



TENTATIVE TEACHING PLAN (THEORY)

Department: **Civil Engineering**

Name of Teacher: **Prof. Dr. Ashfaque A. Memon**

Subject: **Drainage Engineering** Course Code: **CE442**

Batch: **19CE(A+C+D)** Year: **4th** Semester: **8th**


Semester Starting Date: **03-07-2023** Semester Suspension Date: **20-10-2023**

Course Learning Outcomes (CLOs): Upon successful completion of the course, the student will be able to:

CLO	Description	Taxonomy Level	PLO
1	CATAGORIZE the situations that necessitate drainage of agricultural lands.	C4	4
2	Design, operate and maintain the surface and sub-surface drainage systems for sustainable agriculture.	C6	3,7

S. No.	Topic	CLO	No. of lecture/hrs. required
Introduction			
1.	Causes of waterlogging, Need for drainage, Objectives of land drainage, Benefits of drainage.	1	2
2.	Reclamation of waterlogged soils.	1	1
Observation wells and Piezometers			
3.	Difference between shallow monitoring wells and piezometers, Construction, location of observation wells.	1	1
4.	Installation of observation wells and piezometers, Reading water levels.	1	1
Factors related to drainage			
5.	Drainage requirement, Groundwater table. Dissolved salts in the groundwater, Measuring groundwater salinity.	1	2
6.	Hydraulic conductivity. Topography, Impermeable layers.	1	2
Major Drainage Projects of Pakistan			
7.	Major Drainage Projects of Pakistan	1	1
Sea water intrusion			
8.	Sea water intrusion	1	2
Design considerations of drainage systems			
9.	Drainage as part of an agricultural development project, Field drainage systems.	2	1
10.	Surface and subsurface drainage systems, Combined drainage systems, Components of a drainage system, Layout of field drainage systems, Outlet of a field drainage system, Design discharge, Slopes of field drains.	2	1

Surface drainage			
11.	Land forming, Bedding, Land grading and land planning., Field drains	2	1
12.	Design and construction of surface drains.	2	1
Subsurface drainage			
13.	Types of subsurface drainage systems, Design of subsurface drainage systems	2	2
14.	Depth and spacing of field drains	2	2
15.	Drainage coefficient, Pipes, Envelopes	2	1
16.	Construction of pipe drainage systems: Construction methods, alignment, and levels.	2	2
17.	Machinery, Supervision and inspection, Interceptor drains.	2	1
Operation and maintenance			
18.	Data of drainage works, Monitoring of drains	2	1
19.	Maintenance of Open drains, Pipe drains and Structures.	2	2
Cross drainage structures			
23.	Introduction and classification of cross drainage structures.	2	1
24.	Design of cross drainage structures.	2	4
TOTAL			32

Signature of Teacher: 

Dated: 20-06-2023

Remarks of DMRC: APPROVED

Signature of Chairman: 

Dated: 01-08-2023