

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Underground Structures		Code 1010102111010120210
Field of study Civil Engineering Second-cycle Studies	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Bridges and Underground Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: 1		No. of credits 2
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 technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: Wojciech Siekierski email: Wojciech.Siekierski@put.poznan.pl tel. 0-61 6653413 Budownictwa i Inżynierii Środowiska ul. Piotrowo 5, 61-138 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Strength of materials, structural mechanics, concrete structures, steel structures
2	Skills	Structural computations, basics of structural design
3	Social competencies	Responsibility
Assumptions and objectives of the course: Acquiring knowledge on construction, design and methods of erection of tunnels.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Terminology concerning tunnels - [KW14, KW-16] 2. Construction of tunnels - [KW14, KW-16] 3. Design of tunnels - [KW14, KW-16-]		
Skills:		
1. Ability to work out the method of static analysis of deep tunnels - [K_U04] 2. Ability to explain technology of tunnel building - [K_U04]		
Social competencies:		
1. Self-reliance - [K_K01] 2. Honesty - [K_K02]		
Assessment methods of study outcomes		
Lectures - written test. Project - oral discussion		
Course description		

Terminology and general information on underground structures. Classifications of underground structures. Geotechnical and transport conditions of tunnel design. Structural elements and equipment of tunnels. Design of tunnels. Methods of tunnel erection.

Basic bibliography:

1. Furtak K., Kędracki M.: Podstawy budowy tuneli, Wyd. Politechniki Krakowskiej, 2005
2. Gałczyński S.: Podstawy budownictwa podziemnego, Wyd. Politechniki Wrocławskiej, 2001
3. Świst E.: Hydrotechniczne i komunikacyjne bud. podziemne, Wyd. STO, 2006
4. Glinicki S.: Budowle podziemne, wyd. Politechniki Białostockiej, 1994
5. Stamatello H.: Tunele i miejskie budowle podziemne, Arkady, 1970
6. Lessaer S.: Miejskie tunele, przejścia podziemne i kolektory, WKiŁ, 1979
7. Bartoszewski J., Lessaer S.: Tunele i przejścia podziemne w miastach, WKiŁ, 1971

Additional bibliography:

1. Podoski J.: Transport w miastach, WKiŁ, 1985

Result of average student's workload

Activity	Time (working hours)	
Student's workload		
Source of workload	hours	ECTS
Total workload	50	2
Contact hours	30	1
Practical activities	20	1