

### DEPARTMENT OF CIVIL ENGINEERING 1 YEAR BE I SEMESTER SESSION 2017-18

- 1. Course Code : **CE 100**
- 2. Course Title : ENGINEERING MECHANICS

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- 3. Credit : 3(2+1)
- 4. Theory Lecture Outlines

1.	Introduction of condition of equilibrium: Force, system of force, coplanar forces.
2.	<i>Moment and couples:</i> Moment and parallel forces, Couples, General conditions of equilibrium
3.	<i>Moment and couples:</i> Moment and parallel forces, Couples, General conditions of equilibrium
4.	<i>Practical Applications:</i> Levers, Cracked levers, Steel yards. Sagging chains and toggle joints.
5.	<i>Practical Applications:</i> Levers, Cracked levers, Steel yards. Sagging chains and toggle joints.
6.	<i>Centre of Gravity:</i> Centre of parallel forces, C.G. in some simple cases, C.G. of Solids.
7.	<i>Moment of Inertia:</i> Moment of inertia, Radius of gyration and perpendicular axis.
8.	Determination of moment of inertia of simple sections. Mass of moment of inertia.
9.	<i>Friction:</i> Introduction, Critical angle of friction, Friction on horizontal planes
10.	Friction on inclined planes, Wedge and block, Screw jacks, Rolling friction.
11.	<i>Machines:</i> Introduction, Effects of friction, Loss of work, Reversible and irreversible machine,
12.	Law of machine, Wheel and axle, Differential wheel and axle,
13.	Pulley block, Screw jack, Single and double purchase crab,
14.	Worm and Worm wheel, System of pulleys.
15.	<i>Frames:</i> Statically determinate plane frames, Method of joints, Method of sections, Graphical method
16.	<i>Rectilinear Motion</i> , Motion under gravity, Projectiles equation of the path, Maximum height attained,
17.	Time of flight, Horizontal range. Angle of projection, Projectile from a given height Projectile on an inclined plane Problems
18.	Work. Power and Energy: Work, Power. Work done by torque.
	Energy,Law of conservation

19.	Work, Power and Energy: Work, Power, Work done by torque,
	Energy,Law of conservation
20.	Centripetal and centrifugal forces
21.	Centripetal and centrifugal forces
22.	Laws of motion: Newton's Law of motion and their explanation
23.	Laws of motion: Newton's Law of motion and their explanation
24.	Collision of elastic bodies; Impulse and impulsive force, Principle of conservation of momentum
25.	Collision of elastic bodies; Impulse and impulsive force, Principle of conservation of momentum.
26.	Collision of elastic bodies; Impulse and impulsive force, Principle of conservation of momentum
27.	Loss of kinetic energy during impact.
28.	Loss of kinetic energy during impact.
29.	Numericals
30.	Revision

#### **Text Books/References**

1. I.B. Prasad. Engineering Mechanics, Khanna Publisher, New Delhi.

2. R.S. Khurmi. Applied Mechanics, S. Chand & Company Ltd., New Delhi

3. S.B. Junnarkar. Applied Mechanics, Charotar Publishing House, New Delhi.

4. Saluja. Applied Mechanics, Satya Prakashan, New Delhi.



## DEPARTMENT OF CIVIL ENGINEERING 1 YEAR BE I SEMESTER SESSION 2017-18

- 1. Course Code **CE 115** :
- **ENGINEERING DRAWING** 2. Course Title :
- 3. Credit : 1(0+1)

- 4. Theory Lecture Outlines
  - Introduction and letter writing. 1.
  - Construction and use of plain, diagonal and vernier scale 2.

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- Construction and use of plain, diagonal and vernier scale 3.
- 4. Construction and use of plain, diagonal and vernier scale
- Methods of drawing ellipse, parabola and hyperbola. 5.
- Orthographic projection and projection of points. 6.
- Orthographic projection and projection of points. 7.
- Projection of lines, projection of planes 8.
- projection of soli 9.
- Introduction of prism, pyramid, cylinder and cone. 10.
- Section of solids, 11.
- introduction of intersection of surfaces 12.
- Development of plane and curved surface 13.
- Isometric projection 14.

### **Text/Reference**

1. N.D. Bhatt. Elementary Engineering Drawing, Rupalee publication, Anand. 2. Lakshmi Narayan and Vaishwanar. A Text Book of Practical Geometry, Jain Brother, New Delhi. 3. R.B. Gupta. A Text Book of Engineering Drawing, Satry Prakashan, New Delhi.

4. Fundamentals of Technical Drawing, Parkinson.



## DEPARTMENT OF CIVIL ENGINEERING 2 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 211(AE,CE,EE,MI)
Course Title	:	STRENGTH OF MATERIAL
Credit	:	3(2+1)

Theory Lecture Outlines

- 1. Stress and strain, engineering properties
- 2. Saint-Venant's Principle. Stress strain diagrams

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- 3. Mechanical properties of materials, elasticity and plasticity.
- 4. Shear stress and strain, pure shear, complementary shear
- 5. Linear elasticity and Hooke's law. Poison's ratio, volumetric strain relation bulk modulus of elasticity
- 6. Elastic constants between elastic modulie. Stress and strain in axially loaded members
- 7. Temperature stresses and effects
- 8. Analysis of Stress and Strain : Stress at a point, stress components
- 9. Stresses on inclined planes. Plane stress and strain
- 10. Stresses on inclined planes. Plane stress and strain
- 11. Mohr's circle representation of plain stress and strain.
- 12. Mohr's circle representation of plain stress and strain.
- 13. Principle stresses and strains, maximum shear stresses. Hooke's law for plain stress.
- 14. Principle stresses and strains, maximum shear stresses. Hooke's law for plain stress.
- 15. Stresses in thin cylinder and special shells subjected to internal & external pressures
- 16. Stresses in thin cylinder and special shells subjected to internal & external pressures
- 17. Bending moment and shear force, relation between load, Shear force and bending moment
- 18. Bending moment and shear force diagrams for simply supported, and
- 19. Cantilever
- 20. overhang beams under static loading of different types viz. point loads,

Uniformly distributed loads, linearly varying loads, Pure bending

- 21. overhang beams under static loading of different types viz. point loads, Uniformly distributed loads, linearly varying loads, Pure bending
- 22. overhang beams under static loading of different types viz. point loads, Uniformly distributed loads, linearly varying loads, Pure bending
- 23. Theory of simple bending of initially straight beams.
- 24. Theory of simple bending of initially straight beams.
- 25. Flexural stresses in beams. Built up and composite beams
- 26. Flexural stresses in beams. Built up and composite beams
- 27. Shear stresses in beams of Rectangular, Circular and I-section. Shear formula, effect of shear strain.
- 28. Torsion of solid and hollow circular shafts
- 29. Torsion of solid and hollow circular shafts
- 30. Numerical

#### **Suggested Books & References**

- Junarkar S.B. and Shah H.J., 'Mechanics of Structures' Vol.-I Charoter Publishing, Anand.
- 2. Punima B.C., 'Strength of Materials and Mechanics of Structures', Vol-I, Standard Publisher distributors, New Delhi



## DEPARTMENT OF CIVIL ENGINEERING 2 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 212
Course Title	:	FLUID MECHANICS
Credit	:	4(3+1)

- 1. *Fluids:* Definition, Ideal fluids
- 2. Real fluids. Newtonian and non-Newtonian fluids
- 3. *Properties of Fluids:* Units of measurement
- 4. Mass density, Specific weight, Specific volume, Specific Gravity
- 5. Surface tension and Capillary. Compressibility and Elasticity
- 6. *Hydro-Statics:* Pressure at a point in a static fluid (pressure variation in compressible static fluid; atmospheric pressure)
- 7. Gauge pressure, vacuum pressure,
- 8. absolute pressure, Manometers, Bourdon pressure gauge.
- 9. Forces acting on immersed plane surface
- 10. Centre of pressure
- 11. forces on curved surfaces.
- 12. *Buoyancy:* Conditions of equilibrium of floating bodies
- 13. meta-centre
- 14. met centric height
- 15. *Hydro-Kinematics:* Types of Flows: Steady and unsteady.
- 16. uniform and non-uniform, stream lines
- 17. path lines, stream tubes, principles of conservation of mass
- 18. Torsion of solid and hollow circular shafts. equation of continuity, acceleration of fluid particles local and connective
- 19. Rotational and irrational motions.
- 20. *Dynamics of Fluid Flow:* Euler's equations of motion in Cartesian coordinate and its integration.
- 21. Bernoulli's equation for incompressible fluids
- 22. assumptions in Bernoulli's equation
- 23. Energy correction factor.

- 24. *Application of Energy Equation*: Application of energy equation for simple problem
- 25. pitot tube, orifice meter,
- 26. venturi meter,
- 27. *Momentum Equation:*
- 28. *Momentum Equation:*
- 29. Development of momentum equation by control volume concept,
- 30. Momentum correction factor
- 31. *Application of Momentum Equation:*
- 32. *Application of Momentum Equation*
- 33. Application of Momentum Equation
- 34. Application of momentum equation for simple problem
- 35. Force on a pipe bend.
- *Elementary concept of Boundary Layer.* 36.
- 37. Force on immersed bodies
- 38. drag and lift force
- 39. drag and lift coefficients
- 40. drag and lift coefficients
- 41. drag and lift coefficients
- 42. Revision

- 1. H.M. Raghunath, 'Fluid Mechanics'.
- 2. P.N. Modi & S.M. Seth, 'Hydraulics & Fluid Mechanics'.



## DEPARTMENT OF CIVIL ENGINEERING 2 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 213
Course Title	:	<b>BUILDING CONSTRUCTION</b>
Credit	:	4(3+1)

- 1. Components of a building & their function.
- 2. Foundation: Objectives
- 3. shallow foundation
- 4. grillage, raft, inverteal arches
- 5. pile foundation.
- 6. Causes of failure of foundation & remedial measures
- 7. *Dewatering:* Dewatering of the foundation trenches (Pumping providing sumps & side drains, cement grouting chemical grouting).
- 8. Damp Proofing: Objective
- 9. materials used for damp proofing
- 10. General principles of damp proofing methods.
- 11. Stone Masonry: Materials required for stone masonry
- 12. Types of stone masonry (rubble & Ashlar masonry)
- 13. Essentials of good stone masonry
- 14. *Brick Masonry:* Types of brick masonry
- 15. English and Flemish bond (for 1 and  $1\frac{1}{2}$  bricks)
- 16. Essentials of good brick masonry.
- 17. Shoring, Underpinning and Scaffolding
- 18. Horizontal & vertical shores
- 19. Purpose and methods of under- pinning. Different types of scaffolding
- 20. *Floors:* Various Types (stone patti, timber and R.C.C. floors).
- 21. Details of construction. Floor finishes (Lime, Cement concrete, terrazzo, marble and P.V.C. tiles).
- 22. assumptions in Bernoulli's equation *Roofs:* Simple roof trusses, lean to verandah roof
- 23. king post roof truss

- 24. Queen post roof truss, North light truss.
- 25. *Timber:* Defects in timber
- 26. *Timber:* Defects in timber
- 27. properties of good quality timber and their uses
- 28. Decay of timber, preservation of timber:
- 29. Decay of timber, preservation of timber:
- 30. Laminates and composites.
- 31. Laminates and composites.
- 32. *Doors:* Paneled door, Glazed door
- 33. Flush door, Collapsible steel door, Rolling steel shutter door.
- 34. Flush door, Collapsible steel door, Rolling steel shutter door
- 35. Windows: Casement windows, Sash window, Skylight window
- 36. Windows: Casement windows, Sash window, Skylight window
- 37. *Staircase:* Dog-legged Staircase
- 38. *Staircase:* Dog-legged Staircase
- 39. Requirement of a good Staircase
- 40. Proportioning rules of a Staircase.
- 41. Proportioning rules of a Staircase
- 42. Revision

- 1. Rangwala, S.C., 'Engineering Materials', Charotar Book Stall, Anand.
- 2. Arora, S.P. and Bindra, 'Building Construction', Dhanpat Rai & Sons, New Delhi.
- 3. Awaasthy, S.N., 'Building Construction', Publishing House, Bhopal.



### DEPARTMENT OF CIVIL ENGINEERING 2 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 214
Course Title	:	COMPUTER AIDED DRAWING
Credit	:	1 (0+1)

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Theory Lecture Outlines

- 1. Introduction to Computer Aided Drafting using popular software like AutoCad
- 2. Drawing entities. Drawing,
- 3. Drawing entities. Drawing,
- 4. Drawing entities. Drawing,
- 5. modifying
- 6. viewing
- 7. printing and dimensioning commands
- 8. Drawing aids
- 9. Drawing aids
- 10. coordinates systems
- 11. coordinates systems
- 12. layers
- 13. hatching
- 14. Blocks. Simple 2-D drawing and dimensioning exercises

### Suggested Books & References

1.AutoCad Reference Manual.

2.George Omura, 'Mastering AutoCad'.



## DEPARTMENT OF CIVIL ENGINEERING 3 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE311
Course Title	:	THEORY OF STRUCTURES-I
Credit	:	4(3+1)

1.	Static and Kinematic Indeterminacy
2.	Static and Kinematic Indeterminacy
3.	Static and Kinematic Indeterminacy
4.	Static and Kinematic Indeterminacy
5.	Static and kinematic indeterminacy (beam, frames: with & without sway)
6.	Static and kinematic indeterminacy (beam, frames: with & without sway)
7.	Static and kinematic indeterminacy (beam, frames: with & without sway)
8.	Introduction of Indeterminate structures.
9.	Introduction of Indeterminate structures.
10.	Slope Deflection Method: Analysis of continuous beams
11.	Slope Deflection Method: Analysis of continuous beams
12.	Slope Deflection Method: Analysis of continuous beams
13.	portal frames (without inclined members)
14.	portal frames (without inclined members)
15.	portal frames (without inclined members)
16.	Moment Distribution Method: Analysis of continuous beams
17.	Moment Distribution Method: Analysis of continuous beams
18.	Moment Distribution Method: Analysis of continuous beams
19.	portal frames (with and without sway)
20.	portal frames (with and without sway)
21.	Energy Methods: Castigliano's second theorem
22.	Energy Methods: Castigliano's second theorem
23.	Energy Methods: Castigliano's second theorem
24.	Principle of minimum strain energy

25.	Application to frames with one and two redundant members
26.	Trussed beam
27.	portal frames.
28.	portal frames.
29.	Approximate Analysis
30.	Analysis of multi storey frames by approximate methods:
31.	Analysis of multi storey frames by approximate methods:
32.	Analysis of multi storey frames by approximate methods:
33.	Portal Method
34.	Portal Method
35.	Portal Method
36.	Cantilever method
37.	Cantilever method
38.	Cantilever method
39.	Cantilever method
40.	Cantilever method
41.	Numericals
42.	Revision

- 1. Junarkar, 'Mechanics of Structures', Vol II.
- 2. Punmia, B.C., 'Strength of materials and theory of structures', Vol -II.
- 3. Vazirani & Ratwani, 'Analysis of Structures', Vol. II



### DEPARTMENT OF CIVIL ENGINEERING 3 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE312
Course Title	:	DESIGN OF CONCRETE STRUCTURES-I
Credit	:	4(3+1)

1.	Design Philosophies: Introduction to Working stress
2.	ultimate load and limit state methods
3.	Analysis and Design of Flexural Members (Using limit state design method)
4.	Analysis and Design of Flexural Members (Using limit state design method)
5.	Rectangular sections: Singly and doubly reinforced
6.	Rectangular sections: Singly and doubly reinforced
7.	Rectangular sections: Singly and doubly reinforced
8.	T section: Singly reinforced.
9.	T section: Singly reinforced.
10.	Shear and Bond: Behaviour of beams in shear and bond
11.	design for shear
12.	anchorage curtailment and splicing of reinforcement
13.	detailing of reinforcement
14.	<i>Torsion:</i> I.S. code provisions for torsion in beams
15.	Serviceability Conditions: I.S. code provisions for limit states of deflection
	and cracking
16.	Slabs, Lintels: Design of one way and two way slabs
17.	Slabs, Lintels: Design of one way and two way slabs
18.	design of lintels and introduction of flat slab
19.	design of lintels and introduction of flat slab
20.	design of lintels and introduction of flat slab
21.	Design of Columns: Short and long columns
22.	Design of Columns: Short and long columns

23.	Design of Columns: Short and long columns
24.	Design of Columns: Short and long columns
25.	eccentrically loaded columns (uni-axial).
26.	Column Footings: Isolated column footing
27.	Column Footings: Isolated column footing
28.	Column Footings: Isolated column footing
29.	combined footing for two columns (without central beam)
30.	combined footing for two columns (without central beam)
31.	combined footing for two columns (without central beam)
32.	Staircases: Design of dog-legged staircases
33.	Staircases: Design of dog-legged staircases
34.	Staircases: Design of dog-legged staircases
35.	Cantilever Retaining Walls: Design of cantilever type retaining walls
36.	Cantilever Retaining Walls: Design of cantilever type retaining walls
37.	Cantilever Retaining Walls: Design of cantilever type retaining walls
38.	introduction to counter-fort retaining wall
39.	introduction to counter-fort retaining wall
40.	introduction to counter-fort retaining wall
41.	Numericals
42.	Revision

- 1. Jain A.K., 'Reinforced Concrete-Limit State Design', Nem Chand & Bros. Roorkee.
- Krishna J. and Jain O.P., 'Plain and Reinforced Concrete, Vol. I. New Chand & Bros. Roorkee.
- 3. Dayaratnam P., 'Reinforced Concrete Structures', Oxford and IBH Publishing Co.
- 4. Punamia B.C., 'Limit State Design of Reinforced Concrete', Laxmi Publication Pvt. Ltd.
- 5. Pillai and Menon, 'Reinforced Concrete Design ', Tata McGraw Hill, New Delhi.



## DEPARTMENT OF CIVIL ENGINEERING 3 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 313
Course Title	:	GEOTECHNICAL ENGINEERING-I
Credit	:	4(3+1)

1.	Fundamental Definitions & Relationship: Soil and soil mass constituents
2.	Fundamental Definitions & Relationship: Soil and soil mass constituents
3.	Water content, specific gravity, void ratio, porosity
4.	degree of saturation, air void and air content
5.	unit weights, density index. Interrelationship of these terms.
6.	Index Properties: Determination of index properties of soil
7.	water content, specific gravity,
8.	particle size distribution
9.	sieve and sedimentation analysis, consistency limits
10.	void ratio and density index
11.	Soil Classification: Classification of soil for general engineering purposes
12.	Soil Classification: Classification of soil for general engineering purposes
13.	particle size, textural H.R.B. Unified
14.	I.S. Classification systems.
15.	Flow through Soils: Soil water absorbed capillary and free water
16.	Darcy's law of permeability of soil and its determination in laboratory
17.	Field pumping out tests, factors affecting permeability
18.	Permeability of stratified soil masses.
19.	Seepage: Seepage pressure, Laplace's equation for seepage
20.	Flownet and its construction. Uplift pressure, piping, principle of drainage
	by Electro Osmosis,
21.	Pheritic line.
22.	Stresses in Soil Mass: Total effective and neutral pressure
23.	Calculation of stresses. Influence of water table on effective stress
24.	quicksand phenomenon

25.	Shear Strength of Soils: Mohr's circle of stress
26.	shearing strength of soil, parameters of shear strength
27.	Coulomb's failure envelope
28.	determination of shear parameters by Direct Shear Box
29.	Triaxial and unconfined compression test apparatuses.
30.	Soil Compaction: Principles of soil compaction
31.	Soil Compaction: Principles of soil compaction
32.	laboratory compaction tests
33.	Proctor's test
34.	Modified Proctor tests
35.	Measurement of field compaction
36.	field methods of compaction and its control
37.	dry and wet of optimum
38.	Factors affecting compaction
39.	Soil Stabilization: Soil stabilization, Mechanical Stabilization
40.	Stabilization with cement, Lime and bitumen.
41.	Numericals
42.	Revision

- 1. Punmia, B.C., 'Soil Mechanics and Foundations'.
- 2. Ranjan G. & Rao, 'Basic and Applied Soil Mechanics'.
- 3. Singh Alam, 'Soil Engineering in Theory and Practice'.
- 4. Arora, K.R., 'Soil Mechanics & Foundation Engineering'.



## DEPARTMENT OF CIVIL ENGINEERING 3 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 314
Course Title	:	SURVEYING – II
Credit	:	4(3+1)

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1.	Contour & Contouring: Definition of contour, contour internal
2.	Contour & Contouring: Definition of contour, contour internal
3.	Contour & Contouring: Definition of contour, contour internal
4.	choice of contour internal, characteristics of contour
5.	Method of locating contours by square method
6.	cross sections & tacheometric method
7.	Interpolation of contours
8.	Use of contour maps.
9.	Computation of Volumes: Volume of reservoir from contour map Volume
	from spot levels & contour plans
10.	Computation of Volumes: Volume of reservoir from contour map Volume
	from spot levels & contour plans
11.	Earthwork calculations, Level, two level & side hill two level section,
12.	Tacheometry: Principle of tacheometric survey & its field application
13.	Stadia method
14.	constants of tacheometer
15.	constants of tacheometer
16.	distance & elevation formulae for staff held vertical & normal
17.	Reduction tables Use of anallactic lens
18.	Errors and precision of tacheometry
19.	Errors and precision of tacheometry
20.	Circular Curves : Necessity of curves
21.	classification of curves (Simple, compound, reverse & vertical curves)
22.	Elements of simple circular curve(definition & notation, designation of
	curve)

23.	Elements of simple circular curve(definition & notation, designation of curve)
24.	setting out of simple circular curve by ordination from the long chord by successive bisection of arc
25.	setting out of simple circular curve by ordination from the long chord by successive bisection of arc
26.	offsets from the tangents & by two theodolite method
27.	Transition Curve: General requirement of super elevation
28.	ideal transition curve. Length of transition curve
29.	Methods of setting out a transition curve
30.	Trigonometrical Leveling: Determination of differences of elevations
31.	base of the object accessible
32.	base of the object accessible
33.	base of the object inaccessible axis at the same level & at different level
34.	base of the object inaccessible axis at the same level & at different level
35.	base of the object inaccessible axis at the same level & at different level
36.	Ariel Photography: Introduction to Ariel Photography.
37.	Ariel Photography: Introduction to Ariel Photography.
38.	Ariel Photography: Introduction to Ariel Photography.
39.	Field Astronomy: Definitions and basic concepts of Field Astronomy
40.	Field Astronomy: Definitions and basic concepts of Field Astronomy
41.	Numerical
42.	Revision

- 1. Arora K. R. 'Surveying', Volume I & II.
- 2. Punmia B.C. 'Surveying', Vol. I & II.
- 3. Clendinning and Oliver, 'Principles and use of surveying instruments'.



## DEPARTMENT OF CIVIL ENGINEERING 3 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 315
Course Title	:	<b>COMPUTER APPLICATIONS IN CIVIL</b>
		ENGINEERING

1(0+1)

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Credit :

Theory Lecture Outlines

1.	Algorithms and flow charts
2.	Computer Algorithms for problem solution and flow charts
3.	Error Analysis: Approximations and errors
4.	rounding of errors Truncation errors (using Taylor Series)
5.	rounding of errors Truncation errors (using Taylor Series)
6.	Absolute Error
7.	Absolute Error
8.	Roots of Equation: Determination of roots of polynomials
9.	transcendental equations by Secant, Bisection and Newton-Raphson methods
10.	Linear Algebraic Equation: Solutions of simultaneous linear algebraic equations by
	Gauss Elimination and Gauss- Jordan methods.
11.	Curve Fitting: Linear regression analysis
12.	Least square of fit of a straight line
13.	Simple Programs: To analyze various Structural elements using C/C++
14.	programming

### **Suggested Books & References**

- Sastry, S. S. "Introductory Methods of Numerical Analysis", 4<sup>th</sup> ed. Prentice- Hall of India, New Delhi.
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International, New Delhi.



### DEPARTMENT OF CIVIL ENGINEERING 3 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 316
Course Title	:	<b>DESIGN OF STEEL STRUCTURES-I</b>
Credit	:	4(3+1)

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1.	Introduction: Types of steels as a structural material
2.	various grades of structural steel, properties and their permissible stresses
3.	Various rolled steel sections and their properties
4.	Introduction to various codes related to steel design of structures (IS 800, 875 etc.)
5.	Introduction to various codes related to steel design of structures (IS 800, 875
	etc.)
6.	Introduction to various codes related to steel design of structures (IS 800, 875
	etc.)
7.	Structural Fasteners: Riveted, bolted and welded connections
8.	Structural Fasteners: Riveted, bolted and welded connections
9.	Strength, efficiency and design of joints
10.	Strength, efficiency and design of joints
11.	Introduction to high strength friction grip bolts
12.	Introduction to high strength friction grip bolts
13.	Design of Axially Loaded Members: Tension and compression members
14.	Design of Axially Loaded Members: Tension and compression members
15.	Design of Axially Loaded Members: Tension and compression members
16.	Design axially loaded and eccentrically loaded columns.
17.	Design axially loaded and eccentrically loaded columns.
18.	Design axially loaded and eccentrically loaded columns.
19.	Design of lacings and battens for built-up columns.
20.	Design of lacings and battens for built-up columns.
21.	Design of lacings and battens for built-up columns.
22.	Column Bases: Slab base, Gusseted base.
23.	Column Bases: Slab base, Gusseted base.

24.	Column Bases: Slab base, Gusseted base.
25.	Column Bases: Slab base, Gusseted base.
26.	Plastic Design: Fundamentals of plastic theory for steel structures
27.	Plastic Design: Fundamentals of plastic theory for steel structures
28.	shape factor, plastic analysis
29.	shape factor, plastic analysis
30.	Design of rectangular & I sections for Continuous beam
31.	Design of rectangular & I sections for Continuous beam
32.	Design of rectangular & I sections for Continuous beam
33.	Design of Simple and Built-up Beams: Laterally restrained and unrestrained
	(symmetrical section only). Curtailment of flange plates.
34.	Design of Simple and Built-up Beams: Laterally restrained and unrestrained
	(symmetrical section only). Curtailment of flange plates.
35.	Design of Simple and Built-up Beams: Laterally restrained and unrestrained
	(symmetrical section only). Curtailment of flange plates.
36.	Design of Simple and Built-up Beams: Laterally restrained and unrestrained
	(symmetrical section only). Curtailment of flange plates.
37.	Gantry Girder: Design of gantry girder
38.	Gantry Girder: Design of gantry girder
39.	Gantry Girder: Design of gantry girder
40.	Gantry Girder: Design of gantry girder
41.	Numericals
42.	Revision

- 1. Arya & Ajmani, 'Design of Steel Structures'.
- 2. Duggal,S.K. 'Design of Steel Structures'.
- 3. Punmia B.C., 'Design of Steel Structures'.
- 4. Steel Hand Book
- 5. Relevant IS Codes.



## DEPARTMENT OF CIVIL ENGINEERING 4 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 411
Course Title	:	BRIDGE ENGINEERING
Credit	:	4(3+1)

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1.	Introduction: Type of bridges & classification of road & railways bridges
2.	Type of bridges & classification of road & railways bridges
3.	Economical span. IRC loadings for bridges
4.	Economical span. IRC loadings for bridges
5.	wind load & Earthquake forces
6.	Various load distribution theories
7.	Investigation for Bridges: Site selection and preliminary data.
8.	Site selection and preliminary data
9.	Maintenance: Maintenance of bridges
10.	Maintenance: Maintenance of bridges
11.	Reinforced Concrete Culverts & Bridges
12.	Reinforced Concrete Culverts & Bridges
13.	Reinforced Concrete Culverts & Bridges
14.	Design of reinforced concrete slab culvert
15.	Design of reinforced concrete slab culvert
16.	T-beam bridges (Courbons & Hendry-Jaegar methods) for IRC Loading
17.	T-beam bridges (Courbons & Hendry-Jaegar methods) for IRC Loading
18.	T-beam bridges (Courbons & Hendry-Jaegar methods) for IRC Loading
19.	Use of Pigeaud's coefficients
20.	Use of Pigeaud's coefficients
21.	Use of Pigeaud's coefficients
22.	Substructure: Principle of design of substructure elements
23.	Substructure: Principle of design of substructure elements
24.	Substructure: Principle of design of substructure elements
25.	Design of pier, abutment and wing wall.

26.	Design of pier, abutment and wing wall.
27.	Design of pier, abutment and wing wall.
28.	Design of Foundation: Introduction of Well foundation
29.	Design of Foundation: Introduction of Well foundation
30.	Design of Foundation: Introduction of Well foundation
31.	Design of Foundation: Introduction of Well foundation
32.	Design of Foundation: Introduction of Well foundation
33.	Bearing: Bearings for slab bridges and girder bridges
34.	Bearing: Bearings for slab bridges and girder bridges
35.	Bearing: Bearings for slab bridges and girder bridges
36.	Elastomeric bearings, design concepts as per IRC 83 (Part II).
37.	Elastomeric bearings, design concepts as per IRC 83 (Part II).
38.	Joints: Expansion joints.
39.	Joints: Expansion joints.
40.	Joints: Expansion joints.
41.	Numericals
42.	Revision

- 1. Victor Johnson, 'Bridge Engineering'.
- 2. Relevant IRC codes



### DEPARTMENT OF CIVIL ENGINEERING 4 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 412
Course Title	:	WATER RESOURCES ENGINEERING
Credit	:	4(3+1)

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1.	Surface Water Hydrology: Hydrological Cycle
2.	Surface Water Hydrology: Hydrological Cycle
3.	Types & forms of precipitations
4.	Rainfall measurements & interpretation of rainfall data, missing rainfall data.
5.	Rainfall measurements & interpretation of rainfall data, missing rainfall
	data.
6.	Runoff: Factor affecting runoff, annual runoff volume
7.	Computation of runoff, infiltration indices.
8.	Hydrograph Analysis: Hydrograph elements and factor affecting
9.	Unit hydrograph & its applications.
10.	Ground Water Hydrology: Ground water aquifers. Permeability &
	transmissibility of aquifers:
11.	Steady flow towards a well in confined & water table aquifer (Dupits &
	Theims equation).
12.	Measurement of yield of an open well, tube well & infiltration galleries
13.	Measurement of yield of an open well, tube well & infiltration galleries
14.	Interference among wells (well losses, comparison of well and flow
	irrigation).
15.	Reservoirs: Planning of reservoir, types of reservoir
16.	Reservoirs: Planning of reservoir, types of reservoir
17.	capacity & yield of reservoir
18.	Reservoir sedimentation and useful life of reservoirs
19.	Gravity Dams: Force acting on a gravity dam
20.	Gravity Dams: Force acting on a gravity dam

21.	stability requirements
22.	stability requirements
23.	Design and construction features.
24.	Design and construction features.
25.	Embankment Dams: Suitable sites
26.	causes of failures
27.	Design & stability analysis (flownet, slope stability analysis, precautions
	of piping)
28.	Design & stability analysis (flownet, slope stability analysis, precautions
	of piping)
29.	Cross Drainage Structure: Necessity of Cross drainage structures
30.	types and selection
31.	comparative merits and demerits
32.	design of various types of cross drainage structure-aqueducts
33.	design of various types of cross drainage structure-aqueducts
34.	syphon aqueduct
35.	Super-passage syphon, level crossing and other types.
36.	Super-passage syphon, level crossing and other types.
37.	Hydro Power Plant: Hydro-electric power generation
38.	Hydro Power Plant: Hydro-electric power generation
39.	Hydro-electric plant. General features of hydroelectric projects.
40.	Hydro-electric plant. General features of hydroelectric projects.
41.	Hydro-electric plant. General features of hydroelectric projects.
42.	Numericals

1.Asawa,G.L., 'Irrigation Engineering', 2nd Ed. New Age International Publisher. New Delhi.

2.Singh Bharat, 'Fundamental of Irrigation Engineering', 7th Ed, Nem Chand & Bros. Roorkee.

3. Varshney, R.S., Gupta S.C. and Gupta R.L., 'Theory and Design of Irrigation Structures'



### DEPARTMENT OF CIVIL ENGINEERING 4 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 413
Course Title	:	PUBLIC HEALTH ENGINEERING- I

Credit

4(3+1)

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:

1.	Sources of Water Supply: Surface water
2.	ground water, springs
3.	wells & galleries
4.	Quantity and Quality of Water: Quantity of water per capita
5.	Quantity and Quality of Water: Quantity of water per capita
6.	variation in seasonal and hourly consumption
7.	variation in seasonal and hourly consumption
8.	Forecasting of population
9.	Standards of purity for public water supply (I.S. and WHO standards)
10.	Raw Water : Lakes and river intakes
11.	raw water pumping
12.	Treatment of Water: Aeration, screening
13.	simple sedimentation, Quiescent and continuous flow types of tanks
14.	simple sedimentation, Quiescent and continuous flow types of tanks
15.	Coagulation of water, principle of coagulation
16.	Coagulation of water, principle of coagulation
17.	coagulation followed by sedimentation, mixing basins.
18.	coagulation followed by sedimentation, mixing basins.
19.	Filtration: Slow sand filters
20.	rapid sand filters, comparison of two filters
21.	rapid sand filters, comparison of two filters
22.	Disinfection: Treatment with excess lime, ozone
23.	Disinfection: Treatment with excess lime, ozone
24.	ultraviolet rays, boiling

25.	chlorine and compound of chlorine for disinfection
26.	Water Softening: Zeolite process, its limitation & advantages
27.	Water Softening: Zeolite process, its limitation & advantages
28.	Pipes for Water Supply: Different types of pipes used in water supplies
29.	Pipes for Water Supply: Different types of pipes used in water supplies
30.	Joints in Pipes: Bell & spigot joint, cement joint, mechanical joint, flanged joint
31.	Joints in Pipes: Bell & spigot joint, cement joint, mechanical joint, flanged joint
32.	Valves: Air valve, reflux valve
33.	safety valve, sluice valve
34.	System of Supply: Constant & intermittent supply of water & its
	disadvantage
35.	System of Supply: Constant & intermittent supply of water & its
	disadvantage
36.	Layout of distribution system. Pressure in pipe
37.	Layout of distribution system. Pressure in pipe
38.	Layout of distribution system. Pressure in pipe
39.	water hammer in distribution system
40.	water hammer in distribution system
41.	water hammer in distribution system
42.	Numericals

- Hussain, S.K., 'Text book of water supply & sanitary engineering ', Oxford & IBH Publishing co. pvt. Ltd., New Delhi.
- 2. Rangewala, S.C., 'Fundamentals of water supply & sanitary engineering', Charotar Publisher House, Anand.
- 3. Punamia, B.C., 'Water supply & sanitary engineering'. Laxmi publishers. Jodhpur
- 4. Garg, S.K., 'Water supply & sanitary engineering', Khanna Publishers. New Delhi.



### DEPARTMENT OF CIVIL ENGINEERING 4 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 414
Course Title	:	TRANSPORTATION ENGINEERING-II

:

Credit : 3(2+1)

gauges				
2. Ideal permanent ways & cross sections in different condition	ons			
3. Salient features of components (Rails, Sleepers, Ballast, Rails, Sleepers, Ballast, Ballast, Rails, Sleepers, Ballast, Ba	ail Fastenings)			
4. <i>Study of Specific Aspects:</i> Coning of wheels				
5. creep, wear, failures in rails Rail- joints, length of rail				
6. Sleepers (Functions and requirement of ideal sleeper, types	Sleepers (Functions and requirement of ideal sleeper, types of sleeper,			
sleeper density).				
7. Railway stations (site selection and facilities required by p	assengers)			
8. Platforms (goods and passengers)				
9. Yards (goods and passengers, marshalling yards).				
10. <i>Geometric Design:</i> Basic principles & factor affecting geo	metric design of			
railway track				
11. Gradient, speed, super elevation				
12. cant deficiency, grade compensation				
13. <i>Points and Crossings:</i> Points & switches Types of turnouts	S			
14.Layout plans of different types of crossing.				
15. Railway Systems Specific to Urban Movements				
16. Introduction of surface railway system, Underground syste	em and Elevated			
System.				
17. <i>Airport Engineering:</i> Airport planning, Airport classificati	ons			
18. Aircraft characteristics (important in planning), Factors in	Airport site			
selection Obstructions & Zoning laws				
19. <i>Runway Orientation and Design:</i> Factors affecting				
20. Wind Rose diagram				

21.	Basic runway length, Corrections for elevation and temperature as per
	ICAO
22.	Types of runway pattern, Runway Layout
23.	Runway & Taxiway width, Gradient, Minimum turning radius.
24.	Airport Layout and Control: Layout plans of an air-port with single and
	multiple runways Planning of Terminal Area (Terminal building)
25.	Location of Gates
26.	Aprons and Hangers, Wind direction and Landing direction indicators
27.	Airport lighting system
28.	Airport Drainage System
	(brief description)

- 1. Saxena, S. C. and Arora, S. P., 'A Text Book of Railway Engineering'.
- 2. Agarwal M. M., 'Railway Engineering'.
- 3. B Mundrey J S, 'Railway Track Eengineering'

( Dr. B.S. Singvi ) Prof.& Head (Civil Engg)



### DEPARTMENT OF CIVIL ENGINEERING 4 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 415
Course Title	:	ESTIMATING AND COSTING
Credit	:	3(2+1)
Theory Lecture Outlines	:	

1.	Estimating: Objects & general principles for estimating & costing
2.	Types of estimates.
3.	Rules & methods of measurement
4.	Procedure for estimating
5.	Various items of work in building construction
6.	General considerations for preparing report
7.	Specification: Types of specification (Brief and detail)
8.	Detailed specification for building works. Detailed specification for canal
	& road works items.
9.	Rate Analysis: Concepts of rate analysis
10.	Requirements of an item for analysis of rate
11.	Quantity calculation of materials for an item
12.	Calculation of labour (task of labour as per N.B.O.) & Overhead cost
13.	Calculation of labour (task of labour as per N.B.O.) & Overhead cost
14.	Calculation of Quantity: Various formulae for calculation of quantity of
	concrete
15.	bricks & reinforcement
16.	Earth work calculations of roadwork for level & side hill sections (two
	level) only
17.	Calculations of quantity of Road works
18.	Canal Earthwork: Balancing depth of earthwork in a canal
19.	Use of L-section & cross-section for earthwork calculations of quantity of
	materials for canal lines.
20.	Accounting: Accounting & procedure of works classification of works
21.	Contract & contract document

22.	Tender; Notice for inviting tenders (NIT)
23.	opening of tenders, processing of tenders
24.	Running & final bill, earnest money, security money & measurement book
25.	General discussion of a works department.
26.	Valuation : Purpose of valuation, , Scrap value, Salvage value, Market value, Book value
27.	Annuity capitalized value. Methods of calculating depreciation (Straight line & Sinking fund method)
28.	Valuation of a building, rent fixation.

- Datta B. N., 'Estimating and Costing in Civil Engineering Theory and Practice', Publishing Distributors Ltd., New Delhi.
- Birdi, 'Estimating and costing in Civil Engineering', Dhanpat Rai & Sons, New Delhi.



## DEPARTMENT OF CIVIL ENGINEERING 4 YEAR BE I SEMESTER SESSION 2017-18

Course Code	:	CE 416 (c)
Course Title	:	<b>DESIGN OF PRE-STRESS STRUCTURES</b>
Credit	:	3(2+1)
Theory Lecture Outlines	:	

1.	Basics of Pre-stressed Concrete: Concepts, materials
2.	various pre-tensioning and post tensioning systems
3.	various pre-tensioning and post tensioning systems
4.	various pre-tensioning and post tensioning systems
5.	losses in pre-stressing
6.	Concept of partial pre-stressing
7.	Concept of partial pre-stressing
8.	Machinery and equipments of pre-stressing.
9.	Machinery and equipments of pre-stressing.
10.	Analysis: Analysis of sections (Stress concept, Load balancing concept and
	Strength concept)
11.	Design: Design of simply supported beams of rectangular and flanged
	sections for flexure and shear as per I.S. code (using limit state design).
12.	Design: Design of simply supported beams of rectangular and flanged
	sections for flexure and shear as per I.S. code (using limit state design)
13.	End Blocks: Design of end blocks
14.	End Blocks: Design of end blocks
15.	Transmission & anchorage zone stresses (anchorage zone reinforcement)
16.	Transmission & anchorage zone stresses (anchorage zone reinforcement)
17.	Transmission & anchorage zone stresses (anchorage zone reinforcement)
18.	Continuous Beams: Analysis of continuous beams of two spans
19.	Continuous Beams: Analysis of continuous beams of two spans
20.	Continuous Beams: Analysis of continuous beams of two spans
21.	Continuous Beams: Analysis of continuous beams of two spans
22.	Concept of cable profile.

23.	Concept of cable profile.
24.	Indeterminate Structures: Design of continuous beams (Two Span)
25.	Indeterminate Structures: Design of continuous beams (Two Span)
26.	Composite Construction: Analysis for flexural stresses and strength of composite members
27.	<i>Composite Construction:</i> Analysis for flexural stresses and strength of composite members
28.	Composite Construction: Analysis for flexural stresses and strength of composite members

- 1. Lin T.Y. 'Design of Pre-stress concrete structures'.
- 2. Krinsharaju N, 'Pre-stressed concrete', Tata McGraw Hill, New Delhi.