Third Semester

FLUID MECHANICS (DCE-302)

Discipline core (DC) : Credit 4(3-0-2)

Objective: Subject of Fluid Mechanics is a basic engineering subject and helps in solving fluid flow problems in the field of Civil Engineering. The subject deals with basic concepts and principles in hydrostatics, hydro kinematics and hydrodynamics and their application in solving fluid -mechanics problems.

COURSE OUTLINE:

1. Introduction:
1.1 Fluids: Real and ideal fluids
1.2 Fluid Mechanics, Hydrostatics, Hydrodynamics, Hydraulics
2. Properties of Fluids (definition only)
2.1 Mass density, specific weight, specific gravity, viscosity, surface tension - cohesion, adhesion and, capillarity, vapour pressure and compressibility.
2.2 Units of measurement and their conversion
3. Hydrostatic Pressure:
3.1 Pressure, intensity of pressure, pressure head, Pascal's law and its applications.
3.2 Total pressure, resultant pressure, and centre of pressure.
3.3 Total pressure and centre of pressure on horizontal, vertical and inclined plane surfaces of rectangular, triangular, trapezoidal shapes and circular. (No derivation)
4. Measurement of Pressure:
4.1 Atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure.
4.2 Piezometer, simple manometer and differential manometer, Bourdon gauge and dead weight pressure gauge.
5. Fundamentals of Fluid Flow:
5.1 Types of Flow: Steady and unsteady flow, laminar and turbulent flow, uniform and non-uniform flow
5.2 Discharge and continuity equation (flow equation) {No derivation}
5.3 Types of hydraulic energy: Potential energy, kinetic energy, pressure energy. Hydraulic gradient line and total energy line.
5.4 Bernoulli's theorem; statement and description (without proof of theorem) and simple numerical problems.
6. Flow Measurements (brief description with simple numerical problems)
6.1 Venturimeter and mouthpiece
6.2 Pitot tube 6.3 Orifice and Orificemeter
6.4 Current meters
6.5 Notches and weirs (simple numerical problems)
7. Flow through Pipes:

7.1 Definition of pipe flow; Reynolds number, laminar and turbulent flow - explained through Reynold's experiment
7.2 Critical velocity and velocity distributions in a pipe for laminar flow
7.3 Head loss in pipe lines due to friction, sudden expansion and sudden contraction, entrance, exit, obstruction and change of direction (No derivation of formula)
7.4 Flow from one reservoir to another through a long pipe of uniform cross section (simple problems)
7.5 Pipes in series and parallel
7.6 Water hammer phenomenon and its effects (only definition and description)
8. Flow through open channels:
8.1 Definition of an open channel, uniform flow and non-uniform flow
8.2 Discharge through channels using i) Chezy's formula (no derivation) ii) Manning's formula (no derivation) iii) Simple Numerical Problems
8.3 Most economical channel sections (no derivation) i) Rectangular
9. Hydraulic Pumps:
Hydraulic pump, reciprocating pump, centrifugal pumps

PRACTICAL

i) To verify Bernoullis Theorem
ii) To find out venturimeter coefficient
iii) To determine coefficient of velocity (Cv), Coefficient of discharge (Cd) Coefficient of contraction (Cc) of an orifice and verify the relation between them
iv) To perform Reynold's experiment
v) To verify loss of head in pipe flow due to a) Sudden enlargement b) Sudden contraction c) Sudden bend
vi) Demonstration of use of current meter and pitot tube
vii) To determine coefficient of discharge of a rectangular notch/triangular notch.

RECOMMENDED BOOKS

1. Jagdish Lal, "Fluid Mechanics and Hydraulics" Delhi Metropolitan Book Co. Pvt Ltd.
2. Modi, PN, and Seth, SM; "Hydraulics and Fluid Mechanics", Standard Publishers Distributors, Delhi.

APPLIED MECHANICS (DCE-301)
Discipline core (DC) : Credit 4(3-0-2)

Objective: The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, Centre of gravity, laws of motion and simple machines which are required by the students for further understanding of other allied subjects. The subject enhances the analytical ability of the students.

COURSE OUTLINE:

1. **Introduction**

1.1 Concept of engineering mechanics definition of mechanics, statics, dynamics, application of engineering mechanics in practical fields. Definition of Applied Mechanics.
1.2 Definition, basic quantities and derived quantities of basic units and derived units

1.3 Different systems of units (FPS, CGS, MKS and SI) and their conversion from one to another density, force, pressure, work, power, velocity, acceleration
1.4 Concept of rigid body, scalar and vector quantities

2. **Laws of forces**

2.1 Definition of force, measurement of force in SI units, its representation, types of force: Point force/concentrated force & Uniformly distributed force, effects of force, characteristics of a force
2.2 Different force systems (coplanar and non-coplanar), principle of transmissibility of forces, law of super-position
2.3 Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, laws of forces, triangle law of forces, polygon law of forces - graphically, analytically, resolution of forces, resolving a force into two rectangular components
2.4 Free body diagram
2.5 Equilibrant force and its determination
2.6 Lami's theorem (concept only)

3. **Moment**

3.1 Concept of moment
3.2 Moment of a force and units of moment
3.3 Varignon's theorem (definition only)
3.4 Principle of moment and its applications (Levers – simple and compound, steel yard, safety valve, reaction at support)
3.5 Parallel forces (like and unlike parallel force), calculating their resultant
3.6 Concept of couple, its properties and effects3.7 General conditions of equilibrium of bodies under coplanar forces and beams, fixed support, roller, support, over hanging, Uniformly distributed load, point load, varying load

3.8 Position of resultant force by moment

4. **Friction**

4.1 Definition and concept of friction, types of friction, force of friction

4.2 Laws of static friction, coefficient of friction, angle of friction, angle of repose, cone of friction

4.3 Equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane, friction in simple screw jack

4.4 Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force:

a) Acting along the inclined plane Horizontally

b) At some angle with the inclined plane

5. **Centre of Gravity**

5.1 Concept, definition of centroid of plain figures and centre of gravity of symmetrical solid bodies

5.2 Determination of centroid of plain and composite lamina using moment method only, centroid of bodies with removed portion

5.3 Determination of center of gravity of solid bodies - cone, cylinder, hemisphere and sphere; composite bodies and bodies with portion removed

6. **Moment of Inertia**

Concept of moment of inertia and second moment of area and radius of gyration, theorems of parallel and perpendicular axis, second moment of area of common geometrical sections: rectangle, triangle, circle *(without derivations)*. Second moment of area for L, T and I sections, section modulus.

7. **Simple Machines**

7.1 Definition of effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, law of machines

7.2 Simple and compound machine (Examples)

7.3 Definition of ideal machine, reversible and self locking machine

7.4 Effort lost in friction, Load lost in friction, determination of maximum mechanical advantage and maximum efficiency

7.5 System of pulleys (first, second, third system of pulleys), determination of velocity ratio, mechanical advantage and efficiency

LIST OF PRACTICALS

1. Verification of the following laws:

a) Parallelogram law of forces

b) Triangle law of forces

c) Polygon law of forces

2. To verify the forces in different members of jib crane.

3. To verify the reaction at the supports of a simply supported beam.

4. To find the Mechanical Advantage, Velocity Ratio and efficiency in case of an inclined

plane.
5. To find the Mechanical Advantage, Velocity Ratio and efficiency of a screw jack.
6. To find the Mechanical Advantage, Velocity Ratio and efficiency of worm and worm wheel.
7. To find Mechanical Advantage, Velocity Ratio and efficiency of single purchase crab.
8. To find out center of gravity of regular lamina.
9. To find out center of gravity of irregular lamina.
10. To determine coefficient of friction between three pairs of given surface.

RECOMMENDED BOOKS

1. A Text Book of Applied Mechanics by S Ramamurtham, Dhanpat Rai Publishing Co. Ltd.

2. A Text Book of Engineering Mechanics (Applied Mechanics) by RK Khurmi; S Chand and Co. Ltd., New Delhi

SURVEYING – I (DCE-303)
Discipline core (DC): Credit 4(3-0-2)

Objective: The important functions of a diploma civil engineer includes the jobs of detailed surveying, plotting of survey data, preparation of survey maps and setting out works

COURSE OUTLINE:

1. Introduction:
1.1 Basic principles of surveying
1.2 Concept and purpose of surveying, measurements-linear and angular, units of measurements 1.3 Instruments used for taking these measurements, classification based on surveying instruments
2. Chain surveying:
2.1 Purpose of chain surveying, principles of chain surveying and its advantages and disadvantages
2.2 Obstacles in chain surveying
2.3 Direct and indirect ranging offsets and recording of field notes
2.4 Errors in chain surveying and their corrections
3. Compass surveying:
3.1 Purpose of compass surveying. Use of prismatic compass: Setting and taking observations
3.2 Concept of following with simple numerical problems: a) Meridian - Magnetic and true b) Bearing - Magnetic, True and Arbitrary c) Whole circle bearing and reduced bearing d) Fore and back bearing e) Magnetic dip and declination
3.3 Local attraction - causes, detection, errors and corrections, problems on local attraction, magnetic declination and calculation of included angles in a compass traverse
4. Levelling:

4.1 Purpose of levelling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and bench marks
4.2 Identification of various parts of Dumpy level and use of Dumpy level, Engineer‟ level, Auto level: advantages and disadvantages, use of auto level.
4.3 Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis 4.4 Levelling staff: single piece, folding, invar precision staff, telescopic
4.5 Temporary adjustment and permanent adjustment of dumpy level by two peg method.
4.6 Concept of back sight, foresight, intermediate sight, change point, to determine reduce levels 4.7 Level book and reduction of levels by
4.7.1 Height of collimation method and
4.7.2 Rise and fall method
4.8 Arithmetic checks, problem on reduction of levels, fly levelling, check leveling and profile levelling, errors in levelling, permissible limits, reciprocal leveling. Numerical problems.
4.9 Computations of Areas of regular figures and irregular figures. Simpson‟s rule: prismatic formula and graphical method use of planimeter for computation of areas, numerical problems
5. Plane Table Surveying
5.1 Purpose of plane table surveying, equipment used in plane table survey:
5.2 Setting of a plane table: (a) Centering (b) Levelling (c) Orientation
5.3 Methods of plane table surveying (a) Radiation, (b) Intersection (c) Traversing (d) Resection

PRACTICAL
I. Chain surveying:
i) a)Ranging a line b) Chaining a line and recording in the field book c) Taking offsets - perpendicular and oblique (with a tape only) d) Setting out right angle with a tape
ii) Chaining of a line involving reciprocal ranging
iii) Chaining a line involving obstacles to ranging
iv) Chain Survey of a small area.

II.Compass Surveying:
i) a)Study of prismatic compass b) Setting the compass and taking observations c) Measuring angles between the lines meeting at a point

III. Levelling:
i) a)Study of dumpy level and levelling staff b) Temporary adjustments of various levels c) Taking staff readings on different stations from the single setting and finding differences of level between them
ii) To find out difference of level between two distant points by shifting the instrument
iii) Longitudinal and cross sectioning of a road/railway/canal
iv) Setting a gradient by dumpy and auto-level
IV. Plane Table Surveying:
i) a)Study of the plane table survey equipment b) Setting the plane table c) Marking the North direction d) Plotting a few points by radiation method

ii) a) Orientation by - Trough compass - Back sighting b) Plotting few points by intersection, radiation and resection method
iii) Traversing an area with a plane table (at least five lines)

RECOMMENDED BOOKS

1. Hussain, SK and Nagraj, MS; "Text Book of Surveying"; New Delhi, S Chand and Co Ltd. New Delhi
2. Deshpande, RS; "A Text Book Surveying and Levelling"; Poona, United Book Corporation, New Delhi

CONSTRUCTION MATERIALS (DCE-304)
Discipline core (DC) : Credit 4(3-0-2)

Objective: Civil Engineering diploma holders have to supervise construction of various types of civil works involving use of various materials like stones, bricks and tiles, cement and cement based products, lime, timber and wood based products, paints and varnishes, metals and other miscellaneous materials. The students should have requisite knowledge regarding characteristics, uses and availability of various building materials and skills in conducting tests to determine suitability of materials for various construction purposes. In addition, specifications of various materials should also be known (PWD/BIS) for effective quality control.

COURSE OUTLINE:

1. Building Stones:
1.1 Classification of Rocks: (General Review)
1.1.1 Geological classification: Igneous, sedimentary and metamorphic rocks
1.1.2 Chemical classification; Calcareous, argillaceous and siliceous rocks
1.1.3 Physical classification: Unstratified , startified and foliated rocks
1.2 General characteristics of stones – Marble, Kota stone, Granite, Sand, Trap, Basalt stone, Lime stone and Slate
1.3 Requirements of good building stones
1.4 Identification of common building stones
1.5 Various uses of stones in construction
1.6 Quarrying of stones by blasting and its effect on environment
2. Bricks and Tiles:
2.1 Introduction to bricks
2.2 Raw materials for brick manufacturing and properties of good brick making earth
2.3 Manufacturing of bricks
2.3.1 Preparation of clay (manual/mechanically)
3. Cement:
3.1 Introduction, raw materials, flow diagram of manufacturing of cement

3.2 Various types of Cements, their uses and testing: Ordinary portland cement, rapid hardening cement, low heat cement, high alumina cement, blast furnace slag cement, white and coloured cement, portland pozzolana cement, super sulphate cement, Tests of cement – fineness, soundness, initial and final setting time etc.as per B.I.S. Code.
3.3 Properties of cement
4. Lime:
4.1 Introduction: Lime as one of the cementing materials
4.2 Classification and types of lime as per BIS Code
4.3 Calcination and slaking of lime
5. Timber and Wood Based Products:
5.1 Identification and uses of different types of timber: Teak, Deodar, Shisham, Sal, Mango, Kail, Chir, Fir, Hollock, Champ
6. Paints and Varnishes:
6.1 Introduction, purpose and use of paints
6.2 Types, ingredients, properties and uses of oil paints, water paints and cement paints
6.3 Covering capacity of various paints
6.4 Types, properties and uses of varnishes
6.5 Trade name of different products.
7. Metals:
7.1 Ferrous metals: Composition, properties and uses of cast iron, mild steel, HYSD steel, high tension steel as per BIS.
7.2 Commercial forms of ferrous, metals.
7.3 Aluminium & Stainless Steel.

8. Miscellaneous Materials:
8.1 Plastics – Introduction and uses of various plastic products in buildings such as doors, water tanks and PVC pipes
8.2 Fibre Sheets and their manufacture process.
8.3 Types and uses of insulating materials for sound and thermal insulation
8.4 Construction chemicals like water proofing compound, epoxies, polymers
8.5 Water proofing, termite proofing and fire resistance materials – types and uses

PRACTICALS:
i) To identify the stones used in building works by visual examination
ii) To determine the crushing strength of bricks
iii) To determine the water absorption of bricks and efflorescence of bricks
iv) To identify various types of timbers such as: Teak, Sal, Chir, Sissoo, Deodar, Kail & Hollock by visual examination only
v) To determine fineness (by sieve analysis) of cement
vi) To conduct field test of cement.
vii) To determine normal consistency of cement
viii) To determine initial and final setting times of cement
ix) To determine soundness of cement

x) To determine compressive strength of cement
xi) The students should submit a report work on the construction materials, covering water proofing material, cements, steel, paints and timber products available in the local market. They will also show the competitive study based upon the cost, brand name, sizes available in the local market.

RECOMMENDED BOOKS

1) Sharma, SK; and Mathur, GC; "Engineering Materials;" Delhi-Jalandhar, S. Chand and Co.
2) Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd.
3) Chowdhuri, N; "Engineering Materials;" Calcutta, Technical Publishers of India.

BUILDING CONSTRUCTION (DCE-305)

Discipline core (DC) : Credit 4(3-0-2)

Objective: Diploma holders in Civil Engineering are supposed to effectively supervise construction of buildings. Effective supervision is essential to obtain/provide a fault free service from contractors to users. To perform above task, it is essential that students should have knowledge of various sub components of buildings like foundations, walls, roofs, staircases, floors etc., and their constructional details as well as preventive, remedial and corrective methods of common construction faults.

COURSE OUTLINE:

1. Introduction:
1.1 Definition of a building, classification of buildings based on occupancy
1.2 Different parts of a building
2. Foundations:
2.1 Concept of foundation and its purpose
2.2 Types of foundation-shallow and deep
2.2.1 Shallow foundation - constructional details of: Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block, stepped foundation, masonry pillars and concrete columns
2.3 Earthwork
2.3.1 Layout/setting out for surface excavation, cutting and filling
2.3.2 Excavation of foundation, trenches, shoring, timbering and de- watering
3. Walls:
3.1 Purpose of walls
3.2 Classification of walls - load bearing, non-load bearing, dwarf wall, retaining, breast walls and partition walls
3.3 Classification of walls as per materials of construction: brick, stone, reinforced brick, reinforced concrete, precast, hollow and solid concrete block and composite masonry walls
3.4 Partition walls: Constructional details, suitability and uses of brick and wooden partition walls
3.5 Mortars: types, selection of mortar and its preparation

3.6 Scaffolding, construction details and suitability of mason‟s brick layers and tubular scaffolding, shoring, underpinning

4. Masonry

4.1 Brick Masonry: Definition of terms like header, stretcher, queen closer, king closer, frog and quoin, course, bond, facing, backing, hearting, jambs, reveals, soffit, plinth, pillars and pilasters

4.1.1 Bond – meaning and necessity; English, flemish bond and other types of bonds

4.1.2 Construction of brick walls –methods of laying bricks in walls, precautions observed in the construction of walls, methods of bonding new brick work with old (toothing, raking, back and block bonding), Expansion and contraction joints

4.1.3 Importance towards special care during execution on: soaking of bricks, maintenance of bonds and plumb, filling of horizontal and vertical joints, masonry work, restriction height of construction on a given day, every fourth course, earthquake resistance measure, making of joints to receive finishes

4.2 Stone Masonry

4.2.1 Glossary of terms – natural bed, bedding planes, string course, corbel, cornice, block in course grouting, moulding, templates, corner stone, bond stone, throating, through stone, parapet, coping, pilasters and buttress

4.2.2 Types of stone masonry: rubble masonry - random and coursed; Ashlar masonry, principles to be observed in construction of stone masonry walls

4.2.3 Importance towards special care during execution of stone masonry work on dressing of stone, size and placing of bond and corner stones, filling joints, proper packing of internal cavities of rubble masonry wall, raking of joints to receive finishes

5. Arches and Lintels:

5.1 Meaning and use of arches and lintels:

5.2 Glossary of terms used in arches and lintels - abutment, pier, arch ring, intrados, soffit, extrados, voussoiers, springer, springing line, crown, key stone, skew back, span, rise, depth of an arch, haunch, spandril, jambs, bearing, thickness of lintel, effective span

5.3 Arches:

5.3.1 Types of Arches - Semi circular, segmental, elliptical and parabolic, flat, inverted and relieving

5.3.2 Stone arches and their construction

5.3.3 Brick arches and their construction

5.4 Lintels 5.4.1 Purpose of lintel

5.4.2 Materials used for lintels

5.4.3 Cast-in-situ and pre-cast lintels

5.4.4 Lintel along with sun-shade or chhajja

6. Doors, Windows and Ventilators:

6.1 Glossary of terms with neat sketches

6.2 Classification based on materials i.e. wood, metal and plastic and their suitability for different situations. Different type of doors- panel door, flush door, flazed door, rolling shutter, steel door, sliding door, plastic and aluminium doors

6.3 Window – Panel window, glazed windows (fixed and openable) ventilators, sky light window, Louvres shutters, plastic and aluminium windows. 6.4 Door and window frames – materials and sections, door closures, hold fasts

7. Damp Proofing and Water Proofing

7.1 Dampness and its ill effects on bricks, plaster, wooden fixtures, metal fixtures and reinforcement, damage to aesthetic appearance, damage to heat insulating materials, damage to stored articles and health, sources and causes of dampness

7.2 Sources of dampness - moisture penetrating the building from outside e.g. rainwater, surface water, ground moisture. Moisture entrapped during construction i.e. moisture in concrete, masonry construction and plastering work etc. Moisture which originates in the building itself i.e. water in kitchen and bathrooms etc.

7.3 Damp proofing materials and their specifications: rich concrete and mortar, bitumen, bitumen mastic, polymer coating, use of chemicals

7.4 Damp proofing of : basement, ground floors, plinth and walls, special damp proofing arrangements in bathrooms, WC and kitchen, damp proofing for roofs and window sills

8. Floors

8.1 Glossary of terms-floor finish, topping, under layer, base course, rubble filling and their purpose

8.2 Types of floor finishes - cast-in-situ, concrete flooring (monolithic, bonded) Terrazzo tile flooring, stone (marble and kota) flooring, PVC flooring, Terrazzo flooring, glazed tiles flooring, Timber flooring, description with sketches. The methods of construction of concrete, terrazzo and timber floors and their BIS specifications

8.3 Special emphasis on level/slope/reverse slope in bathrooms, toilets, kitchen, balcony and staircase

9. Roofs

9.1 Types of roofs, concept of flat, pitched and arched roofs

9.2 Glossary of terms for pitched roofs - batten, eaves, facia board, gable, hip, lap, purlin, rafter, rag bolt, valley, ridge, rain water gutter, anchoring bolts

9.3 False ceilings using gypsum, plaster boards, cellotex, fibre boards

9.4 Special emphasis on maintenance of slopes, overlaps of roofing materials, applicability and problems of wind ties, size of anchoring bolts

10. Stairs

10.1 Glossary of terms: Staircase, winders, landing, stringer, newel, baluster, riser, tread, width of staircase, hand-rail, nosing

10.2

Classification of staircase on the basis of material – RCC, timber, steel, Aluminium 10.3 Planning and layout of staircase: Relations between rise and tread, determination of width of stair, landing etc

10.4 Various types of layout - straight flight, dog legged, open well, quarter turn, half turn (newel and geometrical stairs), bifurcated stair, spiral stair

11. Surface Finishes

11.1 Plastering - classification according to use and finishes like plain plaster, grit finish, rough cast, pebble dashed, concrete and stone cladding etc., dubbing, proportion of mortars used for different plasters, techniques of plastering and curing

11.2 Pointing - different types of pointing and their methods

11.3 Painting - preparation of surface, primer coat and application of paints on wooden, steel and plastered wall surfaces

11.4 Application of white washing, colour washing and distempering, polishing, application of cement and plastic paints
11.5 Selection of appropriate paints/finishes for interior and exterior surfaces
11.6 Importance of preparation of surfaces such as hacking, grooving etc before application of surface finishes
12. Anti Termite Measures (As per IS 6313 –I – III)
12.1 Introduction, site preparation and chemicals used in anti-termite treatment
12.2 Treatment of masonry foundation
12.3 Treatment of RCC foundation
12.4 Treatment of top surface of earth filling
12.5 Treatment of junction of walls and floors
12.6 Treatment along external perimeter of building
12.7 Treatment and selection of timber
12.8 Treatment in existing buildings
13. Building Planning
13.1 Site selection: Factors to be considered for selection of site for residential, commercial, industrial and public building
13.2 Basic principles of building planning, arrangement of doors, windows, cupboards etc
13.3 Orientation of building as per IS: 7662 in relation to sun and wind direction, rains, internal circulation and placement of rooms within the available area, concept of Vastu-Shastra
13.4 Planning of building services
13.5 Introduction to National Building code.

RECOMMENDED BOOKS

1. Gupta, Sushil Kumar, Singla, DR, and Juneja BM; "A Text Book of Building Construction"; Ludhiana, Katson Publishing House.
2. Deshpande, RS and Vartak, GV; "A Text Book of Building Construction"; Poona, United Book Corporation.

BUILDING DRAWING (DCE-306)
Discipline core (DC) : Credit 2(0-0-4)

DRAWING SHEETS

Drawing No. 1: (2 sheets)
Details of spread footing foundations, load bearing and non-load bearing wall for given thickness of walls with the help of given data or rule of the thumb, showing offsets, position of DPC. The details of the concrete and brick plinth protection have to be shown in the drawing.
Drawing No. 2: (one sheet)
Plans of „T“ and Corner junction of walls of 1 Brick, 1-1/2 Brick and 2 brick thick in English bond
Drawing No. 3: (2 sheets)

Detailed drawing of basement, single wooden floor, double wooden floor.

Drawing No.4 (3 sheets) Elevation, sectional plan and sectional side elevation of flush door, glazed door, panelled door and window, Aluminium door and window with wire gauge shutter. Sketches of various joints of different members.

Drawing No.5 (one sheet)

Draw at least one sheet using CAD software

Drawing No. 6: (2 sheet)

Drawing plan, elevation of a small building by measurement and foundation detail and sectional elevation.

Drawing No.7 (4 sheets)

Drawing detailed plan, elevation and section of a two room residential building from a given line plan, showing details of foundations, roof and parapet

Drawing No. 8 (one sheet)

Drawings of following floors Cement concrete floors on ground and at first floor i) Conglomerate (Concrete Flooring) ii) Bonded cement concrete flooring iii) Terrazo flooring iv) Ceramic / vitrified tile flooring

Drawing No. 9: (one sheet)

Drawing of flat roof, showing the heat/thermal insulation provisions.

Drawing No.10

Draw at least one sheet using CAD software

RECOMMENDED BOOKS

1. Civil Engineering Drawing by RS Malik, Asia Publishing House
2. Civil Engineering Drawing by V.B.Sikka. Katson Publishing, Ludhiana
3. Civil Engineering Drawing by NS Kumar; IPH, New Delhi

BASICS OF ELECTRICAL & MECHANICAL ENGINEERING SYSTEMS (DCE-307)

Basic Engineering and Science (BES) Core: Credit 4(3-0-2)

Objective: A diploma holder has to assist in activities of installation, operation and maintenance etc of different machines and equipment. These activities are not branch specific and instead require him to know basics of civil, electrical and mechanical engineering. The subject of General Engineering has been included to impart basic knowledge of civil, electrical and mechanical engineering to the students.

COURSE OUTLINE:

PART-A MECHANICAL ENGINEERING

1. Transmission of Power

1.1 Belt Drives: Types of belts, belt materials, cross and flat belt drives, advantages of V-belt drive over flat belt drive.

1.2 Gears Drives: Types of gears (briefly), types of gear trains

2. Internal Combustion Engines

2.1 Classification of IC engines

2.2 Working principles of two stroke and four stroke engines

2.3 Working principles of petrol engine and diesel engines

2.4 Gas turbines (working principle only)

2.5 Using principle of prime motor used in high power single phase and three phase generators used in building

3. Refrigeration and Air Conditioning System

3.1 Different types of refrigeration principles and refrigerants

3.2 Working of domestic refrigerator

3.3 Working of Window type AC system

3.4 Working of Split AC System

3.5 Working of Centralized Air Conditioning System

4. Hydraulics

4.1 Classification of pumps (reciprocating and centrifugal)

4.2 Working principles of both reciprocating and centrifugal pumps

4.3 Turbine: Working principles of impulse turbine and reaction turbine

5. Working principle of lift used in modern building

PART B ELECTRICAL ENGINEERING

1. Basic Quantities of Electricity:

1.1 Definition of voltage, current, power and energy with their units

1.2 Name of the instruments used for measurement of different electrical quantities such as voltmeter, ammeter, wattmeter, energy meter.

1.3 Connection of the instruments in electric circuit

2. Application and Advantages of Electricity:

2.1 Difference between AC and DC

2.2 Various applications of electricity

2.3 Advantages of electrical energy over other types of energy

3. Various Types of Power Plants:

3.1 Elementary block diagram of thermal, hydro and nuclear power stations

3.2 Brief explanation of the principle of power generation in above power stations

4. Transmission and Distribution System

4.1 Key diagram of 3 phase transmission and distribution system 4.2 Brief functions of accessories of transmission line 4.3 Distinction between high and low voltage distribution system

4.4 Identification of three phase wires, neutral wires and the earth wire on a low voltage distribution system 4.5 Identification of the voltage between phases and between one phase and neutral 4.6 Distinction between three phase and single phase supply

5. Supply from the Poles to the Distribution Board:

5.1 Arrangement of supply system from pole to the distribution board 5.2 Function of service line, energy meter, main switch, distribution board

6. Domestic Installation:

6.1 Distinction between light and fan circuits and single phase power circuit, sub circuits 6.2 Various accessories and parts of installation, identification of wiring systems, such as batton, conduct, caring and coping 6.3 Common safety measures and earthing 6.4 Introduction to BIS code of safety and wiring installation

7. Electric Motors and Pumps:

7.1 Definition and various application of single phase and three phase motors 7.3 Conversion of horse power in watts or kilowatts 7.4 Type of pumps and their applications 7.5 Use of direct online starter and star delta starter

8. Installation of Generators

8.1 Working of single phase and three phase generators. 8.2 Installation of generators with panel diagram etc.

9. Electrical circuits idea used in buildings

9.1 Basic elementary circuit idea of lift, stage lightening, internal wiring for telephone, internet and PBX.

PRACTICAL EXERCISES IN MECHANICAL ENGINEERING

1. Demonstration and study of main parts of 4 stroke petrol and diesel engines by actually dismantling them (The idea is to acquaint the students with the most common troubles occurring in the engines)
2. Demonstration and study of main parts of 2 stroke petrol engine by actually dismantling it. (The idea is to acquaint the students with the most common trouble occurring in the engines)
3. Demonstration and study of gas turbines through models
4. Demonstration and study of different hydraulic pumps
5. Demonstration and study of various drives for transmission of powers i.e. models of belts and gears.
6. Demonstration and study of air conditioning system in a building
7. Demonstration and study of domestic refrigerating system
8. Demonstration and study of Prime motor used in three phase generating set

PRACTICAL EXERCISES IN ELECTRICAL ENGINEERING:

1. Use of Megger: Objective:To make the students familiar with different uses of different electrical instruments.

2. Connection of a three phase motor and starter including fuses and reversing of direction of rotation.

Objective:Students may be made familiar with the equipment needed to control a three- phase motor The students must experience that by changing any two phases, the direction of rotation is reversed.

3. Connection of a lamp, ceiling fan, socket outlet, geyser, floor grinder, voltage stabilizer etc.

Objective:Students may be made familiar with the different types of equipment and circuits used in the domestic installations

4. Treatment of electric shock

Note:The teacher may give a demonstration how an electric shock must be treated.

Objective:Students must be trained to treat the persons suffering from an electric shock

5. Demonstration and study of Domestic installation components used in single phase and three phase wiring

6. Demonstration and study of distribution line components

7. Demonstration and study of different electrical circuits used in Generator, Lift, Stage lightening etc.

8. Demonstration and study of distribution board

9. Note: Students may be asked to study the distribution board in the institution and note down all accessories.

10. Objective: Students must be made familiar with the distribution board

11. 9. Connections and taking reading of an energy meter (1φ & 3φ)

12. Objective: Students may be asked to connect an energy meter to a load and calibrate reading

13. 10. Demonstration and study of submersible motor pump set and its working

14. Objective:To tell use of the set in water supply and irrigation works.

RECOMMENDED BOOKS

Mechanical Engineering

1. General Mechanical Engineering by M. Adithan; TTTI, Chandigarh

Electrical Engineering

1. Electrical Technology Part 1: Basic Electrical Engineering by Theraja, BL; S Chand and Company, New Delhi