Integral University, Lucknow

Department of Civil Engineering (Construction Management & Safety)

Study and Evaluation Scheme

Program: Diploma in Engineering

Semester -II

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-201	Applied Mathametics-1(B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y		Y				
2	DPH-201	Applied Physics (B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
3	DCH-201	Applied Chemistry (B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
4	DCE-201	Building Material (B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
5	DAM-201	Applied Mechanics (B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y		Y				Y
6	DPC-201	Professional Communication	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y			Y	Y
1	DPH-251	Applied Physics Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y		Y		
2	DWS-251	Workshop Practice	Core	00	00	03	40	20	60	40	100	0:0:1.5	1.5	Y	Y	Y		Y		
3	DCAD-251	Basic Computer Aided Design Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y				Y
4	DPC-251	Professional Communication Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y			Y	Y
5	GP-251	General Proficiency		_	_	_	_	_	60	_	60									
Total				18	06	09	**400**	200	660	400	1060		28.5							

APPLIED MATHEMATICS-I (B)
(DMA-201)
(Common to All Diploma Engineering Courses)

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UNIT-1 [9]

Differential Calculus-I

Function, Limit, Continuity:

Definitions of variable, constant, intervals (open, closed, semi-open). Definition of function, graph of function, range and domain, value of a function and type of functions. Elementary method for finding limits, continuity& differentiability.

Derivatives:

Definition of derivative and notation,derivativeof standard function, derivative of trigonometric function. Fundamental rules for derivative (without proof), derivatives of sum or difference, scaler multiplication, product of function, quotient of function and function of function.

UNIT-2 [9]

Differential Calculus-II

Differentiation:

Logarithmic differentiation, differentiation of implicit function, differentiation of parametric equation, differentiation of a function with respect to another function.differentiation of special functions (Hyperbolic and Inverse circular functions), higher order d theorem.

Application: Tangents and Normals, Maxima and Minima, Rate, Velocity and Acceleration.

UNIT-3 [9]

Integral Calculus:

Definition of Integration(anti-derivative), Integration of standard functions. Rule of integration (Integration of sum, difference and scaler multiplication).

Indefinite Integral:

Integration by substitution, Integration by parts, Integration by partial fraction, Integration of special functions(Hyperbolic and Inverse circular functions).

Definite Integral:

Definition of definite integral, properties and evaluation of definite integral.

UNIT-4 [7]

Application of Integral Calculus:

Finding areas bounded by sample curves, length of simple curves, Volume of solids of revolution, mean value, mean square value, root mean square value of function.

UNIT-5 [6]

Numerical Integration & Error:

Introduction, Newton-Cote's Quadrature formula,Trapezoidardruleand3/8th rule.Concept of error for simple function.

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.
5. Mathematics for Polytechnic: S.P Deshpande, Pune Vidyarthi Griha.

APPLIED PHYSICS(B)
(DPH-201)
[Common to All Engineering Courses]

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UNIT-I **[6]**

Application of Sound Waves :

Acoustics :

Standing waves, Closed and Open organ pipes, Resonance, End correction.Definition of pitch, loudness, quality and intensity of sound waves. Echo and reverberation and reverberation time. Sabine's formula, Control of reverberationtime).Accousticsof ti buildings, defects and remedy.

Ultrasonics,

Generation, Magnetostriction, Piezoelectric effect, Application in new technology

UNIT-II **[8]**

Quantum nature of light, Coherence (Spatial and temporal), Duality of wave and particle, Concept of Interference, Biprism, Fraunhoffer single slit diffraction,grating, Resolving and dispersive power, Elementary concept of polarization.

Fibre Optics :

Critical angle, Total internal reflection, Principle of fiber optics, Optical fiber, Pulse dispersion in step-index fibers, Graded index fiber, Single mode fiber, Optical sensor

UNIT-III

D.C. Circuits :

Principle of Wheat Stone bridge and application of this principle in measurement of resistance (Meter bridge and Post Office Box); potent application. Principle of Carey-Foster's bridge.

Electric potential, potential energy, Energy of a charged capacitor. Charging and Discharging of capacitors,

Dielectrics :

Electric dipole; effect of electric field on dielectrics, polarization.Magnetic Fields & Materials : Dia, Para and Ferro-magnetism, Ferrites, Hysteresis, Hysteresis curve of a ferro magnetic materials and their uses, Basic idea of super conductivity.

UNIT-IV[**10]**

Semiconductor Physics :

classification of solids into conductors, insulators and semiconductors on the basis of energy band structure. Intrinsic and extrinsic semi conductors, Electrons and holes as charge carriers in semiconductors, Effect of temperature in conduction in semiconductors, P-type and N-type semiconductors, P-N junction formation, barrier voltage, Forward and reverse biasing of a junction diode.

Production of X-rays types of X-rays spectra :

Continuous and characteristics of X-rays,Properties & applications of X-rays.

Nuclear Physics :

Radioactivity, Nuclear stability, Radioactive emission, radiation hazards, Nuclear fission and fusion, Nuclear reactors and their application, Mass-energy relation, Atomic mass unit, Mass defect and binding energy.

UNIT-V **[8]**

Lasers and its Applications :

Absorption and Emission of energy by atom, Spontaneous and Stimulated Emission, Population inversion. Main components of laser and types of laser,Ruby Laser, He-Ne laser and their applications.

Non-conventional energy resources.

Wind energy : Introduction, scope and significance,measurement of wind velocity by anemometer, general principle of wind mill, Indian wind energy programme.

Solar energy: Solar radiation and potentiality of solar radiation in India, unit of solar radiation.

Bio fuel and Gobar gas plants

Uses of solar energy: Solar Cooker, solar water heater, solar photo-voltaic cells, solar energy collector, Modern applications in technology. 5

References :

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

DCH-201	Applied Chemistry (B)				
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	**Fuels:**				07

Definition, its classification, high and low calorific value. Determination of calorific value of solid and liquid fuels by Bomb calorimeter.

Liquid fuel- Petroleum and its refining, distillates of petroleum (Kerosene oil, Diesel and Petrol), Benzol and power alcohol. Knocking, Anti-knocking agents, Octane number and Cetane number.

Cracking and its type, Gasoline from hydrogenation of coal (Bergius process and Fischer Tropsch's process)

Gaseous Fuel- Coal gas, Oil gas, Water gas, Producer gas, Biogas, LPG and CNG.

Numerical problems based on topics.

UNIT II	**Colloidal State of Matter and Lubricants:**	08

Concept of colloidal and its types, different system of colloids, dispersed phase and dispersion medium. Methods of preparation of colloidal solutions, Dialysis and electrodialysis. Properties of colloidal solution with special reference to absorption, Brownian movement, Tyndal effect, Electrophoresis and Coagulation. Relative stability of hydrophilic and hydrophobic colloids. Protection and protective colloids. Emulsion, types, preparation, properties and uses. Application of colloids chemistry in different industries.

Definition, classification, necessity and various kinds of lubricants. Function and mechanism of action of lubricants and examples. Properties of lubricants, importance of additive compounds in lubricants, Synthetic lubricants and cutting fluids. Industrial application, its function in bearing.

UNIT III	**Hydrocarbons:**	08

A. Classification and IUPAC nomenclature of organic compounds homologous series (Functional Groups). B. Preparation, properties and uses of Ethane, Ethene, Ethyne (Acetylene), Benzene and Toluene.		
UNIT IV	**Organic Reactions and Mechanism:**	08
Fundamental aspects- A. Electrophiles and nucleophiles, Reaction intermediates, Free radicals, Carbocation, Carbanion. B. Inductive effect, Mesomeric effect, Electromeric effect. Mechanism- A. Mechanism of addition reaction (Markonicove's Rule, Cyanohydrin and Peroxide effect). B. Mechanism of substitution reactions; (Nucleophillic) hydrolysis of alkyl halide, electrophillic substitution halogenations, Sulphonation, Nitration and Friedel- Craft reaction. C. Mechanism of Elimination reaction- Dehydration of primary alcohol, Dehydrohalogenation of primary alkyl halide.		
UNIT V	**Polymers and Synthetic Materials:**	09
Polymers- Polymers and their classification. Average degree of polymerization, Average molecular weight, Free radical polymerisation (Mechanism). Thermosetting and thermoplastic A. Addition polymers and their industrial applications- Polythene, Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon. B. Condensation polymers and their industrial applications- Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Dacron, Polyurethanes. General concept of Bio polymers, Biodegradable polymers and Inorganic polymers (Silicon). Synthetic Materials- A. Introduction- Fats and Oils		

	B. Saponification of fats and oils, Manufacturing of soap C. Synthetic detergents, types of detergents and its manufacturing. Explosives: TNT, RDX and Dynamite Paint and Varnish.	
Reference books:	6. Applied Chemistry: R. S. Katiyar and J. P. Chaudhary 7. Applied Chemistry: Rakesh Kapoor 8. Principles of general and inorganic chemistry: O. P. Tandon 9. Engineering Chemistry: S. Chandra 10. Applied Chemistry: M. Gupta	

BUILDING MATERIALS-(B)
(DCE-201)

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UNIT-I

Timber and wood based Products:

Classification of trees. Cross-section of an exogenous tree and explantion of terms. Identification of different types of timber: teak, chir, shisham, sal, mango,devdar, kail etc. Market forms of converted timber as per IS. Seasoning of timber: purpose, types of sea- soning.air seasoning, water seasoning, kiln seasoning, chemical seasoning, Solar seasoning kiln.

Defects in timber. Decay in timber. Preservation of timber and methods of treatment. Properties of good timber. Common structural timbers in India, thier availability, and uses.Plywood, veneers; manufacture of plywood,uses of plywood.Other wood based product their brief description, maufacture and uses.

Laminated boards : block boards, fibre boards, resistant board, hardboard,plastic coated finishes, water and fire resistant ply wood, PVC boards. 10

UNIT-II

Paints :

Various types of paints. Constituents of oil paints, their functions and properties. Cement paints, their properties and uses, Varnish and polish: types, properties and uses. Lacquars and enamels: their properties and uses. Trade names of different products. 7

UNIT-III

Insulating Materials :

Properties, uses and requirements of heat and sound insulating materials. Properties and uses of:cork, rockwool,glass wool, concrete, aluminium foil, asbestas sheets for ceiling, commercial names of different insulating materials. 7

UNIT-IV

1. Glass :

Types of glasses and their properties, Sheet glass,plate glass,frosted glass,wired glass,fibre glass bullet resisting glass, coloured glass and glass wool Commercial sizes, forms and their uses.

2. Plastics :

Methods of moulding and types, properties and uses of plastics. Important commercial product, uses of plastic in Civil Engineering: plastic pipes, taps, valves, plastic coated paper, polythene sheets, thermocole, bakalyte, PVC, rexine and linolium. 9

UNIT-V

Water proofing materials :

Properties & commercial trade names.Exposure to non conventional & waste by product Fly ash, Stone Cladding and other finishing materials. 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.

APPLIED MECHANICS-(B)
(DAM-201)

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UNIT-I

Machines:

Definition of a machine. Mechancial advantage, velocity ratio, input, output, mechanical efficiency and relation between them for ideal and actual machines. Law of a machine, Lifting machines such as levers, single pulley, three system of pulleys. Weston differential pulley, simple wheel and axle, differential wheel and axle. Simple screw jack, differential screw jack, simple worm and worm wheel. 8

UNIT-II

Stresses and strains:

Concept of stress and strain. Concept of various types of stresses and strains . Definitions of tension, compression shear, bending, torsion. ratio. Changes in dimensions and volume of a bar under direct load (axial and along all the three
axes). Ultimate stress, working stress. Elasticity, Hook's l deformation diagram for mild steel and cast iron. Definition of modulus of elasticity, yield point, modulus of rigidity and bulk Modulus. Stresses and strains for homogeneous materials and
composite sections. 10

UNIT-III

Beams :

Definition of statically determinate and indeterminate trusses. Types of supports. Concept of tie & strut, Bow's notation, space diagram, polar
at the support of cantilever and simply supported beams graphically and analytically. 10

UNIT-IV

Trusses :

calculation of reaction at the support of trusses graphically and analytically; graphical solution of simple determinate trusses with reference to force diagram for determining the magnitude and nature of forces in its various members. Analytical methods: method of joints and method of sections.(simple problems only) 6

UNIT-V

Thin cylindrical and spherical shells:

Differentiation between thick and thin shells, cylinderical and spherical shells, thin spherical and cylindrical shells subjected to internal pressure, lognitudinal stresses, circumferential or hoop stresses. longitudinal, circumferential and volumetric strains. Changes in the dimensions and volume of a thin shell subjected to internal fluid pressure. 6

References :

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

PROFESSIONAL COMMUNICATION
(DPC-101)
[Common to All Engineering Courses]

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UNIT-I

Communication in English :

Concept of communication, importance of effective communication, types of communication, formal and informal, verbal and nonverbal, spoken and written, Techniques of communication, Listening and reading, writting and speaking, Barriers to communication- Modern tools of communication-

Fax, e-mail, Telephone, telegram, etc., Techniques for clear , concise , correct and coherent writing, Difference between technical writing and general writing. 5

Kinds of letters: Official, demi-offical, unofficial , enquiry letter, quotation, tender and order giving letters. Application for a job, Resume, complaint letter and adjustment letter. 5 Report writing, Note making and minutes writing.

Transformation of sentences, synthesis, Preposition, Articles, Idioms and Phrases, One word substitution, Abbreviations. Tenses, Active and Passive voice. 15 Composition on narrative, descriptive, imaginative, argumentative, discussion and factual topics.

UNIT-IV

Spoken English:

Phonemes(Speech sound),Consonant sounds, vowels sounds and dipthongs, Phonetic transcription, IPA,word stress and Intonation. 10

Development of comprehension and knowledge of English through the study of text material and language exercises based on the prescribed text book of English.

UNIT-V.

Letter writing in Hindi:

Kinds of letters: Official, demi-offical, unofficial, enquiry letter, quotation, tender and order giving letters, Application for a job. 5

References :

1. Dr. R.P. Chauhan, : Asian Publishers, Muzaffarnagar.
2. S.V. Singh & M. S. Verma : Bharat Bharat Prakashan, Meerut.
3. R. Thakur & M . Singh, Meerut Publication.

APPLIED PHYSICS LAB
(DPH-251)

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Note: Any ten experiments are to be performed.

1. Determination of 'g' using simple pendulum
2. To find the surface Tension of water by the method of capillary rise.
3. To determine the frequency of A.C. mains by using a sonometer and a horse shoe magnet.
4. To determine the value of modulus of rigidity of given material of a wire by statical method using Barton's app
5. Determination of coefficient of viscosity of water by capillary flow (Poiseuilles method).
6. To determine the height of a tower by Sextant.
7. To determine the moment of Inertia of a flywheel.
8. Determination of velocity of sound by resonance tube.
9. Determination of resistivity of a given wire by Post Office Box.
10. By using Potentiometer, determination of
    (i) E_1/E_2
    (ii) Internal resistance of givn cell.
11. Determination of coefficient of friction on a horizontal plane.
12. Determination of viscosity coefficient of
13. Determination of Spring Constant.
14. Verification of Kirchoff's laws.
15. To draw the characteristics of a p-n junction diode.

WORKSHOP PRACTICE
(DWS-251)

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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.

Basic Computer Aided Design Lab

(DCAD-251)

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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.

PROFESSIONAL COMMUNICATION LAB
(DPC-251)

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UNIT-I

Introduction to speech sounds through (IPA) International Phonetic Alphabet.

- Pronounciation practice emphasizing the articulation of vocal sounds & Word stress.
- Pronounciation Practice emphasizing the words with spelling pronounciation Mismatch.

UNIT-II

- Techniques of giving focused self description in formal communication Situations.
- Practice in describing objects.

UNIT-III

- The basics of group discussion.
- common pitfalls in group discussion.
- Techniques for making a claim & supporting it in group discussion.
- Techniques for offering polite but firm counter arguments.
- Participating in a Debate.

UNIT-IV

- The essentials of Seminar Presentation.
- Techniques for preparing a Seminar Presentation.
- Mock Interview: Preparation, Unfolding of personality and expressing Ideas effectively.
- Role Play/General Conversation, Making polite enquiries at Railway station, Post Office and other Public Places.

UNIT-V

Project :

At the beginning of the Semester each student in the class will be given topics for one informative & one persuasive speech to be delivered by him/her towards the end of the semester. The students will research for, organize and finalize the speeches under the guidance of the subject teacher. For each speech, the student will submit a one page written outline.

Software:

- Learn to Speak English (BPB MultiMedia)
- A talking Dictionary.
- CD's of Professional Communication.

References :

1. Grant Taylor : English Conversation Practice (T.M.H.)
2. Grathe King :Colloqnial English Routledge London