Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	DMA-101	**Title of the Course**	APPLIED MATHEMATICS-I	**L**	**T**	**P**	**C**
Year	I[st]	**Semester**	1[st]	**03**	**01**	**00**	**-**
Pre-Requisite	DMA-101	**Co-requisite**	NA				
Course Objectives	To know the basic concepts of Mathematics with their Applications in Engineering.						

Course Outcomes	
CO1	Arithmetic Progression and Geometric Progression can be applied in real life by analyzing a certain pattern that we see in our daily life.
CO2	Trigonometry is widely used in several fields. Some of its uses are Measuring heights and distances, in construction and architecture, flight engineering, marine biology, application of Physics, electrical engineering, manufacturing industry, gaming industry.
CO3	The concept of Complex Number is used in the field of Computer Science. It is also used in coding and programming.
CO4	Here students are getting the knowledge of Graphs, continuity, and differentiation by which they will be able to find areas of any surface.
CO5	By getting full knowledge of Tangent and normal students will be able to use it in daily lives and further studies in Architecture Engineering, Civil Engineering etc.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1.	i) Series ii) Binomial Theorem iii) Determinants	**Series**: **Arithmetical Progression**: nth term of AP, Sum of 'n' terms, Arithmetic Mean. **Geometrical Progression**: nth term of GP, Sum of 'n' terms& infinite terms, Geometric Mean. **Binomial theorem:** Definition of factorial notation, permutation and combination, Binomial theorem for positive index, negative and fractional index (without proof), Application of Binomial theorem. **Determinants:** Definition, expansion and elementary properties of determinant of order 2 and 3. Solution of system of linear equations, Consistency of equations, Cramer's rules.	08	1
.	i) Trigonometry ii) Vector Algebra	**Trigonometry:** Relation between sides and angles of triangles: Simple cases only. **Vector Algebra:** Dot and Cross product, Scalar and vector triple product.	07	2
3.	Complex Number	**Complex Number:** Definition of imaginary number, complex number & its conjugate. Algebra of complex number (equality, addition, subtraction, multiplication and division). Geometrical representation of a complex number, modulus and amplitude. Polar form of a complex number, Square root of a complex number. De Moivre's theorem (without proof) & its application.	08	3
4.	Differential Calculus-I	**Differential Calculus-I** **Functions, limits, continuity:** Definitions of variable, constant, intervals (open, closed, semi-open). Definition of function, elementary methods of finding limits (right and left), elementary test for continuity and differentiability. **Methods of finding derivative:** Fundamental rules of derivatives (Sum and Difference), Derivatives of special functions, Trigonometric functions, exponential function, Function of a function.	09	4
5.	Differential Calculus-II	**Differential Calculus - II** **Differentiation:** Logarithmic differentiation, Function with respect to another function, Function power function, Higher order derivatives. **Application:** Finding Tangents, Normal. Maxima/Minima.	08	5

References Books:

1. Applied Mathematics: Dr. Kailash Sinha, Meerut publication.
2. Applied Mathematics: P. K. Gupta, Asian Publication.
3. Applied Mathematics: H. R. Loothara, Bharat Bharti Publication
4. Mathematics for Polytechnic: S.P. Deshpande, Pune Vidyarthi Griha.

e-Learning Source:

https://youtu.be/syLIPtxjN0E?si=OrM4IRejVzgmwWpl

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	-	1	-	-	2	-	1	1
CO2	1	3	1	1	2	-	-	2	1	2	-
CO3	-	1	2	2	3	-	-	3	2	2	1
CO4	2	2	2	1	-	-	-	-	2	1	3
CO5	2	1	2	3	1	-	-	-	1	-	2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2010							
Course Code	DPH-101	**Title of the Course**	Applied Physics-I	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	To equip learners with the foundational concepts of units, dimensions, dimensional analysis, measurement accuracy, and vector operations, enabling them to analyze physical equations, perform unit conversions, estimate errors, and apply vector algebra in solving scientific and engineering problems.						

Course Outcomes	
CO1	Students learn to convert one unit to different unit and they use conversation factor which is numerically quantity that we multiply or divide to the quantity. Student learns accuracy of the lab instrument with the help of significant figure.
CO2	In this student learn investigate the effect of gravity and friction on the motion of machines (mechanical) instrument etc.
CO3	Fundamental concepts of electrochemistry, including oxidation-reduction (redox) reactions, electrolytes, electrodes, and electrochemical cells.
CO4	Explain the fundamental principles of chemical kinetics, including the definition of reaction rate, rate laws, and the role of molecular collisions in reactions.
CO5	Identify and explain various physical, chemical, and biological parameters of water quality, including turbidity, pH, dissolved oxygen, hardness, and biological oxygen demand (BOD). Understand modern water purification technologies like reverse osmosis (RO), ultrafiltration (UF), ion exchange, and membrane filtration, and their applications in industrial and municipal water treatment.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-1	**Measurement & Vector**	**Measurement:** Units and Dimensions, Fundamental and derived units: S.I. Units and Dimensions of physical quantities, Dimensional formula and dimensional equation, Principal of homogeneity and application of homogeneity principle to:(i) Checking the correctness of physical equations (ii)Deriving relations among various physical quantities, (iii)Conversion of numerical values of physical quantities form one system of units into another, Limitations of dimensional analysis, Errors in measurement, accuracy and precision, random and systematic errors, estimation of probable errors in the result of measurement (combination of errors in addition, subtraction, multiplication and power). Significant figures and order of accuracy in respect to instruments. **Vector**: Scaler and vector quantities; Addition, Subtraction, Resolution of vector; Cartesian components of vector, Scaler and vector product of vectors	6	CO-1
Unit-2	**Force and Motions, Fluid mechanics and fiction, Work, Power and Energy**	**Force and Motions:** Newton's Law of Motion, Circular motion, angular velocity, angular acceleration and centripetal acceleration. Relationship between linear velocity and angular velocity, Relationship between linear acceleration and angular acceleration. **Fluid mechanics and fiction**: Surface tension, capillaries, equation of continuity, Bernoulli's theorem, stream line and turbulent flow, Reynold's number. Physical significance of friction, Advantage and disadvantage of friction and its role in everyday life, Static and dynamic frictional forces, Coefficients of static and dynamic frictions and their measurement, Viscosity, Coefficients of viscosity and its determination by Stoke's method. **Work, Power and Energy:** Work done by force on bodies moving on horizontal and inclined planes in presence of frictional forces, Concept of power and its units, Calculation of power (simple cases). Concept of kinetic and potential energy, various forms of energy, conservation of energy, Force constant of spring, Potential energy of stretched spring.	10	CO-2
Unit-3	**Elasticity**	**Elasticity:** Stress and Strain, Hooke's law, Elastic limit, Yielding point and breaking point, Modulus of elasticity, Young's modulus, Bulk modulus and modulus of rigidity, Poisson ratio, Resilience. Simple Harmonic Motion, Periodic Motion, Characteristics of Simple Harmonic Motion, Equation of Simple Harmonic Motion and determination of Velocity and acceleration, Graphical representation, Spring Mass system, Simple pendulum, Derivation of their periodic time, Energy conservation in Simple Harmonic Motion, Definition of free, Forced, undamped and damped vibrations, Resonance and its sharpness, Q-factor.	8	CO-3
Unit-4	**Gas laws and specific heats of gases**	Boyle's law, Charle's law, Gay Lussac's law, Absolute temperature, Kelvin scale of temperature, General gas equation(without derivation), Molar or universal gas constant, Universal gas equation, Standard or normal temperature and pressure (N.T.P), Specific heat of gases, Relation between two specific heat, Thermodynamics variables, first law of thermodynamics(statement and equation only), Isothermal, Isobaric, Isochoric and adiabatic processes (Difference among these processes and equation of state).	8	CO-4
Unit-5	**Heat transfer and radiation**	**Heat transfer and radiation:** Modes of heat transfer, Coefficient of thermal conductivity and its determination by (i) Searle's Method for good conductors. (ii) Lee's Method for poor conductors. Conduction of heat through compound media, Conduction and convection, Radial flow of heat, Blackbody radiation, Stefan's law, Wein's displacement and Rayleigh- Jeans laws, Planck's law.	8	CO-5

References Books:

1. Nootan Physics: Kumar & Mittal
2. Applied Physics: P.K. Gupta.
3. Pradeep Fundamental: Gogia & Gomber.
4. Applied Physics: P.S. Kushwaha.

e-Learning Source:

1. https://youtu.be/RYwU769Eny4?si=VOn3l74xnpyIdfbM

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3								2		3	3	1		2	3	2
CO2	3										2	2					2
CO3	3	1										1					2
CO4	2	2										1					2
CO5	2			2								1					2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DCH-101	**Title of the Course**	Applied Chemistry-I	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	**-**
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	1. To understand all the chemical reactions, principle and theory related to topics 2. To provide examples and unsolved problems as much as possible 3. To provide example related to industrial as well as domestic proposes						

Course Outcomes	
CO1	By applying knowledge of atomic structure and periodic properties to real-world engineering challenges, such as enhancing the performance of electronic devices, improving energy efficiency, or designing corrosion-resistant materials.
CO2	To explain the fundamental types of chemical bonds (ionic, covalent, and metallic) and their significance in determining the properties of engineering materials.
CO3	Fundamental concepts of electrochemistry, including oxidation-reduction (redox) reactions, electrolytes, electrodes, and electrochemical cells.
CO4	Explain the fundamental principles of chemical kinetics, including the definition of reaction rate, rate laws, and the role of molecular collisions in reactions.
CO5	Identify and explain various physical, chemical, and biological parameters of water quality, including turbidity, pH, dissolved oxygen, hardness, and biological oxygen demand (BOD). Understand modern water purification technologies like reverse osmosis (RO), ultrafiltration (UF), ion exchange, and membrane filtration, and their applications in industrial and municipal water treatment.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Atomic Structure** **Classification of Elements**	Basic concept of atomic structure, Matter wave concept, Quantum number, Heisenberg's uncertainty principle, Shapes of orbital Modern classification of elements (s, p, d, and f block elements), periodic properties: ionization potential, electro negativity, electron affinity.	8	1
2	**Chemical Bonding**	Overview of basic concept of Ionic, Covalent & Co-ordinate bonds, Hydrogen bonding, Valence bond theory, Hybridization, VSEPR theory, Molecular orbital theory.	8	2
3	**Electrochemistry -I & II**	Arrhenius theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of acid and bases: Arrhenius, Bronsted & Lewis theory. Concept of pH and numerical. Buffer solutions, Indicators, Solubility product, Common ion effect with their application. Redox reactions, electrode potential (Nernst equation), Electro-chemical cell (Galvanic & Electrolytic). EMF of a cell & free energy change. Standard electrode potential, Electrochemical series & Application. Chemical & electrochemical theory of corrosion, Galvanic Series. Prevention of corrosion by various methods.	8	3
4	**Chemical Kinetics** **Catalysis** **Solid State**	Introduction, Law of mass action, order and molecularity of reaction. Activation energy, rate constants, 1st order reactions and 2nd order reactions. Definition, catalytic reactions properties, Catalytic promoters & poison, autocatalysis & negative catalysis. Theory of catalysis & applications. Types of solids (Amorphous and Crystalline), classification (Molecular, Ionic, Covalent and Metallic), Band theory of solids (Conductors, Semiconductors & Insulators), types of crystals, FCC, BCC, Crystal imperfection.	8	4
5	**Water Treatment**	Hardness of water, its limits and determination of hardness of water by EDTA method. Softening methods (Soda lime, Zeolite and Ion exchange resin process). Disadvantages of hard water in different industries, scale & sludge formation, corrosion, caustic embrittlement, priming & foaming in boilers. Disinfection of Water by chloramine-T, Ozone and chlorine. Advantages and disadvantages of chlorination. Industrial waste & sewage, Municipality waste water treatment, Definition of BOD & COD. Numerical problems based on topics.	8	5

References Books:

1. Applied Chemistry: R. S. Katiyar and J. P. Chaudhary
2. Applied Chemistry: Rakesh Kapoor
3. Principles of General and Inorganic Chemistry: O. P. Tandon
4. Engineering Chemistry: S. Chandra
5. Applied Chemistry: M. Gupta

e-Learning Source:

https://docs.google.com/document/d/1f9FaU1Y8D6D_5DRCJXXIunGXageT23G0/edit?usp=drive_link&ouid=106019737385905957374

Integral University, Lucknow

&rtpof=true&sd=true
https://drive.google.com/file/d/1lsZHgt7nlIdB0iReCbTaP53JZjgzjOZ3/view?usp=drive_link
https://drive.google.com/file/d/1lymiyHymX86HqsdnkmuIsvZp-zIm02RR/view?usp=drive_link
https://drive.google.com/file/d/1mH1CQmpYLKJeTvyi018gIW2KUS4l-9RK/view?usp=drive_link

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO12	PSO1	PSO2	PSO3	PSO4
CO1	03		01				01					
CO2	03		-									
CO3	03		01				02					
CO4	03	01	02				02					
CO5	03		-				02					

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Dr. Rida Sagheer **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2013-14							
Course Code	DEC-102	**Title of the Course**	Electronics Components & Devices-I	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. To understand the difference between conductor semiconductor and insulator. 2. To provide the understanding of the diode and its related application 3. To provide the understanding of the transistor and its related application.						

Course Outcomes	
CO1	Evaluate the basic circuits parameters like voltage, current, resistance etc.
CO2	Analyze simple analog circuits by the application of KCL and KVL
CO3	Characterize Semiconductor diode and its application.
CO4	Characterize and configure the BJT.
CO5	Detailed analysis of BJT and its application as an amplifier.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Semiconductor Physics**	Intrinsic Semiconductors- Conductivity, atomic and crystal structure of germanium and silicon, covalent bonds, generation and recombination, effect of temperature on conductivity of intrinsic semiconductors, energy levels diagram of conductor, insulators and intrinsic semiconductors. Extrinsic semiconductor P&N type semiconductors and their conductivity, Definition of Drift and Diffusion currents.	8	1
2	**Semiconductor Devices**	PN junction diode, mechanism of current flow in PN junction, Zener and avalanche breakdown, Semiconductor diode characteristics, static and dynamic resistances. Introduction to special purpose diodes (Zener diode, LED, photo diode, varactor diode, Schottky diode, tunnel diode).	8	2
3	**Rectifiers & Wave Shaping Circuit**	Concept of rectification, specification of rectifier diode, single-phase half wave, full wave, bridge rectifier circuits and their operation calculations of ripple factor and rectification efficiency of rectifiers, basic concept of filtrating and filtering circuits. Working and use of voltage-doubler circuit. Basic concept of clipping and charging circuits.	8	3
4	**Bipolar Junction Transistor**	Charge carriers, PNP and NPN transistors, their symbols and mechanisms of current flow, explanation of fundamental current relations. Concept of leakage current (ICBO) effect of temperature on leakage current. Standard notation for current and voltage polarity. CB, CE and CC configurations. (A) Common base configuration (CB): inputs and output characteristics, determination of transistor parameters (input and output) dynamic resistance, current amplification factor. (B)Common emitter configuration: current relations in CE configuration, collector current in terms of base current and leakage current (ICEO), relationship between the leakage current in CB and CE configuration, input and output characteristics, determination of dynamic input and output resistance and current amplification factor B from the characteristics. (C) Common collector configuration: Expression for emitter current in terms of base current and leakage current in CC configuration. Comparison of CB and CE configuration with regards to dynamic input and output resistance, current gain and leakage current performance of CE configuration for low frequency voltage amplification. Typical application of CB configuration in amplification. Transistor as an amplifier in CE configuration. (a) DC load line, its equation and drawing it on collector characteristics. (b) Determination of small signal voltage and current gain of a basic transistor amplifier using CE output characteristic and DC load line, Concept of power gain as a product of voltage gain and current gain.	8	4
5	**BJT Biasing**	Different transistor biasing circuits for fixing the operating points, effect of temperature on operating point. Need and method for stabilization of operating point. Effect of fixing operating point in cut-off or saturation region on performance of amplifier. Calculation of operating point for different biasing circuits, use of Thevenin's theorem in analysing potential divider biasing circuit. Simple design problems on potential divider biasing circuit.	8	5

References Books:

1. Fundamental of Electrical Engg. – Ashfaq Husain

2. Electrical Technology Volume-I – B.L. Thereja

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e-Learning Source:
https://nptel.ac.in/

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1		3	2		1	1	1			2	
CO2		2	2		1					2	
CO3		2	2	3	2	3	2			3	
CO4		2	2							2	
CO5		2	3				2			2	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	DEE-101	**Title of the Course**	BASIC ELECTRICAL ENGINEERING-I	**L**	**T**	**P**	**C**
Year	First	**Semester**	First	**3**	**1**		-
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Fundamental of current, voltage and power and would be able to utilize in electrical engineering. 2. Study and verification of electrical laws and network theorems for AC & DC circuits.						

Course Outcomes	
CO1	Conceptualize the fundamental of current, voltage and power and would be able to utilize in electrical heating and mechanical work.
CO2	Study the basic laws and DC network theorem which will apply to analyze the different electrical machines and network problems.
CO3	Develop the concept of magnetic flux and analogy between electric and magnetic circuit used in all engineering field.
CO4	Importance of ac circuit ,power factor and resonance in RLC circuit.
CO5	To impart knowledge of poly phase system and its application eg Electrical machine.

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
Unit-I	Introduction of Electrical Engineering	Application of Electrical Engineering in different fields. Basic terminology: Current, Voltage and EMF, Resistor, Capacitor. Series and parallel combination of Resistors and Capacitors. Concept of constant voltage sources and Constant current source, symbols and graphical representation, characteristics of ideal and practical sources. Conversion of voltage sources into current sources and vice versa.	8	1
Unit-II	D.C. Circuit, Lighting Schemes	KVL & KCL, Ohm's law and simple numerical problems based on it. Introduction to Thevenin, Norton and Superposition theorem. LIGHTING SCHEMES: Lux, Candela, Series and parallel connection of wiring. LAMPS: Fluorescent and Incandescent lamp construction and working.	8	2
Unit-III	Electromagnetism	Concept of magnetic flux, flux density, magnetic field intensity (formula based numerical problem). Concept of reluctance and MMF (formula based numerical problem). Analogy between electric and magnetic circuit, B – H curve, Faraday's Law of electromagnetic induction. Lenz's Law, Energy stored in inductor.	8	3
Unit-IV	A.C. circuit	Terminology: Instantaneous value, maximum value, cycle, frequency, alternating current and voltage ,different types of power (Simple numerical problem), Difference between A.C. and D.C. Concept of phase and phase difference, Phasor representation of voltage and current for inductor, capacitor and resistor. Power factor ,RLC series resonance Introduction to three phase system, Advantage of three phase over single phase system. Star and Delta connection, Relationship between phase and line value of current and voltage.	8	4

Unit-V	Electrical machine	Types of A.C. and D.C. motors, Basic principle and working of A.C. and D.C. motor. Basic principle and working of A.C. and D.C. generator. Application of A.C. and D.C. motor. Single phase transformer (Brief introduction). Brief idea about stepper motor, reluctance motor and PMDC motor.	8	5
References Books:				
1. Fundamental of Electrical Engg. – Ashfaq Husain				
2. Electrical Technology Volume-I – B.L. Thereja				
e-Learning Source:				
https://nptel.ac.in/				

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1		3	2		1	1	1						2	
CO2		2	2		1				2				2	
CO3		2	2	3	2		2	2	1	2			3	
CO4		2	2			3		2					2	
CO5		2	3				2	3					2	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DED-101	**Title of the Course**	Engineering Drawing	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**3**	**1**	**0**	
Pre-Requisite	10th	**Co-requisite**	-				
Course Objectives	To instill students about the importance of engineering drawing so students can understand the installation plan and can take different projects in their professional life.						

Course Outcomes	
CO1	Students' ability in legible writing letters and numbers will be improved.
CO2	Students' ability to perform basic sketching techniques and mechanical component drawing will be improved.
CO3	Students will be able to draw orthographic projections of different objects irrespective of number of dimensions and to develop pictorial views.
CO4	Students' ability to produce engineered drawing of any newly designed object will be improved.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Drawing, instruments and their uses and Introduction to Scales**	Introduction to various drawing, instruments. Correct use and care of Instruments. Sizes of drawing sheets and their layouts. Lettering Techniques 1 Sheet Printing of vertical and inclined, normal single stroke capital letters. Printing of vertical and inclined normal single stroke numbers. Stencils and their use. **Introduction to Scales:** 1 Sheet Necessity and use, R F Types of scales used in general engineering drawing. Plane, diagonal and chord scales.	7	2
2	**Conventional Presentaion, Principles of Projection and Dimensioning Techniques**	Thread (Internal and External), Welded joint, Types of lines, Conventional representation of materials, Conventional representation of machine parts. **Principles of Projection:** Orthographic, Pictorial and perspective. Concept of horizontal and vertical planes. Difference between I and III angle projections. **Dimensioning Techniques:** Projections of points, lines and planes. 2 Sheet Orthographic Projections of Simple Geometrical Solids Edge and axis making given angles with the reference planes. Face making given angles with reference planes. Face and its edge making given angles with reference planes. Orthographic views of simple composite solids from their isometric views. Exercises on missing surfaces and views.	7	3
3	**Section of Solids and Isometric Projection**	Concept of sectioning Cases involving cutting plane parallel to one of the reference planes and perpendicular to the others. Cases involving cutting plane perpendicular to one of the reference planes and inclined to the others plane, true shape of the section **Isometric Projection:** 1 Sheet Isometric scale Isometric projection of solids.	8	2

4	**Free hand sketching and Development of Surfaces**	Use of squared paper Orthographic views of simple solids Isometric views of simple job like carpentry joints **Development of Surfaces:** 1 Sheet Parallel line and radial line methods of developments. Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid).	8	4
5	**Assembly and Disassembly Drawings, Orthographic Projection of Machine Parts and Practice on AUTO CAD**	**Assembly and Disassembly Drawings:** 2 Sheet Plummer block Footstep bearings Couplings etc. Rivetted & Welded Joints Screw and form of screw thread **Orthographic Projection of Machine Parts:** 1 Sheet Nut and Bolt, Locking device, Wall bracket **Practice on AUTO CAD:** To draw geometrical figures using line, circle, arc, polygon, ellipse, rectangle - erase and other editing commands and osnap commands (two dimensional drawing only) (Printouts of figures)	10	3

References Books:

1. Engineering Drawing : ND Bhatt
2. Engineering Drawing : R.K. Dhawan
3. Engineering Drawing : B.K.Goel.

e-Learning Source:

https://www.youtube.com/watch?v=gp3oKSEnEFM&list=PLDN15nk5uLiD3MEUiqsYPnZOHcVu7um6_

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2		2		1	-	2	1	-
CO2	3	3	2			2	2	2	3	-	2
CO3	2	3			2		1	3	-	2	1
CO4	2	3	2		2		2	-	2	-	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DPH-151/251	**Title of the Course**	Applied Physics Lab	**L**	**T**	**P**	**C**
Year	1st	**Semester**	1st / 2nd	**0**	**0**	**3**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives							

Course Outcomes	
CO1	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
CO2	Experience and understand basic physical fundamentals and the key vocabulary to describe them: basic Electronics & Electrical, kinematics, dynamics, work and energy, gravitation, fluids.
CO3	Develop skills in observation, interpretation, reasoning, synthesis, generalizing, predicting, and questioning as a way to learn new knowledge.
CO4	Apply conceptual understanding of the physics to general real-world situations.

Experiment No.	Title of the Experiment	Content of the Unit	Contact Hrs.	Mapped CO
1		Determination of 'g' using simple pendulum.	2	1
2		To find the surface Tension of water by the method of capillary rise.	2	1
3		To determine the frequency of A.C. mains by using a sonometer and a horse shoe magnet.	2	1
4		To determine the value of modulus of rigidity of given material of a wire by statical method using Barton's apparatus.	2	1
5		Determination of coefficient of viscosity of water by capillary flow (Poiseuille's method).	2	2
6		To determine the height of a tower by Sextant.	2	3
7		To determine the moment of Inertia of a flywheel.	2	3
8		Determination of velocity of sound by resonance tube.	2	3
9		Determination of resistivity of a given wire by Post Office Box.	2	3
10		By using Potentiometer, determination of (i) E1/E2 (ii) Internal resistance of given cell.	2	4
11		Determination of coefficient of friction on a horizontal plane.	2	1
12		Determination of viscosity coefficient of a lubricant by Stoke's law.	2	4
13		Determination of Spring Constant.	2	4
14		Verification of Kirchoff's laws.	2	2
15		To draw the characteristics of a p-n junction diode.	2	3

Note: Any ten experiments are to be performed.

References Books:

1. Nootan Physics: Kumar & Mittal
2. Applied Physics: P.K. Gupta.
3. Pradeep Fundamental: Gogia & Gomber.

e-Learning Source:

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3												1		2	3	2
CO2	3																2
CO3	2																2
CO4	3																2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session:							
Course Code	DCAD-151	**Title of the Course**	Basic Computer Aided Design Lab	**L**	**T**	**P**	**C**
Year	FIRST	**Semester**	FIRST			**2**	
Pre-Requisite	10 TH PASSED	**Co-requisite**					
Course Objectives	After the successful completion, learner will develop following attributes.						

Course Outcomes	
CO1	Students will develop good communication skills and team work
CO2	Students will become familiar with office practice and standards.
CO3	Students will become familiar with Auto Cad's two-dimensional drawings.
CO4	Student's ability to convert sketches into engineered drawings will increase.
CO5	Students will be able to draw orthographic projections and sections.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	AutoCAD	To study of Auto CAD software	2	CO1
2	Sketch and drafting	Study And Sketch of drafting setting.	2	CO2
3	Dimensional sketch	Study and sketch of Dimensional setting	2	CO3
4	Draw geometrical figure	Draw geometrical figure using drawing commands	2	CO4
5	Modify figure Scaling	To modify a geometrical figure using editing comment.	2	CO5
6	Orthographic	To draw orthographic view of a geometrical figure.	2	CO1
7	Isometric view	To Draw isometric view of a geometrical figure.	2	CO2
8	Different view	To Draw top front and side view of an isometric figure.	2	CO3
9	Sectional view	To draw sectional view of a solid object.	2	CO4
10	Scaling	To do practical on page set up & scaling of drawing.	2	CO5

References Books:

Autocad book by Rohit Mongia

e-Learning Source:

https://www.googleadservices.com

https://www.googleadservices.com

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	2	2	1	1	3	3	3	1
CO2	2	2	3	2	1	1	2	3	1	1	3
CO3	1	3	1	2	2	1	2	1	3	3	2
CO4	2	3	2	2	1	2	3	2	1	2	3
CO5	2	2	3	2	3	1	3	2	2	1	2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session: 2024-25							
Course Code	DEE-151	**Title of the Course**	BASIC ELECTRICAL ENGINEERING-I LAB	**L**	**T**	**P**	**C**
Year	First	**Semester**	First			**2**	-
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Different electrical measuring instruments (Analog and Digital) 2. Study and verification of electrical laws and network theorems.						

Course Outcomes	
CO1	Familiarization of different electrical measuring instruments (Analog and Digital)
CO2	Verifying laws of series and parallel connection of circuit elements.
CO3	Verifying different DC network theorems and electrical machines.

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	Use of ammeter, voltmeter and multimeter	2	1
Experiment-2	To verify the laws of series and parallel connections of resistance.	2	2
Experiment-3	To verify the laws of series and parallel connections of capacitance.	2	2
Experiment-4	Verification of Ohm's law.	2	2
Experiment-5	To verify Kirchhoff's first laws: The algebric sum of the currents at a junction is zero.	2	2
Experiment-6	To verify Kirchhoff's second laws: The algebric sum e.m.f. in any closed circuit is equal to the algebric sum of IR products (drops) in that circuit.	2	2
Experiment-7	To measure the resistance an ammeter and a voltmeter and to conclude that ammeter has very low resistance whereas voltmeter has very high resistance.	2	2
Experiment-8	To verify Thevenin's theorems.	2	3
Experiment-9	Study of 1-phase Energy meter.	2	3
Experiment-10	Study of running and reversing of a 3-phase Induction motor.	2	3
Experiment-11	Measurement of Efficiency of a 1- phase transformer by load test.	2	3
Experiment-12	Study of phenomenon of resonance in RLC series circuit.	2	3
Experiment-13	Practice in making different types of wiring and control of lamp with one or many switches.	2	2

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1			2					3	1	3			2	
CO2		1	3		2				1				2	
CO3		1	3		2				1				3	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University,

Effective from Session: 2010-11							
Course Code	DWS-151	**Title of the Course**	WORKSHOP PRACTICE	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**0**	**0**	**3**	**30**
Pre-Requisite	Metric Qualified	**Co-requisite**					
Course Objectives	The Workshop Practice course is designed to provide hands-on experience with essential tools, machines, and techniques used in various engineering workshops. Students will learn the principles and operations of turning, tapering, threading, and grinding in the lathe shop, emphasizing precision machining and tool grinding. In the fitting and bench working shop, students will practice filing, drilling, tapping, dieing, and creating accurate male-female joints. The blacksmith shop focuses on foundational operations like upsetting, punching, bending, and swaging. Welding exercises include butt joints, lap joints, and oxy-acetylene welding. In the sheet metal shop, students will fabricate objects like funnels, trays, and electrical panel boxes with soldering and forming techniques. Carpentry introduces students to woodworking tools, joints like half-lap and mortise-tenon, and basic lathe operations. Finally, in the foundry, students will make moulds with single and multi-piece patterns, create cores, and cast aluminium. The course aims to equip students with practical skills and knowledge for effective problem-solving and application in mechanical engineering.						

Course Outcomes	
CO1	To acquire skills in basic engineering practice.
CO2	To identify the hand tools and instruments.
CO3	To acquire measuring skills.
CO4	To acquire practical skills in the trades.
CO5	To provides the knowledge of job materials in various shops.
CO5	To provides the knowledge of core technical subjects for making and working of any type of project.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1.	Machine Shop	a. Study of tools and operations b. Plane turning c. Step turning d. Taper turning e. Threading f. Single point cutting tool grinding	6	CO1
2.	Fitting Bench Working Shop	a. Study of tools and operations b. Simple exercises involving filing work c. Making perfect male-female joint d. Simple exercises involving drilling/tapping/die	3	CO2
3.	Black Smithy Shop	a. Study of tools and operations b. Simple exercises based on black smithy operations such as c. Upsetting/drawing down, punching, bending, fullering and swaging	3	CO2
4.	Welding Shop	a. Study of tools and operations b. Simple butt Joint c. Lap Joint d. Oxy acetylene welding	6	CO3
5.	Sheet Metal Shop	a. Study of tools and operations b. Making funnel complete with soldering c. Fabrication of tool box, tray, electrical panel box etc.	3	CO4
6.	Carpentry Shop	a. Study of tools and operation and carpentry Joints. b. Simple exercise using jack plain c. To prepare half lap corner, joint, mortise and tenon joints. d. Simple exercise on woodworking lathe.	3	CO5
7.	Foundry	a. Making a mould using single piece pattern b. Making a mould using two piece pattern c. Making a mould using a pattern with core print d. Making Pouring and Making an Aluminium Casting.	6	CO5
References Books:				

Integral University,

Workshop Technology by R. S. Khurmi
e-Learning Source:
https://www.youtube.com/watch?v=sHbvMmOKdjg&list=PL8PvmC2cEsGSCry_RY0Qk2PcsNI5DQZ-h&index=2

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
CO1	2	-	-	2	2	-	-	2	-	-	-	2	2
CO2		-	-	-	3	-	-	-	2	-	-	3	-
CO3	3	-	-	2		-	3	2	-	-	-	2	-
CO4	-	-	-	-	2	-	2	2	-	2	-	2	-
CO5	-	-	-	3	2	-	2	3	2	-	-	-	3
	3	-	-	-	-	2	2	2	-	-	3	-	2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**