Integral University, Lucknow
University Polytechnic
Study and Evaluation Scheme

Program: Diploma in Architecture

Semester- I

S. No.	Course code	Course Title	Type of Paper	Period Per hr./week/sem.			Evaluation Scheme				Sub. Total	Credit	Total Credits	Attributes						
				L	T	P/ST	CT	TA	Total	ESE				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics
THEORIES																				
1	DMA-101	Applied Mathematics-I	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y		Y				
2	DPH-101	Applied Physics (A)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
3	DCH-101	Applied Chemistry (A)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
4	DAR-101	Technical Drawing-I	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
5	DAR-102	Building Materials	Core	03	01	00	40	20	60	40	100	1:3:0	4	Y	Y	Y		Y		
6	DEE-101	Basic Electrical Engineering-I	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y		Y				
1	DCH-151	Applied Chemistry Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y		Y		
2	DAR-152	Building Materials Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y		Y		
3	DEE-151	Basic Electrical Engineering-I Lab	Core	00	00	02	40	20	60	40	100	0:0:1.5	1.5	Y		Y				
4	DCS-151	Computer Application Lab	Core	01	00	02	40	20	60	40	100	1:0:1	2	Y	Y	Y				
5	GP-151	General Proficiency		_	_	_	_	_	60	_	60								Y	Y
Total				19	06	08	**400**	200	660	400	1060		29.5							

Effective from Session: 2024-25							
Course Code	DMA-101	**Title of the Course**	APPLIED MATHEMATICS-I	**L**	**T**	**P**	**C**
Year	IST	**Semester**	IST	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 it's 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:** n^{th} term of AP, Sum of 'n' terms, Arithmetic Mean. **Geometrical Progression:** n^{th} 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
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	2
3	i) **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	i) **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	i) 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: 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://www.youtube.com/watch?v=syLIPtxjN0E&list=PLn78sdsv0QoXBxWmyGp5SQdg-F_AlyB05&pp=iAQB

https://www.youtube.com/watch?v=rBNQ0r7CN2c&list=PLn78sdsv0QoXUdre4aCAobj3cxACkNeLL&pp=iAQB

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**

APPLIED PHYSICS-(A)

(DPH-101)

[COMMON TO ALL DIPLOMA ENGINEERING COURSES]

L T P

3 1 0

UNIT-1

Measurement:
Units and Dimensions   **6**
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 quantitions,
(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.

UNIT-II   **10**

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 every day 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.

Unit-III   **8**

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, Peridic 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.

Unit-IV   **8**

Gas laws and specific heats of gases:
Boyle's law, Charle's law, Gay Lussac's law, Absolute temperature, Kelvin scale oftemperature, 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).

Unit-V   **8**

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.

References:

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

DCH-101	Applied Chemistry (A)				
Pre-requisite	Co-Requisite	L	T	P	C
None	None	03	01	00	--
Objective	To know the basic concept of Chemistry and their Applications in Engineering				
UNIT I	**Atomic Structure and Classification of Elements:**				08
	Basic concept of atomic structure, Matter wave concept, Quantum number, Heisenberg's uncertainty principle, Shapes of orbitals. Modern classification of elements (s, p, d, and f block elements), periodic properties: ionization potential, electro negativity, electron affinity.				
UNIT II	**Chemical Bonding:**				07
	Overview of basic concept of Ionic, Covalent & Co-ordinate bonds, Hydrogen bonding, Valence bond theory, Hybridization, VSEPR theory, Molecular orbital theory.				
UNIT III	**Electrochemistry-I and Electrochemistry-II:**				08
	Arrhenius theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of acid and bases: Arrhenius, Bronsted and Lewis theory. Concept of pH and numericals. Buffer solutions, Indicators, Solubility product, Common ion effect with their application. Redox reactions, electrode potential (Nernst equation), Electro-chemical cell (Galvanic and Electrolytic). EMF of a cell and free energy change. Standard electrode potential, Electrochemical series and its application. Chemical and electrochemical theory of corrosion, Galvenic Series. Prevention of corrosion by various methods.				
UNIT IV	**Chemical Kinetics, Catalysis and Solid State:**				09
	Introduction, Law of mass action, order and molecularity of reaction. Activation energy, rate constants, 1st order reactions and 2nd order reactions. Definition, Characteristics of catalytic reactions, Catalytic promoters and poison, autocatalysis and negative catalysis. Theory of catalysis and applications. Types of solids (Amorphous and Crystalline), classification (Molecular, Ionic, Covalent and Metallic), Band theory of solids (Conductors, Semiconductors and Insulators), types of crystals, FCC, BCC, Crystal imperfection.				

UNIT V	**Water Treatment:**	08
Hardness of water, its limits and determination of hardness of water by EDTA method. Softening methods (Only Soda lime, Zeolite and Ion exchange resin process). Disadvantages of hard water in different industries, scale and sludge formation, corrosion, caustic embrittlement, priming and foaming in boilers. Disinfection of Water by chloramine-T, Ozone and chlorine. Advantages and disadvantages of chlorination. Industrial waste and sewage, Municipality waste water treatment, Definition of BOD and COD. Numerical problems based on topics.		
Reference 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	

TECHNICAL DRAWING-I
(DAR-101)

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3 1 0

UNIT-I

    (a) Printing & lettering – small & capital letters, both vertical & italics. Roman printing as per I.S. code and lettering.

    (b) Scale construction of plane, diagonal & vernier scales & their use.   **8**

UNIT-II

    Plane geometry problems of lines, triangles, polygons & circles.   **8**

UNIT-III

    Difference & use of I angle and III angle projections I-angle orthographic projections **8**

UNIT-IV

    Isometric projections of simple compound solids. Isometric views of building block, a column with isolated footing.   **8**

UNIT-V

    Wall section through arch, door & window.   **8**

References :

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

BUILDING MATERIALS
(DAR-102)

L T P
3 1 0

UNIT-I

Building Stones, Bricks and Timber

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

UNIT-II

Lime and Cement

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**

UNIT-III

Concrete

Introduction, characteristics of good concrete, classification of concrete, plain cement concrete, pre-cast concrete, general aspects and application of fly-ash. **8**

UNIT-IV

Glass, Insulating Materials

Introduction, properties of glass, sheet glass, float glass, plate glass, bullet proof glass, fiber glass. Heat and sound insulating materials, uses of cork, slage wool, light weight concrete, aluminum foil. **8**

UNIT-V

Paints, Varnishes, Distempers and Gypsum plaster

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, distempering process, properties of distempers, white washing, color washing and gypsum plaster.

8

References :

1. Building Material   : Sushil Kumar
2. Building Construction   : S.K.Sinha& J. Jha
3. A Text Book Of Building Construction   : S.P. Arora&S.P.Sindra

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-	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4

PSO CO												
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**

DCH-151/251	Applied Chemistry Lab				
Pre-requisite None	Co-Requisite None	L 00	T 00	P 02	C ----
Objective	**To develop the practical knowledge for qualitative analysis of salts and determination of hardness, chloride contents, dissolved oxygen in water**				
	ANY TEN EXPERIMENTS				
Experiment 1-5	To analyze inorganic mixture for two acid and basic radicals from following radicals A. Basic Radicals : NH_4^+, Pb^{++}, Cu^{++}, Bi^{+++}, Cd^{++}, As^{+++}, Sb^{+++}, Sn^{++}, Al^{+++}, Fe^{+++}, Cr^{+++}, Mn^{++}, Zn^{++}, Co^{++} Ni^{++}, Ba^{++}, Sr^{++}, Ca^{++}, Mg^{++} B. Acid Radicals : CO_3^{--}, S^{--}, SO_3^{--}, CH_3COO^-, NO_2^-, NO_3^-, Cl^-, Br^-, I^-, SO_4^{--}				10
Experiment 6	To determine the total hardness of water sample in terms of $CaCO_3$ by EDTA titration method using E Br indicator.				02
Experiment 7	Determination of temporary hardness of water sample by O-hener's method.				02
Experiment 8	To determine the Chloride content in supplied water sample by using Mohr's methods.				02
Experiment 9	Determination of Dissolved oxygen (DO) in given water sample.				02
Experiment 10	To determine the strength of given HCl solution by NaOH solution using pH meter				02
Experiment 11	To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.				02

BUILDING MATERIALS LAB
(DAR-152)

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0 0 2

1. Identification of different types of stones and aggregates (visual identification).
2. Identification of timbers: teak, sal, chir, shisum, siras, deodar, kail and mango. (visual identification)
3. To conduct field tests of cement.
4. To determine normal consistency of cement.
5. To determine setting time (initial and final) of cement.
6. To determine fineness of given sample of cement.
7. To determine compressive strength of bricks.
8. To determine water absorption of bricks
9. To determine soundness of cement.
10. To identify hydraulic & fat lime.

Effective from Session: 2024-25							

Course Code	DEE-151	Title of the Course	BASIC ELECTRICAL ENGINEERING LAB-I	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**

COMPUTER APPLICATION LAB

(DCS-151)

L T P
1 0 2

1. Introduction of computer types, generation, Application, characteristic & Memory.

2. Introduction and practice of Ms-Office package (Ms-Word, Ms- Excel, and Ms- Power point & Ms-Access).

3. Introduction & Practice of Internet and e-mail.

4. Programming of 'C' history of character set, variables, keywords, token data types input and output function.

5. Introduction of Decision control statement- if, if- else, nester if statement and switch case.

6. Programming practice of if, if – else, nested if statement and switch case.

7. Loops- while loop, do- while loop, for loop, break and continuous statements.

8. Programming practice of while loop, do- while loop, for loop, break and continuous statements.

9. Array Declaration, initialization of one and two dimensional array.

10. Programming practice on array.

Reference:

1. Computer fundamental-   Sinha & Sinha

2. Computer Basics & 'C'-   V. Rajaraman

3. Office 2007 -   Ruthosky, Seguim, Ruthosky

4. Programming in ANSI-   E Balagurusamy