**17CE3102 – FOUNDATION ENGINEERING**

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| **Course Category** | Professional Core | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 2 - 2 - 0 |
| **Prerequisite** | Soil Mechanics | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To analyse slope stability of finite and infinite slopes. 2. To explain various types of earth pressure in various soils under different types of loading. 3. To demonstrate stability of retaining walls. 4. To study the bearing capacity of shallow foundations. 5. To understand design of pile foundation and characteristics of well foundation. 6. To study the various methods of site exploration and site investigation reports. | |
| **Course Outcomes** | CO1 | Analyse finite and infinite slopes. |
| CO2 | Calculate earth pressure in various soils under different types of loading. |
| CO3 | Analyse stability of retaining walls. |
| CO4 | Calculate bearing capacity of shallow foundations. |
| CO5 | Calculate pile load capacities of individual piles and pile groups. |
| CO6 | Understand the various methods of site exploration and write site investigation reports. |
| **Course Content** | **UNIT – I**  **STABILITY OF SLOPES:** Stability analysis of infinite slopes – Stability analysis of finite slopes – Swedish circle method – Friction circle method – Tailor’s stability number and use of charts – Improving stability of slopes, Bishop’s method.  **UNIT – II**  **EARTH PRESSURES:** Earth pressure theories of lateral earth pressure – Active and passive earth pressures in cohesion less and cohesive soils (with and without surcharge) – Rankine’s and Coulomb’s earth pressure theories.Graphical methods due to Rebhann and Culmann.  **UNIT – III**  **EARTH RETAINING STRUCTURES:** Types of retaining structures – Stability consideration of gravity and cantilever retaining walls – Drainage in retaining walls – Joints in retaining walls  **UNIT – IV**  **BEARING CAPACITY OF SHALLOW FOUNDATIONS :** Types of foundations – Depth of foundation – Terzaghi’s bearing capacity equation – Bearing capacity of square, square, circular, rectangular and continuous footings – Meyerhof’s theory – Skempton’s method – Brinch Hansen’s method – Effect of ground water table on bearing capacity – Bearing capacity from building codes - Types of settlements – Tolerable settlements – Settlement analysis.  **UNIT – V**  **PILE FOUNDATIONS:** Classification of piles – Pile driving – Load carrying capacity of piles – Dynamic formulae – Static formulae – pile load tests – In situ penetration tests – Group action of piles – Negative skin friction.  **WELL FOUNDATIONS:** Types – Different shapes of wells – Components of wells – Functions – Sinking of wells – Tilts and shifts.  **UNIT – VI**  **SITE INVESTIGATIONS AND SUB-SOIL EXPLORATION:** Site reconnaissance – Depth of exploration – Lateral extent of exploration – Test pits – Auger borings – Wash borings – Soil sampling – Split – spoon sampler – Penetration tests – Geophysical methods – Seismic refraction and electrical resistivity methods – Sub soil investigation reports. | |
| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. Soil Mechanics and Foundation Engineering by K.R.Arora. 2. Geotechnical Engineering by C. Venkatramaiah. 3. Soil Mechanics and foundation engineering by P.N. Modi. 4. Soil Mechanics & Foundation Engineering by Gopalrao & Ranjan.   **REFERENCE BOOKS:**   1. Analysis and design of foundations and retaining structures by Shamsher Prakash, Gopal Ranjan & Swamisaran. 2. Soil Mechanics & Foundation Engg. byV.N.S.Murthy. 3. Foundation Engineering by Teng. | |