



## 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 <sup>st</sup>	Semester	I <sup>st</sup>	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
1.	i) Series ii) Binomial Theorem iii) Determinants	<b>Series:</b> <b>Arithmetical Progression:</b> nth term of AP, Sum of 'n' terms, Arithmetic Mean. <b>Geometrical Progression:</b> nth term of GP, Sum of 'n' terms & infinite terms, Geometric Mean. <b>Binomial theorem:</b> Definition of factorial notation, permutation and combination, Binomial theorem for positive index, negative and fractional index (without proof), Application of Binomial theorem. <b>Determinants:</b> 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	<b>Trigonometry:</b> Relation between sides and angles of triangles: Simple cases only. <b>Vector Algebra:</b> Dot and Cross product, Scalar and vector triple product.	07	2
3.	Complex Number	<b>Complex Number:</b> 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	<b>Differential Calculus-I</b> <b>Functions, limits, continuity:</b> 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. <b>Methods of finding derivative:</b> 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	<b>Differential Calculus - II</b> <b>Differentiation:</b> Logarithmic differentiation, Function with respect to another function, Function power function, Higher order derivatives. <b>Application:</b> Finding Tangents, Normal. Maxima/Minima.	08	5

<b>References Books:</b>											
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.											
<b>e-Learning Source:</b>											
<a href="https://youtu.be/syLIPtxjN0E?si=OrM4IRejVzgmwWpl">https://youtu.be/syLIPtxjN0E?si=OrM4IRejVzgmwWpl</a>											

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
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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	<b>Measurement &amp; Vector</b>	<b>Measurement:</b> 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. <b>Vector:</b> Scaler and vector quantities; Addition, Subtraction, Resolution of vector; Cartesian components of vector, Scaler and vector product of vectors	6	CO-1
Unit-2	<b>Force and Motions, Fluid mechanics and fiction, Work, Power and Energy</b>	<b>Force and Motions:</b> 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. <b>Fluid mechanics and fiction:</b> 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. <b>Work, Power and Energy:</b> 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	<b>Elasticity</b>	<b>Elasticity:</b> 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	<b>Gas laws and specific heats of gases</b>	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	<b>Heat transfer and radiation</b>	<b>Heat transfer and radiation:</b> 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=VOn3l74xnpyldfbm>



PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO																	
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
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## Integral University, Lucknow

Effective from Session:							
Course Code	DCH-101	Title of the Course	Applied Chemistry	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	Basic concept of atomic structure, Matter wave concept, Quantum number, Heisenberg's uncertainty principle, Shapes of orbital	10	
	Classification of Elements	Modern classification of elements (s, p, d, and f block elements), periodic properties: ionization potential, electro negativity, electron affinity.		
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	
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	
Unit-4	Chemical Kinetics	Introduction, Law of mass action, order and molecularity of reaction. Activation energy, rate constants, 1st order reactions and 2nd order reactions.	07	
	Catalysis	Definition, catalytic reactions properties, Catalytic promoters & poison, autocatalysis & negative catalysis. Theory of catalysis & applications.		
	Solid State	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.		
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	07	



## Integral University, Lucknow

		water treatment, Definition of BOD & COD. Numerical problems based on topics.		
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### 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&rtpof=true&sd=true](https://docs.google.com/document/d/1f9FaU1Y8D6D_5DRCJXXIunGXageT23G0/edit?usp=drive_link&ouid=106019737385905957374&rtpof=true&sd=true)  
[https://drive.google.com/file/d/1lsZHgt7nIldB0iReCbTaP53JZjgziOZ3/view?usp=drive\\_link](https://drive.google.com/file/d/1lsZHgt7nIldB0iReCbTaP53JZjgziOZ3/view?usp=drive_link)  
[https://drive.google.com/file/d/1lymiyHymX86HqsdnkmulsvZp-zIm02RR/view?usp=drive\\_link](https://drive.google.com/file/d/1lymiyHymX86HqsdnkmulsvZp-zIm02RR/view?usp=drive_link)  
[https://drive.google.com/file/d/1mH1CQmpYlKJeTvyi018gIW2KUS4l-9RK/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	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

 <b>Dr. Rida Sagheer</b> <b>Name &amp; Sign of Program Coordinator</b>	<b>Sign &amp; Seal of HoD</b>
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## Integral University, Lucknow

Effective from Session: 2015							
Course Code	DAR-101	Title of the Course	TECHNICAL DRAWING-I	L	T	P	C
Year	I	Semester	I	3	1	-	-
Pre-Requisite	-	Co-requisite	-				
Course Objectives	1. The course aims at developing the requisite level of proficiency in drawing, which is seen as a primary communication tool in the practice of architecture just like language. 2. Students shall be familiarized with a range of techniques of expression beginning with manual drawing. 3. Familiarization with drafting tools and accessories. 4. Comprehension and visualization of geometrical forms.						

Course Outcomes	
CO1	Students shall be familiarized with arrange of Techniques of expression beginning with manual drawing.
CO2	They will learn drafting, lettering and rendering techniques.
CO3	They will learn about the differences between 2D&3D objects.
CO4	They will learn about Comprehension and visualization of geometrical forms
CO5	Students shall be familiarized with drafting tools and accessories

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
UNIT-I	Printing & Scale	Printing & lettering – small & capital letters, both vertical & italics. Roman printing as per I.S. code and lettering. Scale construction of plane, diagonal & Vernier scales & their use.	8	2
UNIT-II	Plane Geometry	Plane geometry problems of lines, triangles, polygons & circles.	8	3
UNIT-III	Orthographic Projections	Difference & use of I angle and III angle projections I-angle orthographic projections.	8	5
UNIT-IV	Isometric Projections	Isometric projections of simple compound solids. Isometric views of building block, a column with isolated footing.	8	4
UNIT-V	Wall Section	Wall section through arch, door & window.	8	1

References Books:	
1. Engineering Drawing: ND Bhatt	
2. Engineering Drawing: R.K. Dhawan	
3. Engineering Drawing: B.K. Goel	
e-Learning Source:	
<a href="https://nptel.ac.in/courses/112103019">https://nptel.ac.in/courses/112103019</a>	

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	-	-	2	1	-	-	-	-	-	-	3	-	-	
CO2	-	3	-	-	-	3	-	-	-	-	-	-	-	2	-	3	
CO3	-	3	-	-	-	3	-	-	-	-	-	-	-	-	3	-	
CO4																	
CO5																	

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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## Integral University, Lucknow

Effective from Session: 2015							
Course Code	DAR-102	Title of the Course	BUILDING MATERIALS	L	T	P	C
Year	I	Semester	I	3	1	0	
Pre-Requisite	DAR-102	Co-requisite	NA				
Course objectives	To impart knowledge about building materials used for construction.						

Course Outcomes	
<b>CO1</b>	Identify and characterize building materials
<b>CO2</b>	Understand the manufacturing process of bricks and cement
<b>CO3</b>	Identify the methods for preservation of timber and metals.
<b>CO4</b>	Learn the basic theory about important building material.
<b>CO5</b>	Proper selection of Paints.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
<b>UNIT-I</b>	<b>Building Stones, Bricks and Timber</b>	Classification of rocks, selection of stones for different building works. Classification of bricks, characteristics of good bricks, size and weight of standard brick. Composition of brick earth. Introduction, classification, property and uses. Defects in timber and prevention.	8	CO-1
<b>UNIT-II</b>	<b>Lime and Cement</b>	Use of lime, setting and hardening action of lime. Introduction, properties and uses of cement, chemical constituents of cement. Functions of ingredients of cement. Setting and hardening of cement types of cement, grading of cement.	8	CO-2
<b>UNIT-III</b>	<b>Concrete</b>	Introduction, characteristics of good concrete, classification of concrete, plain cement concrete, pre-cast concrete, general aspects and application of fly-ash.	8	CO-3
<b>UNIT-IV</b>	<b>Glass, Insulating Materials</b>	Introduction, properties of glass, sheet glass, float glass, plate-glass, bullet-proof glass, fiber glass. Heat and sound insulating materials, uses of cork, slag wool, light weight concrete, aluminum foil.	8	CO-4
<b>UNIT-V</b>	<b>Paints, Varnishes, Distempers and Gypsum plaster</b>	Definition of paints, function of paints, constituents of an oil paint and their functions, characteristics of good paint. Types of paints, failure of paint, defects in painting. Definition of varnish, functions of varnish, ingredients of varnish, characteristics of gold varnish, types of varnish, distemping process, properties of distempers, white washing, color washing and gypsum plaster.	8	CO-5

### References Books:

1. Building Material : Sushil Kumar
2. Building Construction : S.K.Sinha & J. Jha

### e-Learning Source:

1. <https://www.youtube.com/live/Gcmh-als2-c?si=JI2paggbK621LGt->

PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PSO1	PSO2	PSO3
<b>CO1</b>	-	-	-	3	-	2	-	-	-	3	-	2	-	-	3	2
<b>CO2</b>	-	-	-	3	-	2	-	-	-	3	-	2	-	2	-	-
<b>CO3</b>	-	-	-	3	-	2	-	-	-	3	-	2	-	1	-	3
<b>CO4</b>	-	-	-	3	-	2	-	-	-	3	-	2	-	-	2	-
<b>CO5</b>	-	-	-	3	-	2	-	-	-	3	-	2	-	1	-	3

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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## Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	DEE-101	Title of the Course	BASIC ELECTRICAL ENGINEERING	L	T	P	C
Year	First	Semester	First	3	1	2	-
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. motor, 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
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## Integral University, Lucknow

Effective from Session: 2017-18							
Course Code	DCH-151	Title of the Course	Applied Chemistry Lab Practical	L	T	P	C
Year	I	Semester	I			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						

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 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
	Experiment 1	Analysis of acid and basic radical of inorganic mixture No1	2	1
	Experiment2	Analysis of acid and basic radical of inorganic mixture No2	2	1
	Experiment3	Analysis of acid and basic radical of inorganic mixture No3	2	2
	Experiment4	Analysis of acid and basic radical of inorganic mixture No4	2	2
	Experiment5	Determination of chloride content by Mohr's method in supplied water	2	3
	Experiment6	Testing of total hardness of water sample by EDTA titration method in terms of CaCO <sub>3</sub>	2	3
	Experiment7	Analysis of temporary hardness in water sample through O'Hener's method	2	4
	Experiment8	Dissolve oxygen analysis in water sample	2	5
	Experiment9	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\\_tMkEUCeiEuWuTuUHF2fYrn0ASKdFvI/view?usp=drive\\_link](https://drive.google.com/file/d/1K_tMkEUCeiEuWuTuUHF2fYrn0ASKdFvI/view?usp=drive_link)  
[https://drive.google.com/file/d/1X-zvmfiPgJ\\_LvbxI7X5ciwJBXHvhadHI/view?usp=drive\\_link](https://drive.google.com/file/d/1X-zvmfiPgJ_LvbxI7X5ciwJBXHvhadHI/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

 <b>Dr. Rida Sagheer</b> Name & Sign of Program Coordinator	Sign & Seal of HoD
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## Integral University, Lucknow

Effective from Session: 2015						
Course Code	DAR-152	Title of the Course	Building Materials Lab	L	T	P C
Year	I	Semester	II	0	0	2
Pre-Requisite	NA	Co-requisite	NA			
Course objectives	To provide diploma students with practical experience in testing and analyzing the physical, mechanical, and chemical properties of construction materials to ensure their quality and suitability for building projects.					

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 & Identification of timbers i.e. the visual identification of specimen of Exogenous Trees.
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	To determine the Strength of various Engineering Materials and Conduct the Field Test of Cement, Lime and Bricks.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Experiment No-1	Identification of different types of stones and aggregates (visual identification).	2	CO-1
2	Experiment No-2	Identification of timbers: Teak, Sal, Chir, Shisum, siras, deodar, kail and mango. (visual identification)	2	CO-1
3	Experiment No-3	To conduct field tests of cement.	2	CO-2
4	Experiment No-4	To determine normal consistency of cement.	2	CO-2
5	Experiment No-5	To determine setting time (initial and final) of cement.	2	CO-3
6	Experiment No-6	To determine fineness of given sample of cement.	2	CO-3
7	Experiment No-7	To determine compressive strength of bricks.	2	CO-4
8	Experiment No-8	To determine water absorption of bricks	2	CO-4
9	Experiment No-9	To determine soundness of cement.	2	CO-5
10	Experiment No-10	To identify hydraulic & fat lime.	2	CO-5

### References Books:

1. Lab manual of University Polytechnic Department

### e-Learning Source:

1. <https://www.youtube.com/live/3OXoo2WXTws?si=TqZdQQvc-c3H5Thp>

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PSO1	PSO2	PSO3
CO1	2									3	2	2				
CO2	2									3	2	2				
CO3	2									3	2	2				
CO4	2									3	2	2				
CO5	2									3	2					

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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## Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	DEE-151	Title of the Course	BASIC ELECTRICAL ENGINEERING 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 algebraic sum of the currents at a junction is zero.	2	2
Experiment-6	To verify Kirchhoff's second laws: The algebraic sum e.m.f. in any closed circuit is equal to the algebraic 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

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**

<b>Name &amp; Sign of Program Coordinator</b>	<b>Sign &amp; Seal of HoD</b>
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## Integral University, Lucknow

Effective from Session: 2016-17							
Course Code	DCS-151/DCS-251	Title of the Course	Computer Application Lab	L	T	P	C
Year	1 <sup>st</sup>	Semester	1 <sup>st</sup> / 2 <sup>nd</sup>	1		2	
Pre-Requisite		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 with the basic concepts of the C programming language
CO4	Students will be able to develop logics 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 Practicals	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 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, Seguin, Ruthosky	
4.Programming in ANSI- E Balagurusamy	
e-Learning Source:	

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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