

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (CIVIL ENGINEERING)
SEMESTER	5
COURSE TITLE	WATER RESOURCES ENGINEERING
COURSE CODE	09CI0509
COURSE CREDITS	4

Objective:

- 1 To learn estimation of hydrological parameters
- 2 To understand water demand of crops and provisions to meet the same
- 3 To know planning of reservoirs and dams
- 4 To design irrigation projects, canals and other diversion works
- 5 To learn estimation of hydrological parameters.
- 6 To understand water demand of crops and provisions to meet the same.
- 7 To know planning of reservoirs and dams.
- 8 To design irrigation projects, canals and other diversion works.

Course Outcomes: After completion of this course, student will be able to:

- 1 Estimate hydrological parameters
- 2 Estimate crop water requirements of a command area and capacity of canals.
- 3 Execute Minor and Micro Irrigation Schemes.
- 4 Select the relevant Cross Drainage works for the specific site conditions.
- 5 Design, construct and maintain simple irrigation regulatory structures

Pre-requisite of course: no pre requisite subject required

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Introduction to Hydrology Hydrology: Definition and Hydrological cycle, Rain Gauge: Symons rain gauge, automatic rain gauge, Methods of calculating average rainfall: Arithmetic mean, Isohyetal, and Thiessen polygon method., Runoff, Factors affecting Run off, Computation of run-off, Maximum Flood Discharge measurement: Rational and empirical methods, Simple numerical problems, Yield and Dependable yield of a catchment, determination of dependable yield	8

Contents : Unit	Topics	Contact Hours
2	Crop water requirement and Reservoir Planning Irrigation and its classification., Crop Water requirement: Cropping seasons, Crop period, base period, Duty, Delta, CCA, GCA, intensity of irrigation, factors affecting duty, Problems on water requirement and capacity of canal., Methods of application of irrigation water and its assessment, Surveys for irrigation project, data collection for irrigation project, Area capacity curve, Silting of reservoir, Rate of silting, factors affecting silting and control measures, Control levels in reservoir, Simple numerical problems on Fixing Control levels	10
3	Dams and Spillways Dams and its classification: Earthen dams and Gravity dams (masonry and concrete)., Earthen Dams – Components with function, typical cross section, seepage through embankment and foundation and its control, Methods of construction of earthen dam, types of failure of earthen dam and preventive measures, Gravity Dams – Forces acting on dam, Theoretical and practical profile, typical cross section, drainage gallery, joints in gravity dam, concept of high dam and low dam., Spillways-Definition, function, location, types and components, Energy dissipaters.	8
4	Minor and Micro Irrigation Bandhara irrigation: Layout, components, construction and working, solid and open band- hara, Percolation Tanks – Need, selection of site, Lift irrigation Scheme-Components and their functions, Lay out, Drip and Sprinkler Irrigation- Need, components and Layout, Well irrigation: types and yield of wells, advantages and disadvantages of well irrigation.	6
5	Diversion Head Works & Canals Weirs – components, parts, types, K.T. weir – components and construction, Diversion head works – Layout, components and their function, Barrages – components and their functions. Difference between weir and Barrage, Canals – Classification according to alignment and position in the canal network, Cross section of canal in embankment and cutting, partial embankment and cutting, balancing depth, Design of most economical canal section., Canal lining - Purpose, material used and its properties, advantages, Cross Drainage works- Aqueduct, siphon aqueduct, super passage, level crossing., Canal regulators- Head regulator, Cross regulator, Escape, Falls and Outlets.	8
Total Hours		40

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment 1 Draw the Sketches for: Hydrological Cycle	4

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
2	Experiment 2 Draw the Sketches for: Types of Precipitation	4
3	Experiment 3 Draw the Sketches for: Rain gauges	4
4	Experiment 4 Draw the Sketches for: Various methods of artificial recharge	4
5	Experiment 5 Draw the Sketches for: Component parts of earthen and Gravity dam	4
6	Experiment 6 Draw the Sketches for: Diversion head works	4
7	Experiment 7 Draw the Sketches for: Cross Drainage Works	4
Total Hours		28

Textbook :

- 1 Irrigation, Water Resources & Water Power Engg, Dr. P.N. Modi , Standard Book House, Delhi. , 2020
- 2 Engineering Hydrology, K. Subramanya, Tata McGraw-Hill Education, 2013

References:

- 1 Hydrology & Water Resources , Hydrology & Water Resources , R.K. Sharma , Dhanpat Rai & Sons, Delhi. , 2018
- 2 Hydrology & Water Resources Engg. , Hydrology & Water Resources Engg. , S.K.Garg , Khanna Pub., Delhi. , 2019

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
35.00	40.00	15.00	10.00	0.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

Instructional Method:

- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <https://archive.nptel.ac.in/courses/105/105/105105110/>