

MOTHERHOOD UNIVERSITY

Roorkee-Dehradun Road, Village Karoundi Post Bhagwanpur, Tehsil-Roorkee, Uttarakhand, India

DIPLOMA IN ENGINEERING

(All Branches)

I Year/2nd SEMESTER

[Academic Session 2022-2023 onwards]





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Sr. No.	Subject Code	Subject Name	Effective Teaching			Credits	Evaluation Scheme		
			L	T	P		Internal Assessment	End Term	Total Marks
			Hours/Week						
THEORY									
1	MDFET22-201T	Applied Mathematics-II	3	1	0	4	30	70	100
2	MDFET22-202T	Applied Physics – II	2	1	0	3	30	70	100
3	MDFET22-203T	Fundamentals of Electrical & Electronics Engineering	2	1	0	3	30	70	100
4	MDFET22-204T	Engineering Mechanics	2	1	0	3	30	70	100
5	MDFET22-205T	Environmental Science	2	0	0	2	20	30	50
TOTAL			11	4	0	15	140	310	450

6	MDFET22-251P	Engineering Graphics	0	0	4	2	40	60	100
7	MDFET22-252P	Applied Physics – II Lab	0	0	2	1	20	30	50
8	MDFET22-253P	Fundamental of Electrical & Electronics Engineering Lab	0	0	2	1	20	30	50
9	MDFET22-254P	Engineering Mechanics Lab	0	0	2	1	20	30	50
10	MDFET22-255P	Sports and Yoga	0	0	2	1	20	30	50
TOTAL			0	0	12	6	120	180	300



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MDFET22-201	Applied Mathematics–II	(L:3,T:1,P:0)	Credits:4
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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 Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	Solve problems in engineering domain related to Linear Algebra using matrices	K1
CO2	Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity	K2
CO3	Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.	K2
CO4	Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.	K2
CO5	To be able to apply the knowledge of first order ordinary differential equation in different engineering applications.	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

S.No.	Course Content:
I	Determinant and Matrices: Elementary properties of Determinant up to 3 rd order, consistency of equations, Cramer's rule. Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.
II	Integral Calculus: Integration as inverse operation of differentiation. Simple integration by substitution, by parts and by partial fractions (for linear factors only). Use of formulas, 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).



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III	Co-Ordinate Geometry:) Equation 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. General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, Three points lying on it and Coordinates of endpoint so radiometer; Definition of conics (Parabola, Ellipse, Hyperbola) their stand and equations without proof .Problems on conics when their foci directory so advertises are given.
IV	Vector Algebra:) Definition Notational Rectangular Resolution factor. Addition and Subtraction of vectors. Scalar and vector products of 2 vectors. Simple problem is related to work, moment an angular velocity.
V	Differential Equations:) Solution off restored and first degree different I AL equation by variable separation method (simple problems). mat lab–Simple Introduction.

Suggested Readings: -

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 Publishing House, New Delhi



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MDFET22-202	Applied Physics-II	(L:2,T:1, P:0)	Credits:3
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Course Objectives:

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

Course Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	Learn the basic concepts of dual nature of matter and wave packet and apply them to analyze various relevant phenomenon and to solve related numerical problem.	K1
CO2	Apply concepts in interference and diffraction to solve relevant numerical problems and to relate to relevant engineering applications	K3
CO3	Find how to extend the basic concepts of motion of charged particles in electric magnetic fields to solve numerical problems	K2
CO4	Acquaint with the applications of Nano science and technology and study of drastic changes in the properties of Nano sized particles	K2
CO5	To formulate and solve the engineering problems on Electromagnetism	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

Course Content

UNIT - I: Wave motion and its applications

Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship, Sound and light waves and their properties, wave equation ($y = r \sin \omega t$) amplitude, phase, phase difference, principle of superposition of waves and beat formation. Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration time period, frequency etc. Simple harmonic progressive wave and energy transfer, study of vibration of cantilever and determination of its time period, Free, forced and resonant Vibrations with examples. Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications, Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.



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UNIT - II: Optics

Basic optical laws; reflection and refraction, refractive index, Images and image formation by mirrors, lens and thin lenses, lens formula, power of lens, magnification and defects. Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber. Optical Instruments; simple and compound microscope, astronomical telescope in normal adjustment, magnifying power, resolving power, uses of microscope and telescope, optical projection systems.

UNIT - III: 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 - IV: Current Electricity

Electric Current and its units, Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance, Series and parallel combination of resistances. Factors affecting resistance of a wire, carbon resistances and color-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 - V: 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. Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor, force on rectangular coil placed in magnetic field. Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.

UNIT - VI: Semiconductor Physics

Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier – half wave and full wave rectifier (centre taped). Transistor; description and three terminals, Types- pnp and nun, some electronic applications (list only). Photocells, Solar cells; working principle and engineering applications.



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UNIT - VII: 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. Nano science and Nanotechnology: Introduction, nanoparticles and nanomaterials, properties at nanoscale, nanotechnology, nanotechnology based devices and applications.

Suggested Readings: -

- a. Text Book of Physics for Class XI&XII (Part-I, Part-II); N.C.E.R.T., Delhi
- b. Applied Physics, Vol.I&II and Vol.II, TTTIPublications, TataMcGrawHill, Delhi
- c. Concept sin Physics by H C Verma, Vol.I&II, Bharti Bhawan Ltd. New Delhi
- d. Engineering Physics by P V Nail, Pearson Education Pvt.Ltd, New Delhi.
- e. Modern approach to Applied Physics-I and II, A S V Vasudeva, Modern Publishers.
- f. ATextbookofOptics, Subramanian, BrijLal, MNAvahanulu, SChandandCompanyLtd.
- g. Introduction to Fiber Optics, Ajoy Ghatak and K K KThyagarajan,
Cambridge University Press India Pvt.Ltd, New Delhi.
- h. Nano science and Nano technology, KKChoudhary, Narosa Publishing
House, Pvt. Ltd. New Delhi.
- i. Nano technology: Importance and Applications, M.H. Fulekar,
International Publishing House Pvt.Ltd, New Delhi.
- j. e-books/e-tools/learning physics software/websites etc.



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MDFET22-203	Fundamentals of Electrical and Electronics Engineering	(L:2,T:1, P:0)	Credits:3
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Course Objectives:

To provide basic knowledge of the different elements and concepts of electrical engineering field and to 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 Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	Understand the characteristics of diodes, transistors, FET and digital electronic components	K2
CO2	Understand the concepts of Digital electronics and analog to digital conversion and vice versa	K2
CO3	Understand the basic definitions of electro- magnetic terminologies, concepts of Inductor and analysis.	K2
CO4	Illustrate basics of AC circuits	K1
CO5	Explain operative principle of transformer with background of magnetic circuits	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

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, average, 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



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UNIT III

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 (ofTTLType).

Unit IV

Electric and Magnetic Circuits:

EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and 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

A.C. Circuits: Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMSvalue, Average value, FormFactorPeak 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; Powering A.C. Circuits, power triangle.

Unit VI

Transformer and Machines:

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 character rustic of motors.

Suggested Readings: -

1. Mittle and Mittal, Basic Electrical Engineering, Mc Graw Education, New Delhi,2015, ISBN:978-0-07-0088572-5
2. Saxena, S.B. Lal, Fundamental soft Electrical Engineering, CambridgeUniversityPress, latest editionISBN: 9781107464353
3. The raja, B.L., Electrical TechnologyVol-I, S. Chand Publications, NewDelhi,2015, ISBN:9788121924405
4. The raja, B.L., Electrical TechnologyVol-II, S. Chand Publications, NewDelhi,2015, ISBN:9788121924375
5. Jegathesan, V., BasicElectricalandElectronicsEngineering, Wiley India, NewDelhi,2015, ISBN: 97881236529513
6. Sedha, R.S., A text book of Applied Electronics, S. Chand, NewDelhi,2008, ISBN-13:978-8121927833
7. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi,2015, ISBN-13:0070634244-978
8. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. ChandandCompany, NewDelhi,2014, ISBN-13-9788121924504
9. Believed, Fundamental of Electronic Devices and Circuits, Oxford University Press, New, New Delhi2015ISBN: 9780195425239



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MDFET22-204	Engineering Mechanics	(L:2,T:1, P:0)	Credits:3
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Course Objectives:

Following are the objectives of this course:

- 1) To obtain result at various forces
- 2) To calculate support reactions through conditions of equilibrium for various structures
- 3) To understand role of various equilibrium problems
- 4) To know fundamental laws of mechanics and their application to various engineering problems

Course Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	To develop ability to model and analysis of mechanical engineering systems using vectoral representation of forces and moments.	K1
CO2	To be able to draw the free body diagrams of mechanical components and systems	K2
CO3	To understand the phenomenon of friction and ability to solve problem related to the same.	K2
CO4	Students will gain knowledge regarding center of gravity and moment of inertia and apply them for practical problems.	K1
CO5	Solve the problems of simple system with sliding friction and calculate linear and angular acceleration of moving body in general plane motion	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

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 derived units. Force–unit, representation as a vector and by Bow's notation, characteristics and effects 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.



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Unit– II Equilibrium

Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analyzing 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 to combination of Point load and uniform load is tributary 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, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between coefficient of friction and angle of friction. Equal barium of bodies on level surface subjected to force parallel and inclined to plane. Equal barium of bodies on inclined plane subjected to force parallel to the plane only.

Unit– IV Centroid and center of gravity

Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle) 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 of Gravity 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 pulley block, geared pulley block.

Suggested Readings: -

1. Khurmi, R.S., Applied Mechanics, S. Chand&Co. New Delhi.
2. Bansal RK, A text book of Engineering Mechanics, Laxmi Publications.
3. Ramamrutham, Engineering Mechanics, S. Chand&Co. New Delhi.
4. Dhade, Jamadar&Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
5. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi



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MDFET22-205	Environmental Science	(L:2,T:0,P:0)	Credits:2
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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 finished products.

- Solve various engineering problems apply in ecosystem to produce Eco-friendly products.
- Use relevant air and noise control method to solved domestic and industrial problems.
- Use relevant water and soil control method to solved domestic and industrial problems.
- To recognize relevant energy sources required for domestic and industrial applications.
- Solve local solid and e-waste problem

Course Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	Gain knowledge about environment and ecosystem.	K1
CO2	Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures.	K1
CO3	Categorize different types water and soil of pollutions and their control measures.	K1
CO4	Students will learn about natural resource, its importance and environmental impacts of human activities on natural resource and use of reversible energy	K1
CO5	Discover effective methods of solid waste management. Analyze global environmental problems and come out with best possible solutions.	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

Course Content

Unit-I Ecosystem

Structure of ecosystem, Biotic & Abiotic components Food chain and food web Aquatic (Lentic and Lotic) and terrestrial ecosystem Carbon, Nitrogen's Sulphur, Phosphorus cycle. Global Warming-Causes, effects, process, Greenhouse Effect, Ozone depletion



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Unit– II Air and, Noise Pollution

Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refrigerants, 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 Refrigerants, I.C., Boiler Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000

Unit- III Water and Soil Pollution

Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membran separation technology, RO (reverse osmosis). Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

Unit–IV Renewable Sources of Energy

Solar Energy: Basics of Solar energy. Flat plate collector (Liquid Air). Theory of flat plate collector. 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. Environmental 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-V Solid Waste Management, ISO 14000 & Environmental Management

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 act 1996. Structure and role of Central and state pollution control board. Concept of Carbon Credit, Carbon Footprint. Environmental management in fabrication industry. ISO 14000: Implementation in industries, Benefits.

Suggested Readings:

1. S.C. Sharma & M.P. Poonia, Environmental Studies, Khanna Publishing House, New Delhi
2. C.N.R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
3. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi
4. Rao, C. S., Environmental Pollution Control and Engineering, New Age International Publication, 2007, ISBN: 81-224-1835-X.
5. Rao, M. N. Rao, H.V.N, Air Pollution, Tata Mc-Graw Hill Publication, New Delhi, 1988, ISBN: 0-07-451871-8.
6. Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN: 978-81-7993-502-6
7. Metcalf & Eddy, Waste Water Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.
8. Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi



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MDFET22-251P	Engineering Graphics Lab	(L:0,T:0,P:4)	Credits:2
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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 equipment's, and get familiarize with Indian Standard related to engineering drawings.
- To develop skills to visualize actual object or a part of it, on the basis of drawings.
- To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.
- To understand the basic commands and develop basic skills related to computer aided drafting, of how to draw, modify, and edit basic shapes (2D), using AUTOCAD.

Course Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	Use the drawing instruments effectively and able to dimension the given figures	K3
CO2	Convert the pictorial views into orthographic view and vice versa	K3
CO3	Sketch the different concepts of isometric projections	K3
CO4	Learn to visualize multiple types of objects in different positions and also to draw sectional views.	K2
CO5	Know about the basics of drawing including use of standards; dimensioning types and methods for technical drawings and have basic insight about the use of Auto CAD for engineering drawing	K1

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create



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Course Content

Unit – I Basic elements of Drawing

Drawing Instruments and supporting materials: method to use them with applications. Convention of lines and their applications. Representative Fractions– reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale. Dimensioning techniques as per SP-46:2003–types and applications of chain, parallel and coordinated dimensioning. Geometrical and Tangency constructions. (Re-draw the figure)

Unit – II Orthographic projections

Introduction of projections-orthographic, perspective, is metric and oblique: concept and applications. (No question to be asked in examination). Introduction or zoographic 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 ortho graphic views into is metric view/projection.

Unit – IV Free Hand Sketches of engineering elements

Freeh and sketches of machine elements: Thread profiles, nuts, bolts, studs, setscrews, washer, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for freehand sketching) Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)

Unit – V Computer aided drafting interface

Computer Aided Drafting: concept. Hardware and various CAD software available. System requirements and Understanding the interface. Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon. File features: New file, Saving the file, opening an existing drawing file, creating templates, Quit. Setting up new drawing: Units, Limits, Grid, Snap. Undoing and redoing action.

Unit – VI Computer aided drafting Draw

basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, Polyline. Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates. Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers. Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, And 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.



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S. No.	Practical Exercises	Unit No.	Approx. Hrs.
1	Draw horizontal, Vertical, 30 degrees, 45 degrees, 60 and 75 degrees' lines, different types of lines, dimensioning styles using Tee and Set squares/ drafter. (do this exercise in sketchbook)	I	02
2	Write alphabets and numerical (Vertical only)(do this exercise in sketch book)	I	02
3	Draw regular geometric constructions and re draw the given figure (do this exercise in sketch book)Part	II	02
4	Draw regular geometric constructions and re draw the given figure (do this exercise in sketch book)PartII	II	02
5	Draw a problem on or the graphic projections using first angle method of projection having plain surfaces and slanting.PartI	III	02
6	Draw another problem on ortho graphic projections using first angle method of Projection having landing surfaces with lots. Part II	III	02
7	Draw two problems on or the graphic projections using first angle method of projection having cylindrical surfaces,ribs.PartI	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 is metric 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,Lockingarrangements.PartI	V	02
11	Problem based Learning: Given the ortho graphic view so fat least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw the reviews in sketch book.PartI	III, II, V	02
12	Draw basic 2Dentities like: Rectangle, Rhombus, Polygonising Auto CAD (Print out should be a part of progressive assessment).Part I	V	02
13	Draw basic 2Dentities like: Circles, Arcs, circular using Auto CAD (Print out should be a part of progressive assessment).PartII	V	02
14	Draw basic 2Dentities like: Circular and rectangular array using Auto CAD (Print out should be a part of progressive assessment).PartII	V	02



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Suggested Readings: -

1. Bureau of Indian Standards. Engineering Drawing Practice for Schools and Colleges IS: Sp-46.BIS. Government of India, Third Reprint, October1998; 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. Jolie, D.A. Engineering Drawing. Tata Mc Graw 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 Drawings. Chand and Company, NewDelhi,2008, ISBN:81-219-2964-4. Kulkarni, D.M.; Rastogi, A.P.; Sarkar, A.K. Engineering Graphics with Auto CAD.PHIL earning Private Limited-New Delhi (2010); ISBN:978-8120337831.
7. Jeyapooran, T. Essentials of Engineering Drawing and Graphics using AutoCAD. Vikas Publishing House Pvt. Ltd, Noida, 2011; ISBN:978-8125953005.
8. Auto desk. Auto CAD user Guide. Autodesk Press, USA,2015.
9. Sham, Tickoo.Auto CAD 2016 for Engineers and Designers.Dreamtech Press; Golgotha Publication, New Delhi, 2015; ISBN978-9351199113.



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MDFET22-252P	Applied Physics II Lab	(L:0,T:0, P:2)	Credits:1
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Course Objectives:

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

Course Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory	K1
CO2	To learn the usage of electrical and optical systems for various measurements.	K1
CO3	Apply the analytical techniques and graphical analysis to the experimental data.	K3
CO4	Identify the magnetic Induction along the axis of current carrying coil	K1
CO5	To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create.

List of Practical /Activities: (To perform any 12 Practical's)

1. To determine and verify the time period of a cantilever.
2. To determine velocity of ultrasonic in different liquids using ultrasonic center aerometer.
3. To verify laws of reflection from plane mirror/interface.
4. To verify laws of refraction (Snell's law) using a glass slab.
5. To determine of optical than magnifying power of a convex lens.
6. To verify Ohm's law by plotting graph between current and potential difference.



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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 Kirchoff's law using electric circuits.
10. To study the dependence of capacitance of a parallel plate capacity on various factors and determines permittivity of a plate.
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 voltage.
15. To verify inverse square law of radiations using a photo-electric cell.
16. To measure wave length 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 Readings: -

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, J.N. Jaiswal, Laxmi Publications (P) Ltd.
New Delhi
3. Practical Physics by C.L. Arora, S. Chand & Company Ltd.
4. E-books/e-tools/learning physics software/you tube videos/websites etc.



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Roorkee-Dehradun Road, Village Karoundi Post Bhagwanpur, Tehsil-Roorkee, Uttarakhand, India

MDFET22-253P	Fundamentals of Electrical and Electronics Engineering Lab	(L:0,T:0,P:2)	Credits:1
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Course Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	Study different meters and instruments for measurement of electronic quantities	K1
CO2	Experimentally verify the basic circuit theorems	K2
CO3	Design and experiment with various voltage regulation circuit	K2
CO4	Study the linear and nonlinear characteristics of different types of loads experimentally	K1
CO5	Understand 3 phase balanced and unbalanced, star and delta connected supply and load and to measure power in 3 phase circuits	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

Gusted Practical's/Exercises:

S.No.	Practical Outcomes	Approx.Hrs
1.	Determine the permeability of magnetic material by plotting its B-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.	Connecting transformer and measure input and output quantities.	02
6.	Make Standard 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 capacitor in series and parallel combination on bread board and measure its value using multimeter.	02*
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
19.	Test the performance of NPN transistor.	02*
20.	Determine the current gain of CE transistor configuration.	02



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Suggested Readings: -

1. Ritu Sahdev, Basic Electrical Engineering, KhannaPublishingHouse,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, CambridgeUniversityPress, latest edition ISBN: 9781107464353
4. The raja, B.L., ElectricalTechnologyVol–I, S. Chand publications, New Delhi ,2015, ISBN:9788121924405
5. The raja, B.L., ElectricalTechnologyVol–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, NewDelhi,2008, ISBN-13:978-8121927833
8. Malvino, Albert Paul, David, Electronics Principles, Mc Graw Hill Education, NewDelhi,2015, ISBN-13:0070634244-978
9. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, NewDelhi,2014, ISBN-13-9788121924504
10. Believed, FundamentalofElectronicDevicesandCircuits, Oxford University Press, New Delhi,2015



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MDFET22-254P	Engineering Mechanics Lab.	(L:0,T:0,P:2)	Credits:1
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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 Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	To be able to understand practical application of mechanical advantages	K2
CO2	To determine the impact strength of material	K1
CO3	To compare the analytical and experimental values of the stress and deflection in the simply supported beam.	K2
CO4	To determine the modulus of rigidity of the given sample	K3
CO5	To be able to learn the concept of friction through inclined plain experiment.	K1

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

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List of Practical to be performed: (To perform any 12 Practical's)

1. To study various Equipment's 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.



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7. Derive Law of machine using Weston's differential or wormed geared pulley block.
8. Determine resultant of concurrent for custom applying Law of Polygon causing force table.
9. Determine solution of concurrent for ecosystem graphically.
10. Determine solution of parallel for ecosystem graphically.
11. Verify Lami's theorem.
12. Study for various members of a 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 Readings:

1. Bedi D.S., Engineering Mechanics, Khanna Publishing House
2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal, A textbook 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 Graph.



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MDFET22-255P	Sports and Yoga	(L:0,T:0,P:2)	Credits:1
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Course Objectives:

- To make the students understand the importance of sound health and fitness principles As they relate to Bette health.
- To expose the students to a variety of physical and yogi activities aim dissimulating their continued inquiry about Yoga, physical education, health and fitness.
- To create safe, progressive, methodical and efficient activity based plant enhance improvement and minimize risk of injury.
- To develop among students an appreciation of physical activity as a lifetime pursuit and a mean stop better health.

Course Outcomes:

At the end of the course ,students will be able to:		Blooms Level
CO1	Develop an understanding of Concept regarding Physical Education in modern society to develop their growth and development to maintain quality of life number	K2
CO2	develop basic understanding of the human anatomy, the human physiology and a deeper understanding of the human systems.	K2
CO3	Learn the essential elements of a yogic life style, the concept of health and disease and their remedies through yoga practice. They will also learn the overview of the five sheath human existence.	K1
CO4	Develop health, fitness, performance and Wellness as part of sport person.	K2
CO5	Acquire deeper knowledge regarding their Health, Disease, Immunity, Prevention Control and Management to develop Wellness of sports persons and non-sports persons in different stages.	K2

- K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaulate, K6- Create

Course Content

UNIT-I

- **IntroductiontoPhysicalEducation**
 - Meaning & definition of Physical Education
 - Aims & Objectives of Physical Education
 - Changing trends in Physical Education



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- **Olympic Movement**
 - Ancient & Modern Olympics (Summer Winter)
 - Olympic Symbols, Ideals, Objectives Values
 - Awards and Honoring the field of Sports in India (Dronacharya Award, Arjuna Award, Dhyanchand Award, Rajiv Gandhi Khel Ratna Award etc.)
- **Physical Fitness, Wellness & Lifestyle**
 - Meaning & Importance of Physical Fitness & Wellness
 - Components of Physical fitness
 - Components of Health related fitness
 - Components of wellness
 - Preventing Health Threat through Life Style Change
 - Concept of Positive Lifestyle

UNIT-II

- **Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**
 - Define Anatomy, Physiology & Its Importance
 - Effect fixer case in the functioning of Various Body Systems. (Circulatory System, Respiratory 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, Kyphosis, Bowlegs and Scoliosis.
 - Corrective Measures for Postural Deformities

UNIT-III

- **Yoga**
 - Meaning & Importance of Yoga
 - Elements of Yoga
 - Introduction - Asana, Pranayama, Meditation & Yogic Kriyas
 - Yoga for concentration & related Asanas (Suk asana; Tad asana; Padma Sana & Shashank asana)
 - Relaxation Techniques for improving concentration - Yog-nidra
- **Yoga & Lifestyle**
 - Asanas as preventive measures.
 - Hypertension: Tad asana, Vajrayana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Shraavana.
 - Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana,
 - Ardha Matsyendrasana.
 - Back Pain: Tad asana, Ardha Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.
 - Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana,

- Pavan Muktasana, Ardha Matsyendrasana.



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

- **Training and Planning in Sports**

- Meaning of Training
- Warming up and limbering down
- Skill, Technique & Style
- Meaning and Objectives of Planning.
- Tournament – Knock-Out, League/Round Robin & Combination.

UNIT-IV

- **Psychology & Sports**

- Definition & Importance of Psychology in Physical Edu. & Sports
- Define & Differentiate Between Growth & Development
- Adolescent Problems & Their Management
- Emotion: Concept, Type & Controlling of emotions
- Meaning, Concept & Types of Aggressions in Sports.
- Psychological benefits of exercise.
- Anxiety & Fear and its effects on Sports Performance.
- Motivation, its type & techniques.
- Understanding Stress & Coping Strategies

- **Doping**

- Meaning and Concept of Doping
- Prohibited Substances & Methods
- Side Effects of Prohibited Substance

UNIT-V

- **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.

Suggested Readings: -

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)