

GANPAT UNIVERSITY					
FACULTY OF DIPLOMA ENGINEERING					
Programme	Diploma		Branch/Spec.	Agricultural Engineering	
Semester	IV		Version	2.0.0.1	
Effective from Academic Year		2026-27	Effective for the Batch admitted in		July 2025
Course Code	1AE4104	Course Name	Soil-Water Conservation and Engineering		

I. TEACHING, LEARNING AND ASSESSMENT SCHEME																				
Course Type	Course Code	Course Title	Total IKS Hrs for Sem	Learning Scheme					Credits	Examination Scheme										
				Actual Contact Hrs/week			SLH	NLH		TH				PR			SLA		Total	
				CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL				
												Max	Min			Max	Min	Max		Min
DSC	1AE4104	Soil-Water Conservation and Engineering	-	3	0	2	3	8	4	40	60	100	40	30	20	50	20	20	8	170

Abbreviations:	CL- Classroom Learning	TL- Tutorial Learning	LL- Laboratory Learning
	SLH- Self Learning Hour	NLH- National Learning Hour	SLA- Self Learning Assessment
	FA- Formative Assessment (Term work + Mid Exam + Attendance)		SA- Summative Assessment

II. PRE-REQUISITES
Students enrolling in this course are expected to have a basic understanding of soil science, agricultural engineering principles, elementary hydrology related to rainfall and runoff, common agronomic practices, and the use of basic mathematics and engineering units.

III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES
On completion of the course, learners will be capable of assisting in soil and water conservation planning at farm and watershed levels, measuring and interpreting rainfall and runoff data, and identifying erosion problems with suitable control measures.

IV. COURSE LEARNING OUTCOMES
CO-1. Identify and recall different water resources, types of erosion, factors affecting erosion, and methods of erosion control.
CO-2. Explain the mechanics of water and wind erosion, the impact of erosion on soil and water conservation, and the principles of erosion control methods.
CO-3. Demonstrate the ability to measure rainfall, estimate runoff, and implement agronomic and structural erosion control practices such as contour farming, strip cropping, and terracing.
CO-4. Compare and evaluate different erosion control techniques based on their effectiveness, design parameters, and adaptability to various soil and climatic conditions.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:		
Unit	Content	Hrs.
1	Introduction: Water resources and their importance. Rainfall and its measurement. Factors affecting rainfall. Run off, factors affecting runoff. Estimation of runoff.	6
2	Erosion: Definition, Classification of erosion viz., Geological & accelerated. agents causing erosion. Mechanics of Water Erosion: Raindrop erosion, Sheet erosion, Rill erosion, Gully erosion and principle of gully erosion and Classification of gullies. Stream channel erosion. Effects of water erosion, Factors affecting erosion by water. Mechanics Of Wind Erosion: Processes of saltation, suspension, surface creep. Factors affecting erosion by wind.	8
3	Principles of erosion control. Agronomic and field practices to control erosion by wind & water i.e. Contour farming, strip cropping, tillage etc. Terracing to control erosion by water.	8
4	Types of terraces. Terrace design parameters and planning a terrace system. Bench terraces, types and design parameters. Use of bunds to control erosion and design parameters of bunds. Contour bunding. Vegetated water ways for the control of erosion.	8

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL
1. To study different instruments at meteorological observatory station,
2. To study the rainfall measurement system. Analysis of rainfall data i.e. intensity, duration, frequency analysis, mean-

3.	To study the various types of soil erosion and their control.									
4.	To study the terracing and bunds for soil erosion control.									
5.	To study the vegetative water ways for the control of erosion and safe disposal of water									
VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)										
1. Collection and analysis of rainfall data for a nearby village or farm										
2. Identification of erosion types in a selected agricultural field and Suggest suitable agronomic and structural control measures										
3. Preparation of contour map and contour farming plan for a sloping field										
4. Design of bench terrace or contour bund using standard parameters										
5. Visit of a watershed development or soil conservation project in Gujarat										
VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD										
1.	Standard Rain Gauge									
2.	Recording Rain Gauge									
3.	Anemometer									
4.	Wind Vane									
5.	Measuring Cylinders									
6.	Stop Watch									
7.	Soil Erosion Models / Charts									
8.	Contour Map Sheets									
9.	Levelling Instruments (Dumpy / Auto Level – demo)									
10.	Models of Terraces, Bunds, and Vegetative Waterways									
11.	Meteorological Observatory Trainer Board									
IX. LIST OF REFERENCE BOOKS										
1.	Soil & Water Conservation Engineering by Glenn O. Schwaiblmair, Richard K. Frevert, Talcott W. Edminster, Kenneth K. Barnes; John Wiley & Sons New York.									
2.	Manual of Soil & Water Conservation Practice by Gurmail Singh; Oxford & IBH Publication co.									
3.	Soil & Water Conservation Engineering by Suresh R.; Standard Publication.									
4.	Principle of Agricultural Engineering Volume-II by A.M. Michael & T.P. Ojha; Jain brothers.									
5.	Hydrology: Principles analysis and design (Revised II Edition) Raghunath, H.M. 2006. New Age International, Pvt. Ltd., Publishers, New Delhi.									
X. LINK OF LEARNING WEB RESOURCE										
1.	ICAR – Soil & Water Conservation Division: https://icar.org.in									
2.	Central Soil and Water Conservation Research & Training Institute (CSWCRTI): https://cswcrti.org									
3.	FAO – Soil and Water Conservation Practices: https://www.fao.org/soils-portal									
4.	Ministry of Jal Shakti – Watershed Development: https://jalshakti-dowr.gov.in									
5.	NPTEL – Soil and Water Conservation Engineering (Video Lectures): https://nptel.ac.in									
6.	Agricultural Engineering Text Resources (Open Access): https://www.agritech.tnau.ac.in									
XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE										
Unit	Unit Title	Aligned COs	Learning Hours	U-Level	R-Level	A-Level	Total Marks			
1.	Water Resources, Rainfall Measurement & Runoff Estimation	CO1	6	6	4	–	10			
2	Types of Erosion & Mechanics of Water and Wind Erosion	CO1, CO2	8	8	8	4	20			
3	Principles of Erosion Control & Agronomic Practices	CO2, CO3	8	6	8	6	20			
4	Terraces, Bunds & Vegetated Waterways – Design & Planning	CO3, CO4	8	4	8	8	20			
5	Field Applications, Case Studies & Practical Assessment	CO4	5	2	4	4	10			
XII. COs AND POs AND PSOs MAPPING										
Course Outcome (Cos)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	1	0	0	0	1	2	1	0

CO2	3	2	1	0	1	0	0	3	2	0
CO3	2	3	2	1	2	0	0	2	3	1
CO4	1	3	2	2	2	0	1	1	2	2
CO5	1	2	3	2	2	1	2	2	2	2