**Soil Mechanics 1**

**Course Description Form**

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| 1. Course Name: | | | | | | | | |
| Soil Mechanics 1 | | | | | | | | |
| 1. Course Code: | | | | | | | | |
| CE3103 | | | | | | | | |
| 1. Semester / Year: | | | | | | | | |
| First semester / Third year | | | | | | | | |
| 1. Description Preparation Date: | | | | | | | | |
| 1/10/2024 | | | | | | | | |
| 1. Available Attendance Forms: | | | | | | | | |
| In class | | | | | | | | |
| 1. Number of Credit Hours (Total) / Number of Units (Total) | | | | | | | | |
| The. 2 hr Pract. 2 hr Tut.1 hr / 3 Units | | | | | | | | |
| 1. Course administrator's name (mention all, if more than one name) | | | | | | | | |
| Name: Dr. Lubna Abdulrahman Khdier  Email: lubna.abddulrahman@muc.edu.iq | | | | | | | | |
| 1. Course Objectives | | | | | | | | |
| **Course Objectives** | | | | 1. Understanding Soil Formation: The course aims to provide students with a deep understanding of the process of soil formation, including the geological, environmental, and biological factors influencing it. 2. Soil Classification: The course intends to familiarize students with soil classification methods and explain their importance in civil engineering, including the geographical, physical, and structural composition of soil. 3. Comprehending Soil Compaction: The course aims to explain the process of soil compaction, methods of measurement, and its impact on the strength and stability of foundations and structures. 4. Studying Permeability: The course aims to understand the concept of permeability in soil and its effect on water drainage and its utilization in engineering design. 5. Analyzing Seepage: The course aims to clarify the process of water seepage in soil and its effect on the stability of land and structures, including calculation methods and evaluation. | | | | |
| 1. Teaching and Learning Strategies | | | | | | | | |
| **Strategy** | | 1. Lectures: Traditional classroom lectures will be used to deliver theoretical concepts, principles, and fundamental theories related to soil mechanics. These lectures will provide a foundational understanding of the subject matter. 2. Practical Demonstrations: Hands-on practical demonstrations will complement theoretical learning. Students will have the opportunity to observe soil samples, testing procedures, and equipment used in soil mechanics analysis, enhancing their comprehension of key concepts. 3. Laboratory Sessions: Laboratory sessions will allow students to conduct experiments and tests on soil samples, applying theoretical knowledge to practical scenarios. This hands-on experience will deepen understanding and develop skills in soil testing and analysis. 4. Group Discussions: Group discussions and problem-solving activities will encourage active participation and engagement among students. Collaborative learning will foster critical thinking and problem-solving skills as students work together to analyze and solve soil mechanics problems. 5. Multimedia Resources: Utilization of multimedia resources such as videos, simulations, and interactive presentations will cater to diverse learning styles and reinforce key concepts covered in lectures and readings. 6. Assignments and Projects: Assignments and projects will be assigned to students to apply their understanding of soil mechanics principles to practical problems. These tasks will encourage independent research, critical analysis, and application of theoretical knowledge. | | | | | | |
| 1. Course Structure | | | | | | | | |
| **Week** | **Hours** | | **Required Learning Outcomes** | | **Unit or subject name** | | **Learning method** | **Evaluation method** |
|  | 5 | | * Understand the geological processes and environmental factors involved in soil formation, such as weathering, erosion, and biological activity. * Identify the different soil horizons and their characteristics formed during the soil formation process. * Explain the significance of soil formation in land development, agriculture, and environmental sustainability. | | Soil Formation | | 1. Interactive Learning 2. Experimental Learning 3. Collaborative Learning 4. Technology-enhanced 5. Learning Problem-based Learning | Several Ways (Exams + Assignments) |
|  | 5 | | Soil Formation | | Several Ways (Exams + Assignments) |
|  | 5 | | Soil Formation | | Several Ways (Exams + Assignments) |
|  | 5 | | * Describe the various soil classification systems used in geotechnical engineering, such as the Unified Soil Classification System (USCS) or the AASHTO Soil Classification System. * Classify soils based on their physical and engineering properties, including grain size distribution, consistency, and plasticity. * Interpret soil classification charts and tables to determine soil types and their engineering behavior. | | Soil Classifications | | Several Ways (Exams + Assignments) |
|  | 5 | | Soil Classifications | | Several Ways (Exams + Assignments) |
|  | 5 | | * Understand the concept of soil compaction and its importance in construction projects to improve soil stability and bearing capacity. * Explain the factors influencing soil compaction, including moisture content, compaction energy, and soil type. * Perform laboratory and field tests to assess soil compaction levels and determine optimum compaction parameters for different soil types | | Soil Compaction | | Several Ways (Exams + Assignments) |
|  | 5 | | Soil Compaction | | Several Ways (Exams + Assignments) |
|  | 5 | | Soil Compaction | | Several Ways (Exams + Assignments) |
|  | 5 | | * Define permeability and understand its significance in groundwater flow, drainage systems, and environmental engineering. * Describe the factors affecting soil permeability, such as soil particle size, soil structure, and compaction. * Calculate permeability coefficients using laboratory methods and empirical equations, and analyze their implications for engineering design. | | Permeability | | Several Ways (Exams + Assignments) |
|  | 5 | | Permeability | | Several Ways (Exams + Assignments) |
|  | 5 | | Permeability | | Several Ways (Exams + Assignments) |
|  | 5 | | * Explain the mechanisms of water seepage through soil, including Darcy's Law and flow nets. * Analyze seepage problems in soil structures, such as dams, retaining walls, and foundations, and assess their stability. * Apply seepage control measures and drainage techniques to mitigate the adverse effects of water infiltration on soil stability and infrastructure performance. | | Seepage | | Several Ways (Exams + Assignments) |
|  | 5 | | Seepage | | Several Ways (Exams + Assignments) |
|  | 5 | | Seepage | | Several Ways (Exams + Assignments) |
|  | 5 | | Seepage | | Several Ways (Exams + Assignments) |
| 1. Course Evaluation | | | | | | | | |
| 1. Final Exam: 50% 2. Monthly Exams: 20% 3. Reports and Assignments: 15% 4. Attendance and Daily Participation: 10% 5. Oral Evaluation: 5% | | | | | | | | |
| 1. Learning and Teaching Resources | | | | | | | | |
| Required textbooks (curricular books, if any) | | | | | | PRINCIPLES OF GEOTECHNICAL ENGINEERING Das, Braja M | | |
| Main references (sources) | | | | | | Soil Mehanics  T. William **Lambe**, Robert V. Whitman | | |
| Recommended books and references (scientific journals, reports...) | | | | | |  | | |
| Electronic References, Websites | | | | | |  | | |