Course Title	Geotechnical and Engineering Geology (ECTS 4)
Course/Module Code	GMG2304
Semester(s) in Which the Course Is Taught	Semesters 3
Assigned Instructor	Kasimova Dilrabo, Associate Professor
Language of Instruction	Uzbek
Course Type	Compulsory
Study Hours (Including Independent Study)	**Total: 120 hours** **Classroom instruction: 48 hours** Lectures: 24 hours Laboratory classes: — Practical classes: 24 hours **Independent study: 72 hours**
ECTS Credits	4
Course Aim, Objectives and Learning Outcomes	**The aim of the course** To provide students with fundamental knowledge regarding minerals, rocks, and the physical and mechanical properties, types, and classification of soils (grounds), as well as the impact of groundwater and filtration processes on geotechnical structures **The objectives of the course** are to provide students with knowledge of: - the content and tasks of engineering geology; - physical and mechanical properties of minerals, rocks, and soils; - classification and types of rocks and soils; - groundwater and filtration processes; - internal and external dynamic processes and their causes; - geosynclines and their types; -origin of tectonic movements; - hydrogeology and groundwater; Learning Outcomes: 1. Forms theoretical knowledge, practical skills, and independent working competencies regarding soils in students. As a result, the student acquires the ability to ensure quality, control, analyze, and solve problems in road construction. 2.Performing basic geological measurement work during geological prospecting and design work, and taking into account the requirements imposed on the field of geology. 3.The student must have knowledge of the current state and development prospects of the industry and the specific features of their application. 4.The student must have knowledge of the current state and development prospects of the industry and the specific features of their application. 5.Evaluating the quality of materials and structures used in construction, analyzing quality problems at geological sites and developing corrective measures. 6.Physical and mechanical properties, types, and classification of soils; their working conditions and calculation methods. 7.Physical and mechanical properties, types, and classification of soils; their working conditions and calculation methods. 8.To give an understanding of the physical and mechanical properties, types, and classification of minerals, rocks, and soils, and the impact of

	groundwater and filtration processes on geotechnical structures.
Course Content (Topics)	I. MAIN THEORETICAL PART (LECTURES) Topic 1: Purpose and tasks of the subject of geotechnical and engineering geology. Topic 2: Structure of the Earth's crust and geological layers. Topic 3: Origin of minerals and rocks. Topic 4: Origin, mineralogical, and chemical composition of magmatic rocks. Topic 5: Sedimentary rocks, their classification, formation conditions, and construction properties. Topic 6: Metamorphic rocks, their construction properties, and metamorphism processes. Topic 7: Internal dynamic processes of the Earth, tectonic movements, and earthquakes. Topic 8: External dynamic processes of the Earth (weathering, karst, suffosion, collapse, landslide, and rockfalls). Topic 9: Origin, types, physical properties, and chemical composition of groundwater. Topic 10: Composition and classification of soils. Topic 11: Quaternary deposits. Geological timeline. Geological mapping and profiles. Topic 12: Engineering-geological prospecting work. II. GUIDELINES AND RECOMMENDATIONS FOR LABORATORY CLASSES Laboratory classes are not included in the curriculum. III. GUIDELINES AND RECOMMENDATIONS FOR PRACTICAL CLASSES Preparation for practical classes begins with the instructor’s review of the initial documents (curriculum, thematic plan, etc.) and concludes with the preparation of a lesson plan. Recommended practical topics: 1. Familiarization with the physical properties of rock-forming minerals. 2. Study of the crystal structures of minerals. 3. Study of engineering-geological properties of igneous rocks. 4. Study of engineering-geological properties of metamorphic rocks 5. Study of engineering-geological properties of sedimentary rocks. 6. Engineering-geological properties of Quaternary deposits. 7. Compilation of a groundwater distribution map for hydrogeological zoning. 8. Determination of physical properties of soils through calculation methods. 9. Granulometric composition and properties of soils. 10. Mechanical properties of soils. 11. Determination of water in soils and its bonding forms. 12. Processing of engineering-geological survey materials and report preparation

	IV. INDEPENDENT STUDY AND SELF-DIRECTED WORK Independent learning helps students develop the ability to improve themselves independently and contributes to increasing the effectiveness of their professional activities. Students complete independent assignments on their mobile devices, under the instructor's guidance, either in traditional or electronic format. Recommended topics for independent study: 1. The great contribution of Uzbek scientists to the development of engineering geology. 2.Main forms and types of relief. 3.Jointing of rock masses and their classification. 4. Types, classification, and description of water in soils 5.Mechanical properties of soils. 6.Groundwater and its formation. 7. Regime of groundwaters and showing them on hydrogeological maps and sections 8.Classification of Quaternary deposits. 9.Loess and loess-like rocks and their properties. 10.Engineering-geological prospecting work in the construction of buildings and hydraulic structures 11.Seismic phenomena and earthquakes. Earthquakes and their origin, types 12.Engineering-geological features of Quaternary deposits 13.Geological maps and conventional symbols 14.Determining the hydrogeological conditions of the area 15.Compiling a groundwater location map for hydrogeological zoning 16.Engineering-geological surveying work 17.Independent laboratory work and analysis of results 18.Engineering-geological features of Quaternary deposits
Student Assessment	Student assessment is based on the level of mastery of the learning materials during the semester and final assessment, as demonstrated through tests, assignments, and written and oral work. Throughout the course "Assessment of the Technical Condition of Buildings and Structures," students are assessed on a 100-point scale. Of these, 50 points are allocated to current and midterm assessment (60% of these 50 points for ongoing assessment and independent study, and 40% for midterm assessment), while the remaining 50 points are allocated to the final assessment. Students whose combined current and midterm assessment score is below 30 points are not admitted to the final examination. A student who scores 30 points or more in the final assessment is considered to have successfully completed the course.
Examination Requirements	Students must fully master the theoretical and practical concepts covered in the topics and be able to present the results of their analyses accurately. Students must complete the assignments given for independent work and the current and midterm assessment components. They must also obtain the required number of points in current assessment, midterm assessment, independent study and final assessment for the course within the specified period. A student who fails to submit current assessment, midterm assessment or independent study assignments, or who scores fewer than 30 points for these assignments and assessment components, is not admitted to the final assessment. Furthermore, a student who is absent without a valid reason for 25% or more of the classroom hours allocated to the course will be withdrawn from the course, will not be admitted to the final examination, and will be considered not to have earned the relevant credits for the course.

	A student who fails the final examination or scores between “0 and 29.9” in this examination is considered to have an academic debt.
Recommended Literature	1.Kasimova D. P. *Injenerlik geologiyasi* (Engineering Geology). Textbook. – T.: Uzbekistan, 2024. – 204 p. 2. Zafarov O. *Geotexnika muhandisligi* (Geotechnical Engineering). Textbook. – T.: Tashkent Publishing, 2026. – 260 p. 3.Rasulov H. Z. *Gruntlar mexanikasi, zamin va poydevorlar* (Soil Mechanics, Subgrades, and Foundations). Textbook. – T.: Tafakkur 2nd Edition, 2017. – 342 p. 4.Kasimova D. P. *Injenerlik geologiyasidan amaliy mashg‘ulotlar* (Practical Classes in Engineering Geology). Study guide. – Tashkent, 2021. – 157 p. 5. Kayumov A. D. *Geologiya va gruntshunoslik* (Geology and Soil Science). Textbook. – Tashkent, 2016. – 169 p. 6. *International Journal of Geotechnical Engineering*, Elsevier, 2022. 7. *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, 2022. 8. Geoengineer.org – Collection of geotechnical engineering resources and practical issues. 9. https://my.gov.uz/oz – Official website of the Unified Interactive State Services Portal of the Republic of Uzbekistan.