GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Multimedia environmental monitoring, PG_00052391		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2027/2028
Education level	first-cycle studies	Subject group	Optional subject group 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	4	Language of instruction	Polish
Semester of study	7	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Multimedia Systems -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Józef Kotus	
	Teachers	dr hab. inż. Józef Kotus	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						

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	30	2.0	18.0	50

Subject objectives	Student knows the principles of protection against noise, the numerical description of the various noise sources. Student can use the tools to assess and control noise. Student can use of modern control and measurement equipment and software for management of the environmental noise. Student realized their own set of laboratory exercises to consolidate the acquired knowledge and practical skills.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	Student presents the principles of protection against noise. He describes the basic noise sources such as: road noise, railway noise, industrial noise, aircraft noise. He specifies the harmful effect of excessive noise. He knows the basic algorithm of digital signal processing used in the acoustic measurements. He does the measurement of the sound pressure level and assess the acoustic conditions according to the applicable standards. He computes the noise distribution on analyzed area for basic noise sources using specialized software. He can select the proper noise control technique for considered acoustic conditions.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_W35] Knows the concepts of the technique of signal transmission, operation of telecommunications networks and multimedia services and the rules for providing them	Student know the properties of the measuring signal. He knows how the environmental noise monitoring systems works.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_W03] knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	Student knows the types and parameters of acoustics transducers used in the acquisition of measurement signals. He can explain how the measurement equipment used in the noise assessment works.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	Student applies the noise control methods in practice. He perform the numerical simulations of the environmental noise for selected types of sources such as: road noise, rail noise, occupational noise, aircraft noise using specialized software. He builds and runs the systems for acoustic measurements, especially for measurement the environmental noise or noise exposure levels at the workplace. He specifies the harmful effect of excessive noise on the basis of measured noise exposure levels. He can explain how the measurement equipment used in the noise assessment works. He does the measurement of the sound pressure level and assess the acoustic conditions according to the applicable standards. He can select the proper noise control technique for considered acoustic conditions. He designs the noise reduction systems.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
Subject contents	1. Introduction 2. References 3. Basic definitions: the environmental, the sound, the noise, the acoustical climate, the noise control 4. Noise influence on the quality of life and human health 5. Basic indicators describing the environmental noise and acoustical climate 6. Noise standards, international recommendations, noise limits 7. Noise measuring methods. Noise measuring equipment. Sound level meter construction. 8. Basic Noise Sources – road noise 9. Basic Noise Sources – rail noise 10. Basic Noise Sources – industry noise 11. Basic Noise Sources – air noise 12. Noisiness and subjective noise annoyance, psychoacoustical indicators, acoustical comfort. 13. Assessment of the occupational noise. 14. Noise-induced hearing loss (steady noise, impulsive noise), temporary and permanent hearing loss, the tinnitus. 15. Occupational noise control methods 16. Hearing damage risk criteria. Selection and applications o the personal hearing protection. 17. Environmental noise control in cities. 18. Noise control method inside the buildings. 19. Active noise control, the idea, basic systems, algorithms and practical applications. 20. Vibration suppression, vibro-isolation of machineries and devices. 21. Structural acoustical ivbrations. Vibration influence on human. 22. Vibration influence on buildings. 23. Noise propagation in the city environment. The mathematical description of the main propagation components. 24. Noise propagation in the city environment. The practical implementation of the sound propagations properties – noise maps. 25. The permanent environmental noise monitoring systems. The practical hardware and software solutions.		
Prerequisites and co-requisites	No requirements		

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<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Practical exercise</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Midterm colloquium</td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>• Young J. KimUlrich Platt, Advanced Environmental Monitoring, Springer, Dordrecht, 2008, DOI: 10.1007/978-1-4020-6364-0
• Rossing, Thomas (Ed.), Springer Handbook of Acoustics, Springer-Verlag New York, Series ISSN 2522-8692, 2007
• Wang, Lawrence K., Pereira, Norman C., Hung, Yung-Tse (Eds.), Advanced Air and Noise Pollution Control, Humana Press, 2005, DOI: 10.1007/978-1-59259-779-6
• F. Alton Everest, Podręcznik akustyki, W. SONIA DRAGA, Katowice, 2004.</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Introduce occupational noise control methods.
Introduce noise-induced hearing loss.
Perform measurements of the occupational noise properties (measurements in the anechoic chamber).
Based on the measurement resulst determine the daily noise dose.
Prepare simple noise map for road noise source.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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