BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK

 DEPARTMENT OF CIVIL ENGINEERING



LESSON PLAN

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| SUBJECT: GEOTECHNICAL ENGINEERING (TH 2) | ACCADEMIC SESSION: 2021-22 |
| FACULTY: SRI KSHITISH KUMAR SAHOO | SEMESTER: 3 RD  |
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| H O D (Civil Engg.) |

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| **Discipline:** **Civil Engineering** | **Semester:** **3rd** | **Name of the teaching faculty:** **Sri Kshitish Kumar Sahoo** |
| **Subject:** **Geotechnical Engineering** | **No. of Days/ per week class allotted: 04 periods per week. (Mon, Wed, Thu, & Sat – 1 period each)** | **Semester From Date: 15-10-2022 To Date: 22-12-2022****No. of weeks: 15 weeks** |
| **Week** | **Class Day** | **No of period available** | **Theory Topics** |
| 1st | 15/09/2022 | 1 | **1. Introduction** 1.1 Soil and Soil Engineering1.2 Scope of Soil Mechanics1.3 Origin and formation of soil |
| 17/09/2022 | 1 | **2. Preliminary Definitions and Relationship** 2.1 Soil as a three Phase system.  |
| 2nd | 19/09/2022 | 1 | 2.2 Water Content, Density, Specific gravity,  |
| 21/09/2022 | 1 | 2.2 Voids ratio, Porosity, Percentage of air voids, air content, degree of saturation,  |
| 22/09/2022 | 1 | 2.2 density Index, Bulk/Saturated/dry/submerged density, Interrelationship of various soil parameters  |
| 24/09/2022 | 1 |  Problem solving of 2nd chapter |
| 4th | 26/09/2022 | 1 | Problem solving of 2nd chapter |
| 28/09/2022 | 1 | **3. Index Properties of Soil** 3.1 Water Content 3.2 Specific Gravity  |
| 29/09/2022 | 1 | 3.3 Particle size distribution: Sieve analysis, |
| 01/10/2022 | 1 | 3.3 wet mechanical analysis, particle size distribution curve and its uses  |
| 5th | 10/10/2022 | 1 | 3.4 Consistency of Soils, Atterberg’s Limits, Plasticity Index, Consistency Index , Liquidity Index, Indices |
| 12/10/2022 | 1 | Monthly class test |
| 13/10/2022 | 1 | Problems solving on chapter 3  |
| 15/10/2022 | 1 | **4. Classification of Soil** 4.1 General 4.2 I.S. Classification, Plasticity chart  |
| 6th | 17/10/2022 | 1 | Problems solving on chapter 4 |
| 19/10/2022 | 1 | Exam on Chapter 1, 2,3,4 |
| 20/10/2022 | 1 | **5. Permeability and Seepage** 5.1 Introduction to chapter 55.1 Concept of Permeability |
| 22/10/2022 | 1 | 5.1 Darcy’s Law, Co-efficient of Permeability 5.2 Factors affecting Permeability |
| 7th | 26/10/2022 | 1 |  5.3 Constant head permeability and falling head permeability Test |
| 27/10/2022 | 1 | 5.4 Seepage pressure , effective stress, phenomenon of quick sand  |
| 29/10/2022 | 1 | Problems solving on chapter 5 |
| 8th | 31/10/2022 | 1 | **6.1 Compaction:** Compaction, Light and heavy compaction Test  |
| 02/11/2022 | 1 | 6.1 Optimum Moisture Content of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction |
| 03/11/2022 | 1 | Monthly class test |
| 05/11/2022 | 1 | 6.1 Field compaction methods and their suitability  |
| 9th | 07/11/2022 | 1 | **6.2 Consolidation:** Consolidation  |
| 09/11/2022 | 1 | 6.2 distinction between compaction and consolidation. Terzaghi‘s model analogy of compression/ springs showing the process  |
| 10/11/2022 | 1 | consolidation – field implications, Terzaghi‘s model analogy of compression/ springs showing the process of consolidation – field implications |
| 12/11/2022 | 1 | consolidation – field implications, Terzaghi‘s model analogy of compression/ springs showing the process of consolidation – field implications |
| 10th | 14/11/2022 | 1 | Problems solving on chapter 6 |
| 15/11/2022 | 1 | INTERNAL EXAM |
| 17/11/2022 | 1 | **7.Shear Strength** 7.1 Concept of shear strength  |
| 19/11/2022 | 1 | 7.1 Mohr- Coulomb failure theory, Cohesion, Angle of internal friction.  |
| 11th | 21/11/2022 | 1 | 7.1 strength envelope for different type of soil. |
| 23/11/2022 | 1 | 7.1 Measurement of shear strength- Direct shear test, triaxial shear test. |
| 24/11/2022 | 1 | 7.1 unconfined compression test and vane-shear test. |
| 26/11/2022 | 1 | Problems on chapter 7 |
| 12th | 28/11/2022 | 1 | Exam on chapter 6 & 7 |
| 30/11/2022 | 1 |

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| **8**  | **Earth Pressure on Retaining Structures**  |

8.1 Active earth pressure, Passive earth pressure, Earth pressure at rest.  |
| 01/12/2022 | 1 | 8.2 Use of Rankine’s formula for the following cases (cohesion-less soil only) (i) Backfill with no surcharge  |
| 03/12/2022 | 1 | 8.2 Use of Rankine’s formula for the following cases (cohesion-less soil only) (ii) backfill with uniform surcharge  |
| 13th | 05/12/2022 | 1 | Monthly class test |
| 07/12/2022 | 1 | 9.1 Functions of foundations, shallow and deep foundation, different type of shallow and deep foundations with sketches.  |
| 08/12/2022 | 1 | **9. Foundation Engineering** 9.1 Types of failure (General shear, Local shear & punching shear) |
| 10/12/2022 | 1 | 9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi’s formulae & IS Code formulae for strip, Circular and square footings. |
| 14th | 12/12/2022 | 1 | 9.2 Effect water table on bearing capacity of soil.9.3 Plate load test and standard penetration test. |
| 14/12/2022 | 1 | Problems on Chapter 9 |
| 15/12/2022 | 1 | Problems on Chapter 9 |
| 17/12/2022 | 1 | REVISSION |
| 15th | 19/12/2022 | 1 | REVISSION |
| 21/12/2022 | 1 | REVISSION |
| 22/12/2022 | 1 | REVISSION |