

COURSE DESCRIPTION CARD			
The name of the course/module BUILDING PHYSICS - ACOUSTICS			Code A_P_1.6_010
Main field of study ARCHITECTURE	Educational profile (general academic, practical) general academic		Year / term III/6
Specialization -	Language of course: Polish		Course (core, elective) core
Hours Lectures: 30 Classes: - Laboratory classes: - Projects / seminars: -			Number of points 2
Level of qualification: I	Form of studies (full-time studies/part-time studies) Full-time studies and part-time studies	Educational area(s) Technical Sciences	ECTS distribution (number and %) 2 100%
Course status in the studies' program (basic, directional, other) basic		(general academic, from a different major)	
Lecturer responsible for course/lecturer: dr inż. arch. Anna Sygulska e-mail: Anna.Sygulska@put.poznan.pl Faculty of Architecture ul. Nieszawska 13 d, 61-021 Poznań tel.: 061 665 32 60		Lecturer: dr inż. arch. Anna Sygulska e-mail: Anna.Sygulska@put.poznan.pl Faculty of Architecture ul. Nieszawska 13 d, 61-021 Poznań tel.: 061 665 32 60	
Prerequisites defined in terms of knowledge, skills, social competences:			
1	Knowledge:	<ul style="list-style-type: none"> - basic knowledge of physics on the secondary school level - basic knowledge of architectural designing and urban planning - basic knowledge of history of architecture 	
2	Skills:	<ul style="list-style-type: none"> - student is able to use available Polish and English publications - student has basic skills of architectural designing and urban planning - student is able to apply the knowledge in the scope of building engineering for architecture 	
3	Social competences:	<ul style="list-style-type: none"> - is aware of the need for learning in the fields of science related to architecture - is able to creatively co-operate in the group 	
Objective of the course: The objective of the course is presentation of basic issues of architectural acoustics and preparation to architectural designing with particular emphasis of acoustics. The students learn the analysis methods of acoustic field in room, acoustic parameters of interior and assessment parameters of acoustic quality of rooms. Also students learn the designing interior with non-qualified acoustic to avoid acoustic defects. However, for rooms with qualified acoustics, students gain the knowledge of forming the space for the most functional designing facilities. The lectures also include the issues of facilities soundproofing.			
Learning outcomes			
Knowledge:			
W01	student knows the analysis methods of acoustic field in premises	K_W06	
W02	student knows acoustic parameters of interior	K_W06	
W03	student knows parameters of acoustic quality of rooms	K_W06	
Skills:			
U01	student can designing the interior with non-qualified acoustic to avoid acoustic defects	K_U07 K_U12 K_U15	
U02	student is able to design space taking into account the acoustic conditions for rooms with qualified acoustics	K_U07 K_U12 K_U15	

U03	student is able to take into account the issues of facilities soundproofing in designing	K_U07 K_U12 K_U15
Social competences:		
K01	awareness of the consequences of possible acoustic negligence, created in design process	K_K01 K_K02 K_K05
K02	can co-operate with specialist from acoustic branch	K_K01
The evaluation methods:		
<p>The basis to passing is colloquium, which finish the series of lectures of Building Physics – acoustics. The colloquium consists of three parts and checks the knowledge of basic acoustic parameters, the ability to apply of acquired knowledge in practice – descriptive part and calculation part.</p> <p>Summative assessment:</p> <ul style="list-style-type: none"> ▪ grade for written colloquium. <p>Final grading scale: 2,0; 3,0; 3,5; 4,0; 4,5; 5,0</p> <p>Positive grade for module depends on achieved by student all learning outcomes specified in the syllabus.</p>		
Course contents		
<ul style="list-style-type: none"> - Acoustic myths .The beginning of architectural acoustics. Physical nature of sound - Methods of the acoustic field analysis in premise: wave method, geometrical method, statistical method - Basic acoustic parameters of premises. Assessment parameters of acoustics quality in rooms. Rooms with non-qualified acoustic – scope of the study. Acoustic defects, architectural corrections - Rooms with qualified acoustic. Function and cubature and required reverberation time. Shape of a room. - Profile of ceiling and walls. Arrangement of audience. Way of determining the initial time delay gap. Influence of balconies on room acoustic. - Architectural acoustics of concert halls, opera houses and theaters. Arrangement of a stage. - Arrangement of an orchestra pit, stage of a concert hall, organ in a concert hall. Multipurpose halls with adjustable acoustic. - Rehearsal rooms. Technical premises. Adaptation of room for sound system. - Acoustic quality of rooms, Beranek's method, Ando's method. - Acoustic outlines for designing churches. Disposition of finishing materials, sound absorption by air, designing the sound propagation conditions in the room, acoustic criteria of organ and choir location. Room volume against instrument size, instrument location – liturgical, acoustic and thermal aspects, the location of church bells. - Building protection against external disruptions (noise, vibration). Acoustic parameters of building partitions. Requirements of noise protection of halls. Acoustic screens. 		
Basic bibliography:		
<ol style="list-style-type: none"> 1. Kulowski A., Akustyka sal. Wydawnictwo PG. Gdańsk 2007 2. Wróblewska D., Kulowski A., Czynniki akustyki w architektonicznym projektowaniu kościołów. Wydawnictwo PG. Gdańsk 2007 3. Engel Z., Engel J., Kosała K., Sadowski J., Podstawy akustyki obiektów sakralnych. Wydawnictwo Instytutu Technologii Eksploatacji – PIB, 2007 4. Sadowski J., Akustyka architektoniczna, PWN. Warszawa 1976 		
Supplementary bibliography:		
<ol style="list-style-type: none"> 1. Beranek L. Concert Halls and Opera Houses: Music, Acoustics and Architecture. Springer 2004, Second Edition 		
The student workload		
Form of activity	Hours	ECTS
Overall expenditure	50	2
Classes requiring an individual contact with teacher	-	-
Practical classes	-	-

Balance the workload of the average student

Form of activity	Number of hours
participation in lectures	30 h
participation in classes/ laboratory classes (projects)	-
preparation for classes/ laboratory classes	-
preparation to colloquium	-
participation in consultation related to realization of learning process	-
preparation to the exam/colloquium	19 h
attendance at exam/ colloquium	1 h

Overall expenditure of student:

2 ECTScredits**50 h**

As part of this specified student workload

- activities that require direct participation of teachers: **30 h**