**MAHAMAYA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCE,**

**NUAPADA**

**LESSION PLAN FOR THE SESSION 2022-2023**

Branch: **CIVIL ENGINEERING**

Semester: **3rd SEM**

Subject: **GEOTECHNICAL ENGINEERING**

 Name of the Faculty: **ER. SUPRAVA BAG**

|  |  |  |  |
| --- | --- | --- | --- |
| **Class No.**  | **No. OF CHAPTER**  | **Topics to be Covered**  | **Remarks**  |
| 1  | Chapter-1 | 1.0 INTRODUCTION1.1- Soil and Soil Engineering. 1.2- Scope of Soil Mechanics |   |
| 2  | Chapter-2 | 2.0 PRELIMINARY DEFINITIONS AND RELATIONSHIP.  2.1- Soil as a three Phase system.  |   |
| 3  |  | Weight volume relationships: Water Content ,Density |   |
| 4  |  | Specific gravity,Voids ratio, Porosity,  |   |
| 5  |  | degree of saturation ,Percentage of air voids, air content, |   |
| 6  |  |  density Index, Bulk/Saturated/dry/submerged density. |   |
| 7  | Chapter-3 | 3.0DETERMINATION OF INDEX PROPERTIES.  3.1- Water Content (Pycnometer method, Oven drying method) |   |
| 8  |  | 3.2- Specific Gravity |   |
| 9  |  | 3.3- Particle size distribution, Sieve analysis, Wet mechanical analysis- Pipette method, Basic concept of Hydrometer Analysis |   |
| 10  |  | 3.4 – Consistency of Soils, Atterberg’s Limits, Plasticity Index, Consistency Index, Liquidity Index  |   |
| 11  |  | Contd. |   |
| 12  |  | Contd. |   |
| 13  | Chapter-4 | 4.0CLASSIFICATION OF SOIL.  4.1- General. |   |
| 14  |  |  4.2- Particle size Distribution. |   |
| 15  |  | -Textural Classification. |   |
| 16  |  | -HRB Classification. |   |
| 17  |  | -Unified Soil Classifications |   |
| 18  |  | I.S. Classification. |   |
| 19  | Chapter-5 | 5.0PERMEABILITY AND SEEPAGE  5.1- Concept of Permeability, Darcy’s Law |   |
| 20  |  | Co-efficient of Permeability,  |   |
| 21  |  | 5.2 Factors affecting Permeability |   |
| 22  |  | 5.3- Constant head permeability and  |   |
| 23 |  | falling head permeability Test |   |
| 24 |  | 5.4- Seepage pressure, the phenomenon of quick sand  |  |
| 25 |  | 5.5- Concept of flow-net, Properties and application of flow-net. |  |
| 26 | Chapter-6 | 6.0- COMPACTION AND CONSOLIDATION. 6.1- Compaction, Light and heavy compaction Test |  |
| 27 |  | **Optimum Moisture Content of Soil, Maximum dry density, Zero air void line**  |  |
| 28  |  | Factors affecting Compaction |   |
| 29  |  | Field compaction methods and their suitability |   |
| 30  |  | Consolidation, distinction between compaction and consolidation |   |
| 31  |  | **Spring Analogy method, Pressure-void ratio curve, normally consolidated** |   |
| 32  |  | under consolidated and over consolidated soil, Assumption of Terzaghi’s theory of one-dimensional consolidation, Laboratory Consolidation Test |   |
| 30  |  | Co-efficient of Consolidation, Time Factor, Estimation of consolidation settlement, Difference between primary and secondary consolidation |   |
| 31  | Chapter-7 | 7.0SHEAR STRENGTH.  7.1- Concept of shear strength |   |
| 32  |  | Mohr- Coulomb failure theory, |   |
| 33  |  | Cohesion, Angle of internal friction |   |
| 34  |  | strength envelope for different type of soil, |   |
| 35  |  | Measurement of shear strength;- Direct shear test, |   |
| 36 |  | triaxial shear test, unconfined compression test and vane-shear test |  |
| 37 | Chapter-8 | 8.0EARTH PRESSURE ON RETAINING STRUCTURES |   |
| 38  |  | 8.1Active earth pressure |   |
| 39  |  | Passive earth pressure, |   |
| 40  |  | Earth pressure at rest.  |   |
| 41  |  |  8.2- Use of Rankine’s formula for the following cases (cohesion-less soil only)  |   |
| 42  |  | (i) Backfill with no surcharge,  |   |
| 43 |  | (ii) backfill with uniform surcharge.  |   |
| 44 |  | iii) submergedbackfill  |   |
| 45 |  | Contd. |   |
| 46  |  | Contd. |   |
| 47 | Chapter-9 | 9.0 FOUNDATION ENGINEERING. 9.1- Functions of foundations,  |  |
| 48 |  | shallow and deep foundation,  |  |
| 49 |  | different type of shallow and deep foundations with sketches. |   |
| 50  |  | Types of failure (General shear, Local shear & punching shear) |   |
| 51  |  | 9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi’s formulae & IS Code formulae for strip, Circular and square footings |   |
| 52  |  | Contd. |   |
| 53  |  | **Contd.** |   |
| 54  |  | 9.3 Machine Foundation: Introduction to Soil dynamics, Terms associated with soil dynamics |   |
| 55 |  | Free vibration and Forced vibration, Natural frequency, Types of |   |
| 56  |  | machines and machine foundation, General requirements, Design of machine |   |
| 57 |  |  foundations: Reciprocating type , Centrifugal type, Impact type, |  |
| 58 |  | Isolation of foundations.  |  |
| 59 |  | Contd. |  |
| 60 |  | Contd. |  |

 

Signature of faculty member counter signature of HOD