MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY JAMSHORO
Department of Civil Engineering

LESSON PLAN

COURSE TITLE: **Fluid Mechanics & Hydraulics**	COURSE CODE: **CE227**	CREDIT HOURS: **03**	MINIMUM CONTACT HOURS: **48**

COURSE INSTRUCTER: **Engr. Abdul Qudoos Malano (B+C) / Engr. Hafiz Usama Imad (D) / Engr. Shaheer Kazi (A)**

Batch: **22CE**	Semester: **3rd**	Semester Starting Date: **20-11-2023**	Semester Suspension Date: **29-03-2024**

COURSE LEARNING OUTCOMES:

CLO No.	Description	Taxonomy level	Associated PLO
1	**DESCRIBE** the concepts related to fluid statics, kinematics, dynamics and simulation model of a real hydraulic structure.	**C2**	**1**
2	**SOLVE** problems related to various open channel x-sections and flow based on hydraulic energy & momentum principles.	**C3**	**2**

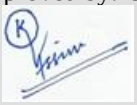
LESSON CONTENTS AND ASSOCIATED CLO(s)

Contents	CLO No.	Marks Assigned	Delivery Methods	Assessment Methods (Marks)
Properties of Fluid Density, Specific weight, Specific volume, Specific gravity, Viscosity and Newton's law of viscosity, Bulk modulus of elasticity, Surface tension, Capillarity, Dimensions and Systems of units. **Fluid Statics** Pressure; Pressure head, Pressure-head relationship, Atmospheric pressure, Absolute pressure, Gauge pressure and Pascal's law. Equipment's for measurement of pressure, Piezometer, Manometers, Bourdon gauge and Mechanical gauges. Hydrostatic pressure, Buoyancy and stability of floatation. **Fluid Kinematics** Basic concepts of uniform and non-uniform, Flow rate and mean velocity, Acceleration in fluid flow. **Fluid Dynamics** Continuity equation in differential form for steady and unsteady flows, Continuity equation's integral form, Total head or energy (Bernoulli's) equation and its applications. **Hydraulic Similitude** Dimensions analysis of physical quantities (FLT or MLT system of measurement) by Releigh's or Buckingham's π-Theorem and its applications, Model analysis, Model and its prototype's geometric, kinematic, dynamic and hydraulic similarities, Dimension less number and their significance. **No. of lectures: 26**	**1**	**55**	• Class Lecture • Discussion • Example practice	• Class Test-I (05) • Assignment-I (05) • Mid Semester Exam (30) • Final Exam (15)

Open Channel Flow and its Classifications Types of open channel and flow. States of flow and Regimes of flow, uniform flow (Chezy's and Manning's velocity equations) through various channel sections. **Design of Open Channels and Their Properties** Open channels Channel geometry, Design of most efficient, effective and economical open channel sections. **Energy and Momentum Principles** Non-uniform flow, Energy in open channels, Specific energy, Critical flow, Momentum principle and its applications, Hydraulic jump and its applications. **Flow Rate Measurement in Open Channels** Measurement of discharge through weirs, modular and non-modular venturi-flumes. **Introduction to subject relevant software's** **No. of lectures: 22**	**2**	**45**	• Class Lecture • Discussion • Example practice	• Assignment-II (05) • Test-II (05) • Final Exam (35)

ASSESSMENT DETAILS

S. No.	Assessment Activities	Marks	Activities		CLO(s) to be assessed
1	Class Test/Assignment/ Quiz	**20**	Assignment(s)	2	1,2
			Class Test(s)/Quiz(s)	2	1,2
2	Mid Semester Exam	**30**	1		1
3	Final Semester Exam	**50**	1		1, 2

Prepared by: **Engr. Abdul Qudoos Malano**  Signature: Dated: 13-11-2023	Reviewed by: **Curriculum Review Committee**  Signature: Dated: 12-12-2023	Approved by: **Chairman, CED**  Signature: Dated: 12-12-2023