

## Course Contents

Category of Course	Course Title	Course Code	Credits-6			Theory Papers (ES)
			L	T	P	
Civil Engineering Department DC-13	Theory of Structures -II	CE601				Max.Marks-100 Min. Marks- 35 Duration-3hrs.
			3	1	2	

**Branch:** Civil Engineering-VI Semester

**Course:** CE601 Theory of Structure -II

### Unit. I

Moment distribution method in analysis of frames with sway, analysis of box frames, analysis of portals with inclined members, analysis of beams and frames by Kani's method.

### Unit. II

Plastic analysis of beams and frames.

### Unit. III

Analysis of tall frames, wind and earthquake loads, codal provisions for lateral loads. Approximate analysis of multistory frames for vertical and lateral loads.

### Unit. IV

Matrix method of structural analysis: force method and displacement method..

### Unit. V

Influence lines for intermediate structures, Muller Breslau principle, Analysis of Beam-Columns.

### Reference Books :-

1. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
2. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
3. Reddy C.S., Basic Stgtructural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
4. Norris C.H., Wilbur J.B. and Utkys. Elementary Structural Analysis, McGraw Hill International, Tokyo.
5. Weaver W & Gere JM, Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi.

## Course Contents

Category of Course	Course Title	Course Code	Credits-6			Theory Papers (ES)
			L	T	P	
Civil Engineering Department DC-14	Water Resources and Irrigation Engineering	CE602				Max.Marks-100 Min. Marks- 35 Duration-3hrs.
			3	1	2	

**Branch:** Civil Engineering VI Semester

**Course:** CE602 Water Resources and Irrigation Engineering.

### Unit-I

**Hydrology :** Hydrological cycle, precipitation and its measurement, recording and non recording rain gauges, estimating missing rainfall data, raingauge net works, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves, Infiltration and infiltration indices, evaporation stream gauging, run off and its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complex storms, S-curve hydrograph, synthetic unit hydrograph.

### Unit-II

**Floods and Ground water:** Types of floods and their estimation by different methods, probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control, confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water recharge-necessity and methods of improving ground water storage. Water logging-causes, effects and its prevention. Salt efflorescence-causes and effects. reclamation of water logged and salt affected lands.

### Unit-III

**Water resources planning and management :** Planning of water resources projects, data requirements, economic analysis of water resources projects appraisal of multipurpose projects, optimal operation of projectsintroduction to linear programming and its application to water resources projects. Role of water in the environment, rain water harvesting, impact assessment of water resources development and managerial measures.

### Unit – IV

**Irrigation water requirement and soil-water-crop relationship:** Irrigation, definition, necessity, advantages and disadvantages, types and methods. Irrigation development. Soils - types and their occurrence, suitability for irrigation purposes, wilting coefficient and field capacity,optimum water supply, consumptive use and its determination. Irrigation methods-surface and subsurface, sprinkler and drip irrigation.Duty of water, factors affecting duty and

methods to improve duty, suitability of water for irrigation, crops and crop seasons, principal crops and their water requirement, crop ratio and crop rotation, intensity of irrigation.

## **Unit – V**

**Canal irrigation:** Types of canals, alignment, design of unlined and lined canals, Kennedy's and Lacey's silt theories, typical canal sections, canal losses, linings-objectives, materials used, economics. Canal falls & cross drainage works, - description and design, head and cross regulators. escapes and outlets, canal transitions.

**Well irrigation:** Types of wells, well construction, yield tests, specific capacity level and specific yield, hydraulic design of open wells and tube wells, methods of raising well water, characteristics of pumps and their selection, interference of wells, well losses, advantages and disadvantages of well irrigation.

### **Suggested Books :-**

1. Engg. Hydrology - J.NEMEC - Prentice Hall
2. Hydrology for Engineers Linsley, Kohler, Paulnus - Tata Mc.Graw Hill.
3. Engg. Hydrology by K. Subhramanya - Tata Mc Graw Hills Publ. Co.
4. Hydrology & Flood Control by Santosh Kumar - Khanna Publishers
5. Engg. Hydrology by H.M. Raghunath

## Course Contents

Category of Course	Course Title	Course Code	Credits-6			Theory Papers (ES)
			L	T	P	
Civil Engineering Department DC-15	Environmental Engg. - I	CE603	L	T	P	Max.Marks-100 Min. Marks- 35 Duration-3hrs.
			3	1	2	

**Branch:** Civil Engineering-VI Semester

**Course:** CE603 Environmental Engg. – I

### Unit – I

Estimation of ground and surface water resources. quality of water from different sources, demand & quantity of water, fire demand, water requirement for various uses, fluctuations in demand, forecast of population.

### Unit – II

Impurities of water and their significance, water-borne diseases, physical, chemical and bacteriological analysis of water, water standards for different uses. Intake structure, conveyance of water, pipe materials, pumps - operation & pumping stations.

### Unit – III

Water Treatment methods-theory and design of sedimentation, coagulation, filtration, disinfection, aeration & water softening, modern trends in sedimentation & filtration, miscellaneous methods of treatment.

### Unit – IV

Layout and hydraulics of different distribution systems, pipe fittings, valves and appurtenances, analysis of distribution system. Hardy cross method, leak detection, maintenance of distribution systems, service reservoir capacity and height of reservoir.

### Unit – V

Rural water supply schemes, financing and management of water supply project, water pollution control act, conservancy & water carriage system, sanitary appliance and their operation, building drainage system of plumbing.

### **Suggested Books and Reading Materials:-**

1. Water Supply Engineering by B.C. Punmia - Laxmi Publications (P) Ltd. New Delhi
2. Water Supply & Sanitary Engg. by G.S. Birdi - Laxmi Publications (P) Ltd. New Delhi
3. Water & Waste Water Technology by Mark J.Hammer - Prentice - Hall of India, New Delhi
4. Environmental Engineering - H.S. Peavy & D.R.Rowe - Mc Graw Hill Book Company, New Delhi
5. Water Supply & Sanitary Engg. by S.K. Husain
6. Water & Waste Water Technology - G.M. Fair & J.C. Geyer
7. Relevant IS Codes

### **List of Experiments:**

1. To study the various standards for water
2. To study of sampling techniques for water
3. Measurement of turbidity
4. To determine the coagulant dose required to treat the given turbid water sample
5. To determine the conc. of chlorides in a given water samples
6. Determination of hardness of the given sample
7. Determination of residual chlorine by "Chloroscope"
8. Determination of Alkalinity in a water samples
9. Determination of Acidity in a water samples
10. Determination of Dissolved Oxygen (DO) in the water sample.

## Course Contents

Category of Course	Course Title	Course Code	Credits-6			Theory Papers (ES)
			L	T	P	
Civil Engineering Department DC-16	Qty. surveying & Costing	CE604	L	T	P	Max.Marks-100 Min. Marks- 35 Duration-3hrs.
			3	1	2	

**Branch:** Civil Engineering VI Semester  
**Course:** CE604 Qty. Surveying & Costing

### Unit – I

**Introduction:** Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

### Unit – II

**Rate Analysis:** Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)

### Unit – III

**Detailed Estimates:** Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.

### Unit – IV

**Cost of Works:** Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation of DPR.

### Unit – V

**Valuation:** Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.

### Suggested Books:

1. Quantity Surveying & Costing – B.N. Datta
2. Estimating & Costing for Civil Engg. – G.S. Birdi
3. Quantity surveying & costing – Chakraborty

4. Estimating & Costing – S.C. Rangawala

**Practical & Sessional Works:**

1. Preparation of detailed estimate.
2. Detailed estimate for services of plumbing and water supply or Electrification work.
3. Detailed estimate for earth work for the road construction or arched culvert.
4. Rate analysis for at least 8 items of construction.
5. Preparation of DPR of Civil Engineering Project.

## Course Contents

Category of Course	Course Title	Course Code	Credits-6			Theory Papers (ES)
			L	T	P	
Civil Engineering Department DC-17	Structural Design & Drawing – II (Steel)	CE605				Max.Marks-100 Min. Marks- 35 Duration-3hrs.

**Branch:** Civil Engineering-VI Semester

**Course:** CE605 Structural Design & Drawing – II (Steel)

### Unit – I

Various loads and mechanism of the load transfer, partial load factors, structural properties of steel, Design of structural connections -Bolted, Rivetted and Welded connections.

### Unit – II

Design of compression members, Tension members, Roof Trusses - Angular & Tubular, Lattice Girders.

### Unit-III

Design of simple beams, Built-up beams, Plate girders and gantry girders.

### Unit – IV

Effective length of columns, Design of columns-simple and compound, Lacings & battens. Design of footings for steel structures, Grillage foundation.

### Unit – V

Design of Industrial building frames, multistory frames, Bracings for high rise structures, Design of transmission towers.

**NOTE:** - All the designs for strength and serviceability should strictly be as per the latest version of IS:800.

### Reference Books :-

- i) Design of steel structures by Arya & Azmani Nemchand & Bros, Roorkee
- ii) Design of steel structures by P.Dayaratnam
- iii) Design of steel structures Vol. I & II by Ramchandra
- iv) Design of steel structures by L.S. Negi
- v) Design of steel structures by Ramammutham
- iv) Design of steel structures by Punmia