



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY  
SERGARH-756060, BALASORE (ODISHA)  
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



## LESSON PLAN

**SUBJECT: Th-2 (GEOTECHNICAL ENGG.)**

### CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Introduction	02	02
2	Preliminary Definitions and Relationship.	06	06
3	Index Properties of soil	04	04
4	Classification of Soil	06	06
5	Permeability and Seepage	07	07
6	Compaction and Consolidation.	08	08
7	Shear Strength	06	06
8	Earth Pressure on Retaining Structures	07	07
9	Foundation Engineering	14	14
	Total Period:	60	60

Discipline: CIVIL ENGINEERING	Semester: 3rd	Name of the Teaching Faculty: Er.Satyajit Panda
Week	Class Day	Theory / Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	1 Introduction 1.1 Soil and Soil Engineering 1.2 Scope of Soil Mechanics
	2 <sup>nd</sup>	1.3 Origin and formation of soil
	3 <sup>rd</sup>	2 Preliminary Definitions and Relationship 2.1 Soil as a three Phase system.
	4 <sup>th</sup>	2 Preliminary Definitions and Relationship 2.1 Soil as a three Phase system.
	5 <sup>th</sup>	2.2 Water Content, Density, Specific gravity, Voids ratio, Porosity, Percentage of air voids
2 <sup>nd</sup>	1 <sup>st</sup>	2.2 air content, degree of saturation, density Index
	2 <sup>nd</sup>	2.2 Bulk/Saturated/dry/submerged density
	3 <sup>rd</sup>	2.2 Interrelationship of various soil parameters
	4 <sup>th</sup>	3 Index Properties of Soil 3.1 Water Content

	5 <sup>th</sup>	3.2 Specific Gravity
3 <sup>rd</sup>	1 <sup>st</sup>	3.3 Particle size distribution: Sieve analysis, wet mechanical analysis, particle size distribution curve and its uses
	2 <sup>nd</sup>	3.4 Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index
	3 <sup>rd</sup>	4 Classification of Soil 4.1 General
	4 <sup>th</sup>	4 Classification of Soil 4.1 General
	5 <sup>th</sup>	4 Classification of Soil 4.1 General
4 <sup>th</sup>	1 <sup>st</sup>	4.2 I.S. Classification, Plasticity chart
	2 <sup>nd</sup>	4.2 I.S. Classification, Plasticity chart
	3 <sup>rd</sup>	4.2 I.S. Classification, Plasticity chart
	4 <sup>th</sup>	5 Permeability and Seepage 5.1 Concept of Permeability, Darcy's Law, Co-efficient of Permeability
	5 <sup>th</sup>	5.1 Concept of Permeability, Darcy's Law, Co-efficient of Permeability

<b>5<sup>th</sup></b>	<b>1<sup>st</sup></b>	5.2 Factors affecting Permeability
	<b>2<sup>nd</sup></b>	5.2 Factors affecting Permeability
	<b>3<sup>rd</sup></b>	5.3 Constant head permeability and falling head permeability Test.
	<b>4<sup>th</sup></b>	5.3 Constant head permeability and falling head permeability Test.
	<b>5<sup>th</sup></b>	5.4 Seepage pressure, effective stress, phenomenon of quick sand
<b>6<sup>th</sup></b>	<b>1<sup>st</sup></b>	6 Compaction and Consolidation 6.1 Compaction: Compaction, Light and heavy compaction Test
	<b>2<sup>nd</sup></b>	6.1 Optimum Moisture Content of Soil, Maximum dry density
	<b>3<sup>rd</sup></b>	6.1 Zero air void line, Factors affecting Compaction
	<b>4<sup>th</sup></b>	6.1 Field compaction methods and their suitability
	<b>5<sup>th</sup></b>	6.2 Consolidation: Consolidation, distinction between compaction and consolidation
	<b>1<sup>st</sup></b>	6.2 Consolidation: Consolidation, distinction between compaction and consolidation

7 <sup>th</sup>	2 <sup>nd</sup>	6.2Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications
	3 <sup>rd</sup>	6.2Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications
	4 <sup>th</sup>	7 Shear Strength 7.1 Concept of shear strength, Mohr- Coulomb failure theory
	5 <sup>th</sup>	7.1Cohesion, Angle of internal friction
8 <sup>th</sup>	1 <sup>st</sup>	7.1strength envelope for different type of soil
	2 <sup>nd</sup>	7.1Measurement of shear strength
	3 <sup>rd</sup>	7.1Direct shear test, triaxial shear test
	4 <sup>th</sup>	7.1unconfined compression test and vane-shear test 8
	5 <sup>th</sup>	8 Earth Pressure on Retaining Structures 8.1 Active earth pressure,
9 <sup>th</sup>	1 <sup>st</sup>	8.1Passive earth pressure
	2 <sup>nd</sup>	8.1Earth pressure at rest.
	3 <sup>rd</sup>	8.2 Use of Rankine's formula for the following cases (cohesion-less soil only) (i) Backfill with no surcharge

	<b>4<sup>th</sup></b>	8.2 Use of Rankine's formula for the following cases (cohesion-less soil only) (i) Backfill with no surcharge.
	<b>5<sup>th</sup></b>	8.2(ii) backfill with uniform surcharge
<b>10<sup>th</sup></b>	<b>1<sup>st</sup></b>	8.2(ii) backfill with uniform surcharge
	<b>2<sup>nd</sup></b>	9 Foundation Engineering 9.1 Functions of foundations,
	<b>3<sup>rd</sup></b>	9.1shallow and deep foundation
	<b>4<sup>th</sup></b>	9.1different type of shallow and deep foundations with sketches
	<b>5<sup>th</sup></b>	9.1different type of shallow and deep foundations with sketches
<b>11<sup>th</sup></b>	<b>1<sup>st</sup></b>	9.1Types of failure (General shear, Local shear & punching shear)
	<b>2<sup>nd</sup></b>	9.2 Bearing capacity of soil
	<b>3<sup>rd</sup></b>	9.2bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip,
	<b>4<sup>th</sup></b>	9.2Circular and square footings
	<b>5<sup>th</sup></b>	9.2Circular and square footings

<b>12<sup>th</sup></b>	<b>1<sup>st</sup></b>	9.2 Effect water table on bearing capacity of soil
	<b>2<sup>nd</sup></b>	9.3 Plate load test
	<b>3<sup>rd</sup></b>	9.3 Plate load test
	<b>4<sup>th</sup></b>	9.3 standard penetration test
	<b>5<sup>th</sup></b>	9.3 standard penetration test