COURSE CODE:	ENS-442
COURSE NAME:	Water Resource Management
CREDIT HOURS:	Theory = 3 Practical = 0 Total = 3
CONTACT HOURS:	Theory = 48 Practical = 0 Total = 48
PREREQUISITE:	None
MODE OF TEACHING:	Three hours of lecture per week

COURSE DESCRIPTION:

The aim of this course is to educate students about the Water Resources Management with reference to Pakistan, how to minimize the wastage and how to increase its efficiency especially in irrigation sector.

TOPICS COVERED:

Week#	Topics
1	Water resource and its management, hydrological cycle
2	Water quality and quantity aspects, water supply and demand management measures, virtual water
3	Groundwater exploitation, its over-mining and pollution and urbanization aspects
4	Improving water productivity/irrigation water efficiency,
5	Flood and droughts, water conservation and rain water harvesting in urban and rural environment
6	Wetlands resources management, flood and drought management
7	Recycling and re-use of wastewater, fisheries management
8	Fisheries management
9	**Midterm Exam – MSE**
10	Climate change and its impacts on our future water resources, precipitation distribution in Pakistan
11	Indus Water Treaty 1960 (IWT), Indus Water Accord 1991

12	Water relevant institutions and authorities in Pakistan, water resources management and future challenges in Pakistan
13	Integrated water resources management (IWRM)
14	Integrated water resources management (IWRM)
15	Study tours to visit water supply & wastewater treatment plants, watershed/catchment
16	Pollution aspects, like solid waste and waste water disposal into the natural streams
17	Pollution aspects, like solid waste and waste water disposal into the natural streams
18	**End Semester Exam**

Text and Material:

1. Pakistan's Water Economy Running Dry, Briscoe, J. and Qamar, U., Oxford University Press Karachi
2. Problems and Politics of Water Sharing and Management in Pakistan, Cheema, P.I., Khan, R. A. and Malik, A. R., Asia Printer, Islamabad
3. Water Resources: Science and Society by George M. Hornberger and Debra Perrone, Johns Hopkins University Press 2019
4. Water Resource Management: Sustainability in an Era of Climate Change by David E. McNabb, Palgrave Macmillan; 1st ed. 2017
5. Water Resources Assessment, Modelling and Management by C. P. Kumar, 2023

ASSESSMENT SYSTEM:

Theoretical/Instruction	**100%**
Assignments	10%
Quizzes	15%
Mid Semester Exam	25%
End Semester Exam	50%

Practical Work	**0%**
Lab Attendance	0%
Lab Report	0%
Lab Quiz	0%
Lab Rubrics	0%