

Syllabi of

Sixth Semester B.Tech Degree Programme in

CIVIL ENGINEERING

CE3007 STRUCTURAL DESIGN - II

L	T	P	C
3	1	0	3

Prerequisite: Nil

Total hours: 42

Module 1 (11 hours)

General - Introduction to connections - analysis and design of riveted, bolted and welded joints for direct force and moment - struts and ties made of single and double angles.

Module 2 (10 hours)

Design of steel girders

Analysis and design of laterally restrained – unrestrained – simple and compound beams – open web girders – castellated beams–deflection criteria - check for shear.

Module 3 (10 hours)

Design of compression members

Axially and eccentrically loaded compression members - built up columns - lacings and battens - design of column bases.

Module 4 (11 hours)

Introduction to steel roof systems

Design of roof trusses – design of roofing elements and purlin – wind bracings.

Design of timber structures.

Classification and allowable stresses - design of beams for flexure, shear and bearing - deflection criteria - design of solid and built-up columns-flitched beam – formwork design.

References

1. Subramanian, N., Design of Steel Structures, Oxford University Press, 2008
2. Bhavikatti, S. S., Design of Steel Structures, I K International Publishing House (P) Ltd., 2009
3. Duggal, S. K., Limit State of Design of Steel Structures, Tata McGraw Hill, 2010.
4. Ramchandra, Design of Steel Structures Vol I and II, Standard book house , 1991
5. Dayaratnam, P., Design of Steel Structures, (Wheeler),1998
6. Negi, L. S., Design of Steel Structures Vol. I, Tata McGraw Hill, 2005.
7. Raghupathi, M., Design of Steel Structures, Tata McGraw Hill, 1985
8. Lin and Breslar, Design of Steel Structures, John Wiley and Sons, 1963
9. Relevant BIS codes (IS 800, SP:6 – Part 1 to 6, IS 883).

CE3008 TRANSPORTATION ENGINEERING - II

L	T	P	C
3	0	0	3

Prerequisite: Nil

Total hours: 42

Module 1 (10 hours)

Components & Geometric Design of Railways: Introduction - Typical cross-sections -Various gauges -Coning of wheels and tilting of rails - Functions and requirements of component parts of a railway track -Creep of rails - Geometrical design of railway track –Horizontal curves, radius, super elevation, cant deficiency, transition curves, safe speed on curves, different types of gradients, grade compensation - worked out problems - Modern Track based Systems

Module 2 (10 hours)

Railway Operation and Control: Points and crossings and their design -Track junctions and simple track layouts - Details of different types of stations and yards - Signaling and interlocking –Train movement control systems.

Railway Construction and Maintenance: Construction of railway track: earthwork, plate laying and packing - Maintenance of track-alignment - gauge, renewal of component parts and drainage, modern methods of track maintenance

Module 3 (10 hours)

Tunneling: Tunnel alignment and grade - Size and shape of a tunnel - Methods of tunneling in hard rocks - full face method, heading and bench method, drift method -Methods of tunneling in soft soils - compressed air and shield tunneling - Shafts in tunnels - Ventilation of tunnel and various methods - Lining of tunnels - Drainage and lighting of tunnels – Micro Tunneling – Trenchless technology

Module 4 (12 hours)

Airport planning and Design: Introduction - Aircraft characteristics and their influence on planning of airports - Airport obstructions and zoning - Component parts of airport and site selection - Runway design - Orientation, basic runway length, corrections and geometric design - Design of taxiways and aprons - Terminal area planning - Facilities in terminal area and their planning concepts, aircraft parking configurations -Airport drainage system - surface and subsurface drainage systems and their design

References

1. Agarwal, M. M.,and Sathish Chandra, Railway Engineering, Oxford University, 2008
2. Khanna, S. K., and Arora, M. G., Airport Planning and Design, Nemchand and Bros, 2005.
3. Antia, K. F., Railway Track, New Book Company Pvt. Ltd, 1960.
4. Horonjeff, R., Planning and Design of Airports, McGraw-Hill Professional, 2010
5. Mundrey, J. S., Railway Track Engineering, TMGS, 2003.
6. Richard de Neufville, Airport Systems: Planning, Design, and Management, McGraw-Hill Professional; 2003
7. Alexander, T. Wells, Airport Planning and Management, McGraw-Hill Professional; 2004

CE3009 ENVIRONMENTAL ENGINEERING

L	T	P	C
3	1	0	3

Prerequisite: CE3006 Environmental Studies in Civil Engineering

Total hours: 56

Module 1 (12 hours)

Water Supply Engineering – Quantity of water, types of water demand, fluctuation in demand, factors affecting consumption, forecasting population – design period. Sources of water – surface water sources, intakes, ground water sources. Design of gravity and pumping mains.

Module 2 (16 hours)

Treatment of water (process details and design considerations) – aeration, coagulation, flocculation, sedimentation, filtration, disinfection. Miscellaneous and advanced treatment methods – removal of iron and manganese, fluoridation and defluoridation, water softening, arsenic removal, desalination, membrane filtration.

Module 3 (16 hours)

Wastewater characteristics – sampling, different types of oxygen demand, population equivalent.
Preliminary treatment of wastewater – screens, grit chamber, detritus tank, sedimentation tank.
Biological treatment (process details and design considerations) - Activated sludge process, Trickling filter, Oxidation pond.
Anaerobic treatment- Anaerobic digesters, Septic tank and soak pit.

Module 4 (12 hours)

Wastewater disposal – disposal into stream – fundamentals of stream sanitation- disposal by irrigation – sludge treatment and disposal.
Sanitary plumbing - sanitary fixtures, systems of piping, house drainage, connection of house drains and street sewers. Systems of sewerage. Dry weather flow and wet weather flow. Sewers and sewer appurtenances, sewage pumping, maintenance of sewers.

References

1. Modi, P. N., Sewage Treatment and Disposal and Wastewater Engineering, Standard Book House, New Delhi, 2008.
2. Birdie, G. S., and Birdie, J. S., Water Supply and Sanitary Engineering, Dhanpat Rai and Sons, New Delhi, 2007.
3. Garg, S. K., Environmental Engineering, Vol. II, Khanna Publications, New Delhi, 2009.
4. Duggal, K. N., Elements of Environmental Engineering, S Chand and Co. Ltd., New Delhi, 2008.
5. Mark J. Hammer and Mark J. Hammer Jr., Water and Waste Water Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 2009.
6. Ernest W. Steel and Terence J. Mc Ghee, Water Supply and Sewerage, McGraw Hill, New York, 1991.
7. Ehlers, V. M. and Steel, E. W., Municipal and Rural Sanitation, McGraw Hill, 2009.
8. Fair, Geyer and Okun, Water and Wastewater Engineering, John Wiley and sons, Inc., 2010
9. Metcalf and Eddy, Wastewater Engineering Treatment, Disposal and Reuse, Tata McGraw Hill, 2007.
10. Kiely, G., Environmental Engineering, McGraw Hill, McGraw Hill, 2009.
11. Relevant BIS Codes.

CE** ELECTVE I**

L	T	P	C
3	0	0	3

CE** ELECTVE II**

L	T	P	C
3	0	0	3

ME3093 FLUIDS LABORATORY.

L	T	P	C
0	0	3	2

Prerequisite: Nil

Total hours : 42

List of Exercises

1. Study of plumbing tools and pipe fittings
2. Study of instruments – pressure gauge – piezometer – manometer – pressure transducers – pitot tubes
3. Demonstration of Bernoulli's theorem
4. Determination of friction factor for flow through pipes
5. Calibration of flow measuring devices – venturimeter – orifice meter – nozzlemeter – notches and weirs
6. Performance characteristics of pumps and turbines – Pelton turbine – Francis turbine - centrifugal pumps - reciprocating pumps - gear pumps.

CE3094 ENVIRONMENTAL ENGINEERING LABORATORY

L	T	P	C
0	0	3	2

Prerequisite: CE3009 Environmental Engineering or its concurrent registration

Total hours: 42

List of experiments:

1. Determination of solids (total, dissolved, organic, inorganic and settleable) in water
2. Determination of turbidity and the optimum coagulant dose
3. Determination of alkalinity and pH of water
4. Determination of hardness and chlorides in water
5. Determination of iron and manganese in water
6. Determination of sulphates and sulphides in water
7. Determination of D.O and B.O.D of waste water
8. Determination of available chlorine in bleaching powder and the chlorine dose required to treat the given water sample
9. Determination of coliforms in water
10. Demonstration of instrumental methods of pollutant analysis

References

1. Standard methods for the examination of water and wastewater (latest edition): APHA, AWWA, WPCF Publication.
2. Relevant BIS codes

CE3007 STRUCTURAL DESIGN - II

L	T	P	C
3	1	0	3

Prerequisite: Nil

Analysis and design of riveted, bolted and welded joints for direct force and moment, struts and ties made of single and double angles, Girders - laterally restrained – unrestrained – simple and compound beams, Compression members - axially and eccentrically loaded compression members - built up columns, lacings and battens, design of column bases, design of roof trusses – design of roofing elements and purlin – wind bracings, Design of timber structures - flexure, shear and bearing - deflection criteria - solid and built-up columns - flitched beam, formwork design.

Total hours : 42

CE3008 TRANSPORTATION ENGINEERING - II

L	T	P	C
3	0	0	3

Prerequisite: Nil

Railway Track – Cross sections, Functions and Requirements of Components, Geometric Design, Points & Crossing, Track junctions, Stations and Yards, Signaling, Construction and Maintenance; Tunneling – Alignment, Grade, Size, Shape, Methods of Tunneling in Hard Rock & Soft Soils, Ventilation, Lining, Drainage, Micro Tunneling; Airport – Aircraft characteristics and their influence, Airport Obstructions & zoning, Component Parts of Airport, Runway Design, taxiway Design, Terminal Area Planning, Airport Drainage

Total hours: 42

CE3009 ENVIRONMENTAL ENGINEERING

L	T	P	C
3	1	0	3

Prerequisite: CE3006 Environmental Studies In Civil Engineering

Water Supply Engineering – Quantity of water – Demand - Forecasting population – Design period. Sources of water – Design of gravity and pumping mains - Treatment of water (process details and design considerations) - Miscellaneous and advanced treatment methods - Wastewater characteristics – Sampling - Different types of oxygen demand - Population equivalent - Preliminary treatment of wastewater – Biological treatment (Process details and design considerations) - Wastewater disposal – Disposal into stream – Fundamentals of stream sanitation - Disposal by irrigation – Sludge treatment and disposal - Sanitary plumbing - Systems of sewerage - Dry weather flow and wet weather flow - Sewers and sewer appurtenances, sewage pumping, maintenance of sewers.

Total hours: 56

ME3093 FLUIDS LABORATORY.

L	T	P	C
0	0	3	2

Prerequisite: Nil

Study of plumbing tools and pipe fittings, Study of instruments – pressure gauge – piezometer – manometer – pressure transducers – pitot tubes, Demonstration of Bernoulli's theorem, Determination of friction factor for flow through pipes, Calibration of flow measuring devices – venturimeter – orifice meter – nozzlemeter – notches and weirs, Performance characteristics of pumps and turbines – Pelton turbine – Francis turbine - centrifugal pumps - reciprocating pumps - gear pumps.

Total hours : 42

CE3094 ENVIRONMENTAL ENGINEERING LABORATORY

L	T	P	C
0	0	3	2

Prerequisite: CE3009 Environmental Engineering or its concurrent registration

Determination of solids (total, dissolved, organic, inorganic and settleable) in water, turbidity and the optimum coagulant dose, alkalinity and pH of water, hardness and chlorides in water, iron and manganese in water, sulphates and sulphides in water, D.O and B.O.D of waste water, available chlorine in bleaching powder and the chlorine dose required to treat the given water sample, coliforms in water, Demonstration of instrumental methods of pollutant analysis

Total hours: 42