



Subject card

Subject name and code	Acoustics project, PG_00061534						
Field of study	Architecture						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		English		
Semester of study	5		ECTS credits		1.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Technical Fundamentals of Architectural Design -> Faculty of Architecture -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor						
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	15.0	0.0	0.0	25
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=43134						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	25		1.0		4.0	30
Subject objectives	To acquaint the student with the mechanism of sound and vibration transmission in building structures and the propagation of noise in the environment. Acquainting the student with the principles of anti-sound and anti-vibration protection of the building and the environment, as well as shaping the acoustics of rooms.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U03] is able to prepare a graphic, written and oral presentation of your own design concepts in the field of architecture and urban planning, meeting the requirements of a professional record appropriate for architectural and urban design		is able to integrate information obtained from various sources, interpret it and critically analyze it;		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W01] knows and understands construction problems, building and engineering issues related to building design; principles, solutions, constructions and building materials used in simple engineering tasks in the field of architectural and urban design		The student is aware of the importance of acoustics for the function of a facility and learns about the possibilities of influencing its acoustic properties; has knowledge of the ways and mechanism of sound and vibration transmission in building structures and the propagation of noise in the field. The student knows the mechanism of sound propagation in rooms. of zerowaste architecture.		[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture 1. Physics of sound. Sound pressure, decibel, sound level, sound spectrum, hearing range. 2. Room acoustics. Acoustic phenomena in rooms. Acoustic parameters of rooms. 3. Acoustic properties of finishing materials and room equipment elements, sound absorption coefficient. 4. Shaping room acoustics - function, form and volume of a room and its acoustics. 5. Building acoustics. Mechanism of sound and vibration propagation in a building. Airborne and structure-borne sound. Installation interference. 6. Acoustic properties of building materials. Acoustic insulation of partitions, mass law. 7. Building protection against noise and vibrations - location in relation to external sources of noise and vibrations, protection against vibrations transmitted by the ground, room layout, prevention of noise and vibration transmission in a building. 8. Urban acoustics - protection against noise by shaping the body of a building, the layout of buildings and the formation of urban interiors. 9. Acoustic climate of a city. Acoustic climate parameters. Acoustic city plans, synthetic and analytical, current and forecast. Acoustic map of the city. 10. Environmental acoustics. Noise propagation in open areas. The influence of wind, temperature and air humidity on sound propagation. Noise attenuation by ground surfaces with different types of covering. 11. Protection of the area from transport and industrial noise. Noise from wind turbines. 12. Aircraft noise. Degradation of the functions of adjacent areas under the influence of aircraft noise. Area of limited use. 13. Acoustic issues in construction law. Protection of the building, built-up area and area from noise and vibrations in the light of Polish Standards and accompanying regulations. Course content – laboratory 1. Types of acoustics halls 2. Familiarization with the basic regulations for the design of auditoriums. 3. Familiarization with the operation of the SABINE computer program 4. Getting acquainted with the acoustic properties of building and finishing materials stored in the database 5. Case study: study of an exemplary room, execution of exemplary calculations 6. Selection of the room, development of the proportions and shape of the interior, the profile of the ceiling and walls, the layout of the auditorium, escape routes. 7. Development of the layout of finishing materials. Calculation of acoustic parameters taking into account design recommendations. 8. Preparation of a report on Acoustic guidelines for interior design.																	
Prerequisites and co-requisites																		
Assessment methods and criteria	<table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Report "Acoustic guidelines for the interior design of the hall"</td><td>51.0%</td><td>40.0%</td></tr><tr><td>Exercise "Examples of halls"</td><td>40.0%</td><td>5.0%</td></tr><tr><td>attendance</td><td>30.0%</td><td>15.0%</td></tr><tr><td>Colloquium from the theoretical part of the lectures</td><td>55.0%</td><td>40.0%</td></tr></table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Report "Acoustic guidelines for the interior design of the hall"	51.0%	40.0%	Exercise "Examples of halls"	40.0%	5.0%	attendance	30.0%	15.0%	Colloquium from the theoretical part of the lectures	55.0%	40.0%
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Recommended reading	Basic literature Supplementary literature	1. Kulowski A.: Akustyka sal - zalecenia projektowe dla architektów. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2011 2. Nurzyński J.: Akustyka w budownictwie. PWN, 2021 3. Suder-Dębska K, i in.: Wprowadzenie do akustyki użytkowej, Wyd.AGH, 2018 4. Sadowski J.: Akustyka architektoniczna. PWN, Warszawa 1976 5. Rusiński A.: Przestrzenie akustyki. Professional Acoustics, Wyd WAM 2021, 2023 6. Instrukcja ITB 369/2002: Właściwości dźwiękoizolacyjne przegród budowlanych i ich elementów. Wyd. Instytut Techniki Budowlanej, Warszawa 2002 7. Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie 8. Rozporządzenie Ministra Środowiska z dnia 1 października 2012 r. w sprawie dopuszczalnych poziomów hałasu w środowisku 1. Ciesielski, J. Kawecki, E. Maciąg: Ocena wpływu wibracji na budowlę i ludzi w budynkach. Instytut Techniki Budowlanej, Warszawa 1993 2. Kulowski A.: Ćwiczenia projektowe z akustyki pomieszczeń z wykorzystaniem programu komputerowego "Sabine" (lab instructions), Gdańsk 2014 3. Ozimek E.: Dźwięk i jego percepcja. Warszawa 2002 4. Wydawnictwo Naukowe PWN Everest A.: Podręcznik akustyki. Katowice 2004 5. Polska Norma PN-B-02151-2:2018-01 Akustyka budowlana. Ochrona przed hałasem pomieszczeń w budynkach. Część 2: Wymagania dotyczące dopuszczalnego poziomu dźwięku w pomieszczeniach 6. PN-B-02151-3:2015-10 Akustyka budowlana - Ochrona przed hałasem w budynkach. Wymagania dotyczące izolacyjności akustycznej przegród w budynkach i elementów budowlanych 7. PN-B-02151-4:2015 Akustyka budowlana - Ochrona przed hałasem w budynkach. Wymagania dotyczące warunków pogłosowych i zrozumiałości mowy w pomieszczeniach oraz wytyczne prowadzenia badań																
	eResources addresses																	

Example issues/ example questions/ tasks being completed	Selection of the room to be developed, determination of the shape and proportions of the room, selection and arrangement of finishing materials, preparation of the final study
Practical activities within the subject	Not applicable

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