MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY JAMSHORO
Department of Civil Engineering

LESSON PLAN

COURSE TITLE: **Applied Hydraulics**	COURSE CODE: **CE241**	CREDIT HOURS: **03**	MINIMUM CONTACT HOURS: **48**
COURSE INSTRUCTER: Dr. Khalifa Qasim Laghari (B+C)/ Engr. Abdul Qudoos Malano (A+D)			
Batch: 21**CE**	Semester: **4th**	Semester Starting Date: 03-07-2023	Semester Suspension Date: 20-10-2023

COURSE LEARNING OUTCOMES:

CLO No.	Description	Taxonomy level	Associated PLO
1	ANALYZE states of flow with respect to water surface and channel bed profiles due to sediment transport in open channels.	C4	2
2	DESIGN effective solution (flow computation) of pipes looping, branching, network and water hammer problems.	C6	3

LESSON CONTENTS AND ASSOCIATED CLO(s)

Contents	CLO No.	Marks Assigned	Delivery Methods	Assessment Methods (Marks)
Gradually Varied Flow in Open Channels Dynamic equation of gradually varied flow, Surface profiles, Computation of backwater curve length and surface profiles. **Sediment Transport in Open Channels** Importance of sediment transport, Bed load and suspended load, Threshold motion of the sediment, Use of different empirical methods/formulae to estimate sediment load in ppm, Open channel bottom deformation (theory and practical aspects). **Waterpower Development** Hydroelectric power, Important terms and definitions and principal components of a hydroelectric scheme, Classification of hydel plants, Runoff plants, Storage plants, Pumped storage plants, Tidal plants, Low head, medium head and high head schemes. **No. of lectures: 23**	**1**	**48**	• Class Lecture • Discussion • Example practice	• Class Test (05) • Quiz (05) • Mid Semester Exam (20) • Final Exam (18)

Flow in Pipes Flow through simple pipes, Compound pipes, Pipes in series and parallel, Looping and branching pipes, Analysis of network of pipes and water hammer. **Steady Incompressible Flow in Pressure Conduits** Major and minor losses, Reynold's number and its significance, Viscous flow through circular pipes, Turbulent flow through pipes, Universal velocity distribution and Prandtil's mixing length theory. **Reaction and Centrifugal Turbine** Types, Construction features, Operations, Specific speed. **Pumps:** Centrifugal pumps their classification, Cavitation, Draft tube, Construction features and operation and specific speed, Reciprocating pumps their classifications (single acting and double acting pumps), Acceleration head, Maximum suction lift, Use of air vessels, Specific speed. **Introduction/use of the subject related software's.** **No. of lectures: 25**	**2**	**52**	• Class Lecture • Discussion • Example practice	• Assignment (10) • Final Exam (42)

ASSESSMENT DETAILS

S. No.	Assessment Activities	Marks	Activities		CLO(s) to be assessed
1	Class Test/Assignment/Project Design/ Presentation/Quiz/Field Report	**20**	Assignment(s)/Project Design	1	2
			Class test(s) + Quiz	1+1	1
2	Mid Semester Exam	**20**	1		1
3	Final Semester Exam	**60**	1		1, 2

Prepared by: Dr. Khalifa Qasim Laghari  Signature: Dated: 13-04-2023	Reviewed by: **Curriculum Review Committee**  Signature: Dated: 18-04-2023	Approved by: **Chairman, CED**  Signature: Dated: 18-04-2023