

**Forensic Geotechnical Engineering**
**01GT0211 (PEC)**
**Objective of the Course:**

- To understand the roles and responsibilities of a forensic geotechnical
- To understand the types of damages and investigation methods that can be adopted.
- To understand and apply reverse-engineering of design and analysis to identify the cause of failure.
- To inculcate the ability to write reports of the faults as deduced and suggest repair and rehabilitation measures.

**Credit Earned: 3**
**Students learning outcomes:**

After successful completion of the course, it is expected that student will be able to,

1. To Understand o understand the roles of a Forensic Engineer.
2. To classify the types of damage and plan the investigation accordingly based on the knowledge obtained from case studies and relatable issues.
3. To apply design and analysis principles to investigate the cause of failure.
4. To suggest mitigation or rehabilitation measures according to the site conditions.

**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	CSE (I)	IA (M)	Viva (V)	Term Work (TW)	
03	00	00	03	50	20	30	25	25	150

**Detailed Syllabus**

Sr. No.	Title of the unit	Number of hours
<b>1</b>	<b>Types of Damages</b>	<b>12</b>
	Types of Damage - Planning the Investigation - Investigation methodology, Collection of Data - Distress Characterization - Development of Failure, Hypothesis - Diagnostic Tests - Back Analysis - Technical Shortcomings, Legal Issues - Reliability Aspects.	
<b>2</b>	<b>Method of Performance Evaluation</b>	<b>12</b>
	Observation Method of Performance Evaluation - Case Histories related to settlement of Structures - lateral movement - backfill settlements - causes due to soil types such as collapsible soil, expansive soil, soluble soils, slope failures and landslides, debris flow, slope softening and creep, trench collapses, dam failures.	

**Geotechnical Engineering**

<b>3</b>	<b>Failure of Foundation</b>	<b>12</b>
	Foundation due to earthquakes, erosion, deterioration, tree roots, groundwater and moisture problems, groundwater problems, retaining failures problems, pavement failures and issues, failures in soil reinforcement and geosynthetics.	
<b>4</b>	<b>Codal Provision in Forensic Investigation</b>	<b>6</b>
	Development of codal provisions and performance based analysis procedures.	
		<b>42</b>

**Suggested Theory Distribution**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	5%	20%	25%	25%	20%

**Instructional Method and Pedagogy:**

1. Use of Learning Management system like canvas
2. Demonstration through presentations on power point and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

**Recommended Study Material:**
**Reference Book:**

1. Bolton M, A Guide to Soil Mechanics, Universities Press,1991.
2. Robert W. Day (2011) Forensic Geotechnical and Foundation Engineering, Second Edition McGraw-Hill Companies, Inc.
3. Rao, V.V.S. and Sivakumar Babu, G.L (2016) Forensic Geotechnical Engineering, Springer Nature.