

# **CEU201 MECHANICS OF SOLIDS**

L	T	P	Cr
3	0	0	3

**Prerequisite: ZZ 101T Engineering Mechanics - Statics**

## **Tension, compression & shear: (11 hours)**

Types of external loads - self weight - internal stresses - normal and shear stresses - strain - Hooke's law - Poisson's ratio - relationship between elastic constants - stress strain diagrams working stress - elongation of bars of constant and varying sections - statically indeterminate problems in tension and compression - assembly and thermal stresses - strain energy in tension - compression and shear

## **Analysis of stress and strain: (5 hours)**

Stress on inclined planes for axial and biaxial stress fields - principal stresses - Mohr's circle of stress - principal strains - strain rosette – principal stress/strain problem as an eigenvalue problem

## **Bending moment and shear force (6 hours)**

Different types of beams - shear force and bending moment diagrams for simply supported overhanging and cantilever beams - relationship connecting intensity of loading - shearing force and bending moment - shear force and bending moment diagrams for statically determinate plane frames

## **Stresses in laterally loaded symmetrical beams (7 hours)**

Theory of simple bending - limitations - bending stresses in beams of different cross sections - moment of resistance - beams of uniform strength - beams of two materials - shearing stresses in bending - principal stresses in bending - strain energy due to bending.

## **Unsymmetrical bending (4 hours)**

Shear flow - shear centre - determination of shear centre for simple sections

## **Torsion (6 hours)**

Torsion of circular solid and hollow shafts - power transmission - strain energy in shear and torsion - close coiled and open coiled helical springs

## **Thin and Thick Cylinders (3 hours)**

Lame's equation - stresses in thick cylinders due to internal and external pressures - compound cylinders - shrink fit - wire wound pipes and cylinders

## **References**

1. Timoshenko, S.P., and Young, D.H., Elements of Strength of Materials, East West Press, New Delhi, 2003.
2. Timoshenko, S.P. and Gere, J.M., Mechanics of Materials, CBS Publishers, 2002.
3. Popov E.P., Mechanics of Materials, Prentice Hall India, New Delhi, 2002.
4. Hearn E.J., Mechanics of Materials Pergamon Press, Oxford, 1982.
5. Warnock F.V., Strength of Materials, Isaac Pitman, London, 1962.
6. Nash W.A., Strength of Materials, Schaum's Outline Series, McGraw Hill, New York, 1988.
7. Au, T, Elementary Structural Mechanics, Prentice Hall, New York, 1963.
8. Junnarkar, SB, and Shah, HJ, Mechanics of Structures, Vol. 1, Charotar, New Delhi, 1997.

## CEU202 ENGINEERING GEOLOGY

L	T	P	Cr
3	0	0	3

### **Module I (7 hours)**

#### **Branches and scope of geology**

##### **Physical geology**

Geological agents and their action, weathering, volcanism, earthquake and plate tectonics

### **Module II (9 hours)**

#### **Elements of crystallography and mineralogy**

##### **Petrology**

Types of rocks, genesis and physical and chemical characters, Building stones

### **Module III (13 hours)**

#### **Structural geology**

Types of structures and classification and their effect on civil engineering projects and Geological mapping

##### **Hydrogeology**

Groundwater and occurrence, investigations, quality, artificial recharge

### **Module IV (13 hours)**

#### **Geology in Civil Engineering**

Tunnels, dams, reservoirs, bridges, Runways, Roads and Buildings.

Slope failures and landslides. Investigations, Remote sensing and GIS applications

##### **Geology of India**

Types, age and occurrence of rock formations and economic importance

### **References**

- 1 Parbin Singh., Engineering and General Geology , 2003, S.K. Kataria and Sons, Delhi.
- 2 Bangar,K.M., Principles of Engineering Geology,1995, Standard Publishers Distributors, New Delhi
- 3 Billing,M.P.,Structural geology,1974, Prentice Hall India, New Delhi.
- 4 Blyth.F.G.H.,and deFreitas,M.H., Geology for Engineers, 1974 ELBS, London.
- 5 Gokhale,K.V.G.K. and Rao,D.M., Experiments in Engineering Geology,1981,Tata McGraw Hill,New Delhi.
- 6 Kesavulu.C., Text book of Engineering Geology,1993,Macmillan India Ltd., New Delhi.
- 7 Reddy.V., Engineering Geology for Civil Engineers,1997, Oxford &iBH,New Delhi.
- 8 Krynine.D.P. and Judds.W.R., Principles of Engineering Geology and Geotechniques,1957,McGraw Hill, New York.
- 9 Todd.D.K., Groundwater Hydrology,1980, John Wiley and Sons, New York.
- 10 Tyrrel,G.W., The Principles of Petrology,1970, Asia Publishing House, Mumbai .
- 11 Thomas.M. Lilliesand and Ralph.W.Keifer., Remote sensing and Image Interpretation,1987, John Wiley and Sons, New York.
- 12 Jacobs.G.A.,Russel.R.D and Wilson. J.T., Physics and Geology,1974, McGraw Hill Book.Co.Inc.

## **CEU203 MECHANICS OF FLUIDS**

L	T	P	Cr
3	0	0	3

### **Module I (12 hours)**

Fluids - Definition - Types and properties. Fluid as a continuum - Control volume concept. Fluid Statics- Fluid pressure-Measurement of pressure- Hydrostatic forces on immersed surfaces-Application of fluid pressure analysis in engineering problems. Buoyancy and stability of immersed and floating bodies, Pressure in case of accelerated rigid body motion. Fluid kinematics- Methods of describing fluid motion - Types of motion, Inviscid flows, Velocity and acceleration- Continuity equation- Potential flows-Velocity potential and Stream function. Cauchy Reimann equations – Flownet - Circulation and vorticity.

### **Module II (10 hours)**

Fluid dynamics, Types of forces, Forces influencing fluid motion- Energy and Head-Energy correction factor, Euler and Bernoulli's equations. Application of Bernoulli's equation. Flow measurement, Linear momentum equations, Momentum correction factor, Application of momentum equation.

### **Module III (9 hours)**

Pipe flow- Introduction – Laminar and turbulent flows - Reynolds' number Head loss. Major loss in pipe flow-Friction loss, Minor losses, Total energy and hydraulic gradient line, Compound pipes, Pipes in series and parallel, Branching pipes, Pipe networks.

### **Module IV (11 hours)**

Introduction to boundary layer theory - Boundary layer growth in flow over a plate, Flow past immersed bodies. Dimensional analysis and similitude - Methods of dimensional analysis, Dimensionless numbers. Principles of similarity- Modelling using Reynolds and Froude laws, Distorted models and scale effects.

### **References**

1. Shames, I.H., Mechanics of Fluids McGraw Hill , 1992, New York
2. Streeter, V.L and Wylie, E.B., Fluid Mechanics, McGraw Hill , 1985, New York
3. Modi P.N. & Seth S.M., Hydraulics and Fluid Mechanics including Fluid Machines- Standard Book House, 2000, New Delhi.
4. Subramanya K. Theory and Applications of Fluid Mechanics, Tata McGraw Hill Publishing Co, 1993, New Delhi.
5. S.K. Agrawal. Fluid Mechanics and Machinery, Tata McGraw Hill Publishing Co, 1997, New Delhi.
6. Narayana Pillai., Ramakrishnan., Principles of Fluid Mechanics and Fluid Machines, University Press, 2003.

## CEU204 BUILDING TECHNOLOGY

L	T	P	Cr
3	0	0	3

### **Module I (11 hours)**

Building stones - Classification of rocks - Quarrying - Dressing - Properties and uses of common type of stones ; Timber - Defects - Seasoning - Decay - Preservation - Plywood, fibre board, particle board ; Clay products - Bricks - Manufacture - IS classifications - Properties and testing - Types of bricks - Tiles - Manufacture, properties and uses - Types of tiles ; Ceramic products - Lime - Classification - Manufacture, properties and uses.

### **Module II (10 hours)**

Cement - Ingredients - Manufacture - Types of cement - Properties and testing - Uses ; Mortar - Sand - Properties - Types of mortar and uses ; Concrete - Properties of fresh concrete and tests - Proportioning of concrete mixes - Properties of hardened concrete and tests - Recent developments in concrete ; Iron and steel - Structural sections - Properties and uses of structural steel - Recent developments ; Miscellaneous materials - Glass - Plastics - A.C.sheets - Thermocole.

### **Module III (11 hours)**

Foundation - Timbering of foundation trenches - Bearing capacity of soils - Improvement of bearing capacity - Settlement of foundation - Description of spread, grillage, raft and pile foundations ; Brick and stone masonry - Bonds in brick work - Types of stone masonry - Cavity walls - Lintels and arches ; Concrete construction - Batching, mixing, placing, compacting and curing of concrete - form work - Precast concrete - Prestressed concrete - Recent developments in concreting ; Partition walls - Types and features.

### **Module IV (10 hours)**

Floors and flooring - Different types and applications; Doors, windows and ventilators - Different types ; Finishing works ; Building Failures - Concrete failure - Steel failure - Foundation failure - Other types of failures - Causes and Remedial measures - Building repairs - Shoring - Underpinning - Scaffolding ; Tall buildings - Framed structures - Steel and concrete frames - Joints in steel and concrete frames - Introduction to prefabrication - Slip form and lift slab constructions; Fire proof construction - Fire load - Fire resisting properties of building materials - Fire extinguishing methods - Fire proof construction methods.

### **References**

1. Rangwala S. C, Engineering Materials, Charotar Publishing House, 1992, Anand
2. Punmia B. C, Building Construction, Laxmi Publications, 1999, New Delhi.
3. Rangwala S. C, Building Construction, Charotar Publishing House, 1992, Anand
4. Huntington W.C, Building Construction, John Wiley, 1959, New York.
5. Shetty M. S, Concrete Technology, S.Chand & Co., 1992, New Delhi

## **CEU205 SURVEYING**

L	T	P	Cr
2	0	1	3

### **Module 1 (10 hours)**

Introduction - classification of surveys - plane surveying - geodetic surveying - topographic surveying - reconnaissance - principle of working from whole to part - provision of control - conventional signs - chain survey - instruments - principles of chain survey - field book - plotting - tie line and check line - chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey - uses of cross staff and optical square

### **Module II (10 hours)**

Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing - true and magnetic bearing - dip and declination - local attraction - traversing - plotting - error of closure - graphical and analytical adjustments - plane table survey - instruments and accessories - different methods - orientation - advantages and disadvantages of plane tabling - two point problem - three point problem - errors in plane tabling - minor instruments - hand levels - clinometer - Ceylon ghat tracer - hypsometer - pantagraph -ediograph - box sextant - telescopic alidade

### **Module III (10 hours)**

Levelling - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary and permanent adjustments - fly leveling - booking - reduction of levels - corrections for refraction and curvature - reciprocal leveling - longitudinal levelling and cross sectioning - contour survey - definition - characteristics of contour - uses of contour - methods of contouring - direct and indirect interpolation - plotting - areas and volumes - trapezoidal rule - Simpson's rule - area from latitude and departure - uses of planimeter - volumes - trapezoidal and prismoidal formula

### **Module IV (12 hours)**

Theodolite surveying - study of theodolite - temporary and permanent adjustments - measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles - theodolite traverse - calculation of co ordinates - corrections - traverse table - omitted measurements - tacheometric surveying - stadia system - fixed and movable hair methods - staff held vertical and normal - instrument constants - analytic lens - tangential system - direct reading tacheometer - subtense bar – trigonometric leveling – various methods – E.D.M – total station.

### **References**

1. Kanetkar T.P.& Kulkarni S.V., Surveying Vol I &II, Vidyarthigriha Prakashan, 2004
2. Punmia B.C., Surveying Vol I &II, Laxmi Pub,1994.
3. Arora K.R., Surveying Vol I &II, Standard Book House, 1993
4. S.K Duggal, Surveying Vol 1, Tata - McGraw Hill, 2004.

## **CEU291 CIVIL ENGINEERING DRAWING**

L	T	P	Cr
1	0	3	3

1. Panelled doors, glazed windows and ventilators in wood
2. Steel and aluminium windows
3. Steel roof trusses
4. Reinforced concrete staircase
5. Residential buildings with flat and pitched roof – RC and tiled
6. Public buildings like office, dispensary, post office, bank etc.
7. Industrial buildings

### **References**

1. National Building Code of India
2. Local Building Bye-laws
3. Callender, John Hancock, Time Saver Standards for Architectural design Data, Tata McGraw Hill.
4. Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
5. Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
6. Ching, Francis D K, Architectural Graphics. .John Wiley

## CEU292 SURVEYING PRACTICAL I

L	T	P	Cr
0	0	3	2

### List of Exercises

1. Chain survey- Traversing and plotting of details
2. Compass survey - Traversing with compass and plotting
3. Plane table survey - Method of Radiation and Intersection
4. Plane table survey - Solving three point problem
5. Plane table survey - Solving two point problem
6. Plane table survey - Traverse
7. Levelling Fly leveling - Plane of collimation method
8. Levelling Fly leveling - Rise and Fall method
9. Levelling Longitudinal and cross sectioning
10. Levelling Contour surveying
11. Theodolite surveying - Measurement of horizontal angle by method of repetition and reiteration.