

REPUBLIC OF UZBEKISTAN
MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATIONS
FERGANA STATE TECHNICAL UNIVERSITY

Soil mechanics, floors and foundations

MODULE HANDBOOK

Field of knowledge:	700000	- Engineering and construction industries
Field of Education:	730 000	- Architecture and construction
Educational Program:	60730300	- Civil Engineering

Module title	<i>Soil mechanics, floors and foundations</i>
Code (if available)	<i>MechG1M56, MechG2M66</i>
Semester(s) of module teaching	<i>5, 6</i>
Responsible for the module	<i>Maksimov Qosimkhon Ibayevich, Department of Civil Engineering, Ph.D., Associate Professor Khamitov Rasul Khasankhon oly, Assistant Professor, Department of Civil Engineering</i>
Language of instruction	<i>Uzbek, Russian</i>
Connection to the curriculum	<i>Compulsory</i>
Teaching methods	<i>lecture, practical training, independent study.</i>
Study load (including classroom and independent study hours)	<i>Total hours: 360 hours Auditorium hours: 144 hours Lectures – 60 hours, practical training – 72 hours, laboratory training – 12 hours, independent study 216 hours.</i>
Credit units	12
Required and recommended prior knowledge for studying the module	<i>Engineering Geology, Geodesy, Construction Mechanics, Construction Materials</i>
Module objectives/intended learning outcomes	<i>The purpose of the module:</i> The purpose of teaching the subject “Soil Mechanics, Grounds and Foundations” is to familiarize students with the basics of the science of the ground and foundations, which are the main part of any structure, which play a key role in ensuring its stability and long-term operation. At the same time, the student will develop knowledge and skills in the design of technically sound, economically efficient ground and foundation structures, taking into account complex engineering geological conditions. To teach students modern methods of designing and calculating the ground and foundation of a structure and to develop skills for independent practical application. To achieve the above goal, the subject performs the tasks of providing students with theoretical knowledge, practical skills, a methodological approach to mastering the design processes of ground and foundations, and forming a scientific worldview. The following requirements are imposed on the knowledge, skills and skills of students in the subject. The student: soil structure and composition, soil construction properties, soil massif stress-deformation state, soil calculation and types of soil and foundations. solve problems of basic soil mechanics and coefficients characterizing them, selection of alternative forms of soil and foundations; know how to choose their devices using progressive methods of soil and foundation calculation; determine the physical and mechanical properties of soils, calculate stresses and stress-deformation state in soils, design and calculate various foundations using regulatory documents and literature, and have the skills to calculate soil and foundations using electronic calculators; stages of soil deformation in a stressed state; Must have the skills to thoroughly understand the strength and stability of soils and their pressure on retaining walls, independently correctly assess the engineering and geological conditions of the construction site, select alternative types of soil and foundations,

	<i>apply the latest (convenient) methods of calculating and designing soil foundations, and improve their construction.</i>
Content	Module 1. Soil mechanics. Introduction. Formation of soils and their constituents. Physical, mechanical and strength properties of soils. Compaction, Coulomb and Darcy's laws. Module 2. Stress states of the soil of a structure Stress of the soil layer and its dependence on the bearing capacity of the soil, spatial problems of stress, the problem of stress in the plane, stress on the soil surface, stress due to the specific gravity of the soil. Theory of the upper equilibrium state of the soil, Stability of the soil layer and the theory of soil pressure against the pile wall. Module 3. Settlement of structures and its calculation Deformation modulus (E_0), Poisson (μ) and lateral pressure (ζ) coefficients. Methods for determining the amount of settlement, small layers and equivalent layer methods, duration of settlement, continuous settlement of clay soils Module 4. Grounds and foundations. Engineering geological and hydrogeological surveys at the construction site, foundations and foundations design basics, materials required for foundation design, foundation depth determination, types of foundations. Foundation calculation based on the deformation of the ground at the highest stress state. Foundation calculation based on the bearing capacity of the ground Module 5. Calculation of shallow foundations Calculation of single foundations under central load. Calculation of flexible foundations under central load. Calculation of single foundations under non-central load. Calculation of foundations of buildings with basements Module 6. Pile and deep foundations. Types of pile foundations, areas of application, installation, calculation and design of pile foundations. Deep foundations. Submersible wells, thin shells, caisson foundations. Module 7. Methods of artificial strengthening of loose soils. Repair of floors and foundations. Replacement of loose soils. Soil compaction methods. Soil hardening methods. Methods of repairing soils and foundations, installing foundations near existing structures. Module 8. Designing foundations in highly subsiding soils and in seismic areas. Highly subsiding soil indices, foundations design basics. Calculation and design of seismic soils. Foundations of machines and equipment that transmit vibrational motion
Forms of assessment	oral, presentation, written work, practical assignments, and final exams.
Requirements for study and assessment	To successfully complete the module, the student must attend classes and achieve the minimum scores in the current, intermediate and final assessments.

Bibliography	1. Rasulov H.Z. Soil mechanics, soil and foundations (Second edition). Tashkent "Tafakkur" publishing house, 2010. - 231 p 2.. N.D. Kayumov. Soil science textbook (528K -17) Tashkent "Cholpon" publishing house 2012-144 3. Maksimov Q., Ma'rupov A. Theoretical soil mechanics. Textbook., Translation. N2023y, (D. Columbas "A Primer on Theoretical Soil Mechanics" University Printing House, Cambridge CB2 8BS, United Kingdom One Liberty Plaza, 20th Floor, New York, NY 10006, USA) ., 231 p. 4. N.D. Teshaboyeva . Soil mechanics, soil and foundations. – Tashkent: Navroz, 2020. 142 p. 5. M. Mirzaakhmedov - Calculation of soil and foundations. Textbook, Tashkent State University of Applied Sciences. Tashkent, 1991. - 84 p. 6. Maksimov K.I., Khamitov R. Methodological guide for practical work on the subject "Soil mechanics, soil and foundations". FarPI, 2024, 47 p. 7. Maksimov Q.I. Methodological guide for completing a course project on the subject "Soil and foundations". Fergana-2023-67 p. 8. Maksimov Q.I., Turdiqulov Kh., Numonov J.O. Soil and foundations. Textbook. Fergana, FarPI, 2023., 67b 9. SHNK 1.02.09-21. Engineering geological research for construction. Tashkent, 2021 10. SHNK 2.01.01-22 Climatic and physical-geological data for design Tashkent, 2023 11. KMK 2.01.03-19 Construction in seismic areas. Tashkent, 2023 12. SHNK 2.02.01-19 Foundations of buildings and structures Tashkent, 2019 13. SHNK 2.03.01-24 Concrete and reinforced concrete structures Tashkent, 2024 14. Buzrukov Z. Calculation of soil and foundations. Tashkent, "UAZHBNT" Center, 2004. 15. Dalmatov B.I. Mechanical engineering, foundations and fundamentals. M.: Stroyizdat, 1990
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