**Lesson Plan**

**Name of faculty : SAURAV PURI, AP-CIVIL**

**Discipline : CIVIL**

**Semester : 4TH**

**Subject : SOIL MECHANICS**

**Lesson Plan Duration** : **15 weeks (from January, 2018 to April, 2018)**

**Work Load(Lecture/Practical) per week: Lectures: 03 hours, Tutorials: 01hours**

**(in hours) : Practical: 02 hours per group**

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| **Week** | **Theory** | | **Practical** | |
|  | **Lecture day** | **Topic(Including assignment/ test)** | **Practical day** | **Topic** |
| 1st |  | Introduction to soil and rock, Soil Mechanics and Foundation Engineering, | 1 | Visual Soil Classification and water content determination |
|  | origin of soils, weathering, soil formation, major soil deposits of India |
|  | particle size, particle shape, interparticle forces, soil structure, principal clay minerals |
| 2nd |  | Introduction, three phase system, weight-volume relationships, soil grain properties, soil aggregate properties, grain size analysis, sieve analysis | 2 | Determination of specific gravity of soil solids |
|  | sedimentation analysis, grain size distribution curves, consistency of soils, |
|  | consistency limits and their determination, activity of clays, relative density of sands |
| 3rd |  | Purpose of classification, classification on the basis of grain size | 3 | Grain size analysis-sieve analysis. |
|  | classification on the basis of plasticity, plasticity chart, Indian Standard Classification System |
|  | Introduction, Darcy's law and its validity, discharge velocity and seepage velocity |
| 4th |  | factors affecting permeability laboratory determination of coefficient of permeability | 4 | Liquid limit and plastic limit determination |
|  | determination of field permeability, permeability of stratified deposits |
|  | Principle of effective stress, effective stress under hydrostatic conditions, |
| 5th |  | capillary rise in soils | 5 | Proctor's compaction test |
|  | effective stress in the zone of capillary rise, effective stress under steady state hydro-dynamic conditions, seepage force, |
|  | quick condition, critical hydraulic gradient, two dimensional flow, Assignment 1 |
| 6th |  | 1 sectional | 6 | REVISION |
|  | Laplace's equation, properties and utilities of flownet, graphical method of construction of flownets, piping, protective filter. |
|  | Introduction role of moisture and compactive effect in compaction, |
| 7th |  | laboratory determination of optimum moisture content | 7 | 1st Viva Voce |
|  | moisture density relationship |
|  | compaction in field, compaction of cohesionless soils, moderately cohesive soils and clays, field control of compaction |
| 8th |  | Introduction, Boussinesq's equation, vertical stress distribution diagrams, vertical stress beneath loaded areas | 8 | Coefficient of permeability of soils |
|  | Newmark's influence chart, approximate stress distribution methods for loaded areas, |
|  | . Introduction, components of total settlement, consolidation process |
| 9th |  | one-dimensional consolidation test, , | 9 | Unconfined compressive strength test. |
|  | typical void ratio-pressure relationships for sands and clays normally consolidated and over consolidated clays, |
|  | Casagrande's graphical method of estimating pre-consolidation pressure, |
| 10th |  | Terzaghi's theory of one-dimensional primary consolidation | 10 | REVISION |
|  | determination of coefficients of consolidation, consolidation settlement, |
|  | Construction period settlement, secondary consolidation |
| 11th |  | relationship between principal stresses at failure | 11 | 2nd Viva Voce |
|  | shear tests, direct shear test |
|  | unconfined compression test Assignment |
| 12th |  | 2nd Sessional Test | 12 | .Direct shear test on granular soil sample |
|  | triaxial compression tests, drainage conditions and strength parameters |
|  | Vane shear test, |
| 13th |  | shear strength characteristics of sands, normally consolidated clays, over-consolidated clays and partially saturated soils, | 13 | Unconsolidated undrained (UU) triaxial shear test of fine grained soil sample. |
|  | sensitivity and thixotropy |
|  | Introduction, earth pressure at rest |
| 14th |  | Rankine's active & passive states of plastic equilibrium | 14 | REVISION |
|  | Rankine's earth pressure theory |
|  | Coulomb's earth pressure theory |
| 15th |  | Culmann's graphical construction | 15 | 3rd Viva Voce |
|  | Rebhann's construction |
|  | 3rd Sessional Test |