

Course No. : SWCE – 232

Sem : III

Title: Soil Mechanics

Credit: 3 (2+1)

Theory :

Introduction of soil mechanics, field of soil mechanics, phase diagram physical and index properties of soil classification of soils, general classification based on particles size, textural classification and I.S. soil classification system stress condition in soils, effective and neutral stress, Permeability and seepage, Shear strength mohr stress circle, theoretical relationship between principle stress circle, theoretical relationship between principal stress mohr-coulomb failure theory, effective stress principle. Determination of shear parameters by direct shear to be circle, theoretical test. Numerical exercise based on various types of tests. Compaction composition of soils standard and modified protector test, abbot compaction and Jodhpur mini compaction text field compaction method and control. Consolidation of soil: Consolidation of soils, one dimensional consolidation spring analogy, Terzaghi' s theory Laboratory consolidation text, calculation of void ratio and coefficient of volume change, Taylor' s and Casagrand' s method, determination of coefficient of consolidation. Earth pressure: Plastic equilibrium in soils Active and passive states, Rankine' s theory of earth pressure active and passive earth pressure for cohesive soils, simple numerical exercise. Stability of slopes: Introduction to stability Analysis of infinite and finite slopes friction circles method Taylor' s stability number.

Practical:

Determination of water content of soil; Determination of specific gravity of soil; Determination of field density of soil by core cutter method; Determination of field density by sand replacement method; Grain size analysis by sieving (Dry sieve analysis); Grain size analysis by hydrometer method; Determination of liquid limit by Casagrande' s method; Determination of plastic limit; Determination of shrinkage limit; Determination of permeability by constant head method; Determination of permeability by variable head method; Determination of compaction properties by standard proctor test; Determination of shear parameters by Direct shear test; Determination of unconfined compressive strength of soil.

DEPARTMENT OF SOIL AND WATER CONSERVATION ENGINEERING

Lesson Plan for the B.Tech.[Agril.Engg.] from 2007-08

Title: Soil Mechanics

Course No: SWCE 232

Semester: III

Credits: 3(2+1)

Course : B.Tech. (Agri. Engg.)

Lesson Plan

Lecture No	Topic	Book No	Article No
1	Soil and Soil Engineering, Field of Soil Mechanics	1	1.1 to 1.3
2	Preliminary definitions and relationships	1	2.1 to 2.5
3	Functional relationships	1	2.6
4	Numericals on functional relationships	1	---
5	Determination of index properties	1	3.1 to 3.3
6	Determination of index properties	1	3.4 to 3.5
7	Sedimentation analysis and numericals Hydrometer method	1	3.6, 3.8
8	Particle size distribution curve and numericals	1	3.9
9	Consistency of soils, determination of liquid and plastic	1	3.10, 3.11

	limit		
10	Determination of shrinkage limit	1	3.12
11	Soil Classification	1	4.1, 4.2, 4.3, 4.5
12	Modes of occurrence of soil water, adsorbed water, capillary water, Numericals	1	6.1 to 6.3
13	Stress conditions in soil: Effective and neutral pressures	1	6.4
14	Numericals on stress conditions	1	--
15	Permeability, Discharge velocity, seepage velocity, factors affecting seepage velocity	1	7.1 to 7.4, 7.6
16	Permeability of stratified soils and numericals	1	7.12
17	Seepage analysis, seepage pressure, upward flow	1	9.1 to 9.3
18	Laplace equation and Flow net	1	9.4 and 9.5
19, 20	Shear strength, Mohr stress circle, Theoretical relationship between principal stress	1	18.1 and 18.2
21 - 23	Compaction: standard and modified proctor test, abbot compaction and Jodhpur mini compaction test, field compaction method and control		17.1, 17.2, 17.3, 17.6, 17.7 and 17.8
24 - 26	Consolidation, spring analogy, Terzaghi's theory, laboratory consolidation test, calculation of void ratio and coefficient of volume change, Taylor's and Cassagrandes method determination of coefficient of consolidation	1	15.1, 15.2, 15.5, 15.7, 15.8 and 15.9
27	Earth pressure, active and passive states,	1	20.1, 20.2
28	Rankine's theory: only two cases of earth fill i.e. I) Dry or moist back fill with no surcharge II) submerged backfill	1	20.4
29	Numerical on the above two cases	1	----
30	Stability of slopes, stability analysis of infinite and finite slopes	1	23.1 to 23.3
31, 32	Friction circle method, and Taylor's stability number	1	23.6, 23.7

PRACTICALS:

Practical No	Title
1	Determination of water content by different methods
2	Determination of field density by core cutter method
3	Determination of field density by sand replacement method
4	Determination of sp Gravity by Pycnometer
5	Mechanical analysis of soil by sieving
6	Determination of grain size distribution by hydrometer
7	Determination of Liquid limit of soil
8	Determination of Plastic limit of soil
9	Determination of Shrinkage limit of soil
10	Determination of hydraulic conductivity by constant head permeameter
11	Determination of hydraulic conductivity by variable head permeameter
12	Determination of compaction properties of soil by Proctor's test

TEXT BOOK:

1. Soil Mechanics and Foundations by B.C.Punmia

REFERENCE BOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan and A.S.R
2. Soil Testing for Engineers by L.W. Lambe