FLUID MECHANICS (LAB)

CIVIL ENGINEERING (3rdSem)

PRACTICAL EXERCISES

i) To verify Bernoulli's 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 Reynolds's experiments
v) To verify loss of head in pipe flow due to
a) Sudden enlargement
b) Sudden contraction
c) Sudden bends
vi) Demonstration of use of current meter and pitot tube
vii) To determine coefficient of discharge of a rectangular notch/triangular notch.

STRUCTURAL MECHANICS

CIVIL ENGINEERING (3rdSem)

PRACTICAL EXERCISES

i) Determination of yield stress, ultimate stress, percentage elongation and plot the stress strain diagram and compute the value of young's modulus on mild steel
ii) Testing of HYSD Steel
iii) Determination of Young's modulus of elasticity for steel wire with searl's apparatus
iv) Determination of modulus of rupture of a concrete beam
v) Determination of maximum deflection and young's modulus of elasticity in simply supported beam with load at middle third point
vi) Verification of forces in a framed structure

SURVEYING-1(LAB)
CIVIL ENGINEERING (3rdSem)

PRACTICAL EXERCISES

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 abroad/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)

V. Layout of Buildings (from given drawing of two room residential building) by use of surveying instruments.

CONSTRUCTION MATERIAL (LAB)
CIVIL ENGINEERING (3rd Sem)

PRACTICAL EXERCISES:

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.

BUILDING CONSTRUCTION
CIVIL ENGINEERING (3rd Sem)

PRACTICAL EXERCISES

i) Demonstration of tools and plants used in building construction
ii) To prepare Layout of a building: two rooms building with front verandah
iii) To construct brick bonds (English bond only) in one, one and half and two brick thick: (a) Walls for L, T and cross junction (b) Columns
iv) Demonstration of following items of work at construction site by:
a) Timbering of excavated trenching
b) Damp proof courses laying
c) Construction of masonry walls
d) Laying of flooring on an already prepared lime concrete base
e) Plastering and pointing exercise
f) Constructing RCC work
g) Pre-construction and post construction termite treatment of building and woodwork

CIVIL ENGINEERING DRAWING - I
CIVIL ENGINEERING (3rd Sem

DETAILED CONTENTS

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 atleast 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 (a) (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
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Drawing No. 7 (b)
Draw detailed plan, elevation and section of:
(i) Single flight R.C.C. stair case
(ii) Dog legged wooden stair case

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 atleast one sheet using CAD software

Drawing No. 11 (one sheet)
Drawing details of damp proofing arrangement of roofs and walls as per BIS Code. Show the rain water drainage arrangement also.

CONCRETE TECHNOLOGY (LAB)
CIVIL ENGINEERING (4th semester)

PRACTICAL EXERCISES:

i) To determine the physical properties of cement as per IS Codes
ii) To determine flakiness and elongation index of coarse aggregates
iii) To determine silt in fine aggregate
iv) Determination of specific gravity and water absorption of aggregates
v) Determination of bulk density and voids of aggregates
vi) To determine surface moisture in fine aggregate by displacement method
vii) Determination of particle size distribution of fine, coarse and all in aggregate by sieve analysis (grading of aggregate)
viii) To determine necessary adjustment for bulking of fine aggregate
ix) To determine workability by slump test:
x) To verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/Cement ratio on slump
xi) Compaction factor test for workability
xii) Non destructive test on concrete by:
a) Rebound Hammer Test
b) Ultrasonic Pulse Velocity Test
xiii) Tests for compressive strength of concrete cubes for different grades of concrete

WATER SUPPLY AND WASTE WATER ENGINEERING (LAB)
CIVIL ENGINEERING (4th Sem)

LIST OF PRACTICALS

1) To determine turbidity of water sample
2) To determine dissolved oxygen of given sample
3) To determine pH value of water
4) To perform jar test for coagulation
5) To determine BOD of given sample
6) To determine residual chlorine in water
7) To determine conductivity of water and total dissolved solids
8) To study the installation of following:
a) Water meter
b) Connection of water supply of building with main
c) Pipe valves and bends
d) Water supply and sanitary fittings
9) To study and demonstrate the joining/threading of GI Pipes, CI Pipes, SW pipes,

D.I. pipes and PVC pipes.
10) To demonstrate the laying of SW pipes for sewers
11) Study of water purifying process by visiting a field lab.
12) To test house drainage

SURVEYING-2 (LAB)
CIVIL ENGINEERING (4th Sem)

PRACTICAL EXERCISES

I. Contouring:

- i) Preparing a contour plan by radial line method by the use of a Tangent Clinometers/Tachometer
- ii) Preparing a contour plan by method of squares
- iii) Preparing a contour plan of a Road/Railway track/Canal by taking cross sections.

II. Theodolite:

- Taking out the Theodilite, mounting on the tripod and placing it back in the box
- Study of a transit vernier theodolite; temporary adjustments of theodolite
- Reading the vernier and working out the least count, measurement of horizontal angles by repetition and reiteration methods
- Measurement of vertical angles and use of tachometric tables
- Measurement of magnetic bearing of a line
- Running a closed traverse with a theodolite (at least five sides) and its plotting
- Height of objects with and without accessible bases

III. Curves
i) Setting out of a simple circular curve with given data by the following methods
a) Offsets from the chords produced
b) One theodolite method

IV Minor instruments:
i) Demonstration and use of minor instruments like Ceylon Ghat Tracer, Tangent Clinometers, Pantograph, Abney level etc.
ii) Use of planimeter for computing areas

V Demonstration of digital instruments through field visits to Survey of India andother government agencies.

VI Total Station (only demonstrations).

CIVIL ENGINEERING DRAWING – II

CIVIL ENGINEERING (4th Sem)

Drawings Exercises

A) WATER SUPPLY AND WASTE WATER ENGINEERING DRAWING

1. Drains and Sewers

Cross section of standard types of open drains (circular, v-shaped and μ-shaped) with their foundations

Cross section of earthen ware and RCC sewer pipes

Cross sections of masonry sewers (circular and egg shaped)

2. Traps, manholes and inspection chamber

Detailed section of floor trap and gully trap

Detailed plan and section of an inspection chamber

Detailed plan and section of a manhole

3. Septic Tank and Soak Pit

Detailed plan and cross sections of a domestic septic tank with soak pit for 10 and 50 users

4. Bath room and W.C connections:

4.1 Cross-section through the external wall of lavatories at ground and first floor showing the one and two pipe system and the connections of the lavatory to inspection chamber

4.2. Plan of a bathroom showing positions of lavatory, bath tub, wash-basin, taps and showers

5. Draw sectional elevation of a two storeyed building showing details of one pipe and two pipes systems with sanitation system.

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6. Practice of reading water supply and sanitary engineering working drawings (PWD/urban Development agencies) including hot water and cold water supply system of a two room set.

7. Detailed Layout Plan of Sewage Treatment Plant for a residential area and Effluent Treatment Plant for an industrial unit.

B) IRRIGATION ENGINEERING DRAWING:

1. Typical cross-section of a channel

- L-section of a channel for given data
- Typical cross section of an unlined and lined channel in cutting, partly cutting and partly filling and fully in filling with given design data.

2. Layout plan of a canal head works.

3. Draw the typical L-section of a weir

4. Draw the X-section of an Earthen Dam

i) Homogeneous

ii) Zoned type

iii) Diaphragm type

5. Cross section of a tube well

6 Layout and cross section of rain water harvesting

HIGHWAY ENGINEERING (LAB)
CIVIL ENGINEERING (5th Sem)

PRACTICAL EXERCISES

1. Determination of penetration value of bitumen
2. Determination of softening point of bitumen
3. Determination of ductility of bitumen
4. Determination of impact value of the road aggregate
5. Determination of abrasion value (Los Angeles') of road aggregate
6. Determination of the California bearing ratio (CBR) for the sub-grade soil
7. Visit to Hot mix plant
8. Visit to highway construction site for demonstration of operation of:

Tipper, tractors (wheel and crawler), scraper, bulldozer, dumpers, shovels, grader, roller, dragline, road pavers, JCB etc.

9. Mixing and spraying equipment
10 A compulsory visit to Ready Mix Concrete plant.

SOIL AND FOUNDATION ENGINEERING (LAB)
CIVIL ENGINEERING (5th Sem)

PRACTICAL EXERCISES

1. To determine the moisture content of a given sample of soil
2. Auger Boring and Standard Penetration Test
   a) Identifying the equipment and accessories
   b) Conducting boring and SPT at a given location
   c) Collecting soil samples and their identification
   d) Preparation of boring log and SPT graphs

e) Interpretation of test results

3. Extraction of Disturbed and Undisturbed Samples
   a) Extracting a block sample
   b) Extracting a tube sample
   c) Extracting disturbed samples for mechanical analysis.
   d) Field identification of samples
4. Field Density Measurement (Sand Replacement and Core Cutter Method)
   a) Calibration of sand
   b) Conducting field density test at a given location
   c) Determination of water content
   d) Computation and interpretation of results
5. Liquid Limit and Plastic Limit Determination:
   a) Identifying various grooving tools
   b) Preparation of sample

c) Conducting the test
d) Observing soil behavior during tests
e) Computation, plotting and interpretation of results

6. Mechanical Analysis
   a) Preparation of sample
   b) Conducting sieve analysis
   c) Computation of results
   d) Plotting the grain size distribution curve
   e) Interpretation of the curve
7. Laboratory Compaction Tests (Standard Proctor Test)
   a) Preparation of sample
   b) Conducting the test
   c) Observing soil behavior during test
   d) Computation of results and plotting
   e) Determination of optimum moisture content and maximum dry density
8. Demonstration of Unconfined Compression Test
   a) Specimen preparation
   b) Conducting the test
   c) Plotting the graph
   d) Interpretation of results and finding/bearing capacity
9. Demonstration of:
   a) Direct Shear and Vane Shear Test on sandy soil samples
   b) Permeability test apparatus