



LESSON PLAN

COURSE TITLE: Drainage Engineering	COURSE CODE: CE442	CREDIT HOURS: 02	MINIMUM CONTACT HOURS: 32
--	------------------------------	-------------------------	----------------------------------

COURSE INSTRUCTOR: **Prof. Dr. Ashfaque A. Memon (A+C+D) / Engr. Abdul Qudoos Malano (B)**

Batch: **19CE** Semester: **8th** Semester Starting Date: **03-07-2023** Semester Suspension Date: **20-10-2023**

COURSE LEARNING OUTCOMES:




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

Contents	CLO No.	Marks Assigned	Delivery Methods	Assessment Methods (Marks)
<ul style="list-style-type: none"> Introduction Causes of waterlogging, Need for drainage, Objectives of land drainage, Benefits of drainage, Reclamation of waterlogged soils. No. of lectures: 03	1	05	<ul style="list-style-type: none"> Class Lectures Discussion Example practice 	<ul style="list-style-type: none"> Mid semester Exam (05)
<ul style="list-style-type: none"> Observation wells and Piezometers Difference between shallow monitoring wells and piezometers, Construction, location and installation of observation wells and piezometers, Reading water levels. Factors related to drainage Drainage requirement, Groundwater table, Depth to the water table, Dissolved salts in the groundwater, Measuring groundwater salinity, Hydraulic conductivity, Topography, Impermeable layers. No. of lectures: 06	1	09	<ul style="list-style-type: none"> Class Lectures Discussion 	<ul style="list-style-type: none"> Class Test-I (02) Assignment-I (02) Mid semester Exam (05)
<ul style="list-style-type: none"> Major drainage projects of Pakistan Sea water intrusion No. of lectures: 03	1	04	<ul style="list-style-type: none"> Class Lectures Discussion Example practice 	<ul style="list-style-type: none"> Final Exam (04)

<ul style="list-style-type: none"> • Design considerations of drainage systems Drainage as part of an agricultural development project, Field drainage systems, 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. • Surface drainage Land forming- Bedding, Land grading and land planning, Field drains- Design of surface drains and construction of surface drains. • Subsurface drainage Types of subsurface drainage systems, Design of subsurface drainage systems, Depth and spacing of field drains, Drainage coefficient, Pipes, Envelopes, Construction of pipe drainage systems, Construction methods, Alignment and levels, Machinery, Supervision and inspection, Interceptor drains. <p>No. of lectures: 12</p>	2	19	<ul style="list-style-type: none"> • Class Lectures • Discussion • Example practice 	<ul style="list-style-type: none"> • Class Test-II (03) • Assignment-II (03) • Final Exam (13)
<ul style="list-style-type: none"> • Operation and maintenance Data of drainage works, Monitoring, Maintenance of Land surface, Open drains, Pipe drains, and Structures. <p>No. of lectures: 03</p>	2	4	<ul style="list-style-type: none"> • Class Lectures • Discussion • Example practice 	<ul style="list-style-type: none"> • Final Exam (4)
<ul style="list-style-type: none"> • Cross drainage structures Introduction, Classification, and design of cross drainage structures. <p>No. of lectures: 05</p>	2	9	<ul style="list-style-type: none"> • Class Lectures • Discussion • Example practice 	<ul style="list-style-type: none"> • Final Exam (09)

ASSESSMENT DETAILS

S. No.	Assessment Activities	Marks	Activities		CLO(s) to be assessed
1	Class Test/Assignment/Project Design/Presentation/Quiz/Field Report	10	Assignment(s)	2	1,2
			Class test(s)	2	1,2
2	Mid Semester Exam	10	1		1
3	Final Semester Exam	30	1		1,2

Prepared by: Dr. Ashfaq A. Memon  Signature: Dated: 13-04-2023	Reviewed by: Curriculum Review Committee  Signature: Dated: 18-04-2023	Approved by: Chairman, CED  Signature: Dated: 18-04-2023
---	---	---