STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Underground Structures**		Code **1010101161010120210**
Field of study **Civil Engineering First-cycle Studies**	Profile of study (general academic, practical) **general academic**	Year /Semester **3 / 6**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **elective**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **15** Classes: **-** Laboratory: **-** Project/seminars: **15**		No. of credits **2**
Status of the course in the study program (Basic, major, other) **major**	(university-wide, from another field) **from field**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **2 100%** **2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Strength of materials, structural mechanics, geotechnics
2	**Skills**	Basic static-strength computation of building structures.
3	**Social competencies**	Honesty, responsibility

Assumptions and objectives of the course:

The aim of the subject is presentation of basic problems of design, construction and building of underground structures.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Factors of tunnel building. - [K_W08, K_W09]
2. Construction of tunnels - [K_W09]
3. Tunnel loadings - [K_W10]

Skills:

1. Static computations of tunnels - [K_U02, K_U03]
2. Design of tunnel members - [K_U04, K_U08]

Social competencies:

1. Honesty - [K_K02]
2. Self-reliance - [K_K01]

Assessment methods of study outcomes

Lecture: written colloquium.
Design exercises: submission of correctly completed exercise and oral check of knowledge in concern.

Course description

Definitions. Classification of underground structures. Initial design of tunnels. Cross-section design factors. Shallow founded tunnels structural elements and construction. Loads and static computations of shallow founded tunnels. Tunnel fittings. Shallow founded tunnels building methods.
Basic bibliography:
Additional bibliography:

Result of average student's workload	
Activity	**Time (working hours)**

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	50	2
Contact hours	35	1
Practical activities	20	1