

# Structural Design & Drawing – II (Steel)

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**Instructor**

Mr. Devesh Kumar Patel

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**Office Location**

REC, Rewa

**Office Hours**

[10.30 a.m. to 5.00 p.m.]

**Office Days**

[Monday- Saturday]

**Course Outline**

The course will be prepared mainly to address the design of structural steel member and their connection like compression member, tension member, beam, column, footing, frame and Transmission tower. A total of 45 lectures are devised for this course. A number of selected numerical problems will be solved to illustrate the concepts lucidly.

**Course Details****Unit- I (10 Hours Required)**

- 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 (9 Hours Required)**

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

**Unit- III (9 Hours Required)**

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

**Unit- IV (11 Hours Required)**

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

**Unit- V (7 Hours Required)**

- 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 IS: 800-2007**

**References**

- Limit State Design of Steel Structures by S.K. Duggal
- Design of steel structures by Arya & Azmani Nemchand & Bros, Roorkee
- Design of steel structures by P.Dayaratnam
- Design of steel structures Vol. I & II by Ramchandra
- Design of steel structures by L.S. Negi
- Design of steel structures by Ramammutham
- Design of steel structures by Punmia

## Evaluation Policy

Theory Slot			Practical Slot			Total Marks	Credits Allotted			Total Credits
End Sem	Mid Sem. MST (Two tests average)	Quiz/Assignment	End Sem	Term work			Period per week			
				Lab work & sessional	Assignment/quiz		L	T	P	
70	20	10	30	10	10	150	3	1	2	06

# Water Resources & Irrigation Engineering

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[10.30 a.m. to 5.00 p.m.]

**Office Days**

[Monday- Saturday]

**Course Outline**

The course will be prepared mainly to address the irrigation water requirement, soil water drop relationship, ground water, well irrigation, canals, floods and hydrology. A total of 45 lectures are devised for this course. A number of selected numerical problems will be solved to illustrate the concepts lucidly.

**Course Details****Irrigation water requirement and Soil-Water-Crop relationship (8 Hours Required)**

- 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.

**Ground Water and Well irrigation (10 Hours Required)**

- 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.

- Types of wells, well construction, yield tests, specific capacity and specific yield, advantages and disadvantages of well irrigation.

**Hydrology (12 Hours Required)**

- Hydrological cycle, precipitation and its measurement, recording and non-recording rain gauges, estimating missing rainfall data, rain gauge networks, 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.

**Canals and Structures (9 Hours Required)**

- Types of canals, alignment, design of unlined and lined canals, Kennedy's and Lacey's silt theories, typical canal sections, canal losses, lining-objectives, materials used, economics.
- Introductions to Hydraulic Structures viz. Dams, Spillways, Weirs, Barrages, Canal Regulation Structures.

**Floods (6 Hours Required)**

- 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,

**References**

- Irrigation & Water Power Engg. by Punmia & Pandey B.B.Lal
- Engg. Hydrology by K. Subramanya - Tata Mc Graw Hills Publ. Co.
- Hydrology & Flood Control by Santosh Kumar - Khanna Publishers
- Engg. Hydrology - J.NEMEC - Prentice Hall
- Hydrology for Engineers Linsley, Kohler, Paulnus - Tata Mc.Graw Hill.
- Engg. Hydrology by H.M. Raghunath

**Evaluation Policy**

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				Lab work & sessional	Assignment/quiz		L	T	P	
70	20	10	0	0	0	100	3	1	0	04