VSS UNIVERSITY OF TECHNOLOGY, BURLA, ODISHA
CIVIL ENGINEERING DEPARTMENT
CURRICULUM
For
B.TECH – 4TH SEM

THEORY

BCE204-FLUID MECHANICS (3-1-0) CR-04

Introduction
Physical properties of fluids; Density; specific weight; Specific volume; Specific gravity; Compressibility; Elasticity; Surface tension; Capillarity; Vapour pressure; Viscosity; Ideal and real fluids; Concept of shear stress; Newtonian and non-Newtonian fluids.

Fluid statics
Pressure-density-height relationship; Manometers; Pressure on plane and curved surface;; Centre of pressure; Buoyancy; Stability of imme3rsed and floating bodies; Fluid masses subjected to uniform accelerations.

Fluid kinematics
Steady and unsteady, uniform and non-uniform, laminar and turbulent flows and enclosed flows; Definition of one-, two- and three-dimensional flows, Stream-lines, streak-lines, and path-lines; Stream-tubes; elementary explanation of stream-function and velocity potential; Basic idea of flow nets.

Fluid dynamics
Basic equations: Equation of continuity; One-dimensional Euler's equation of motion and its integration to obtain Bernoulli's equation and momentum equation.

Flow through pipes
Laminar and turbulent flow in pipes; Hydraulic mean radius; Concept of losses; Darcy-Weisbach equation; Moody's (Stanton) diagram; Flow in sudden expansion and contraction; Minor losses in fittings; Branched pipes in parallel and series, Transmission of power; Water hammer in pipes; Sudden closure condition.

Open channel flow
Definition; Uniform flow; Chezy's, Kutter's and Manning's equations; Chananel of efficient cross section.

Measurements
Hook gauge; Point gauge; Pitot tube; Current meter; Venturi meter; Orifice meter; Orifices and mouthpieces; Notches and weirs.

Text Books;

1. Hydraulics and Fluid Mechanics including Hydraulic Machines by P.N.Modi and S.M. Seth, Standard Book House.
2. Fluid mechanics by A.K. Jain, Khanna Publishers.

Reference Books:

1. Engineering Fluid Mechanics by K.L. Kumar, S. Chand & Co.
2. Fluid Mechanics by V.L. Streeter, Whlie, MGH

BCE-205: STRUCTURAL ANALYSIS – I (3-1-0) CR-04

Module – I (10 Hrs)

1. Introduction to statically determinate/ indeterminate structure with reference to 2D and 3D structures. Free body diagram of structure.
2. Introduction to kinematically determinate/indeterminate structures with reference to 2D and 3D structures. Degree of freedom.
3. B.M. and S.F. diagrams for different loading on simply supported beam, cantilever and overhanging beams.
4. B.M. shear and normal thrust of three hinged arches.

Module – II (10 Hrs)

5. Deflection of statically determinate beams:
   Integration method, Moment area method, Conjugate beam method.

6. Deflection of statically determinate beams by energy methods- strain energy method, castiglianos theorems, reciprocal theorem, unit load method. Deflection of pin-jointed trusses, Williot-Mohr diagram.

Module – III (6 Hrs)

7. M. and S.F. diagrams for statically indeterminate beams – propped cantilever and fixed beams.

8. Application of three moment theorem to continuous and other indeterminate beams.

Module – IV (8 Hrs)

9. ILD for determinate structures for reactions at supports, S.F. at given section, B.M. at a given section, Maximum shear and maximum bending moment at given section, Problems relating to series of wheel loads, UDL less than or greater than the span of the beam, Absolute Maximum bending moment.

10. ILD for B.M., S.F., normal thrust and radial shear of a three hinged arch.

Module – V (8Hrs)

11. Suspension cables, three hinged stiffening girders.
12. Introduction to space frames.

REFERENCE BOOKS:

1. Sructural Analysis – Norris & Wilber
2. Indeterminate Sructures – J.S. Kenney
3. Structural Analysis – C.S.Reddy, TMH Publication

BCE206-ENGG. SURVEYING (3-1-0) CR-04

1. Concept of Surveying- Definition of surveying, Classification, Principle, Accuracy
2. Linear Measurement- Different methods of direct measurement instrument for chaining, Ranging, Chaining on uneven slopping ground, Errors in Chaining, Corrections.
3. Chain Surveying – Chain triangulation, Survey stn., lines, locating ground features, field work, instruments for setting out basic problems in chaining, obstacles in chaining
4. Compass Surveying – Principles use of Prismatic Compass, Measurement of bearings, Conversion of bearings, Local attraction, Correction of compass traverse.
5. Plane Table Survey- Principles, Advantages and disadvantages, Equipment, Accessories and their uses. Methods of plane table survey. Two point and three point problems.
6. Levelling- Types of levelling and their uses, Permanent adjustment, Curvature and refraction effects.
7. Contouring-Characteristics and uses of contours. Methods of contouring.
8. Theodolite Survey – Application in Height and distance measurements. Permanent adjustment of transit theodolite, methods of repetitions and reiterations.
9. Curve Setting – Simple circular curve setting by chain, tape & theodolite
10. Minor Survey Instruments – Box-sextant, Planimeter, Pantagraph, their working principles and uses.

Reference Books:

1. Surveying & Levelling – Kanetkar & Kulkarni, Vol.-I, Pune Vidyarthi Griha Prakashan.
2. Surveying – Punmia, Vol. – I, Laxmi Publication.
3. Surveying – S.K. Duggal, Tata McGraw Hill

SESSIONAL

BCE294-HYDRAULICS LAB (0-0-3) CR-02

1. Study of flow measuring equipments
2. Determination of head loss in pipes
3. Experiment on flow through orifices
4. Experiment on flow through Venturimeters
5. Experiment on flow through orifice meters
6. Experiment on Laminar flow through pipes (Raynolds Apparatus)
7. Determination of Metacentric height of a pantoon
8. Determination of Manning's and Chezy's constant of an open channel
9. Measurement and calibration of notches and weirs
10. Verification of Bernoulli's Equation

BCE295-SURVEY PRACTICE-I (0-0-3) CR-02

1. Study of Chain, Standardization of Chain & Measurement of a line
2. Chain traversing
3. Compass traversing
4. Plane Table : 3 Point problem
5. Study of Dumpy level, its temporary adjustment, Differential Leveling and Fly leveling.
6. Contouring
7. Study of Theodolite, Temporary adjustment of Theodolite & measurement of horizontal and vertical angle.
8. Theodolite Traversing.

BCE296-GEOLOGY LAB (0-0-3) CR-02

1. Study of topographical map for geological engineering application
2. Physical properties of rocks and minerals
3. Engineering properties of rocks
4. Lithological and structural mapping (field study)

BCE297-ENVIRONMENTAL ENGINEERING LABORATORY (0-0-3) CR-02

1. Determination of taste, odour and turbidity of different samples of water.
2. Determination of colour and Ph of different samples of water.
3. Determination of dissolved solids and suspended solids of different samples of water.
4. Determination of hardness of different samples of water.
5. Determination of optimal chlorine dose for different samples of water.(Break- point Chlorination)
6. Determination of organic content of different samples of water.
7. Determination of inorganic content of different samples of water.
8. Determination of Bio-Chemical Oxygen Demand for different samples of water.
9. Determination of Chemical Oxygen Demand for different samples of water.
10. Determination of bacteriological status of different samples of water.