

1.	Title of the course	Unsaturated Soil Mechanics and Applications
2.	Course number	CE537L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CE5032/11
6.	To be offered by	Department of Civil and Environmental Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	<b>Course Objective(s):</b> To introduce the role of suction and stress state variables on the engineering behaviour of saturated and unsaturated soils. To impart knowledge on the applications of unsaturated soil mechanics to address the hazards associated with problematic soils and climate change on the geotechnical infrastructure.	
10.	<b>Course Content:</b> Introduction: role of climate change on geotechnical infrastructure, need for unsaturated soil mechanics; Phases of unsaturated soil; Properties of individual phases; Interaction of air and water; Concepts and applications of stress-state variables for saturated and unsaturated soils; Soil suction: theory of soil suction, capillarity, measurements of total, osmotic and matric suctions; Flow laws: flow of water and measurement of permeability; Soil-water characteristic curve concepts and its measurement; Shear strength and volume change behaviour of unsaturated soils; Applications of unsaturated soils mechanics to pavements, slope stability, foundations, and heave analysis in expansive soils.	
11.	<b>Textbook(s):</b> 1. Fredlund D G and Rahardjo H, <i>Soil Mechanics for Unsaturated Soils</i> , 1st Edition, John Wiley & Sons (1993). 2. Lu N and Likos W J, <i>Unsaturated Soil Mechanics</i> , 1st Edition, John Wiley & Sons (2004).	
12.	<b>Reference(s):</b> 1. Blight G E, <i>Unsaturated Soil Mechanics in Geotechnical Practice</i> , 1st Edition, CRC Press (2013). 2. Fredlund D G, Rahardjo H and Fredlund M D, <i>Unsaturated Soil Mechanics in Engineering Practice</i> , 1st Edition, John Wiley & Sons (2012). 3. Murray E J and Sivakumar V, <i>Unsaturated Soils: A Fundamental Interpretation of Soil Behaviour</i> , 1st Edition, Wiley-Blackwell (2010).	