axes (statements only), Moment of inertia of rod, disc, ring andsphere (hollow and solid); (Formulae only).

Unit 5: Properties of Matter
Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve.

Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications.

Surface tension: concept, units, cohesive and adhesive forces, angle of contact, Ascent For- mula (No derivation), applications of surface tension, effect of temperature and impurity onsurface tension.
Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic systems.

Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynold's number Equation of continuity, Bernoulli's Theorem (only formula and numericals) and its applications.

Unit 6: Heat and Thermometry
Concept of heat and temperature, modes of heat transfer (conduction, convection and ra- diation with examples), specific heats, scales of temperature and their relationship, Typesof Thermometer (Mercury thermometer, Bimetallic thermometer, Platinum resistance ther-mometer, Pyrometer) and their uses.

Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them, Co-efficient of thermal conductivity, engineering applications.

Learning Outcome:
After undergoing this subject, the student will be able to:

- Identify physical quantities, select their units for use in engineering solutions, and make measurements with accuracy by minimizing different types of errors.
- Represent physical quantities as scalar and vectors and solve real life relevant problems.
- Analyse type of motions and apply the formulation to understand banking of roads/railwaytracks and conservation of momentum principle to describe rocket propulsion, recoil of gunetc.
- Define scientific work, energy and power and their units. Drive relationships for work, ener-gy and power and solve related problems.
- Describe forms of friction and methods to minimize friction between different surfaces.
- State the principle of conservation of energy. Identify various forms of energy, and energytransformations.
- Compare and relate physical properties associated with linear motion and rotational motionand apply conservation of angular momentum principle to known problems.
- Describe the phenomenon of surface tension, effects of temperature on surface tension andsolve statics problems that involve surface tension related forces.
- Describe the viscosity of liquids, coefficient of viscosity and the various factors affecting its value. Determine viscosity of an unknown fluid using Stokes' Law and the terminal velocity.
- Define stress and strain. State Hooke's law and elastic limits, stress–strain diagram, deter- mine; (a) the modulus of elasticity, (b) the yield strength (c) the tensile strength, and (d) estimate the percent elongation.
- Illustrate the terms; heat and temperature, measure temperature in various processes on different scales (Celsius, Fahrenheit, and Kelvin etc.)
- Distinguish between conduction, convection and radiation; identify different methods for re-ducing heat losses and mode of heat transfer between bodies at different temperatures.
- State specific heats and measure the specific heat capacity of solids and liquids.

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. Engineering Physics by DK Bhhatacharya & PoonamTandan; Oxford University Press, New Delhi.
6. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
7. Practical Physics by C. L. Arora, S. Chand Publication.
8. e-books/e-tools/ learning physics software/websites etc.

Course Title	:	Introduction to IT Systems
Number of Credits	:	2 (L: 2, P: 0)
Prerequisites (Course code)	:	NIL
Course Category	:	ES

Course Objectives::

This course is intended to make new students comfortable with computing environment - Learn- ing basic computer skills, Learning basic application software tools, Understanding Computer Hard-ware, Cyber security awareness

Course Content:

UNIT 1:

Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital
India portals (state and national portals) and college portals.

General understanding of various computer hardware components – CPU, Memory, Display, Key-board, Mouse, HDD and other Peripheral Devices.

UNIT 2:

OS Installation (Linux and MS Windows), Unix Shell and Commands, vi editor.

UNIT 3:

HTML4, CSS, making basic personal webpage.

UNIT 4:

Office Tools: OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress.

UNIT 5: Information security best practices.

Class lectures will only introduce the topic or demonstrate the tool, actual learning will take place inthe Lab by practicing regularly.

Suggested Lab Work:

This is a skill course. Topics/concepts taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. This course is allabout some theory and a lot of practice.

References:
- R.S. Salaria, Computer Fundamentals, Khanna Publishing House

- Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House
- Online Resources, Linux man pages, Wikipedia
- Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett

Course outcomes:

At the end of the course student will be able to comfortably work on computer, install and configure OS, assemble a PC and connect it to external devices, write documents, create worksheets, prepare presentations, protect information and computers from basic abuses/ attacks.

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Course Title	:	Fundamentals of Electrical and Electronics Engineering
Number of Credits	:	3 (L3, P: 0)
Prerequisites	:	NIL
Course Category	:	ES

Course Objectives:

To provide basic knowledge of the different elements and concepts of electrical engineering field andto learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, Digital Electronics and their applications to help students deal with electrical and electronics engineering principles and applications in industrial processes of different fields.

Course Content:

UNIT I Overview of Electronic Components & Signals:

Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non-periodic signals, aver- age, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources.

UNIT II Overview of Analog Circuits:

Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator.

UNIT III Overview of Digital Electronics: Introduction to Boolean Algebra, Electronic Implementa- tion of Boolean Operations, Gates-Functional Block Approach, Storage elements-Flip Flops-A Func- tional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).

Unit IV Electric and Magnetic Circuits:

EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hyster- esis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.

Unit V <u>A.C. Circuits:</u>

Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form FactorPeak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation ofalternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle.

Unit VI <u>Transformer and Machines:</u> General construction and principle of different type of trans- formers; Emf equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.

References:

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House

2. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5

3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353

4. Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN:9788121924405

5. Theraja, B. L., Electrical Technology Vol – II, S. Chand Publications, New Delhi, 2015, ISBN:9788121924375

6. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513

7. Sedha, R.S., A text book of Applied Electronics, S.Chand, New Delhi, 2008, ISBN-13: 978-8121927833

8. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi,2015,ISBN-13**:** 0070634244-978

9. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014,ISBN-13-9788121924504

10. Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, New Delhi 2015 ISBN : 9780195425239

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Course Title	:	Engineering Mechanics
Number of Credits	:	3 (L: 3,P: 0)
Prerequisites	:	NIL
Course Category	:	ES

Course Objectives:

Following are the objectives of this course:

1) To obtain resultant of various forces
2) To calculate support reactions through conditions of equilibrium for various structures
3) To understand role of friction in equilibrium problems
4) To know fundamental laws of machines and their applications to various engineering problems

Course Contents:

Unit – I Basics of mechanics and force system

Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body.

Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derivedunits.

Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.

Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem.

Composition of forces – Resultant, analytical method for determination of resultant for concur- rent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.

Unit– II Equilibrium

Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical meth-ods of analysing equilibrium

Lami's Theorem – statement and explanation, Application for various engineering problems. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple),

Beam reaction for cantilever, simply supported beam with or without overhang – subjected tocombination of Point load and uniformly distributed load.

Beam reaction graphically for simply supported beam subjected to vertical point loads only.

Unit– III Friction

Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, lim- iting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-effi- cient of friction and angle of friction.

Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

Unit– IV Centroid and centre of gravity

Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter cir-cle)

Centroid of composite figures composed of not more than three geometrical figures

Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere) Centre ofGravity of composite solids composed of not more than two simple solids.

Unit – V Simple lifting machine

Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines, law of machine.

Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility

Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulleyblock, geared pulley block.

Suggested Learning Resources:

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cam-bridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, NewDelhi.

Course outcomes:

After completing this course, student will be able to:

1. Identify the force systems for given conditions by applying the basics of mechanics.
2. Determine unknown force(s) of different engineering systems.
3. Apply the principles of friction in various conditions for useful purposes.
4. Find the centroid and centre of gravity of various components in engineering systems.
5. Select the relevant simple lifting machine(s) for given purposes.

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Course Title	:	Environmental Science
Number of Credits	:	0 (non-credit) (L:1, P:0)
Prerequisites	:	High School Science
Course Category	:	AU

Course Objectives:

Technicians working in industries or elsewhere essentially require the knowledge of environmental science so as to enable them to work and produce most efficient, economical and eco-friendly fin- ished products.

- Solve various engineering problems applying ecosystem to produce eco – friendly products.
- Use relevant air and noise control method to solve domestic and industrial problems.
- Use relevant water and soil control method to solve domestic and industrial problems.
- To recognize relevant energy sources required for domestic and industrial applications.
- Solve local solid and e-waste problems.

Course Content:

Pre requisite: - High School Chemistry

Unit-1 Ecosystem

Structure of ecosystem, Biotic & Abiotic componentsFood chain and food web

Aquatic (Lentic and Lotic) and terrestrial ecosystemCarbon, Nitrogen, Sulphur, Phosphorus cycle.

Global warming -Causes, effects, process, Green House Effect, Ozone depletion

Unit– 2 Air and, Noise Pollution

Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refriger- ants, I.C., Boiler)

Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator)

Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrig-erants, I.C., Boiler

Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollu-tion, Noise pollution (Regulation and Control) Rules, 2000

Unit- 3 Water and Soil Pollution

Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Tur-bidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation

Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary meth- ods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane sepa-ration technology, RO (reverse osmosis).

Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

Unit– 4 Renewable sources of Energy

Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate col-lector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer.Solar stills.

Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas.

Wind energy: Current status and future prospects of wind energy. Wind energy in India. Envi-ronmental benefits and problem of wind energy.

New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy

Unit-5 Solid Waste Management, ISO 14000 & Environmental Management   06 hours

Solid waste generation- Sources and characteristics of : Municipal solid waste, E- waste, bio-medical waste.

Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.

Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste

Air quality act 2004, air pollution control act 1981 and water pollution and control act1996.Structure and role of Central and state pollution control board.

Concept of Carbon Credit, Carbon Footprint. Environmental management in fabrication industry.

ISO14000: Implementation in industries, Benefits.

References:

(a)   Suggested Learning Resources:

Books:

1.   S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi

2.   C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.

3.   Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and

4.   Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-

5. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000,ISBN 10: 0471144940.

6. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi

7. Rao, C. S., Environmental Pollution Control and Engineering, New Age International Publication, 2007, ISBN: 81-224-1835-X.

8. Rao, M. N.Rao, H.V.N, Air Pollution, Tata Mc-Graw Hill Publication, New delhi, 1988, ISBN: 0-07-451871-8.

9. Frank Kreith, Jan F Kreider, Principles of Solar Engineering, McGraw-Hill, New York ; 1978,ISBN: 9780070354760.

10. Aldo Vieira, Da Rosa, Fundamentals of renewable energy processes, Academic Press Oxford, UK; 2013. ISBN: 9780123978257.

11. Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN:978-81-7993-502-6

12. Metcalf & Eddy, Waste Water Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.

13. Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi (Edition 2018)

(b) **Open source software and website address:**

1) www.eco-prayer.org

2) www.teriin.org

3) www.cpcp.nic.in

4) www.cpcp.gov.in

5) www.indiaenvironmentportal.org.in

6) www.whatis.techtarget.com

7) www.sustainabledevelopment.un.org

8) www.conserve-energy-future.com)

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 thestudents for self-learning and assess the development of competency through classroom presen-tations.

- 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 aroundthe institution.

Course outcomes

At the end of the course student will be able to

1. Understand the ecosystem and terminology and solve various engineering problems ap-plying ecosystem knowledge to produce eco – friendly products.

2. Understand the suitable air, extent of noise pollution, and control measures and acts.

3. Understand the water and soil pollution, and control measures and acts.

4. Understand different renewable energy resources and efficient process of harvesting.

5. Understand solid Waste Management, ISO 14000 & Environmental Management.

<div align="center">*******</div>

Course Title	:	Sports and Yoga
Number of Credits	:	1(L:0,P:2)
Prerequisites	:	NIL

Course Objectives:
- To make the students understand the importance of sound health and fitness principles as they relate to better health.

- To expose the students to a variety of physical and yogic activities aimed at stimulatingtheir continued inquiry about Yoga, physical education, health and fitness.

- To create a safe, progressive, methodical and efficient activity based plan to enhance im-provement and minimize risk of injury.

- To develop among students an appreciation of physical activity as a lifetime pursuit anda means to better health.

Course Content:
- **Introduction to Physical Education**

  o Meaning & definition of Physical Education

  o Aims & Objectives of Physical Education

  o Changing trends in Physical Education

- **Olympic Movement**

  o Ancient & Modern Olympics (Summer & Winter)

  o Olympic Symbols, Ideals, Objectives & Values

  o Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)

- **Physical Fitness, Wellness & Lifestyle**

  o Meaning & Importance of Physical Fitness & Wellness

  o Components of Physical fitness

- Components of Health related fitness
- Components of wellness
- Preventing Health Threats through Lifestyle Change
- Concept of Positive Lifestyle

- **Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**

  - Define Anatomy, Physiology & Its Importance
  - Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respi-ratory System, Neuro-Muscular System etc.)

- **Kinesiology, Biomechanics & Sports**

  - Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports
  - Newton's Law of Motion & its application in sports.
  - Friction and its effects in Sports.

- **Postures**

  - Meaning and Concept of Postures.
  - Causes of Bad Posture.
  - Advantages & disadvantages of weight training.
  - Concept & advantages of Correct Posture.
  - Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Ky-phosis, Bow Legs and Scoliosis.
  - Corrective Measures for Postural Deformities

- **Yoga**

  - Meaning & Importance of Yoga
  - Elements of Yoga
  - Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas
  - Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Sha-shankasana)

- o Relaxation Techniques for improving concentration - Yog-nidra

- **Yoga & Lifestyle**

  - o Asanas as preventive measures.

  - o Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana,Sharasana.

  - o Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.

  - o Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.

  - o Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana.

  - o Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

- **Training and Planning in Sports**

  - o Meaning of Training

  - o Warming up and limbering down

  - o Skill, Technique & Style

  - o Meaning and Objectives of Planning.

  - o Tournament – Knock-Out, League/Round Robin & Combination.

- **Psychology & Sports**

  - o Definition & Importance of Psychology in Physical Edu. & Sports

  - o Define & Differentiate Between Growth & Development

  - o Adolescent Problems & Their Management

  - o Emotion: Concept, Type & Controlling of emotions

  - o Meaning, Concept & Types of Aggressions in Sports.

  - o Psychological benefits of exercise.

  - o Anxiety & Fear and its effects on Sports Performance.

  - o Motivation, its type & techniques.

- Understanding Stress & Coping Strategies.
- Doping
    - Meaning and Concept of Doping
    - Prohibited Substances & Methods
    - Side Effects of Prohibited Substances

- **Sports Medicine**
    - First Aid – Definition, Aims & Objectives.
    - Sports injuries: Classification, Causes & Prevention.
    - Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries

- **Sports / Games**

    Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Vol-leyball, Yoga etc.

    - History of the Game/Sport.
    - Latest General Rules of the Game/Sport.
    - Specifications of Play Fields and Related Sports Equipment.
    - Important Tournaments and Venues.
    - Sports Personalities.
    - Proper Sports Gear and its Importance.

References:
1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

Course Outcomes:

On successful completion of the course the students will be able to:

(i) Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, andrelaxation.

(ii) Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.

(iii) Learn breathing exercises and healthy fitness activities

(iv) Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.

(v) Perform yoga movements in various combination and forms.

(vi) Assess current personal fitness levels.

(vii) Identify opportunities for participation in yoga and sports activities.

(viii) Develop understanding of health-related fitness components: cardiorespiratory endur-ance, flexibility and body composition etc.

(ix) Improve personal fitness through participation in sports and yogic activities.

(x) Develop understanding of psychological problems associated with the age and lifestyle.

(xi) Demonstrate an understanding of sound nutritional practices as related to health andphysical performance.

(xii) Assess yoga activities in terms of fitness value.

(xiii) Identify and apply injury prevention principles related to yoga and physical fitness activ-ities.

(xiv) Understand and correctly apply biomechanical and physiological principles elated to ex-ercise and training.

Course Title	:	Applied Physics-I Labs
Number of Credits	:	2 (L: 0, P: 4)
Prerequisites	:	NIL

Course Objectives

Study of Applied Physics aims to give an understanding of physical world by observations and predic- tions. 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 basicconcepts and principles in solving engineering and technology based problems. In addition, studentsget necessary confidence in handling equipment and thus learn various skills in measurement.

List of Practical's/Activities (To perform minimum 10 practical's).

1. To measure length, radius of a given cylinder, a test tube and a beaker using a Vernier caliper and find volume of each object.

2. To determine diameter of a wire, a solid ball and thickness of cardboard using a screwgauge.

3. To determine radius of curvature of a convex and a concave mirror/surface using a spher-ometer.

4. To verify triangle and parallelogram law of forces.
5. To find the co-efficient of friction between wood and glass using a horizontal board.
6. To determine force constant of a spring using Hook's Law.
7. To verify law of conservation of mechanical energy (PE to KE).
8. To find the moment of inertia of a flywheel.
9. To find the viscosity of a given liquid (Glycerin) by Stoke's law.
10. To find the coefficient of linear expansion of the material of a rod.
11. To determine atmospheric pressure at a place using Fortin's barometer.
12. To measure room temperature and temperature of a hot bath using mercury thermometerand convert it into different scales.

Learning Outcome:

After undergoing this lab work, the student will be able to:

- Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, Spherometeretc.) for determining dimensions of physical quantities and make measurements with accu- racy and precision.
- Differentiate various shapes and determine dimensions of plane, curved and regular surfac-es/bodies.
- Apply and Verify laws of forces and determine resultant force acting on a body.
- Appreciate role of friction and measure co-efficient of friction between different surfaces.
- Describe and verify Hook's law and determine force constant of spring body.
- Identify various forms of energy, energy transformations and verify law of conservation ofenergy.
- Understand rotational motion and determine M.I. of a rotating body (flywheel)
- Understand Stoke's law for viscous liquids and determine viscosity of a given liquid.
- Understand how materials expand on heating and determine linear expansion coefficient for a given material rod.
- Understand working and use Fortin's barometers for determining pressure at a place.
- Understand use of thermometers to measure temperature under different conditions anddifferent scales of temperature measurements.

SUGGESTED STUDENT ACTIVITES & 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 of descriptive in nature should be given tothe students for self-learning and assess the development of competency through classroompresentations.
- Micro-projects may be given to group of students for hand-on experiences.

References:

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.,
3. Practical Physics by C. L. Arora, S. Chand Publication.
4. e-books/e-tools/ learning physics software/YouTube videos/websites etc.

Course Title	:	Introduction to IT Systems Lab
Number of Credits	:	2 (L: 0,P: 4)
Prerequisites (Course code)	:	NIL, should be doing ES102 in parallel
Course Category	:	ES

Course Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Introduction of IT Sys- tems' and become proficient in using computing environment - basic computer skills, basic applica-tion software tools, Computer Hardware, cyber security features, etc.

Course Content:

S.No.	Topics for Practice
1	Browser features, browsing, using various search engines, writing search queries
2	Visit various e-governance/Digital India portals, understand their features, services of-fered
3	Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognise various ports/interfaces and related cables, etc.

4	Install Linux and Windows operating system on identified lab machines, explore various options, do it multiple times

5	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6	Practice HTML commands, try them with various values, make your own Webpage
7	Explore features of Open Office tools, create documents using these features, do it multiple times
8	Explore security features of Operating Systems and Tools, try using them and see what happens.

This is a skill course. More you practice, better it will be.

References:
1. Online resources, Linux man pages, Wikipedia.
2. R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.
5. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.
6. PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

Course outcomes:
At the end of the course student will be able to comfortably work on computer, install and configureOS, assemble a PC and connect it to external devices, write documents, create worksheets, prepare presentations, protect information and computers from basic abuses/attacks.

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Course Title	:	Fundamentals of Electrical and Electronics Engineering Lab
Number of Credits	:	2 (L: 0, P: 4)
Prerequisites	:	NIL
Course Category	:	ES

Suggested Practicals/Exercises:
The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessedin the student for the attainment of the competency.

S. No.	Practical Outcomes (PrOs)	Approx. Hrs.

1.	Determine the permeability of magnetic material by plotting its B-H curve.	02*
2.	Measure voltage, current and power in 1-phase circuit with resistive load.	02*
3.	Measure voltage, current and power in R-L series circuit.	02*
4.	Determine the transformation ratio (K) of 1-phase transformer.	02
5.	Connect single phase transformer and measure input and output quantities.	02
6.	Make Star and Delta connection in induction motor starters and measure the line and phase values.	02
7.	Identify various passive electronic components in the given circuit	02
8.	Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter.	02
9.	Connect capacitors in series and parallel combination on bread board and measure its value using multimeter.	02*

S. No.	Practical Outcomes (PrOs)	Approx. Hrs.
10.	Identify various active electronic components in the given circuit.	02
11.	Use multimeter to measure the value of given resistor.	02
12.	Use LCR-Q tester to measure the value of given capacitor and inductor.	02
13.	Determine the value of given resistor using digital multimeter to confirm with colour code.	02*
14.	Test the PN-junction diodes using digital multimeter.	02*
15.	Test the performance of PN-junction diode.	02
16.	Test the performance of Zener diode.	02
17.	Test the performance of LED.	02
18.	Identify three terminals of a transistor using digital multimeter.	02
19.	Test the performance of NPN transistor.	02*
20.	Determine the current gain of CE transistor configuration.	02
21.	Test the performance of transistor switch circuit.	02
22.	Test the performance of transistor amplifier circuit.	02
23.	Test Op-Amp as amplifier and Integrator	02
	Total	**46**

References:

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House, 2018
2. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5

3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353

4. Theraja, B. L., Electrical Technology Vol – I, S. Chand publications, New Delhi, 2015, ISBN:9788121924405

5. Theraja, B. L., Electrical Technology Vol – II, S. Chand publications, New Delhi, 2015, ISBN:9788121924375

6. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513

7. Sedha, R.S., A text book of Applied Electronics, S.Chand ,New Delhi, 2008, ISBN-13: 978-8121927833

8. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Eduction, New Delhi,2015,ISBN-13: 0070634244-978

9. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014,ISBN-13-9788121924504

10. Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, New Delhi 2015 ISBN : 9780195425239

Suggested Softwares/Learning Websites:

a. en.wikipedia.org/wiki/Transformer

b. www.animations.physics.unsw.edu.au//jw/AC.html

c. www.alpharubicon.com/altenergy/understandingAC.htm

d. www.electronics-tutorials

e. learn.sparkfun.com/tutorials/transistors

f. www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf

    g. www.technologystudent.com/elec1/transis1.htm

    h. www.learningaboutelectronics.com

    i. www.electrical4u.com

Course Outcomes:

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

1. Understand basic principle and operation of electric circuits and machines.
2. Solve basic problems related to electrical circuits and machines. Explain the operation of different electrical technologies.
3. Demonstrate an understanding of the control systems.
4. Understand the basic circuit elements
5. Understand different types of signal waveforms.
6. Understand logic gates and apply them in various electronic circuits.
7. Understand the basic concepts of op-amps, and their applications.
8. Use relevant electric/electronic protective devices safely.

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Course Title	:	Engineering Mechanics Lab.
Number of Credits	:	1 (L: 0, P: 4)
Prerequisites	:	NIL
Course Category	:	ES

Course Objectives::

Following are the objectives of this course:
1) To obtain resultant of various forces
2) To calculate support reactions through conditions of equilibrium for various structures
3) To understand role of friction in equilibrium problems
4) To know fundamental laws of machines and their applications to various engineering problems

List of Practical to be performed:

1. To study various equipments related to Engineering Mechanics.
2. To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3. To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4. Derive Law of machine using Worm and worm wheel.
5. Derive Law of machine using Single purchase crab.
6. Derive Law of machine using double purchase crab.
7. Derive Law of machine using Weston's differential or wormed geared pulley block.
8. Determine resultant of concurrent force system applying Law of Polygon of forces using forcetable.
9. Determine resultant of concurrent force system graphically.
10. Determine resultant of parallel force system graphically.
11. Verify Lami's theorem.
12. Study forces in various members of Jib crane.
13. Determine support reactions for simply supported beam.
14. Obtain support reactions of beam using graphical method.
15. Determine coefficient of friction for motion on horizontal and inclined plane.
16. Determine centroid of geometrical plane figures.

Suggested Learning Resources:
1. Bedi D.S., Engineering Mechanics, Khanna Publishing House
2. Khurmi, R.S., Applied Mechanics, S.Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S.,S Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.

6. Ram, H. D.; Chauhan, A. K. Foundations and Applications of Applied Mechanics, Cambridge Uni-versity Press.
7. Meriam, J. L., Kraige, L.G. , Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

Course outcomes:

After completing this course, student will be able to
2. Identify the force systems for given conditions by applying the basics of mechanics.
3. Determine unknown force(s) of different engineering systems.
4. Apply the principles of friction in various conditions for useful purposes.
5. Find the centroid and centre of gravity of various components in engineering systems.
6. Select the relevant simple lifting machine(s) for given purposes.

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT- 3	Sheet No. 1/3
Branch	**ALL BRANCHES**	**Semester**	**FIRST**
Course Code		**Course Name**	**PROFESSIONAL DEVELOPMENT -I**

Course Outcome 1	**Student will be able to work as a team member**	Teach Hrs	Marks
Learning Outcome 1	Student will be able to **perform** as a team member in a team for organizing vishvakarma pooja/ cultural programme/ departmental plantation programme/ departmental cleanliness drive/ celebration of jayantis of great leaders and personalities	10	10
Contents	Teams, purpose of forming teams, team working, role of team member, certain skills of good team member		
Method of Assessment	Observation + Rating list Administration		
Learning Outcome 2	Student will be able to **perform** as a team member in team for the publication of departmental newsletter / magazine /other departmental academic events/ functions	10	10
Contents	Teams, purpose of forming teams, team working, role of team member, certain skills of good team member		
Method of Assessment	Observation + Rating list Administration		
Course Outcome 2	**Student will be able to communicate non-verbally in a given problem situation**		
Learning Outcome	Student will be able to **communicate** through face expressions in a given problem situation	10	10

1			
Contents	Communication, nonverbal communication, its importance, communication through face expressions, various types of face expressions for different messages		
Method of Assessment	Observation + Rating list Administration		
Learning Outcome 2	Student will be able to **communicate** through body language/ etiquettes in a given problem situation	10	10
Contents	Nonverbal communication, its importance, communication through body language, various types of body expressions for different messages, antiquates &their importance		
Method of Assessment	Observation + Rating list Administration		

Course Outcome -3	**Student will be able to make decision in a given professional situation**		
Learning Outcome 1	Student will be able to identify the decision to be made in the given case	10	10
Contents	Importance of decisions, need of decision making in professional life, identification of situations which needs decision making, identification of decision to be made		
Method of Assessment	Paper pen test		
Learning Outcome 2	Student will be able to take decision in the given case situation	10	10
Contents	Decision making process, identification of various available alternatives,evaluation of alternatives, selection of best possible alternative		
Method of Assessment	Paper pen test		

<table>
<tr><td rowspan="2">RGPV (Diploma Wing) Bhopal</td><td rowspan="2">Scheme for Learning Outcome</td><td colspan="2">Branch Code</td><td colspan="3">Course Code</td><td>CO Code</td><td>LO Code</td><td rowspan="2">Format No. 4</td></tr>
<tr><td></td><td></td><td>1</td><td>0</td><td>5</td><td>1</td><td>1</td></tr>
</table>

COURSE NAME	**PROFESSIONAL DEVELOPMENT-1**
CO Description	**Student will be able to work as a team member**
LO Description	Student will be able to **perform** as a team member in a team for organizing vishvakarma pooja/ cultural programme/ departmental plantation programme/ departmental cleanliness drive/ celebration of jayantis of great leaders and personalities

SCHEME OF STUDY

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Teams, purpose offorming teams, team working, roleof team member, certain skills of good team member	Traditional Lecture+ StudentActivity	Teacher will explain the terms mentioned in content, demonstrate therole and following skills of team member, arrange guided practice for playing role of team member in a team event, arrange formative assessment and tutorials	05	05	Any suitable skill training book on team working, handout	If necessary teacher mayalso suggest video film orother online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

1	Observation + Rating list Administration	In a team event of small group of student, extentof demonstration of the related skills by the student will be observed and assessed through rating list.	10	Rating List	Internal
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)					

The team skills :-

1. **Encourage other team members for ideas and opinions about team activities**
2. **Active participation in team activities**
3. **Bears responsibility for the tasks assigned to him/her**
4. **Try to perform in best way for the assigned team activity**
5. **Prefer to execute the assigned work than mere discussion on team**

activitiesPerformance indicators:-

1. Respect ideas and opinions of other team members (2 marks)
2. Participate actively in all team activities (2 marks)
3. Sincerely completes tasks assigned to him/ her (2 marks)
4. Shows skills and ability to use available resources to achieve best possible results (2 marks)
5. Try to turn talks into practical solutions and actions with positive impact (2 marks)

Advice: - Form three batchesB1, B2 and B3 of students. Assign teaching -learning of the three COs to three faculties F1, F2 and F3 of the department. Conduction of classes will be as per the following matrix:-

	FIRST 20 PERIODS	SECOND 20 PERIODS	THIRD 20 PERIODS
F1 for CO1 (LO1 &LO2)	B1	B2	B3
F2 for CO2 (LO1 & LO2)	B2	B3	B1

	F3 for CO3 (LO1 & LO2)	B3	B1	B2	

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code		Course Code		CO Code	LO Code	Format No. **4**
				1	*0*	*5*	*1*	*2*	

COURSE NAME	PROFESSIONAL DEVELOPMENT-1
CO Description	**Student will be able to work as a team member**
LO Description	Student will be able to **perform** as a team member in team for the publication of departmental newsletter / magazine /other departmental academic events/ functions

SCHEME OF STUDY

S. No.	Learning Content	Teaching-Learning Method	Method of teaching	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Teams, purpose of forming teams,team working, role of team member, certain skills of good team member	Traditional Lecture +Student Activity	Teacher will recall and if necessary, re-explain the terms mentioned in content, demonstrate the role and following skillsof team member, arrange guided practice for playing role of team memberin a team event, arrange formative assessment and tutorials	03	07	Any suitable skill training book on team working, handout	If necessary teacher mayalso suggest video film orother online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

1	Observation + Rating list Administration	In a team event of small group of student, extentof demonstration of the related skills by the student will be observed and assessed through rating list.	10	Rating List	Internal
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)					

The team skills:-

1. **Contributes in solving team work related problems**

2. **Use his skills and abilities for carrying out team activities**

3. **Participates in team activities with a positive attitude**

4. **Cares for genuine concerns of other team members**

5. **Allows other members to share their views in team and cooperate them in team activities**

Performance indicators:-

1. Offers workable solutions to problems faced by the team (2 marks)

2. Shows skills and ability to be resourceful in a team (2 marks)

3. Active participation in all team activities with a display of winning attitude (2 marks)

4. Questions team's efforts for common benefits of all members (2 marks)

5. Patient listener to other's ideas and opinions (2 marks)

Advice: - Form three batchesB1, B2 and B3 of students. Assign teaching -learning of the three COs to three faculties F1, F2 and F3 of the department. Conduction of classes will be as per the following matrix:-

	FIRST 20 PERIODS	**SECOND 20 PERIODS**	**THIRD 20 PERIODS**
F1 for CO1(LO1 &LO2)	B1	B2	B3
F2 for CO2 (LO1 & LO2)	B2	B3	B1

F3 for CO3 (LO1 & LO2)	B3	B1	B2

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
				1	*0*	*5*	*2*	*1*	

COURSE NAME	PROFESSIONAL DEVELOPMENT-1
CO Description	**Student will be able to communicate non-verbally in a given problem situation**
LO Description	Student will be able to **communicate** through face expressions in a given problem situation

SCHEME OF STUDY

S. No.	Learning Content	Teaching-LearningMethod	Description of T-L process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Communication, nonverbal communication, its importance, communication through face expressions, various types of face expressions for different messages	Traditional lecture + Student Activity	Teacher will explain the terms mentioned in content, demonstratepopular face expressions for messaging, conduct guided practicefor communication through face expression under given conditions, conduct formative assessments and remedial /tutorials	05	05	Any suitable training book on non-verbal communication , handout	If necessary teacher mayalso suggest video film orother online learning resources

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

1	Observation + Rating list Administration	Individual student will be asked to demonstrate at least five communications through appropriate face expressions in given different problem situations, correctness of face expression will be observed and assessed through the rating list.	10	Rating List	Internal
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)					

Performance indicators:-
1. Correctness of first face expression according to given situation (2marks)
2. Correctness of second face expression according to given situation (2marks)
3. Correctness of third face expression according to given situation (2marks)
4. Correctness of fourth face expression according to given situation (2marks)
5. Correctness of fifth face expression according to given situation (2marks)

Advice: - Form three batchesB1, B2 and B3 of students. Assign teaching -learning of the three COs to three faculties F1, F2 and F3 of the department. Conduction of classes will be as per the following matrix:-

	FIRST 20 PERIODS	SECOND 20 PERIODS	THIRD 20 PERIODS
F1 for CO1(LO1 &LO2)	B1	B2	B3
F2 for CO2 (LO1 & LO2)	B2	B3	B1
F3 for CO3 (LO1 & LO2)	B3	B1	B2

RGPV (Diploma Wing) Bhopal		Scheme for Learning Outcome	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
						1	*0*	*5*	*2*	*2*	

COURSE NAME	PROFESSIONAL DEVELOPMENT-1
CO Description	**Student will be able to communicate non-verbally in a given problem situation**
LO Description	Student will be able to **communicate** through body language/ etiquettes in a given problem situation

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SCHEME OF STUDY

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S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Nonverbal communication,its importance, communication through body language, various types of body expressions for different messages, antiquates & their importance	Traditional Lecture +Student Activity	Teacher will explain the termsmentioned in content, Demonstrate popular body expressionsfor messaging and antiquates, conduct guided practice for communication through body expression under given conditions, conduct formative assessment and remedial / tutorials	05	05	Any suitable training book on non-verbal communication, handout	If necessary teacher mayalso suggest video film orother online learning resources

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SCHEME OF ASSESSMENT

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S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Observation + Rating list Administration	Individual student will be asked to demonstrate at least five communications through appropriate body expressions in given different problem situations, correctness of body expression will	10	Rating List	Internal

		be observed and assessed through rating list.			

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Performance indicators:-
1. Correctness of first body expression according to given situation (2marks)

2. Correctness of second body expression according to given situation (2marks)
3. Correctness of third body expression according to given situation (2marks)
4. Correctness of fourth body expression according to given situation (2marks)
5. Correctness of fifth body expression according to given situation (2marks)

Advice: - Form three batchesB1, B2 and B3 of students. Assign teaching -learning of the three COs to three faculties F1, F2 and F3 of the department. Conduction of classes will be as per the following matrix:-

	FIRST 20 PERIODS	SECOND 20 PERIODS	THIRD 20 PERIODS
F1 for CO1(LO1 &LO2)	B1	B2	B3
F2 for CO2 (LO1 & LO2)	B2	B3	B1
F3 for CO3 (LO1 & LO2)	B3	B1	B2

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<tr><td rowspan="2">RGPV (Diploma Wing)
Bhopal</td><td rowspan="2">Scheme for Learning Outcome</td><td colspan="2">Branch Code</td><td colspan="2">Course Code</td><td>CO Code</td><td>LO Code</td><td rowspan="2">Format No. 4</td></tr>
<tr><td></td><td></td><td>1</td><td>0</td><td>5</td><td>3</td><td>1</td></tr>
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COURSE NAME	**PROFESSIONAL DEVELOPMENT-1**
CO Description	**Student will be able to make decision in a given professional situation**
LO Description	Student will be able to identify the decision to be made in the given case

SCHEME OF STUDY

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Importance of decisions, need of decision making inprofessional life, identification of situationswhich needs decision making, identification of decision to be made	Traditional Lecture	Teacher will explain the terms mentioned in content, demonstratethe way to identify the simple situations which needs decision making and identification of decision to be made, guided practice, formative assessment and remedial /tutorials	05	05	Any suitable training book on decision making, handout	If necessary teacher mayalso suggest video film orother online learning material

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	1. Student will be asked to spot the four cases that need decisionmaking within the different eight given simple cases. 2. Student will be asked to identify the decisions to be made in	10	Test paper, Rating Scale	Internal

		given three simple cases			

Decision making - It is process of identifying and evaluating the available alternatives and choosing the most valued alternative.

Performance indicators:-

1. Correct identification of the cases which need decision making (4marks)
2. Correct identification of the decisions to be made in the given cases (6 marks)

Advice: - Form three batchesB1, B2 and B3 of students. Assign teaching -learning of the three COs to three faculties F1, F2 and F3 of the department. Conduction of classes will be as per the following matrix:-

	FIRST 20 PERIODS	SECOND 20 PERIODS	THIRD 20 PERIODS
F1 for CO1(LO1 &LO2)	B1	B2	B3
F2 for CO2 (LO1 & LO2)	B2	B3	B1
F3 for CO3 (LO1 & LO2)	B3	B1	B2

RGPV (Diploma Wing) Bhopal	Scheme for Learning Outcome	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
				1	**0**	**5**	**3**	**2**	

COURSE NAME	PROFESSIONAL DEVELOPMENT-I
CO Description	**Student will be able to make decision in a given professional situation**
LO Description	Student will be able to take decision in the given case situation

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SCHEME OF STUDY

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S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Decision making process, identification of various available alternatives, evaluationof alternatives, selection of best possible alternative	Traditional Lecture	Teacher will explain the terms mentioned in content, demonstrate the way to identify various available alternatives, to evaluate the alternativesand selection of best alternative throughanalyzing simple cases, conduct guided practice, formative assessment and remedial /tutorials	05	05	Any suitable training book on decision making, handout	If necessary teacher mayalso suggest video film orother online learning material

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SCHEME OF ASSESSMENT

</div>

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

1	Paper pen test	1. Student will be asked to spot various alternatives available in the givensimple case. 2. Student will be asked to evaluate the given alternatives in the given simplecase. 3. Student will be asked to select the best alternative from within the given evaluated alternatives in the given simple case	10	Test Paper, Rating scale	Internal
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY **(IF ANY)**					

The logical decision making process:
1. Specify the decision to be taken

2. Identify various available alternatives

3. Evaluate the different alternatives in light of decision to be taken
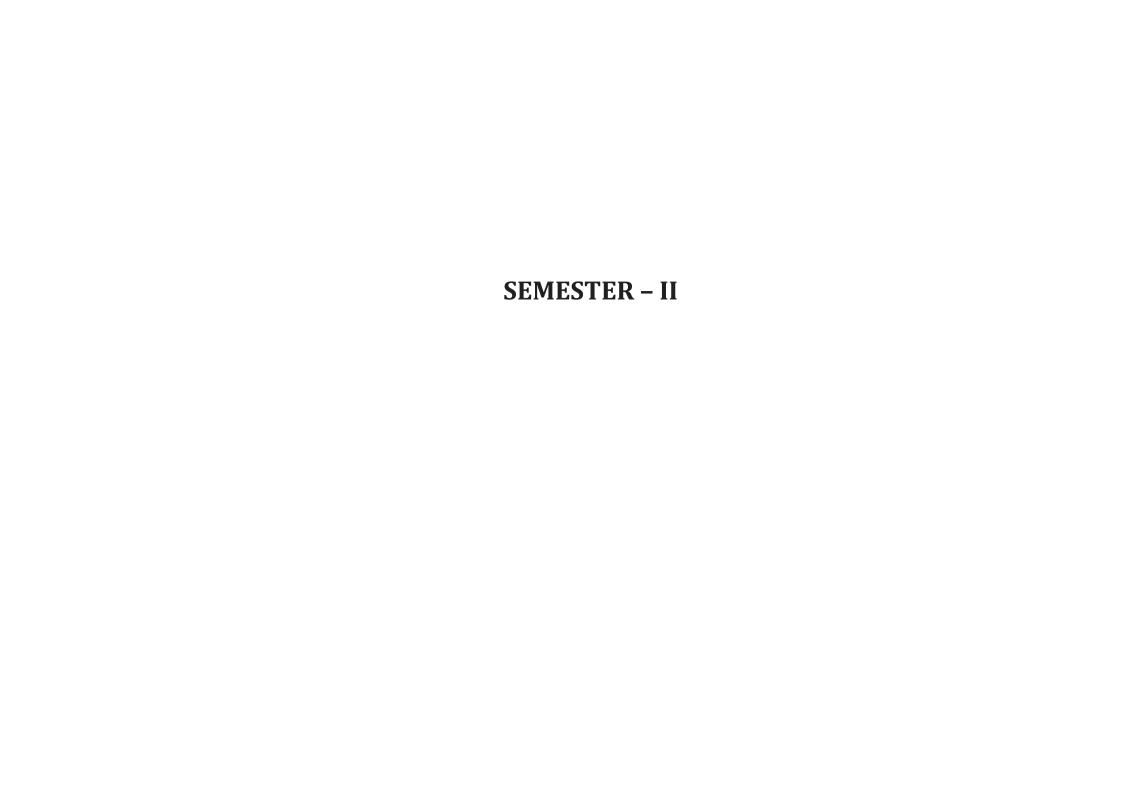
4. Select the most valued alternative as the decision

Performance indicators:-

1. Extent of correct identification of various alternatives available for decision making in the given case (4marks)

2. Extent of correctness of evaluation of alternatives in the given case (4marks)

3. Correctness of selection of best possible alternative from within the given evaluated alternatives in the given case (2 marks)

Advice: - Form three batchesB1, B2 and B3 of students. Assign teaching -learning of the three COs to three faculties F1, F2 and F3 of thedepartment. Conduction of classes will be as per the following matrix:-

	FIRST 20 PERIODS	SECOND 20 PERIODS	THIRD 20 PERIODS
F1 for CO1(LO1 &LO2)	B1	B2	B3
F2 for CO2	B2	B3	B1

	(LO1 & LO2)			
	F3 for CO3 (LO1 & LO2)	B3	B1	B2

SEMESTER – II

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Scheme of Studies & Examinations for the GROUP 'B' SECOND SEMESTER

Implemented from Session: JULY-2022

---: NAME OF THE PROGRAMMES: ---

Cement Tech., Civil, CTM, Electrical,
PRPC, Plastic Tech., Printing Tech., Production Engg., Textile Technology

COURSE TITLE	THEORY COMPONENT								PRACTICAL COMPONENT						PRACTCAL CREDIT	TOTAL CREDIT	GRAND TOTALOF MARKS
	LECTURE Hrs. Per Week	TERM WORK QUIZ, ASSIGN-MENT	MID TERM TESTS (BEST TWO OUT OF THREE)		THEORY PAPER			THEORY CREDIT	PRACTICAL Hrs. Per Week	CONTINUOUS EVALUATION LAB. WORK QUIZ, ASSIGN-MENT	END OF THE TERM / SEMESTER EVALUATION PRACTICAL / ORAL EXAMINATION (VIVA)					
			I	II	NO.	MARKS	DURATION (Hrs)				NO.	MARKS	DURATION (Hrs.)			
Mathematics – II	04	10	10	10	01	70	03	03	--	--	--	--	--	--	04	100
Applied Physics – II	04	10	10	10	01	70	03	04	04	20	01	30	03	02	06	150
Applied Chemistry	04	10	10	10	01	70	03	04	04	20	01	30	03	02	06	150
Communication Skill in English	03	10	10	10	01	70	03	03	02	20	01	30	03	01	04	150
Engineering Graphics	--	--	--	--	--	--	--	--	04	40	01	60	03	02	02	100
Engineering Workshop Practice	--	--	--	--	--	--	--	--	04	40	01	60	03	02	02	100
Professional Development - II	--	--	25	25	--	--	--	--	02	25	--	--	--	01	01	75
Library & Contact Hours	01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	16							14	20					11	25	

Course Title	:	Mathematics - II
Number of Credits	:	4 (L: 4, P: 0)
Prerequisites	:	NIL
Course Category	:	BS

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 partsand by partial fractions (for linear factors only). Use

of formulas   ,   and

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 Ma- trices 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.

Course Title	:	Applied Physics -II
Number of Credits	:	4 (L: 4, P: 0)
Prerequisites	:	High School Level Physics
Course Category	:	BS

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 fieldsof engineering and technology are given prominence in the course content. The course will help the diploma 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 appli-cations on various concepts and principles in each topic so that students are able to under- stand 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, fre- quency 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, timeperiod, 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 – Introduc- tion 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 adjust- ment, magnifying power, resolving power, uses of microscope and telescope, optical projection sys-tems.

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 resis-tance, 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 mag-

netic 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 ex- trinsic 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 semicon- ductor, laser characteristics, engineering and medical applications of lasers.

Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aper-ture, 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, calculatethe 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 conduc-tor 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, com-

puters, 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.

Course Title	:	Applied Chemistry
Number of Credits	:	4 (L: 4, P: 0)
Prerequisites	:	High School Level Chemistry

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 es-sentially 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 prop- erties 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 uncertaintyprinciple, 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), coor- dination bond in NH_4^+, and anomalous properties of NH_3, H_2O due to hydrogen bonding, andmetallic bonding.

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

- **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 measure- ment of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

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

ii). Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, ster- ilization.

Water for human consumption for drinking and cooking purposes from any water sourc- es 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 (ma-
trix), 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 withsuitable 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, pro-ducer gas and biogas.

Lubrication – function and characteristic properties of good lubricant, classification with ex-amples, 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 hardnessof water.

- **Unit 3: Engineering Materials**

    Assignments: Preparation of table showing different ores of iron, copper and aluminiummetals 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 met-

    al, alloys, glasses, cement, refractory and composite materials using knowledge of chemicalbonding.

2. Understand and assess the suitability of water source for domestic and industrial applica-tion, 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-friend-ly 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   (Fueland Combustion)
7 www.chemcollective.org (Metals, Alloys)
8 www.wqa.org(Water Treatment)

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Course Title	:	Communication Skills in English
Number of Credits	:	3(L:3, P:0)
Prerequisites	:	NIL

Course Objectives:

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

To develop confidence in speaking English with correct pronunciation.

To develop communication skills of the students i.e. listening, speaking, reading and writing skills. To introduce the need for personality development-Focus will be on developing certain qualitieswhich will aid students in handling personal and career challenges, leadership skills etc.

Course Content

Unit-1 Communication: Theory and Practice

- Basics of communication: Introduction, meaning and definition, process of communication etc.

- Types of communication: formal and informal, verbal, non-verbal and written Barriers toeffective communication.

- **7** Cs for effective communication (considerate, concrete, concise, clear, complete, correct,courteous).

- Art of Effective communication,

    o Choosing words
    o Voice
    o Modulation
    o Clarity
    o Time
    o Simplification of words

- Technical Communication.

Unit-2 Soft Skills for Professional Excellence

- Introduction: Soft Skills and Hard Skills.
- Importance of soft skills.
- Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligenceand empathy etc.
- Applying soft skills across cultures.
- Case Studies.

Unit-3: Reading Comprehension

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

Section-1

Malgudi Days: R.K. Narayan

The Room on Roof: Ruskin Bond "The Gift of the Magi" by O. Henry

"Uncle Podger Hangs a Picture" Jerome K. Jerome

Section-2

Night of the Scorpion by Nissim Ezekiel,

Stopping by Woods on a Snowy Evening by Robert Frost,Where the Mind is Without Fear by Rabindranath Tagore,Ode to Tomatoes by Pablo Neruda,

Unit-4: Professional Writing

        The art of précis writing, Letters: business and personnel,
        Drafting e-mail, notices, minutes of a meeting etc.
        Filling-up different forms such as banks and on-line forms for placement etc.

Unit-5: Vocabulary and Grammar

        Vocabulary of commonly used words
        Glossary of administrative terms (English and Hindi)One-word substitution, Idioms and phrases etc.
        Parts of speech, active and passive voice, tenses etc., Punctuation

References:

1. J.D.O'Connor. *Better English Pronunciation.* Cambridge: Cambridge University Press, 1980.

2. Lindley Murray. *An English Grammar: Comprehending Principles and Rules.* London: Wilsonand Sons, 1908.

3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Re-vised Edition 2018)

4. Margaret M. Maison. *Examine your English.* Orient Longman: New Delhi, 1964.

5. M. Ashraf Rizvi. *Effective Technical Communication*. Mc-Graw Hill: Delhi, 2002.

6. John Nielson. *Effective Communication Skills.* Xlibris, 2008.

7. *Oxford Dictionary*

8. *Roget's Thesaurus of English Words and Phrases*

9. *Collin's English Dictionary*

Course outcomes:

At the end of this course, the participants will:

- Develop basic speaking and writing skills including proper usage of language and vocabulary so
  that they can become highly confident and skilled speakers and writers.

- Be informed of the latest trends in basic verbal activities such as presentations, facing interviewsand other forms of oral communication.

- Also develop skills of group presentation and communication in team.

- Develop non-verbal communication such as proper use of body language and gestures.

Course Title	:	Engineering Graphics
Number of Credits	:	02 (L: 0, P: 4)
Prerequisites	:	NIL

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, andget 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 engineeringcurves, 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; EngineeringScales such as plain and diagonal scale.

Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel andcoordinate 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, wash-er, 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, sta-tus 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 coordi-nates.

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

Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diame-ter, 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 Pri-vate Limited-New Delhi (2010); ISBN: 978-8120337831.

8. Jeyapoovan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD*. Vikas PublishingHousePvt. 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 Indi-an Standards of engineering drawing

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

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

Course Title	:	Engineering Workshop Practice
Number of Credits	:	02 (L: 0, , P: 4)
Prerequisites	:	NIL

Course Objectives:

- To understand basic engineering processes for manufacturing and assembly.
- To understand, identify, select and use various marking, measuring, and holding, striking andcutting 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 practic-es

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:

2. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi,2015
3. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
4. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
5. 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

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Course Title	:	Applied Physics II Lab
Number of Credits	:	2 (L: 0, P: 4)

Prerequisites	:	NIL
Course Category	:	BS

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 firsthand manipulation of apparatus. This will develop scientific temper and help to apply the basic con- cepts 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:

2. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi

3. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
4. Practical Physics by C. L. Arora, S. Chand & Company Ltd.
5. e-books/e-tools/ learning physics software/you Tube videos/ websites etc.

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Course Title	:	Applied Chemistry Lab
Number of Credits	:	2 (L: 0, P: 4)
Prerequisites	:	NIL

Course Objectives:

There are numerous number of materials used in fabricating and manufacturing devices for the com- fort of life. The selection, characterization and suitability assessment of natural raw materials es- sentially 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.

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:

2. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.

3. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II,NITTTR, Chandigarh, Publications, 2013-14.

4. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

5. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

Course Title	:	Communication Skills in English - Lab
Number of Credits	:	1 (L: 0, P: 2)
Prerequisites	:	NIL

Course Objectives:

Communication skills play an important role in career development. This lab course aims at activelyinvolving 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 skills with a focus on correct pronunciation and fluency.

3. To introduce the need for Personality development- Focus will be on developing certain qual-ities which will aid students in handling personal and career challenges, leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content:

Unit 1 Listening Skills

Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches,listening tests.

Unit II Introduction to Phonetics

Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable divi-sion, word stress, intonation, voice etc.

Unit III Speaking Skills

Standard and formal speech: Group discussion, oral presentations, public speaking, business presen-tations etc. Conversation practice and role playing, mock interviews etc.

Unit IV Building vocabulary

Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to en- hance self-expression and vocabulary of participants.

Recommended Readings:
1. Daniel Jones. *The Pronunciation of English.* Cambridge: Cambridge University Press, 1956.

2. James Hartman& et al. Ed. *English Pronouncing Dictionary.* Cambridge: Cambridge University

   Press, 2006.

3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed. 2018)

4. J.D.O'Connor. *Better English Pronunciation.* Cambridge: Cambridge University Press, 1980.

5. Lindley Murray. *An English Grammar: Comprehending Principles and Rules.* London: Wilson and Sons, 1908.

6. Margaret M. Maison. *Examine your English.* Orient Longman: New Delhi, 1964.

7. J.Sethi & et al. *A Practice Course in English Pronunciation*. New Delhi: Prentice Hall, 2004.

8. Pfeiffer, William Sanborn and T.V.S Padmaja. *Technical Communication: A Practical Approach*.6th ed. Delhi: Pearson, 2007.

Learning Outcome:
- At the end of this course the students will be able to communicate effectively with an increase in their confidence to read, write and speak English fluently.

- They will also demonstrate a significant increase in word power.

- The variety of exercises and activities that will be conducted in the Language Lab will devel-op their skills needed to participate in a conversation like listening carefully and respectfullyto others' viewpoints; articulating their own ideas and questions clearly and over all studentswill be able to prepare, organize, and deliver an engaging oral presentation.

- They will also develop non-verbal communication such as proper use of body language and gestures.

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	0	2	**2**	**0**	**5**	**1**	**1**	

COURSE NAME	Professional Development-II
CO Description	**Student will be able to keep his/her body and mind fit through performing different useful physical exercises and meditation.**
LO Description	**Student will be able to keep his/her body fit through performing different useful physical exercises**

<div align="center">SCHEME OF STUDY</div>

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Need for fitness of body, need for daily physical exercise, traditional physicalexercises, modern physical exercises, pre-requisites andprecautions related to different exercises, durationand frequency of different exercises, conditions	Teacher/Expert* demonstration + student activity	Teacher/Expert* will demonstrate different traditional/ modern exercisesfor the students. Teacher/ Expert* will guide and supervise every student's exercise, students will practicedifferent exercises under	05	05	Handout, video film@	@Teacher/expert will suggest a suitable online video to be viewedby students

	forprohibition of exercises		direction and supervision ofteacher/ expert				

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student Activity	Student will be asked to demonstrate thegiven physical exercise and his/her knowledge related to the given exercise	10	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY
(IF ANY)

*College/department may hire local external experts/ facilities, if, trained teachers /PTIs / Physical Education Teachers/ Assistant directors

(Physical Education) /related facilities are not available in the college.

1. **Traditional physical exercises: -** Surya-namskar, Pranayam, different Yogic postures and Asanas etc.

2. **Modern physical exercises: -** Warm-up & stretch, Workouts, different body exercises, brisk walking, cycling, pushups, rope jumping etc.

3. In course of Professional Development-II, department may assign teaching learning of each of three course outcomes to each of three teachers and may also divide students into three batches B1, B2, B3. Simultaneously three student batch will work under all the three teachers for all the three course outcomes and then the batches will work for next course outcomes under remaining two teachers as per following arrangement:

	T1/E	T2	T3
	CO1	CO2	CO3
FIRST 20 PERIODS	B1	B2	B3
SECOND 20 PERIODS	B2	B3	B1
THIRD 20 PERIODS	B3	B2	B1

4. Separate groups for boys and girls may be also formed.

5. Assessment Criteria:-

S. No	Criteria	To a less extent	To some extent	To a greater extent
1	Extent of proper sequence of steps and appropriateness of steps	1	2	4
2	Extent of coordination between body movement and breathing	0	1	2
3	Correctness of description of related precautions and pre-requisite & prohibitive conditions related to given exercise	1	2	4

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		M	0	2	**2**	**0**	**5**	**1**	**2**

COURSE NAME	Professional Development-II
CO Description	**Student will be able to keep his/her body and mind fit through performing different useful physical exercises and meditation.**
LO Description	**Student will be able to keep his/her mind healthy and fit through performing mindfulness and meditation**

<div align="center">

SCHEME OF STUDY

</div>

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Healthy mind, negative characteristics of mind such as negative self-worth, anxiety, depression, worry-ness, judgmental thoughts towards others, lack of inherent happiness. Methods to reduce them, Need and benefits of mindfulness and meditation, practice of methods of mindfulness and meditation	Teacher/Expert* demonstration + student activity	Teacher/Expert* will demonstrate technique (s) to the students. Students will practice technique (s) and teacher/ expert* will guide and supervise every student's practice	05	05	Handout, video film@	@Teacher/Expert will suggest a suitable online video to be viewed by students

<div align="center">

SCHEME OF ASSESSMENT

</div>

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	A test will be conducted to assess the student	15	Test paper and marking scheme	Internal

<div align="center">

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

</div>

*College/Department may hire local external experts if, trained teachers are not available in the college.

1. **Techniques of mindfulness / meditation:-** Heartfulness (SRCM), Sudarshan kriya (Art of Living), Rajyoga (Bramhkumaris), Kriya-yog(Yogananda), Sahajyog (Kundalini awakening), Hsan (Sufi), Muraqabah (Islamic), Vipasyana (Buddhist), Sumiran-dhyan (Radhasoami) etc.

2. In course of Professional Development-II, department may assign teaching learning of each of three course outcomes to each of three teachers

   and may also divide students into three batches B1, B2, B3. Simultaneously three student batch will work under all the three teachers for

	T1/E	T2	T3
	CO1	CO2	CO3
FIRST 20 PERIODS	B1	B2	B3
SECOND 20 PERIODS	B2	B3	B1
THIRD 20 PERIODS	B3	B2	B1

3. Separate groups for boys and girls may be also

ASSESSMENT TEST PAPER (Time 15 Mins)

	statements	Rarely	Occasionally	Most of the time	Almost
		A	B	C	D
1	I am good at finding the words to describe my feelings				
2	I pay attention to sounds such as clocks ticking, birds chirping or cars passing				
3	When I am working on something, part of my mind is occupied with other topics, such as what I willdo later or things I had rather be doing*				
4	I tell myself that I should not be feeling the way I am feeling*				
5	It is hard for me to find words to describe what I am thinking*				
6	When I do things my mind wanders off and I am easily distracted*				

7	I make judgments whether my thoughts are good or bad*				
8	I tend to do several things at ones rather than focusing on one thing at a time*				
9	My natural tendency to put my experience into words				
10	Slow down or speeding up of my breathing does not affect my mind*				
11	I pay attention to sensations such as wind in my hair or sun on my face				
12	I can easily put my opinions and expectations in to words				
13	I notice the smells and aromas of things				
14	I can complete the given tasks with greater attention and accuracy				
15	When I am doing something, I am only focused on what I am doing, nothing else				

MARKING SCHEME:-

Non-starred Statements: A 1   B 2   C 3   D 4

Starred Statements: A 4   B 3   C 2   D 1

Final Marks = Sum of all statement marks / 4   (decimal fraction rounded off to next number)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	0	2	**2**	**0**	**5**	**2**	**1**	

COURSE NAME	Professional Development-II
CO Description	Student will be able to prepare quality charts and posters on the given technical / professional / community welfare/ morality / ethics related themes
LO Description	Student will be able to prepare quality charts on the given technical / professional / community welfare/ morality / ethics related themes

SCHEME OF STUDY

S. No	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Need and importance of charts,types of charts, different components of a chart, basic principles of chart preparation, general procedure of chart preparation, practice of chart preparation on different giventhemes	Traditional lecture method + student activity	Teacher will explain contents with help of examples and cases; teacherwill guide students in preparation ofdifferent types of charts, supervise their progress, indentify their weaknesses and correct/improve them. Students will practice underguidance of teacher	05	05	Handout, softcopy album of sample exemplary charts, online material/vide ofilm*	*Teacher/exper twill suggest a suitable online material/ video to be viewed by students

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student Assignment	Student will be asked to prepare an appropriate chart on the given theme along with information/data provided bythe teacher	10	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)
A. **Purpose of charts:** - To more effectively present the data or statistics with the help of visual effects. B. **Types of charts:-**

1. **Bar Charts** for presentation of numerical frequency data
2. **Line Charts** demonstration of changes in value over a set of specific periods
3. **Pie Charts** to show pieces of a whole
4. **Radar or spider Charts** visual comparison of different things in a similar category
5. **Pictograms** use of icons or graphics in place of numbers to increase visual attention and better memorization
6. **Flow charts** to guide viewers through processes and steps
7. **Comparison Charts** to visually compare two or more things
8. **Hierarchy Charts** to show how things flow from top to bottom
9. **Venn Diagrams** to compare and contrast different concepts and ideas

C. Different components of chart

1. **Chart area**: This is the area where the chart is inserted.

2. **Data series**: This comprises of the various series which are present in a chart i.e., the row and column of numbers present.

3. **Axes:** There are two axes present in a chart. They are the x- axis and y- axis.

4. **Plot area:** The main area of the chart is the plot area.

5. **Grid lines:** They provide reference for the chart

D. Chart developing procedure

1. **Know your aim of developing the chart**

2. **Know your audiences**

3. **Organize the information to be presented**

4. **Analyze information for best way to present it visually**

5. **Choosing customized template available on Microsoft PowerPoint**

6. **Integrate information within template**

7. **Add visually appealing effects**

8. **Get feedback of peers /teacher on the chart**

9. **Correct / improve the chart**

E. Basic principles for chart preparation

1. Put your conclusion on the title.

2. Highlight your inference.

3. Use images to make your message more memorable.

4. Use visual representation of numbers.

5. Present information in stages.

6. Stick to flat design over 3Ddesign

7. Use a legend only when necessary

8. Turn grid view off

9. Use contrasting colors for each data series

10. Use one font but two weighs

11. Play with chart sizes

12. Try to add animation and interactivity

F. In course of Professional Development-II, department may assign teaching learning of each of three course outcomes to each of three teachers and may also divide students into three batches B1, B2, B3. Simultaneously three student batch will work under all the three teachers for all the three course outcomes and then the batches will work for next course outcomes under remaining two teachers as per following arrangement:

	T1	T2	T3
	CO1	CO2	CO3
FIRST 20 PERIODS	B1	B2	B3
SECOND 20 PERIODS	B2	B3	B1
THIRD 20 PERIODS	B3	B2	B1

G. For assignment, teacher will provide one theme along with necessary data or information to each student. Student will prepare an appropriate chartand will submit it to the teacher. The teacher will assess the chart with following rating scale.

Assessment Rating Scale for the Student Assignment

S. No.	Criteria	Less 0	Average 1	Adequate 2
1	Appropriateness of title			
2	Extent and appropriateness of labeling			
3	Extent of expression of trends/differences/ peculiarities of data			
4	Extent and appropriateness of visually appealing effects			
5	Appropriateness of colors, shades, images and visual icons			

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
			M	0	2	2	0	5	2	2	

COURSE NAME	Professional Development-II
CO Description	Student will be able to prepare quality charts and posters on the given technical / professional / community welfare/ morality / ethics related themes
LO Description	Student will be able to prepare quality posters on the given technical / professional / community welfare/ morality / ethics related themes

SCHEME OF STUDY

S. No	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Need and importance of posters, types of posters, different components of a poster, basic principles of poster preparation, generalprocedure of poster preparation, practice of poster preparation on different given themes	Traditional lecturemethod + studentactivity	Teacher will explain contents with help of examples and cases;teacher will guide students in preparation of different types of poster, supervise their progress, indentify their weaknesses and correct/improve them. Students will practice under guidance ofteacher	05	05	Handout, softcopy albumof sample exemplary posters, online material/video film*	*Teacher/expert will suggest a suitable online material/ video tobe viewed by students

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

1	Student Assignment	Student will be asked to prepare an appropriate poster on the given themealong with information provided by the teacher	15	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY
(IF ANY)

A. Purpose of poster: - A poster is a visual representation of information that has been organized and consolidated into an easily-digestible format. A

good poster should be able to be understood in a few minutes, so it's of the utmost importance to make sure that the poster should be logical,

consistent, and designed well.

B. Types of posters:-

1. Infomercial Posters
2. Formative Posters
3. Show Posters
4. Political Ad Posters
5. Fashion Posters
6. Corporate Posters
7. Campaign Posters
8. Subject Posters
9. Knowledge dissemination Posters

C. Poster developing procedure

1. **Know your aim of developing the poster**

2. **Know your audiences**

3. **Edit and organize the information to be presented**

4. **Analyze information for best way to present it visually**

5. **Decide the size of the poster**

6. **Visualize the layout of the poster and make a thumbnail sketch**

7. **Choosing customized template if available on Microsoft PowerPoint/Google slides/ Inkscape/ Photoshop / Gimp**

8. **Integrate information within template**

9. **Add visually appealing effects such as colors, shades, graphics, icons, cartoons, other visual images**

10. **Get feedback of peers /teacher on the poster**

11. **Correct / improve the poster**

12. **Print the poster**

D. Basic principles for poster preparation

- Important information should be readable from about at least 10 feet away
- Title should be short and should create interest
- Text should be clear and to the point
- Effective use of graphics, color and fonts
- Consistent and clean layout

E. In course of Professional Development-II, department may assign teaching learning of each of three course outcomes to each of three teachers and may also divide students into three batches B1, B2, B3. Simultaneously three student batch will work under all the three teachers for all the three course outcomes and then the batches will work for next course outcomes under remaining two teachers as per following arrangement:

	T1	T2	T3
	CO1	CO2	CO3
FIRST 20 PERIODS	B1	B2	B3
SECOND 20 PERIODS	B2	B3	B1
THIRD 20 PERIODS	B3	B2	B1

F. For assignment, teacher will provide one theme along with necessary data or information to each student. Student will prepare an appropriate chartand will submit it to the teacher. The teacher will assess the chart with following rating scale.

Assessment Rating Scale for the Student Assignment

S. No.	Criteria	Less 0	Average 1	Adequate 2
1	Extent of convey of message			
2	Extent of appropriateness of size and layout chosen			
3	Appropriateness of tile and background			

	4	Use of numbers, colors, graphics (diagrams, drawings and photographs)				
	5	Section header impact and sequence of content				
	6	Quality of printing				

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		M	0	2	**2**	**0**	**5** **3**	**1**	

COURSE NAME	**Professional Development-II**
CO Description	**Student will be able to demonstrate social skills while working in groups**
LO Description	**Student will be able to demonstrate his social perceptiveness while working in student group**

SCHEME OF STUDY

S. No.	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Need and importance of social skills, social skills forbetter group performance,important social skills suchas social perceptiveness, coordination, negotiation, persuasion etc. social perceptiveness , its importance, indicators of social perceptiveness,	Traditional lecture method + student activity	Teacher will explain the contents, through cases and examples; teacherwill explain the benefits of social perceptiveness in group work. Teacher will form small groups of students to complete given group tasks , supervise and guide memberstudents in their learning of social perceptiveness through their group activity	04	06	Handout, video film*	*Teacher will suggest a suitable online material or video to be viewedby students

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group activity	Different student groups will be formed and group taskswill be assign to them, the teacher will assess the extentof coordination demonstrated by every student	10	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)
1. Social perceptiveness: - Social perceptiveness refers to a person's ability to tune into the feelings of the people around him/her. It involves unspokencommunication, picking up on body language cues, and discerning the motivation behind particular behaviors. It also refers to the capacity to be

aware of the needs, goals, and feelings of other members in group environment. Group members high in social perceptiveness are able to perceive accurately the interpersonal situation in groups and determine the requirements in terms of interpersonal aspects within the group. They are aware of group environment and of the intentions and sensitivities of other members.

2. During teaching learning, the student group size should be 4 to 5 and duration of the group task may be between 1 to 2 Hrs.

3. During Assessment, the student group size should be 4 to 5 and duration of the task should be 30 to 45 minutes.

4. **Assessment Rating scale for student's social perceptibility:-**

S. No.	Criteria	To a lesser extent	To some extent	To a great extent
		0	1	2
1	**Show sensitivity and understand other's perspectives**			
2	**Try to understand point of view of others**			
3	**Try to respect the other group member despite of disagreements and difference of opinions**			
4	**Show concerns for others' need**			

5. In course of Professional Development-II, department may assign teaching learning of each of three course outcomes to each of three teachers and may also divide students into three batches B1, B2, B3. Simultaneously three student batch will work under all the three teachers for all the three course outcomes and then the batches will work for next course outcomes under remaining two teachers as per following arrangement:

	T1	T2	T3
	CO1	CO2	CO3
FIRST 20 PERIODS	B1	B2	B3
SECOND 20 PERIODS	B2	B3	B1
THIRD 20 PERIODS	B3	B2	B1

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		M	0	2	**2**	**0**	**5**	**3**	**2**	

COURSE NAME	**Professional Development-II**
CO Description	**Student will be able to demonstrate social skills while working in groups**
LO Description	**Student will be able to demonstrate his ability to coordinate while working in a student group**

SCHEME OF STUDY

S. No	Learning Content	Teaching-Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Important social skills such as social perceptiveness, coordination, negotiation, persuasionetc. Coordination, its importance in group work, key elements of coordination, indicators of coordination	Traditional lecture method + student activity	Teacher will teach contents and will discuss examples and cases of group work with different extents coordination, will explain the behavior of individual having high coordination ability, will form small groups of students and assign them group tasks, will supervise these groups for internal coordination and guide them to improve their group coordination, will also supervise and guide individual members for improving their coordination.	04	06	Handout ,video film*	*Teacher willsuggest a suitable online material or video to be viewed by students

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Student group activity	Different student groups will be formed and group tasks willbe assign to them, the teacher will assess the extent of coordination demonstrated by every student	15	Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY

(IF ANY)
A. Coordination: - Coordination represents a group´s ability to act together by predicting or knowing the needs of the task as well as of their group- mates and the consequent actions to fulfill these needs. It is an orderly arrangement of group efforts to maintain harmony among individual efforts

towards the accomplishment of common goals of a group work. Coordination synchronizes the efforts of different members in a group. Coordinationensures unity of different actions in the group because all individual actions are interrelated and inter-dependent to each other.

B. Key elements of coordination:-

1. **Integration** of interests and efforts of all individuals
2. **Balancing** –mutual support to various activities of individuals to achieve individual 's goals
3. **Timing -** adjusting timings of different activities so that individuals can support one another to deliver final result in time

C. Types of coordination:-

1. **Internal coordination** It is coordination within the group
2. **External coordination** it is coordination with persons and agencies outside the group

D. Indicators of coordination among group members:-

1. Members take interest in the overall performance of the group
2. They try to know the problems and issues being faced by the group
3. They try to contribute in solving group's problems and issues
4. They take interests in work of other group members
5. They try to know their work progresses as well as problems and issues being faced by them
6. They try to contribute in solving other group members' work related problems and issues
7. They try to align self work with interrelated works of other group members

E. Assessment of student's demonstration of coordination in group work:-

Students will be divided into small groups (4-5). Each group will be assigned a group task of approx. 1 Hr. Students will work on given group task. Teacher

will observe behaviors and actions of each student member and assess his/her extent of co-ordination using following rating scale.

E. Assessment Rating scale for student's demonstration of coordination:-

S. No.	Criteria	To a lesser extent	To some extent	To a great extent
		0	1	2
1	Take interest in the overall performance of the group			
2	Try to know the problems and issues being faced by the group			
3	Try to contribute in solving group's problems and issues			
4	Take interests in work of other group members			
5	Try to know their work progresses as well as problems and issues beingfaced by them			
6	Try to contribute in solving other group members' work related problems			

F. In course of Professional Development-II, department may assign teaching-learning of each of three course outcomes to each of three teachers and may also divide students into three batches B1, B2, B3. Simultaneously three student batch will work under all the three teachers for all the three course outcomes and then the batches will work for next course outcomes under remaining two teachers as per following arrangement:

	T1	T2	T3
	CO1	CO2	CO3
FIRST 20 PERIODS	B1	B2	B3
SECOND 20 PERIODS	B2	B3	B1
THIRD 20 PERIODS	B3	B2	B1