

Hydraulic Structures & Hydropower Engineering Module				
Course Title	Dam Engineering II			
Course Code	WRIE3153			
Program	B.Sc in Water Resources and Irrigation Engineering			
Module name	Hydraulic Structures & Hydropower Engineering			
Module Coordinator	Name: Office location Mobile:; e-mail: Consultation Hours: _____			
Instructor Name	Name: Office location Mobile:; e-mail: Consultation Hours: _____			
Course Information	Academic Year : Year: IV Semester : I Meeting Day: To be arranged at the beginning of the semester Meeting Time: To be arranged at the beginning of the semester Meeting Location: To be arranged at the beginning of the semester			
ECTS	3 ECTS			
Students' work load in hrs	Lecture	Tutorial	Lab	Home study
	1	2	0	2
Course Objectives and Competences Acquired	- The objective of this course is to enable students to be familiar with the ancillary components of dams or appurtenant structures which are provided for dam safety and environmental considerations. - To understand the need of energy dissipation and outlet works in dam design and construction; explain the functions of intakes, gates, dam instrumentation and surveillance after completing this course.			
Course Description	- This course is designed to aware students about the need of dam outlets, and factors to be considered in outlet works are also component parts of the course. - As a safety measure of dam, spillways, types of spillways, hydraulic design, construction, aeration and cavitations of spillways, energy dissipaters, intakes structures ,gates and valves; dam safety, instrumentation and surveillance are also included			
Pre-requisite	Dam Engineering-I			
Course status	Core			
Schedule/ syllabus				
Week	Topics and contact hours (Lecture, Tutorial, lab/practical time allocation)		Required Reference with pages	
	1. Dam outlet works 1.1 Introduction 1.2 The design flood 1.3 Sedimentation in reservoirs 1.4 Cavitations 1.5 Spillways 1.6 Bottom outlets			

	2. Energy dissipation 1.1 Energy dissipation on spillways 1.2 Stilling basins 1.3 Plunge pools 1.4 Energy dissipation at bottom outlets 3. Intake structures 3.1 Introduction 3.2 Bottom intake 3.3 surface intake 4. Gates and valves 4.1 General 4.2 Crest gates 4.3 High-head gates and valves 4.4 Tidal barrage and surge protection gates 4.5 Hydrodynamic forces acting on gates	
Summary of Teaching and Learning Method	Lecture, tutorials, discussion, individual work, problem solving, project Work	
Assessment	Percentage mark and type of assessment	Chapter or topics and date
	Evaluation methods: 1. Assessment----- 50% a) Assignment-- 10% b) Project -----10% c) Test-----20% d) Term paper--10% 2. Final examination-----50%	
Course Expectation	Preparedness and participation: both students and the teacher should be prepared since education is an interactive process. Students should be active participants in the teaching-learning process. They should be interested to the course and come to class with the necessary materials such as exercise books and pen. In addition, they should to take responsibility in their education. Teachers are also expected be prepared and interested to the course, which they are offering. They have to consult the essential materials ahead of time and try share their knowledge in an efficient and effective manner. Material availability: reference materials are expected to be available in the library nearest to respective faculties.	
Policy	Attendance: students should attend at least 85% Lecture and 100% laboratory or practical. Assignments: all students must do all the assignments given Tests/quizzes: all students must site/take all tests/quizzes given Cheating/plagiarism: cheating/plagiarism is strictly forbidden. It will result in disqualification of the course.	

Reference	• Arora, K., (2002). Irrigation, Water power and Water Resources Engineering, 4th Edition, A.K. Jain, New Delhi. • Novak, P., et al. (2007). Hydraulic structures, 4th Edition, Taylor and Francis, London. • USBR, (1973). Design of Small Dams, 2nd Edition, US gov't Printing Office, Washington D.C. • Creager, W.P., J.D., Justin, and J. Hinds, (1945). Engineering for Dams (VOL I,II and III). • Bhart Singh, R.S. Varshney (1995). Engineering for embankment dams, A.A.Balkema publishers, USA. • Vischer, D.L & W.H. Hager, (1997). Dam Hydraulics, John Wiley & Sons, New York.
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