

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Special foundations</b>		Code <b>1010102121010126022</b>
Field of study <b>Civil Engineering Second-cycle Studies</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>1 / 2</b>
Elective path/specialty <b>Bridges and Underground Engineering</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>15</b>		No. of credits <b>3</b>
Status of the course in the study program (Basic, major, other) <b>major</b>		(university-wide, from another field) <b>from field</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>3 100%</b> <b>3 100%</b>
<b>Responsible for subject / lecturer:</b>  dr inż. Mieczysław Kania email: mieczyslaw.kania@put.poznan.pl tel. 61 665 2 128 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Physics, Mathematics, Theory of Elasticity and Plasticity (a first/second degree level) Engineering Geology, Soil Mechanics. Foundation Engineering (a first degree level)
2	<b>Skills</b>	creation of the computational models of subsoil on the base of geotechnical data use of CAD software packages and spreadsheets design of footings and strip foundations in simple geotechnical conditions the proper use of Polish language
3	<b>Social competencies</b>	the need to continuously update and supplement knowledge and skills.
<b>Assumptions and objectives of the course:</b> The course aims to familiarize students with modern foundation methods applied in structural engineering. Students learn about: design of specific application of different foundation solutions in complex geotechnical conditions, with special attention to deep foundations, soil improvement techniques and soil modification with the use of geosynthetics Design of deep pile foundations is executed individually by students, in order to acquire practical skills.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Knowledge on special foundation techniques and methods; - [[K W 01-03, K_W15]] 2. Knowledge on soil improvement and modification technologies and methods; - [[K W 01-03]] 3. Knowledge on rules, codes and methods of analysis of soil bearing capacity and deformation states for shallow and deep foundations - [[K W 01-03]]		
<b>Skills:</b>		
1. Correct identification of engineering problems associated with ?soil-structure? interaction; - [[K U 01, 03]] 2. Analysis of bearing capacity and deformations in multilayered subsoil; - [[K U 01, 03]] 3. Geotechnical design of shallow and pile foundations, in complex geotechnical conditions; - [[K U 01, 03, KU_15]] 4. Design of ground improvement, in complex geotechnical conditions; - [[K U 01, 03]]		
<b>Social competencies:</b>		
1. Student is able to cooperate and work in teams; - [[K_K01] ] 2. Student understands the need of continuous learning and is able to organize the learning process of others; - [[K_K03, K_K06]]		

<b>Assessment methods of study outcomes</b>		
Deep foundation exercise: design and calculations of a pile foundation and ground improvement or reinforcement Final evaluation of lectures and classes - test in week 14.		
<b>Course description</b>		
<p>Methods of in situ geotechnical investigations and interpretation of their results            Computer methods in geotechnical design and soil-structure interaction analyses            Advanced foundation technologies in complex geotechnical and loading conditions ? deep foundations and ground improvement            Applications of geosynthetics and other ?untypical? materials to modification, reinforcement and improvement of soils.            Deep excavations and foundation works in urban environments, ground movements during excavation and stability problems of nearby buildings, utilities and streets            Geotechnical design of shallow foundations in complex geotechnical conditions (layered soils, soft soils, expansive soils, glaciectonically disturbed soils)            Geotechnical design of ground improvement and pile foundations in structural engineering            Construction failures and disasters caused by geotechnical reasons ? discussion of case studies            Modern methods of geotechnical measurements and monitoring ? requirements and real examples of application</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Siemińska-Lewandowska A.: Głębokie wykopy. Projektowanie i wykonawstwo, WKŁ, Warszawa 2010</li> <li>2. Gwizdała K.: Fundamenty palowe. Technologie i obliczenia, PWN, Warszawa 2010</li> <li>3. Bzówka J., Knapik K., Juzwa A., Stelmach K.: Geotechnika komunikacyjna, Wydawnictwo Politechniki Śląskiej, Gliwice 2013</li> <li>4. Jaromiński A.: Lekkie konstrukcje oporowe, Wydawnictwo Komunikacji i Łączności, Warszawa 2002</li> <li>5. Pisarczyk St.: Geoinżynieria. Metody modyfikacji podłoża gruntowego, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005</li> <li>6. Stilger-Szydło E.: Posadowienia budowli infrastruktury transportu lądowego: teoria, projektowanie, realizacja, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2005</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Wilun Z.: Zarys geotechniki, WKiŁ, Warszawa 2010 i późniejsze wydania.</li> <li>2. Rybak Cz., Puła O., Sarniak W.: Fundamentowanie, Projektowanie posadowień, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2009 i późniejsze wydania.</li> <li>3. Obyrcki M., Pisarczyk St.: Wybrane zagadnienia z fundamentowania. Przykłady obliczeń, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1998.</li> <li>4. Grabowski Z., Pisarczyk St., Obyrcki M.: Fundamentowanie, Oficyna Wyd. PW, Warszawa 1999.</li> <li>5. Jeż J.: Biogeotechnika, Wyd. Politechniki Poznańskiej, Poznań 2008</li> <li>6. Wysokiński L., Kotlicki W., Godlewski T.: Projektowanie geotechniczne według Eurokodu 7, Wydawnictwo ITB, Warszawa 2011</li> <li>7. Puła O.: Projektowanie fundamentów bezpośrednich według Eurokodu 7, Dolnośląskie Wydawnictwo Edukacyjne, Wyd. 2., Wrocław 2012</li> <li>8. Dąbska A., Gołębiowska A.: Podstawy geotechniki. Zadania według Eurokodu 7, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2012</li> <li>9. Uwaga: aktualne dane bibliograficzne podstawowych norm, aktów prawnych, instrukcji, wytycznych i poradników będą przekazywane studentom w toku zajęć.</li> </ol>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Participation in lectures, classes and tutorials	35	
2. Individual work at	45	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	75	3
Contact hours	30	2
Practical activities	45	1