"PVC" NSSK Govt. Polytechnic Bilaspur at Kalol

Lesson Planning (Theory)

Semester - 2nd

Session:Jan-June, 2026

Branch: Mech. Engg.

Subject: Mathematics-II

Teacher: Dr. Shabnam Sharma

S. No.	Period No.	Topic	Detail of Contents	Instruction Reference	Additional Study Recommended	Remarks
1	1-6	Algebra	(1.1) Determinants : Definition, Value of Det. Of order 1*2, Minors, Co- factors and De-Laplace's Expansion, Problems related to these. Properties of determinants up to 3rd order, applications of det. In solving a system of linear equations by Crammers, Rule, Consistency of	Applied Mathematics Eagle Prakashan	Elementary Engineering Mathematics by BS Grewal	
2	7-15	Algebra	(1.2) Matrix: Definition, Type of matrix, Algebra of matrices, Adjoint of a Matrix, properties of adjoints, Inverse of a matrix, Properties of inverse,Matrix inversion, method to solve a system of linear equations in 3 variables		Engineering mathematics by Reena Garg	
3	16-24	Indefinite Integration	(2.1) Integration by Decomposition of the Integrand: Definition, Fundamental Integrals, theorems and problems.			
4	25-30	Indefinite Integration	(2.2) Integration by Substitution : Method of substitution some standard integrals, and its reducible form, Some special methods of integrating trigonometric functions			
5	31-40	Indefinite Integration	(2.3) Integration By Parts and Partial Fraction: Integration by parts, reducible form, integration by partial fractions(linear factors only)			
6	41-45	Definite Integration	(2.4) Definite Integrals : Definite Integrals, Standard Formulae . Area under the curve, Volume enclosed by rectilinear fig when revolve about axis			
7	46-50	Co-ordinate Geometry	(3.1) Straight Lines:Equations of straight line in various standard forms (without proof), Intersection of two straight lines, angle between two lines, Parallel and perpendicular lines, perpendicular distance formula			
8		Co-ordinate Geometry	(3.2) Circles: General equation of a circle and its characteristics. To find the equation of a circle, given: * Centre and radius* Three points lying on it * Coordinates of end points of a diameter			
9	51-60	Co-ordinate Geometry	(3.3) Conics : (Parabola, Ellipse, Hyperbola) Their standard Equations without proof. Problems on conics when their foci, directrices and vertices are given.			
10	61-75	Differential Equations	(4.1) Differential Equations: Solution of first order and first degree differential equation by variable separation method			

APPROVED

HOD/DC

Signature of Teacher

LESSON PLAN

Name of Teacher :- Subject: Environmental Science Class: 2nd Semester Mechanical & Electrical Engg.

S.N.	Month	Week	Name of Chapter	Contents to be taught	Remarks
1	January	4th week		Introduction of environment	
2	February	1st week	UNIT - I: Ecosystem	Module II: Sources, composition of air, clean air, fresh water	
3		2nd Week		Aquatic Cycles and Cycle of terrestrial ecosystem Carbon, Nitrogen, Sulphur, Phosphorus cycle	
4		3rd week		Global warming, Causes, Effects, prevent.	
5		4th week		Green House Effect, Ozone depletion.	
6	March	1st week	Unit - II Air and Noise Pollution	Definition of pollution, Soil pollution, Natural soil resources, erosion of soil on human Pathogens, soil, Pollution	
7		2nd week		Industrial Pollutants Control, Nuisance, Caseless Conversion, Effects of air pollutants, Ozone Pathogenesis, EC, Pollut	
8		3rd week		Noise pollution, sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000	
9		4th week	Unit - I Water and Soil Pollution	Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Tin boiler, pH, oxygen demand, crude, lead, solids, BOD and COD	
10	April	1st week		Definition, calculations, 4C Waste Water Treatment, Primary methods sedimentation, Unit Operation, Secondary treatment, Activated sludge treatment,	
11		2nd Week		Trickling filter, Oxidation, Tertiary Methods, Membrane technology, Ion exchange methods	
12		3rd week		Causes, Effects and Prevention measures of Soil Pollution, Causes, Effects and Prevention measures of Pesticides and Insecticides, Irrigation, E-Waste	
13		4th week	Unit - I Renewable sources of Energy	Solar Energy, Basics of Solar energy, Flat plate collector, Liquid & Air, Theory of the flat plate collector, Importance of coating, Advanced collectors, Solar pond, Solar water heater, solar dryer, Solar cells	
14	May	1st week		Biomass, Overview of biomass as energy source, Thermal characteristics of biomass as fuel, Anaerobic digestion, Biogas production mechanism, Fermentation and storage of biogas, Wind energy, Current status and future prospects of wind energy, Wind energy in India, Environmental benefits and problems of wind energy	
15		2nd week		Sea Energy Sources, Need of new sources, Different types sea energy sources, Applications of Hydrogen energy, Ocean energy resources, Tidal energy conversion, Concepts, origin and power plants of geothermal energy	
16		3rd week	Unit-I Solid Waste Management, DO WHM & Environmental Management	Solid waste generation, Sources and characteristics of - Municipal solid waste, E-waste, bio-medical waste, liquids, wastes and their hazards, wastes from agriculture, wastes from industries	
17		4th week		Collection and disposal, methods, principles, energy recovery, sanitary landfill, Hazardous	
18				Waste Act, rules etc. 2000, air pollution control act 1981 and water pollution and control act 1974, Objectives and role of Central and state pollution control board, Concept of carbon credit, Carbon Footprint, Environmental management in Industries, industry ISO 14001, Implementation in industries, benefits	

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Signature of Teacher

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

"PVC" NSSK Govt. Polytechnic Bilaspur at Kaloi

Lecture Planning (Theory)

Branch: Mechanical Engg [Electrical I-II] Semester: 2nd
Subject: Fundamentals of Electrical & Electronics Engineering Session: Jan 26 - May 26
Teacher: Satish Kumar Class Room: L2

Sr. No.	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Rem
1.	1-10	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, average, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources.	R1,R2,R3, R4,R5	
2.	11-18	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.	-do-	
3.	19-27	Overview of Digital Electronics	Introduction to Boolean Algebra, Electronic implementation of Boolean Operations, Gates-Functional Block Approach, Storage elements-Flip Flops-A Functional block approach, Counters: Ripple Up/down and decade, Introduction to digital IC Gates (of TTL Type).	-do-	
4.	28-37	Electric and Magnetic Circuits	EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis 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.	-do-	
5.	38-48	A.C. Circuits	Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor, Mathematical and phasor representation of alternating 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.	-do-	
6.	50-58	Transformer and Machines	General construction and principle of core and shell type of transformers, Emf equation and transformation ratio of transformers, Auto transformer, Basic principle of Electromechanical energy conversion.	-do-	

Signature of Teacher with Date

23/01/2026

Signature of HOD (EE) / OIC

PVC NSSK Govt. Polytechnic Bilaspur at Kalol, Distt. Bilaspur (H.P)

Department of applied Science & Humanities

Course: Diploma **Branch: Mechanical, Electrical Engineering.**

Session: 27 Jan 2026 to 27 MAY 2026 **Subject: Applied Physics-II**

Teacher: Pritam Chand **Laboratory: Physics Lab**

Lesson plan for syllabus coverage: Theory-56 Hours, Practical-28 Hours

S.No	Lecture No.	Topic	Syllabus Detail
1	1-12	Wave motion and its applications	Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship. Sound and light waves and their properties, wave equation ($y = r\sin \omega t$) amplitude, phase, phase difference, Principle of superposition of waves and beat formation. Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc. Free, forced and resonant vibrations and their examples. Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications. Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.
2	13-21	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. Total internal reflection. Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber Optical Instruments- simple and compound microscope, astronomical telescope in normal adjustment and their magnifying powers
3	22-27	Electrostatics	Coulomb's law, unit of charge. Electric field, Electric lines of force and their properties. Electric flux, Electric potential and potential difference, Gauss's law. Capacitor and its working, 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

4	25-33	Current Electricity	Electric Current and its units. Direct and alternating current. Resistance and its units. Specific resistance. Conductance. Specific conductance. Series and parallel combination of resistances. Factors effecting resistance of a wire, carbon resistances and colour coding. Ohm's law and its verification. Kirchhoff's laws. 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.
5	34-40	Electromagnetism	Types of magnetic materials: dia, para and ferromagnetic with their properties. Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and units, magnetization. Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor. Moving coil galvanometer; principle, construction and working. Conversion of a galvanometer into ammeter and voltmeter.
6	41-46	Semiconductor Physics	Energy bands in solids. Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors. p-n junction, junction diode and V-I characteristics. Diode as rectifier – half wave and full wave rectifier (centre taped). Photocells. Solar cells; working principle and engineering applications.
7	47-56	Modern Physics	Lasers: Energy levels, ionization and excitation potentials, spontaneous and stimulated emission, population inversion, pumping methods, optical feedback. Types of lasers; Ruby, He-Ne and semiconductor, laser characteristics, engineering and medical applications of lasers. Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture, fiber types, applications in, telecommunication, medical and sensors.

(Pritam Chand)
Lecturer Physics

(Parma Nand Sharma)
OIC
AS&H

GPTC NSSK G.P. BILASPUR (C.G.) SYLLABUS COVERAGE	Department :- Mechanical Engg. (2nd semi) Course- Diploma Time Period- 3rd C. DCS - 141	Subject- EM (ES 106) Duration :- 3 Years Theory-30	

Sr. no.	Period No's	Topic	Details	Instruction Reference	Additional Text Recommended	Remarks
1	1-12	Basics of Mechanics and Force system	Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics, Space, time, mass, particle, Rectile body and rigid body, Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force - unit, representation as a vector and its 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 concurrent, non-concurrent and parallel co-planar force systems - Law of triangle, parallelogram and polygon of forces	R.S. Khurmi, Applied Mechanics, S. Chand & Co. New Delhi	R.K. Bansal A text book of Engineering Mechanics, Laxmi Publications	
2	13-24	Equilibrium	Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods 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 point load, uniformly distributed load). Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load. Beam reaction graphically for simply supported beam subjected to vertical point loads only.	——do——	——do——	
3	25-35	Friction	Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, coefficient of friction, angle of friction, angle of repose, relation between co-efficient 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.	——do——	——do——	

4	16-17	Centroid and Centre of gravity	Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle). Centroid of composite figures composed of not more than two geometrical figures. Centre of Gravity of simple solids (Cubic cuboid, cone, cylinder, sphere, hemisphere). Centre of Gravity of composite solids composed of not more than two simple solids.	——do——	——do——	
5	18-30	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, Simple screw jack.	——do——	——do——	

Approved	HOI's Sign
Date	29/8/20