

B.E. Semester: VIII
Civil Engineering

Subject Name: DESIGN OF HYDRAULIC STRUCTURES (CV 803)

A. Course Objective:

- Demonstrate and understanding of advanced fluid mechanics principles.
- Implementation of geotechnical engineering principles.
- To get a knowledge of various types of dam
- Understand the different elements of dam.

B. Teaching /Examination Scheme:

Teaching scheme				Total Credit	Evaluation Scheme					Total
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract/ Tut.	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
03	02	00	05	05	03	70	30	20	30	150

C. Detailed Syllabus:

1 Elements of dam engineering

Introductory perspectives, Embankment types and Characteristics- Concrete dams and characteristics- Spillways and ancillary works – site assessment and selection of type of dam

2 Embankment dam engineering

Nature and classification of soil- engineering characteristics of soil, principles of design – Material and construction- Internal seepage – Stability and stresses, Settlement and deformation in rock fill embankments

3 Concrete dam engineering

Loading -Concepts and criteria, Gravity dam analysis design features and stability elementary profile of gravity dam- Concrete for dams – roller compacted concrete gravity dams

4 Dam outlet works

Spillways – Ogee spillway - cavitations on spillway – design feature- design principles and design of spillways – Chute spillways –Energy dissipation – stilling basins – plunge pools

5 Drop Structures

Sarda fall – Glacis fall –Design principles- Cross regulator, head regulator and functions.

D. Lesson Planning:

Sr. No.	Title of the Unit	Minimum Hours	Weightage
1	Elements of dam engineering	3	7%
2.	Embankment dam engineering	15	33%
3.	Concrete dam engineering	15	33%
4.	Dam outlet works	7	16%
5.	Drop Structures	5	11%

E. List of Tutorials:

Sr. No.	Title
1	Elements of dam engineering
2	Embankment dam engineering
3	Concrete dam engineering
4	Dam outlet works
5	Drop Structures

F. Instructional method and pedagogy (Continuous Internal Assessment Scheme) (CIA):

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and practical which carries marks.
- At regular intervals assignments will be given. Students should submit all assignments during given period.
- Classroom participation and involvement in solving the problems in Tutorial rooms Carries Marks
- Internal exam of 30 marks will be conducted as a part of Mid semester evaluation.
- Experiments shall be performed in the field related to course contents.
- The course includes a practical, where students have an opportunity to build an appreciation for the concept being taught in lectures.

G. Students Learning Outcomes:

On the completion of the course one should be able to understand:

- Select hydraulic structural elements.

- Evaluate surface water dam.
- Be able to integrate relevant concept and methodologies in the area of hydraulics, hydrology and geotechnical engineering.
- Be able to select the type of dam, design and to construct.

H. Recommended Study Materials

A . Reference Books:

1. Arora, K.R., Irrigation, Water Power and Water Resources Engineering, Standard Publishers Distributors, Delhi
2. Modi, P.N., Introduction To Water Resources And Waterpower Engineering, Standard Publication, Delhi
3. Garg, S.K., Irrigation Engineering and Hydraulic Structures Khanna Publishers
4. Asawa, G, L Irrigation And Water Resources Engineering, New Age Int. Ltd.

A. Web Materials:

1. <http://nptel.iitm.ac.in/video.php?courseId=1029&v=XmO2pItg7YBz>
2. <http://nptel.iitm.ac.in/video.php?courseId=1029&v=SO0suW7TLiCs>
3. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Water%20Resource%20Engg/New_index1.html
4. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Water%20Resource%20Engg/pdf/m3I02.pdf>
5. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Water%20Resource%20Engg/pdf/m3I03.pdf>
6. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Water%20Resource%20Engg/pdf/m3I05.pdf>
7. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Water%20Resource%20Engg/pdf/m3I07.pdf>