

22CEPE24	EARTH RETAINING STRUCTURES	Semester			VII	
PREREQUISITES		Category	PE	Credit		3
Soil Mechanics and Foundation Engineering		Hours/Week	L	T	P	TH
			3	0	0	3
Course Learning Objectives						
1	To impart knowledge on students about various theories in Earth Pressure					
2	To impart knowledge on students to Analyse the Stability of retaining structure					
3	To acquire knowledge in the Analysis and design of sheet pile walls and anchor systems					
4	To get a idea about the lateral pressure during supported excavation					
5	To understand the concepts in analysis and design of slurry supported trenches and deep cuts.					
Unit I	EARTH PRESSURE THEORIES	9	0	0	9	
Introduction – State of stress in retained soil mass – Earth pressure theories – Classical and graphical techniques – Active and passive cases – Earth pressure due to external loads, empirical methods. Wall movement and complex geometry.						
Unit II	COMPACTION, DRAINAGE AND STABILITY OF RETAINING STRUCTURES	9	0	0	9	
Retaining structure – Selection of soil parameters – Lateral pressure due to compaction, strain softening, wall flexibility, drainage arrangements and its influence. – Stability analysis of retaining structure both for regular and earthquake forces.						
Unit III	SHEET PILE WALLS	9	0	0	9	
Types of sheet piles – Analysis and design of cantilever and anchored sheet pile walls – free earth support method – fixed earth support method. Design of anchor systems – isolated and continuous.						
Unit IV	SUPPORTED EXCAVATIONS	9	0	0	9	
Lateral pressure on sheeting in braced excavation, stability against piping and bottom heaving. Earth pressure around tunnel lining, shaft and silos – Soil anchors – Soil pinning –Basic design concepts.						
Unit V	SLURRY SUPPORTED TRENCHES	9	0	0	9	
Basic principles – Slurry characteristics – Specifications – Diaphragm and bored pile walls – stability Analysis and design.						
Total= 45 Periods						

Text Books:	
1	Clayton, C.R.I., Militisky, J. And Woods, R.I.Woods, Earth pressure and Earth-Retaining structures,3 rd Edition, CRC Press, 2014.
2	Muni Budhu “Foundations and Earth Retaining Structures”, John Wiley & Sons,2008.
Reference Books:	
1	Das, B.M., “Principles of Geotechnical Engineering”, 4 th Edition, The PWS series in Civil Engineering, 1998.
2	Das, B.M., “Principles of Geotechnical Engineering”, 4 th Edition, The PWS series in Civil Engineering, 1998.
3	Rowe, R.K., “Geotechnical and Geoenvironmental Engineering Handbook”, Kluwer Academic Publishers, 2001.
4	Koerner, R.M., “Design with Geosynthetics”, 3 rd Edition, Prentice Hall, 1997.
5	Day, R.W., “Geotechnical and Foundation Engineering: Design and Construction”, McGraw Hill, 1999.
6	Mandal, J.N., “Reinforced Soil and Geotextiles”, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 1993.
7	McCarthy, D.F., “Essentials of Soil Mechanics and Foundations: Basic Geotechnics”, 6 th Edition, Prentice Hall, 2002

8	Hajnal, I., Marton, J. and Regele, Z., Construction of diaphragm walls, A Wiley – Interscience Publication, 1984.
9	Petros P. Xanthakos., Slurry walls as structural systems, 1993

Course Outcomes: Upon completion of this course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Understand various Earth Pressure theories	Understand
CO2	Analysis the Stability of retaining structure	Analyse
CO3	Analysis, design of sheet pile walls and anchor systems	Analyse
CO4	Estimate the lateral pressure during supported excavation.	Apply
CO5	Analysis, design of slurry supported trenches	Analyse

COURSE ARTICULATION MATRIX

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	-	-	1	-	-	1	-	-	3	1	-
CO2	3	3	2	2	-	-	2	-	-	1	-	-	3	1	-
CO3	3	3	2	2	-	-	2	-	-	1	-	-	3	1	-
CO4	3	3	1	2	-	-	2	-	-	1	-	-	3	1	-
CO5	3	3	2	2	-	-	2	-	-	1	-	-	3	1	-
Avg	2.8	2.8	2.8	2	-	-	2.8	-	-	1	-	-	3	1	-
3/2/1 – indicates strength of correlation (3- High, 2- Medium, 1- Low)															