

1. Goetsch D.L., (1999), "Occupational Safety and Health for Technologists, Engineers and Managers", Prentice Hall.
2. Heinrich H.W., (2007), "Industrial Accident Prevention - A Scientific Approach", McGraw-Hill Book Company
3. National Safety Council and Associate (Data) Publishers Pvt. Ltd., (1991), "Industrial Safety and Pollution Control Handbook

Reference Books:

1. Colling D.A., (1990), "Industrial Safety Management and Technology", Prentice Hall, New Delhi.
2. Della D.E., and Giustina, (1996), "Safety and Environmental Management", Van Nostrand Reinhold International Thomson Publishing Inc.

| Course Title: Geotechnical Engineering Lab | | | |
|--|------------------------------------|------------------------|---|
| [As per Choice Based Credit System (CBCS) scheme] | | | |
| SEMESTER: V | | | |
| Subject Code | 15CVL57 | IA Marks | 20 |
| Number of Lecture Hours/Week | 03 (1hr tutorial + 2hr laboratory) | Exam Marks | 80 |
| Total Number of Lecture Hours | 42 | Exam Hours | 03 |
| CREDITS – 02 | | Total Marks-100 | |
| <p>Course Objectives: Provide students with a basic understanding</p> <ul style="list-style-type: none"> • To carry out laboratory tests and to identify soil as per IS codal procedures • To perform laboratory tests to determine index properties of soil • To perform tests to determine shear strength and consolidation characteristics of soils | | | |
| Modules | | Teaching Hours | Revised Bloom's Taxonomy (RBT) Level |
| 1. Visual soil classification. Water content determination by oven drying method and infrared moisture method. Specific gravity test (pycnometer and density bottle method). | | 6 Hours | L1, L2 |
| 2. Grain size analysis <ol style="list-style-type: none"> i. Sieve analysis ii. Hydrometer analysis | | 3 Hours | L1, L2 |
| 3. In-situ density tests <ol style="list-style-type: none"> i. Core-cutter method ii. Sand replacement method | | 3 Hours | L1, L2 |

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| 4. Consistency limits i. Liquid limit test (by Casagrande's and cone penetration method) ii. Plastic limit test iii. Shrinkage limit test | 3 Hours | L1, L2 |
| 5. Standard compaction test (light and heavy compaction) | 3 Hours | L1, L2 |
| 6. Co-efficient of permeability test i. Constant head test ii. Variable head test | 3 Hours | L1, L2 |
| 7. Shear strength tests i. Unconfined compression test ii. Direct shear test iii. Triaxial test (undrained unconsolidated) | 9 Hours | L1, L2 |
| 8. Consolidation test : Determination of compression index and co-efficient of consolidation | 3 Hours | L1, L2 |
| 9. Laboratory vane shear test | 3 Hours | L1, L2 |
| 10. Demonstration of Swell pressure test, Standard penetration test and boring equipment | 6 Hours | L1, L2 |

Course Outcomes: Students will be able to conduct appropriate laboratory/field experiments and interpret the results to determine

1. Physical and index properties of the soil
2. Classify based on index properties and field identification
3. To determine OMC and MDD, plan and assess field compaction program
4. Shear strength and consolidation parameters to assess strength and deformation characteristics
5. In-situ shear strength characteristics (SPT- Demonstration)

Reference Books:

1. Punmia B C, Soil Mechanics and Foundation Engineering- (2017), 16th Edition, Laxmi Publications co., New Delhi.
2. Lambe T.W., "Soil Testing for Engineers", Wiley Eastern Ltd., New Delhi.
3. Head K.H., "Manual of Soil Laboratory Testing" Vol. I, II, III, Princeton Press
4. Bowles J.E., "Engineering Properties of Soil and Their Measurements", - McGraw Hill Book Co. New York.
5. Relevant BIS Codes of Practice: 2720(Part-3/Sec. 1) – 1987; IS 2720 (Part – 2)- 1973; IS 2720 (Part – 4) – 1985; IS 2720 (Part – 5) – 1985; IS 2720 (Part – 6) – 1972; IS 2720 (Part – 7) – 1980; IS 2720 (Part – 8) – 1983; IS 2720 (Part – 17) – 1986; IS 2720 (Part - 10) – 1973; IS 2720 (Part – 13) – 1986; IS2720 (Part 11) – 1971; IS2720 (Part 15) – 1986; IS 2720 (Part 30) – 1987; IS 2720 (Part 14) – 1977; IS 2720 (Part – 14) – 1983; IS 2720 (Part – 28) – 1974; IS 2720 (Part – 29) – 1966, IS 2720 (Part-60) 1965.