| Lesson plan (for Even-semester as per revised curriculum and study scheme) | | | | |
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| **Name of Faculty** | | **Sandeep Goyal** | | |
| **Discipline** | | **Civil Engineering** | | |
| **Semester** | | **4th (Even- semester)** | | |
| **Subject** | | **SMFE** | | |
| **Lesson Plan** | | **From 15 feb 2024 to 14 June 2024** | | |
| **Work load (Theory)** | | **(03+02)** | | |
| **Week** | **Day** | **Topics** | **No.** | **Practical** |
| 1st | 1 | Importance of Soil Studies in Civil Engineering | 1 | To determine the moisture content of a given sample of soil. |
| | 2 | Geological origin of soils with special reference to soil profiles in India: residual and transported soil, alluvial deposits, lake deposits | | |
| | 3 | Local soil found in Punjab, dunes and loess, glacial deposits, black cotton soils, conditions in which above deposits are formed and their engineering characteristics | | |
| 2nd | 1 | Names of organizations dealing with soil engineering work in India, soil map of India | 2 | Field Density Measurement Sand Replacement. Method |
| | 2 | Physical Properties of Soils ,Constituents of soil and representation by a phase diagram | | |
| | 3 | Definitions of void ratio, porosity, degree of saturation, water content, specific gravity, unit weight, bulk density/bulk unit weight | | |
| 3rd | 1 | Dry unit weight, saturated unit weight and submerged unit weight of soil grains | 3 | Field Density Measurement Sand Replacement method |
| | 2 | Classification and Identification of Soils, Particle size, shape, and their effect on engineering properties of soil, particle size classification of soils | | |
| | 3 | Gradation and its influence on engineering properties , Relative density and its use in describing cohesionless soils | | |
| 4th | 1 | Behaviour of cohesive soils with change in water content, Atterberg's limit - definitions, use and practical significance | 4 | Field Density Measurement Core Cutter Method |
| | 2 | Field identification tests for soils | | |
| | 3 | Flow of Water Through Soils | | |
| 5th | 1 | Concept of permeability and its importance | 5 | Auger Boring and Standard Penetration Test. |
| | 2 | Darcy's law, coefficient of permeability | | |
| | 3 | seepage velocity and factors affecting permeability | | |
| 6th | 1 | Comparison of permeability of different soils as per BIS | 6 | Extraction of Disturbed and Undisturbed Samples. |
| | 2 | Measurement of permeability in the laboratory | | |
| | 3 | Revision | | |
| 7th | 1 | Effective Stress, Stresses in subsoil | 7 | Liquid Limit and Plastic Limit Determination |
| | 2 | Definition and meaning of total stress | | |
| | 3 | effective stress and neutral stress | | |
| 8th | 1 | Principle of effective stress | 8 | Liquid Limit and Plastic Limit Determination |
| | 2 | Importance of effective stress in engineering problems | | |
| | 3 | Meaning, conditions/situations of occurrence with emphasis on practical significance | | |
| 9th | 1 | a) Consolidation and settlement b) Creep | 9 | Mechanical Analysis |
| | 2 | c) Plastic flow d) Heaving | | |
| | 3 | e) Lateral movement f) Freeze and thaw of soil | | |

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| 10th | 1 | Meaning of total settlement, uniform settlement, and differential settlement; rate of settlement and their effects | 10 | Laboratory Compaction Tests (Standard Proctor test) |
| | 2 | Settlement due to construction operations and lowering of water table | | |
| | 3 | Tolerable settlement for different structures as per BIS | | |
| 11th | 1 | Shear Strength of Soil , Concept and Significance of shear strength | 11 | Direct Shear Test. |
| | 2 | Factors contributing to shear strength of cohesive and cohesion less soils, Coulomb's law | | |
| | 3 | Compaction , Definition and necessity of compaction | | |
| 12th | 1 | Laboratory compaction test (standard and modified proctor test as per IS) | 12 | Permeability Tes |
| | 2 | definition and importance of optimum water content, maximum dry density; moisture dry density relationship for typical soils with different compactive efforts | | |
| | 3 | Compaction control; Density control, measurement of field density by core cutter method | | |
| 13th | 1 | sand replacement method, moisture control, Proctor's needle and its use, thickness control | 13 | Demonstration of Unconfined Compression Test |
| | 2 | Soil Exploration , Purpose and necessity of soil exploration | | |
| | 3 | (auger, wash, rotary, percussion to be briefly dealt) | | |
| 14th | 1 | Sampling; undisturbed, disturbed, and representative samples; selection of type of sample; thin wall and piston samples; area ratio, recovery ratio of samples and their significance, number, and quantity of samples, resetting, sealing and preservation of samples. | 14 | Demonstration of Vane shear Test. |
| | 2 | Bearing Capacity of soil , Concept of bearing capacity , Definition and significance of ultimate bearing capacity, net safe bearing capacity and allowable bearing pressure | | |
| | 3 | Factors affecting bearing capacit, Improvement of bearing capacity by sand drain method, compaction, use of geo¬ synthetics. | | |
| 15th | 1 | Concept of shallow and deep foundation, types of shallow foundations: combined, isolated, strip, mat, and their suitability | 15 | File Checking |
| | 2 | Factors affecting the depth of shallow foundations, deep foundation | | |
| | 3 | type of piles and their suitability; pile classification based on material, pile group and pile cap | | |