Integral University, Lucknow

Department of Civil Engineering

Study and Evaluation Scheme

Program: Diploma in Engineering

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	CT	TA	Total	ESE				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics
THEORIES																				
1	DMA-101	Applied Mathametics-1(A)	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	DCE-101	Building Material (A)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
5	DED-101	Engineering Drawing	Core	01	03	00	40	20	60	40	100	1:3:0	4	Y	Y	Y				Y
6	DAM-101	Applied Mechanics (A)	Core	03	01	00	40	20	60	40	100	3:1:0	4			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	DCAD-151	Basic Computer Aided Design Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y				Y
3	DWS-151	Workshop Practice	Core	00	00	03	40	20	60	40	100	0:0:1.5	1.5	Y	Y	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				17	08	09	**400**	200	660	400	1060		29.5							

CIVIL ENGINEERING

APPLIED MATHEMATICS-I (A)
(DMA-101)

(Common to All Diploma Engineering Courses)

L T P

3 1 0

UNIT-1 [9]

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.

UNIT-2 [8]

Trigonometry:

Trigonometric functions of allied, compound, multiple and submultiple angles.Trigonometric identities.Sine, Cosine, Projection and Tangent rules.

Hyperbolic and Inverse circular functions.

UNIT-3 [7]

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.

UNIT-4 [8]

Coordinate Geometry:

Standard from of curves.

Parabola: $= 4ay, y^2 = 4ax$

Ellipse: $\frac{x^2}{b^2} + \frac{y^2}{} = 1$, Hyperbola: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

Distance between two points in space, direction cosine and direction ratio.

UNIT-5 [8]

Plane and Sphere:

Finding equation of straight line and shortest distance between two lines, Equation of a plane, Relation between lines and planes, Sphere.

References:

1. Applied Mathematics: Kailash Sinha, Meerut publication.
2. Applied Mathematics: P.K Gupta, Asian Publication.
3. Applied Mathematics: H.R Luthra, Bharat Bharti publication.
4. Applied Mathematics: H.K Das, C.B.S Publication.

Mathematics for Polytechnic: S.P Deshpande, Pune Vidyarthi Grih

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 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).

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	

BUILDING MATERIALS-(A)
(DCE-101)

L T P
3 1 0

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. 7

UNIT-II

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 mechanicallly), 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

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 standarrd bricks. IS Classifcation 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 wall,ceiling, roofing and flooring tiles, their properties,and uses.

Other clay products: Earthenware and stoneware, their properties and uses. 9

UNIT-IV

Lime :

Natural sources of lime. Defintions 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. Pozzolonic materials. Types, properties and uses. 7

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, tests of cement as per IS. 7

References :

1. Building Construction : Jha J & Sinha, S .K.
2. A Text Book of Building Construction : Arora , S.P . & Bindra, S.P.
3. A Text Book of Engineering Materials: Kulkarni C.J.

ENGINEERING DRAWING
(DED -101)

L T P

3 1 0

UNIT-I

Drawing, instruments and their uses :

Introduction to various drawing, instruments.Correct use and care of Instruments.Sizes of drawing sheets and their layouts.

Lettering Techniques 1 Sheet

Printing of vertical and inclined, normal single stroke capital letters. Printing of vertical and inclined normal single stroke numbers.

Stencils and their use.

Introduction to Scales : 1 Sheet

Necesssity and use, R F

Types of scales used in general engineering drawing.

Plane, diagonal and chord scales.

UNIT-II

Conventional Presentaion : 1 Sheet

Thread (Internal and External), Welded joint, Types of lines, Conventional representation of materials, Conventional representation of machine parts.

Principles of Projection :

Orthographic, Pictorial and perspective. Concept of horizontal and vertical planes. Difference between I and III angle projections.

Dimensioning Techniques:

Projections of points, lines and planes. 2 Sheet

Orthographic Projections of Simple Geometrical Solids

Edge and axis making given angles with the reference planes. Face making given angles with reference planes. Face and its edge making given angles withreferance planes. Orthographic views of simple composite solids from their isometric views.Exercises on missing surfaces and views.

UNIT-III

Section of Solids: 1 Sheet

Concept of sectioning Cases involving cutting plane parallel to one of the

reference planes and prependicular to the others. Cases involving cutting plane perpendicular to one of the reference planes and inclind to the others plane,true shape of the section

Isometric Projection : 1 Sheet

Isometric scale

Isometric projection of solids.

UNIT-IV

Free hand sketching : 1 Sheet

Use of squared paper

Orthographic views of simple solids Isometric views of simple job like carpentary joints

Development of Surfaces : 1 Sheet

Parallel line and radial line methods of developments.

Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid).

UNIT-V

Assembly and Disassembly Drawings : 2 Sheet

Plummer block

Footstep bearings

Couplings etc.

Rivetted & Welded Joints

Screw and form of screw thread

Orthographic Projection of Machine Parts :

1 Sheet

Nut and Bolt, Locking device, Wall bracket

Practice on AUTO CAD :

To draw geometrical figures using line, circle, arc, polygon, ellipse, rectangle - erase and other editing commonds and osnap commands (two dimensional drawing only) (Printouts of figures)

References :

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

APPLIED MECHANICS-(A)
(DAM-101)

L T P
3 1 0

UNIT-1

Introduction:

Mechanics and its utility. Concept of scalar and vector quantities. Effect of a force. Tension & compression. Rigid body. Principle of physical independence of force. Principle of transmissibility of a force. 7

UNIT-II

System of Forces :

Concept of coplaner and non-coplaner forces including parallel forces. Concurrent and non-concurrent forces. Resultant force. Equilibrium of forces. Law of parallelogram of forces. Law of triangle of forces and its converse. Law of polygon of forces. Solution of simple engineering problems by analytical and graphical methods such as simple wall crane, jib crane and other structures. Determination of resultant of any number of forces in one plane acting upon a particle,conditions of equilibrium of coplaner concurrent force system. ..9

UNIT-III

Moment & Couple:

Concept of Varignon's theorem. Generalised theorem of moments. Application to simple problems on levers-Bell crank lever, compound lever, steel yard, beams and wheels, lever safety valve, wireless mast, moment of a couple; Properties of a couple ; Simple applied problems such as pulley and shaft. 7

UNIT-IV

General Condition of Equilibrium:

General condition of equilibrium of a rigid body under the action of coplaner forces, statement of force law of equilibrium, moment law of equilibrium, application of above on body. 7

UNIT-V

Friction:

Types of friction:statical,limiting and dynamical friction, statement of laws of sliding friction, Coefficient of friction, angle of friction; problems on eqilibrium of a body resting on a rough inclined plane, simple problems on friction. Conditions of sliding and toppling. 10

References :

1. Applied Mechanics & Strength of Material : R.S. Khurmi , S.Chand Publication
2. Applied Mechanics : Hemendra Dutt Gupta, Navbharat Publication

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

Basic Computer Aided Design Lab

(DCAD-151)

L T P
0 0 2

List of Experiments:-

1. To study of Auto CAD software.
2. Study And Sketch of drafting setting.
3. Study and sketch of Dimensional setting.
4. To draw geometrical figure using drawing commands.
5. To modify a geometrical figure using editing comment.
6. To draw orthographic view of a geometrical figure.
7. To Draw isometric view of a geometrical figure.
8. To Draw top front and side view of an isometric figure.
9. To draw sectional view of a soild object.
10. To do practical on page set up & scaling of drawing.

WORKSHOP PRACTICE
(DWS-151)

L T P
0 0 3

1. **Machine Shop**
    a. Study of tools and operations
    b. Plane turning
    c. Step turning
    d. Taper turning
    e. Threading
    f. Single point cutting tool grinding
2. **Fitting Bench Working Shop**
    a. Study of tools and operations
    b. Simple exercises involding filing work
    c. Making perfect male-female joint
    d. Simple exercises involving drilling/tapping/dieing
3. **Black Smithy Shop**
    a. Study of tools and operations
    b. Simple exercises based on black smithy operations such as Upsetting/drawingdown, punching, bending, fullering and swaging
4. **Welding Shop**
    a. Study of tools and operations
    b. Simple butt Joint
    c. Lap Joint
    d. Oxy acetylence welding
5. **Sheet Metal Shop**
    a. Study of tools and operations
    b. Making funnel complete with soldering
    c. Fabrication of tool box, tray, electrical panel box etc.
6. **Carpentry Shop**
    a. Study of tools and operation and carpentry Joints.
    b. Simple exercise using jack plain
    c. To prepare half lap corner, joint, mortise and tennon joints.
    d. Simple exercise on woodworking lathe.
7. **Foundry**
    a. Making a mould using single piece pattern
    b. Making a mould using two piece pattern
    c. Making a mould using a pattern with core print
    d. Making Pouring and Making an Aluminium Casting.

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