Effective from Session: 2024-25							
Course Code	DMA-101	**Title of the Course**	APPLIED MATHEMATICS-I	**L**	**T**	**P**	**C**
Year	Ist	**Semester**	1st	**03**	**01**	**00**	**-**
Pre-Requisite	NA	**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
UNIT-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	CO1
UNIT-2	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	CO2
UNIT-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	CO3
UNIT-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	CO4
UNIT-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	CO5

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: 2015							
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**

Effective from Session: 2015							
Course Code	DCH-101	**Title of the Course**	Applied Chemistry-I	L	T	P	C
Year	I	**Semester**	I	3	1	0	0
Pre-Requisite	None	**Co-requisite**	None				
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	Atomic Model helps to explain the significance of atomic models in designing materials at the atomic and molecular level. Governing atomic structure and their application in engineering fields like semiconductor physics and nanotechnology. The ability to analyze electron configurations and predict how they influence material properties, such as electrical conductivity, magnetic behavior, and chemical reactivity.
CO2	To explain the fundamental types of chemical bonds (ionic, covalent, and metallic) and their significance in determining the properties of engineering materials. Understand the role of electrons in bond formation and the concept of valency. Classify different types of chemical bonds based on electron sharing or transfer.
CO3	Fundamental concepts of electrochemistry, including oxidation-reduction (redox) reactions, electrolytes, electrodes, and electrochemical cells. Analyze standard electrode potentials, and apply the Nernst equation to calculate cell potentials under different conditions. Distinguish between different types of electrochemical cells, such as galvanic (voltaic) and electrolytic cells, and describe their operational principles.
CO4	Explain the fundamental principles of chemical kinetics, including the definition of reaction rate, rate laws, and the role of molecular collisions in reactions. Determine the rate law for a chemical reaction, identify the order of the reaction with respect to each reactant, and calculate the overall reaction order.
CO5	Identify and explain various physical, chemical, and biological parameters of water quality, including turbidity, pH, dissolved oxygen, hardness, and biological oxygen demand (BOD). Describe the basic water treatment processes such as coagulation, flocculation, sedimentation, filtration, and disinfection.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-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.	10	CO1
Unit-2	**Chemical Bonding**	Overview of basic concept of Ionic, Covalent & Co-ordinate bonds, Hydrogen bonding, Valence bond theory, Hybridization, VSEPR theory, Molecular orbital theory.	06	CO2
Unit-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.	10	CO3
Unit-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.	07	CO4
Unit-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.	07	CO5

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

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	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

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

Effective from Session: 2015							
Course Code	DCE-101	**Title of the Course**	BUILDING MATERIALS- I	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	3	1	0	
Pre-Requisite	DCE-101	**Co-requisite**	NA				
Course Objectives	To introduce different materials used in construction industry.						

Course Outcomes	
CO1	Examine the properties of common construction materials and their behaviors under different environments, short or long-term
CO2	Appraise appropriateness and sustainability of materials for construction project
CO3	Understand the Types, Grades, composition, Ingredients and Manufacturing of Important Building Materials Such as Bricks, Lime and Cement
CO4	Name the constituents of Portland cement concrete and proportion concrete mix design
CO5	Understand the use of non-conventional Civil Engineering material

UnitNo.	Title of the Unit		Contact Hrs	Mapped CO
UNIT-I	**Building Stones**	Classification of rocks: Geological and physical classification. Common rock forming minerals; Testing of stones for specific gravity, water absorption, durability, weathering, hardness by Mohr's scale, identification of rocks.	07	CO-1, CO-2
UNIT-II	**Quarrying**	Quarrying: Terminology used in quarrying; basic principles involved, methods of quarrying. Blasting: where used, principles of blasting, line of least resistance, drilling of holes (manually and mechanically), charging, tamping, firing, fuses and detonators, safety precautions, common explosives only names, their uses and storage. Wedging: Where used, tools required and operation of wedging. Stone crushing: Process & equipment used, crushers, grinding mills like hammer mill, ball mill & screens. Availability, characteristics and uses of the following stones: Granite, sandstone, limestone, dolomite, slate, basalt, trap, quartzite and marble, Availability of different stones in state.	10	CO-1
UNIT-III	**Bricks and Clay Products**	Brick: Raw materials for brick manufacture, properties of good brickmaking earth, field testing of brick clay. Manufacture of bricks: Preparation of clay-manually/mechanically. Moulding: Hand moulding and machine moulding, drying of bricks, Burning of bricks. Clamps: Types of kilns, details of Bull's trench kiln and Hoffman's Kiln, process of burning, size of standard bricks. IS Classification of bricks as per IS: 1077 and testing of common building bricks as per IS: 3495 recommendations. Compressive strength, water absorption, efflorescence test. Refractory bricks: Composition, properties and uses. Building tiles: Types of walls, ceiling, roofing and flooring tiles, properties and uses. Other clay products: Earthenware and stoneware, their properties and uses.	09	CO-3, CO-5
UNIT-IV	**Lime**	Natural sources of lime. Definitions of quick lime, fat lime, hydraulic lime, hydrated lime, lump lime, calcination, slaking, manufacture of lime. Process of setting and hardening action of lime. Field tests of lime as per IS-1624. Pozzolanic materials. Types, properties and uses.	07	CO-3, CO-2, CO-5
UNIT-V	**Cement**	Natural and artificial cement, raw materials, manufacture of ordinary Portland cement, flow diagrams for dry and wet process. Setting and hardening of cement, types of cement, properties of cement and tests of cement as per IS.	07	CO-3, CO-4

References Books:

1. Building Construction: Jha J & Sinha, S.K.

2. A Text Book of Building Construction: Arora, S.P. & Bindra, S.P.

3. Building Materials: S.K. Duggal

e-Learning Source:

https://youtu.be/kVopWFgOcrU

https://youtu.be/cx5gPKp9QEc

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

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

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

INTEGRAL UNIVERSITY

Effective from Session: 2015								
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 drawings 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 drawings, 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. Pencils 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	CO2
2	**Conventional Presentation, 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 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	CO3
3	**Section of Solids and Isometric Projection**	Concept of sectioning Cases involving cutting planes parallel to one of the reference planes and perpendicular to the others. Cases involving cutting planes perpendicular to one of the reference planes and inclined to the others plane, true shape of the section Isometric Projection: Isometric scale Isometric projection of solids.　　　1 Sheet	8	CO2
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 development. Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid).	8	CO4
5	**Assembly and Disassembly Drawings, Orthographic Projection of Machine Parts and Practice on AUTO CAD**	Assembly and Disassembly Drawings: Plummer block, Footstep bearings, Couplings etc. Rivetted & Welded Joints, Screw and form of screw thread　　　　2 Sheet Orthographic Projection of Machine Parts: Nut and Bolt, Locking device, Wall bracket Practice on AUTO CAD: To draw geometrical figures using line, circle, arc, polygon, ellipse, rectangle - eraser and other editing commands and snap commands (two dimensional drawing only).　　　　　　　　　　　　　　(Printouts of figures)	10	CO3

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**

Effective from Session: 2024-25							
Course Code	DAM-101	Title of the Course	APPLIED MECHANICS-I	L	T	P	C
Year	I	Semester	I	3	1	0	
Pre-Requisite	10th	Co-requisite	-				
Course Objectives	1. The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, laws of motion and moments which are required by the students for further understanding of other allied subjects. 2. The subject of Applied Mechanics enhances the analytical ability of the students.						

Course Outcomes	
CO1	The students will be able to Interpret various types of units and their conversion from one to another.
CO2	Analyze different types of forces acting on a body and draw free body diagrams.
CO3	Determine the resultant of coplanar concurrent forces and basic concepts of beam.
CO4	To understand basic concept of moment and its application.
CO5	Determine the resultant of forces by moment and understand equilibrium conditions of bodies.

Unit No.	Title of the Unit	Content of Unit	Contact tHrs.	Mapped CO
I	Introduction	**Introduction:** Concept of engineering mechanics, definition of mechanics, statics, dynamics, application of engineering mechanics in practical fields. Definition of Applied Mechanics. Definition, basic quantities and derived quantities of basic units and derived units. Different systems of units (FPS, CGS, MKS and SI) and their conversion from one to another for density, force, pressure, work, power, velocity, acceleration, Concept of rigid body, scalar and vector quantities	8	CO1
II	Forces	**Forces:** Definition of force, measurement of force in SI units, its representation, types of force: Point force/concentrated force & uniformly distributed force, effects of force, characteristics of a force. Different force systems (coplanar and non-coplanar), principle of transmissibility of forces, law of superposition. Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, [Simple problems]	8	CO2
III	Laws of forces & Beams	**Laws of forces:** laws of forces, triangle law of forces, polygon law of forces - graphically, analytically, resolution of forces, resolving a force into two rectangular components Free body diagram Equilibrant force and its determination Lami's theorem (concept only) **Beams:** Type of Load, supports, Beams- definition, types and analysis for simply supported, cantilever beams [Simple problems on above topics]	8	CO3
IV	Moment	**Moment:** Concept of moment. Moment of a force and units of moment. Varignon's theorem (definition only). Principle of moment and its applications (Levers – simple and compound, steel yard, safety valve, reaction at support). Parallel forces (like and unlike parallel force), calculating their resultant	10	CO4
V	Couple	**Couple:** Concept of couple, its properties and effects. General conditions of equilibrium of bodies under coplanar forces. Position of resultant force by moment [Simple problems on the above topics]	6	CO5

References Books:

1. Applied Mechanics & Strength of Material : R.S. Khurmi , S.Chand Publication

2. Applied Mechanics : Hemendra Dutt Gupta, Navbharat Publication

e-Learning Source:

https://www.youtube.com/watch?v=nGfVTNfNwnk

https://www.youtube.com/watch?v=TnWBAnkCDuc&list=PLq7jO-L_k0yUk2tfPwhea9asGRBXcUEpL

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

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

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

Effective from Session: 2015							
Course Code	DCH-151	**Title of the Course**	Applied Chemistry Lab	L	T	P	C
Year	I	**Semester**	I	0	0	2	0
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	1. To understand all the chemical reactions, principle and analysis of chemicals 2. To examine the unknown chemical compounds and unsolved problems as much as possible 3. To analyse the water related to industrial as well as domestic proposes						

	Course Outcomes
CO1	The process of qualitative analysis by applying knowledge of acidic basic nature of chemical properties and ions that sharpens the laboratory skills.
CO2	The careful analysis of substances to ensure the correct compounds are used or safely disposed of during the manufacturing process.
CO3	Fundamental concepts of electrochemistry, including oxidation-reduction (redox) reactions, electrolytes, electrodes, and electrochemical cells.
CO4	To identify the components in a mixture, whether it's for designing manufacturing processes, dealing with wastewater treatment, or working with catalysts and chemical reactions.
CO5	Identify the chemical, and biological parameters of water quality, including turbidity, pH, temporary and permanent hardness. 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.	Experiment No		Contact Hrs.	Mapped CO
1	**Experiment 1**	Analysis of acid and basic radical of inorganic mixture No1	2	1
2	**Experiment 2**	Analysis of acid and basic radical of inorganic mixture No2	2	1
3	**Experiment 3**	Analysis of acid and basic radical of inorganic mixture No3	2	2
4	**Experiment 4**	Analysis of acid and basic radical of inorganic mixture No4	2	2
5	**Experiment 5**	Determination of chloride content by Mohr's method in supplied water	2	3
6	**Experiment 6**	Testing of total hardness of water sample by EDTA titration method in terms of CaCO3	2	3
7	**Experiment 7**	Analysis of temporary hardness in water sample through O'Hener's method	2	4
8	**Experiment 8**	Dissolve oxygen analysis in water sample	2	5
9	**Experiment 9**	Analysis of strength of HCl solution through NaOH solution by using pH meter	2	5

References Books:

1. Applied Chemistry: R. S. Katiyar and J. P. Chaudhary

2. Applied Chemistry: Rakesh Kapoor

https://drive.google.com/file/d/1K_tMkEUCeiEuWuTuUHf2fYrn0ASKdFvl/view?usp=drive_link
https://drive.google.com/file/d/16AxAY-ykhA-nhABsMQGPe7W3sI6g6HMT/view?usp=drive_link
https://drive.google.com/file/d/10huj7rhxLNrJxjXELMmmgimUVBu-X_mC/view?usp=drive_link
https://drive.google.com/file/d/1YE5zh9X_ZNKZgb01vyPjn15P8QlaedWY/view?usp=drive_link
https://drive.google.com/file/d/1X-zvmfiPgJ_LvbxI7X5ciwJBXHvhadHI/view?usp=drive_link
https://drive.google.com/file/d/18GE6ureXZhU8_H6ieqD5dkaeI-Xgo1jZ/view?usp=drive_link
https://drive.google.com/file/d/10yJEYjqYJMl5fhv4zLPEx9Mr7ZflQTM0/view?usp=drive_link
https://drive.google.com/file/d/17MlIBcwsWhaaWq0RpZRHwlzKGigw6Muc/view?usp=drive_link
https://drive.google.com/file/d/1zHoVQc0zC8GW7LSoIxkjmEevHjYfY8iK/view?usp=drive_link

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	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

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

Integral University, Lucknow

Effective from Session: 2015								
Course Code	DAM-151	**Title of the Course**	APPLIED MECHANICS LAB.	**L**	**T**	**P**	**C**	
Year	1	**Semester**	I			2		
Pre-Requisite	10 th pass	**Co-requisite**						
Course Objectives	To provide a quality education for students entering the mechanical engineering profession or Seeking careers in related fields.							

Course Outcomes	
CO1	Learn basics of machine mechanics.
CO2	Students learn how to operate different lifting machines.
CO3	Students learn how to calculate the mechanical advantage of different lifting machines.
CO4	Learn basics of principle of moments, resolution of forces and coefficient friction.
CO5	Students learn about the efficiency of different machines.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Law of Polygon	To verify the law of Polygon of forces	2	3
2	Law of parallelogram and triangle	To verify the law of parallelogram and triangle of forces	2	1
3	Law of principle of moments	To verify the law of principle of moments	2	4
4	Coefficient of friction	To find the coefficient of friction between wood, steel, copper and glass	2	4
5	Reaction at supports	To find the reaction at supports of a simply supported beam carrying point loads only	2	1
6	Forces in the jib & tie of a jib crane	To find the forces in the jib & tie of a jib crane	2	2
7	Forces in the members of a loaded roof truss	To find the forces in the members of a loaded roof truss	2	2
8	Mechanical advantages, velocity ratio and efficiency	To find the mechanical advantages, velocity ratio and efficiency of any: (i)Simple wheel & axle (ii) Differential wheel & axle (iii) Differential pulley block (iv)Simple Screw jack (v) Simple Worm & worm wheel (vi) System of Pulleys (any type).	6	3,5

References Books:

1. Applied Mechanics & Strength of Material: R.S. Khurmi

2. Applied Mechanics: Hemendra Dutt Gupta

e-Learning Source:

https://www.youtube.com/watch?v=alHUJ-jvrpU&list=PLCGTVPoYH6Rbj2Ye38lQgUKACNMMem-wA

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

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

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

Effective from Session: 2015							
Course Code	DCE-151	**Title of the Course**	Building Materials Lab.	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	0	0	3	
Pre-Requisite	DCE-151	**Co-requisite**	NA				
Course Objectives	The objective of the Building Material Lab is to provide students with hands-on experience in testing, analyzing, and evaluating various construction materials						

Course Outcomes	
CO1	Able to design and test the materials either in the laboratory or in the field before their actual use at the site.
CO2	Able to Impart the knowledge about the characteristics, sources and defects in various materials used for construction purposes.
CO3	Able to attain the knowledge of different components of building, their classification, materials and methods of construction and causes of their failures.
CO4	To examine and identify different types of stones and aggregates i.e. the Visual identification of these materials' specimen present in the Lab.
CO5	Identification of timbers i.e. the visual identification of specimen of different Exogenous Trees.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Experiment No.1	Identification of different types of stones and aggregates (visual identification).	3	CO1
2	Experiment No.2	Identification of timbers: teak, sal, chir, shisum, siras, deodar, kail	3	CO1
3	Experiment No.3	To determine normal consistency of cement.	3	CO1
4	Experiment No.4	To determine setting time (initial and final) of cement.	3	CO2
5	Experiment No.5	To determine fineness of given sample of cement.	3	CO2
6	Experiment No.6	To determine compressive strength of bricks.	3	CO3
7	Experiment No.7	To determine water absorption of bricks	3	CO3
8	Experiment No.8	To determine soundness of cement.	3	CO3
9	Experiment No.9	To identify hydraulic & fat lime.	3	CO4
10	Experiment No.10	Identification of different types of stones and aggregates (visual identification).	3	CO4

References Books:

1. Lab Manual.

e-Learning Source:

1. https://www.youtube.com/watch?v=fysIAYNBoe4&list=PLk7ptZcI9vmhBh7evUtxAbHe3Ojs_099H

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

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

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

Integral University, Lucknow

Effective from Session: 2015							
Course Code	DCS-151	**Title of the Course**	Computer Application Lab.	**L**	**T**	**P**	**C**
Year	1ST	**Semester**	1ST	1	0	2	
Pre-Requisite	DCS-151	**Co-requisite**					
Course Objectives	To develop basic knowledge and understanding of Computers and C programming language.						

Course Outcomes	
CO1	Students become familiar with the basic fundamentals and concepts of Computer
CO2	Practical knowledge of the MS Office package, viz. MS Word, MS Excel and MS PowerPoint.
CO3	Students are trained in the basic concepts of the C programming language
CO4	Students will be able to develop logic which will help them to create basic programs and applications in C.
CO5	The course is designed to provide complete knowledge of C language.

Practical No.	List of Practical's	Contact Hrs.	Mapped CO
1	Introduction of computer types, generation, Application, characteristic & Memory.	03	CO1
2	Introduction and practice of MS-Office package (MS-Word, MS- Excel, MS- Power point & MS-Access).	03	CO2
3	Introduction & Practice of Internet and e-mail.	03	CO2
4	Programming of 'C'- History, character set, variables, and keywords, token data types of input and output function.	03	CO3
5	Introduction of Decision control statement- if, if- else, nester if statement and switch case.	03	CO3
6	Programming practice of if, if – else, nested if statement and switch case.	03	CO4
7	Loops- while loop, do- while loop, for loop, break and continuous statements.	03	CO4
8	Programming practice of while loop do- while loop, for loop, break and continuous statements.	03	CO-4
9	Array Declaration, initialization of one- and two-dimensional array.	03	CO-5
10	Programming practice on array.	03	CO-5

References Books:
1.Computer fundamental- Sinha & Sinha
2.Computer Basics & 'C'- V. Rajaraman
3.Office 2007 -Ruthosky, Seguim, Ruthosky
4.Programming in ANSI- E Balagurusamy

e-Learning Source:
https://www.youtube.com/watch?v=6Whoycu9vek&list=PLrjkTql3jnm9Uk9a5biL5bdtjSWJGX9f8

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

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

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