

| STUDY MODULE DESCRIPTION FORM | | |
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| Name of the module/subject Stenghtening of the substrate | | Code 1010125111010106029 |
| Field of study Structural Engineering | Profile of study (general academic, practical) (brak) | Year /Semester 1 / 1 |
| Elective path/specialty Road-Train Engineering | Subject offered in: Polish | Course (compulsory, elective) obligatory |
| Cycle of study: Second-cycle studies | Form of study (full-time,part-time) part-time | |
| No. of hours Lecture: - Classes: 9 Laboratory: - Project/seminars: - | | No. of credits 1 |
| Status of the course in the study program (Basic, major, other) (brak) | | (university-wide, from another field) (brak) |
| Education areas and fields of science and art | | ECTS distribution (number and %) |
| Responsible for subject / lecturer: Andrzej T.Wojtasik email: andrzej.wojtasik@put.poznan.pl tel. 61 665-2429 Civil Engineering Piotrowo5, Poznan | | |
| Prerequisites in terms of knowledge, skills and social competencies: | | |
| 1 | Knowledge | Basic theoretical mechanics. Engineering geology. Basic physics and mathematics. Soil mechanics I degree. |
| 2 | Skills | Basic mathematical calculations. Basic structural design. Stress analysis in different soil conditions. Settlement and consolidation analysis. |
| 3 | Social competencies | The need to constantly update and supplement knowledge and skills. |
| Assumptions and objectives of the course: The course aims to familiarize students with modern foundation methods applied in civil and structural engineering. Students learns about specific application of different foundation and soil improvement techniques. Design of deep pile foundations is executed individually by students, in order to acquire practical skills. | | |
| Study outcomes and reference to the educational results for a field of study | | |
| Knowledge: | | |
| 1. Knowledge on soil- bearing capacity for direct and deep foundations. - [-K W 01-03] 2. Knowledge on stress, compressibility, shear strength, lateral earth pressure in soil. - [-K W 01-03] 3. Knowledge on special foundation techniques and methods. - [-K W 01-03] 4. Knowledge on soil improvement techniques and methods. - [-K W 01-03] | | |
| Skills: | | |
| 1. Calculation of stresses and deformations in soil mass. - [-K U 01 03] 2. Calculation of bearing capacity of direct and deep foundations. - [-K U 01 03] 3. Calculations of soil improvement. - [-K U 01 03] 4. Design of soil improvement. - [-K U 01 03] | | |
| Social competencies: | | |
| 1. Student understands the need of lifelong learning, is able to organize the learning process of others. - [[K 2 W02, K 2 W03] 2. Student correctly identifies and resolves problems associated with his profession. - [K 2 W07] 3. Student is able to cooperate and work in teams and groups. - [[K 2 W01, K 2 W06] | | |

| Assessment methods of study outcomes | | |
|---|----------------------|------|
| <p>-Deep foundation exercise: design and calculations of a pile foundation. -Direct shear laboratory test Report. -Final evaluation of tutorials and lectures - test in week 14. Evaluation of the course: [%] (grade) 100- 91 A excellent 90- 75 B very good 74- 65 C good 64- 51 D sufficient < 50 E failed</p> | | |
| Course description | | |
| <p>-1.Definition of geotechnics. Geotechnical engineering vs. soil mechanics. General information on the subject of geotechnical engineering. Presentation of the engineering application of geotechnics. 2.Fundamentals of soil mechanics. Basic soil properties. Shear strength of soils. Compression and consolidation. 3.Foundation engineering. Bearing capacity. Settlement analysis. 4.Direct/shallow and deep foundations. 5.Soil improvement techniques and design. 6.Case studies I.</p> | | |
| Basic bibliography: | | |
| <p>1. Ground Improvement. Sven Hansbo. Geoforum, 2004. 2. Ground Improvement. Third edition. Klaus Kirsh and Alan Bell. CRS Press 2013. 3. Ground Improvement. Sven Hansbo. Geoforum, 2004. 4. Ground Improvement. Third edition. Klaus Kirsh and Alan Bell. CRS Press 2013.</p> | | |
| Additional bibliography: | | |
| Result of average student's workload | | |
| Activity | Time (working hours) | |
| 1. Participation in lectures | 9 | |
| 2. Participation in tutorials | 5 | |
| 3. Individual work at home | 4 | |
| Student's workload | | |
| Source of workload | hours | ECTS |
| Total workload | 14 | 2 |
| Contact hours | 9 | 1 |
| Practical activities | 5 | 1 |