

Branch Name:	Civil Engineering
Semester/Year:	Semester VIII / Forth Year
Subject Title:	Design of Hydraulic Structures (Elective - IV)
Subject Code:	1ET1060803
Prerequisite:	To Develop the Knowledge of: 1) Fluid Mechanics 2) Hydrology and Water Resources engineering 3) Irrigation Engineering
Rationale:	Develop Understanding of Principles of Design of Embankment Dam, Gravity Dam, Spillways and Canal Falls and Regulation Works.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	02	00	05	70	30	-	-	100

Sr. No	Topic	Total Hours	Weightage (%)
1	<u>Elements of Dam Engineering:</u> Classification of dams, their merits and demerits, characteristics of concrete and embankment dams, site selection of dam and selection of type of dam	3	10
2	<u>Embankment Dam Engineering:</u> Nature and classification of soil- engineering characteristics of soil, principles of design – Material and construction- Internal seepage – Stability analysis and stresses, Phreatic line in earth dam, Settlement and deformation in rock fill embankments	10	25
3	<u>Concrete Dam Engineering:</u> Loading -Concepts and criteria, Gravity dam analysis design features and stability- Principal stress, elementary profile of gravity dam, practical profile of dam, low and high gravity dam, joints and galleries in dam- Concrete for dams –roller compacted concrete gravity dams	10	25
4	<u>Dam outlet works</u> Spillways – Ogee spillway - cavitation on spillway – design features- design principles and design of spillways Design of a Chute spillways –Energy dissipation – stilling basins – plunge pools	10	25
5	<u>Drop structure</u> Design of a Sarda fall and Glacis fall, Design of Cross regulator and head regulator	9	15

Course Outcome:

After successful completion of the course the students shall be able to:

- Carry out stability analysis of embankment dam under sudden drawdown and steady seepage conditions.
- Calculate normal stresses, principle stresses and shear stresses at heel and toe of dam and factor of safety of gravity dam against overturning, sliding and shear friction factor.
- Design an ogee spillway and a chute spillway.
- Suggest suitable energy dissipation measures
- Design canal fall and regulation works

List of Text Books:

1. Irrigation Engineering and Hydraulic Structures by S.K. Garg, Khanna Publishers
2. Irrigation And Water Resources Engineering, By G L Asawa, Pub:- New Age Int. Ltd.
3. Introduction To Water Resources And Waterpower Engineering, By Dr. P N Modi , Standard Publication, Delhi

List of Reference Books:

1. Hydraulic Structures, By P. Novak, Pub. Unwin Hyman, London Handbook of Dam Engineering, By Golze', Pub:- Van Nostrand Reinhold
2. Engineering for Dams, By Creager WP, Justin J D and Hinds J, Wiley Pub. New York

E-Resources (If any):

<http://nptel.ac.in/>