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

**NUAPADA**

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

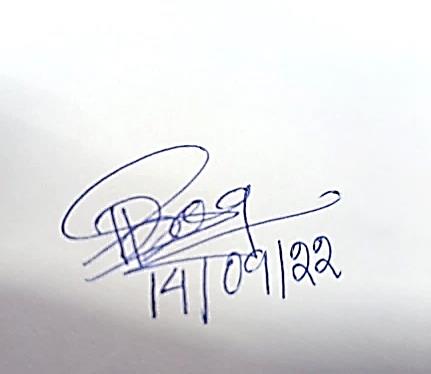
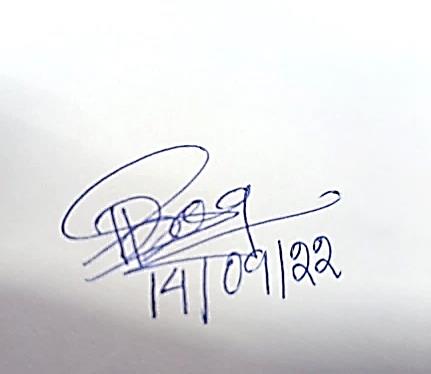
Branch: **CIVIL ENGINEERING**

Semester: **3rd SEM**

Subject: **GEOTECHNICAL ENGINEERING**

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

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| **Class No.** | **No. OF CHAPTER** | **Topics to be Covered** | **Remarks** | |
| 1 | Chapter-1 | 1.0 INTRODUCTION  1.1- 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