

## § GDAŃSK UNIVERSITY § OF TECHNOLOGY

## Subject card

Studio Measurements, PG_00048327							
Electronics and Telecommunications							
February 2023		Academic year of realisation of subject			2023/2024		
second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study			
Full-time studies		Mode of de	elivery		at the university		
1			• •		Polish		
2		ECTS credits			2.0		
general academic profile		Assessment form			exam		
Department of Multim	nedia Systems	-> Faculty of El	lectronics, Tele	ecommu	inications and Informatics		
Subject supervisor		dr hab. inż. G	rzegorz Szwoc	:h			
Teachers		dr hab. inż. Grzegorz Szwoch					
Lesson type	Lecture	Tutorial	Laboratory	y Project		Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0		0.0	30
E-learning hours inclu	uded: 0.0					1	
Learning activity				Self-st	tudy	SUM	
Number of study	30				16.0		50
The aim is to teach students how to perform measurements in studio technology. Students learn about modern measurement equipment, methodology of acoustic and electroacoutic measurements and sound quality assessment. During the laboratory classes, students perform audio measurements on their own.         Course outcome       Subject outcome       Method of verification						s and sound their own.	
[K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions		Student knows how to evaluate the obtained test results in order to assess the quality of systems and devices used in studio technology. Student knows how to create reports with test results. Student knows how to interpret the obtained test results and how to evaluate the tested unit for a specific application in studio technology.		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task			
required specifications, and make a complex 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 [K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex		Student knows how to create a test system necessary to measure the quality of devices and systems used in studio technology. Student knows how to perform a test in a way that the obtained results may be used for assessment of the tested unit. Student knows the most important parameters that describe the quality of devices and systems used in studio technology. Student understands the relationship between the test results and the usefulness of the tested system in a specific studio technology		[SU4] Assessment of ability to use methods and tools [SW1] Assessment of factual knowledge			
	Electronics and Teleo February 2023 second-cycle studies Full-time studies 1 2 general academic pro Department of Multim Subject supervisor Teachers Lesson type Number of study hours E-learning hours inclu Learning activity Number of study hours E-learning hours inclu Learning activity Number of study hours The aim is to teach s modern measuremer quality assessment. I Course out [K7_U06] can analys operation of compon and systems related study; measure their examine technical sp interpret obtained re draw conclusions [K7_U03] can design required specification a complex device, fa or carry out a process the field of study, usi methods, techniques materials, following es standards and nor stechnologies specific study and experience the professional eng environment [K7_W03] Knows an understands, to an ir extent, the construct operating principles of components of study, ar relationships betwee selected specific issues to the field of study, ar relationships betwee	Electronics and Telecommunication: February 2023 second-cycle studies Full-time studies 1 2 general academic profile Department of Multimedia Systems Subject supervisor Teachers Lesson type Lecture Number of study hours E-learning hours included: 0.0 Learning activity Full-time is to teach students how to modern measurement equipment, m quality assessment. During the labo Course outcome [K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions [K7_U03] can design, according to required specifications, and make a complex 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 [K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex	Electronics and Telecommunications         February 2023       Academic yrealisation         second-cycle studies       Subject grownels         second-cycle studies       Subject grownels         Full-time studies       Mode of determinity         1       Language         2       ECTS cred         general academic profile       Assessment         Department of Multimedia Systems -> Faculty of E         Subject supervisor       dr hab. in2. G         Teachers       dr hab. in2. G         Lesson type       Lecture         Learning hours includet: 0.0       0.0         Learning nours included: 0.0       E-learning hours included: 0.0         Learning activity       Participation in didactic classes included in study plan         Number of study hours       30         Number of study hours       30         Course outcome       Subj         [K7_U06] can analyse the operation of components, circuits and systems related to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technology.       Student know the obtained to to evaluate th and evices L applications; interpret obtained results and materials, following engineering standards, to an increased extent, the construction and operation specific to the field of study, including theories, methods and complex related of the field of study, including th	Electronics and Telecommunications         February 2023       Academic year of realisation of subject         second-cycle studies       Subject group         Full-time studies       Mode of delivery         1       Language of instructio         2       ECTS credits         general academic profile       Assessment form         Department of Multimedia Systems -> Faculty of Electronics, Tele         Subject supervisor       dr hab. inż. Grzegorz Szwot         Teachers       dr hab. inż. Grzegorz Szwot         Lesson type       Lecture       Tutorial       Laboratory         Number of study hours       15.0       0.0       15.0         Number of study hours       30       4.0       2         The aim is to teach students how to perform measurements in stumodem measurement equipment, methodology of acoustic and equality assessment. During the laboratory classes, students perfore study, imeasure their parameters; interpret obtained results and craw conclusions       Student knows how to evalut the obtained test results and to assess the quality of syst and devices parality of syst and devices scality, system or carry out a process, specific to the field of study, imeasure their parameters; interpret obtained results and to evaluate the tested unit for specific application in studio technology.       Student knows how to creat the quality of devices and sy used in studio technology.         [K7_U03] can design, according to the eldel of study, and experience	Electronics and Telecommunications         February 2023       Academic year of realisation of subject         second-cycle studies       Subject group         Full-time studies       Mode of delivery         1       Language of instruction         2       ECTS credits         general academic profile       Assessment form         Department of Multimedia Systems -> Faculty of Electronics, Telecommu         Subject supervisor       dr hab. inż. Grzegorz Szwoch         Teachers       dr hab. inż. Grzegorz Szwoch         Lesson type       Lecture       Tutorial       Laboratory         Number of study       15.0       0.0       15.0       0.0         Number of study       30       4.0       4.0         The aim is to teach students how to perform measurement sin studio tech modern measurement equipment, methodology of acoustic and electroac quality assessment. During the laboratory classes, students nows how to evaluate the obtained test results in order to assess the quality of systems and devices used in studio technology.         [K7_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters; interpret obtained results and draw conclusions       Student knows how to eraete a tequired specifications; interpret obtained results and make a complex device, facility, system standards and norms, applying technologies specific to the field of study, using suitable technology. Student knows how to cre	Electronics and Telecommunications       Academic year of realisation of subject       2023/         Second-cycle studies       Subject group       Option Subject         second-cycle studies       Mode of delivery       at the         1       Language of instruction       Polish         2       ECTS credits       2.0         general academic profile       Assessment form       exam         Department of Multimedia Systems -> Faculty of Electronics, Telecommunication       Subject supervisor       dr hab. inż. Grzegorz Szwoch         Teachers       dr hab. inż. Grzegorz Szwoch       Eeson type       Lecture         Number of study       15.0       0.0       15.0       0.0         Number of study       15.0       0.0       16.0       16.0         Number of study       30       4.0       16.0       16.0         Koure outcome       Student knows how to create a sculate the tested unit for a specific ations; interpret obtained results and ho	Electronics and Telecommunications       Academic year of realisation of subject       2023/2024         February 2023       Academic year of realisation of subject       2023/2024         second-cycle studies       Subject group       Optional subject group relaresearch in the fiel         Full-time studies       Mode of delivery       at the university         1       Language of instruction       Polish         2       ECTS credits       2.0         general academic profile       Assessment form       exam         Department of Multimedia Systems -> Faculty of Electronics, Telecommunications and Inform       Subject supervisor       dr hab. in2. Grzegorz Szwoch         Teachers       dr hab. in2. Grzegorz Szwoch       Eeson type       Lecture       Tutorial       Laboratory       Project       Seminar         Number of study       15.0       0.0       15.0       0.0       0.0       0.0         Learning activity       Participation in didactic classes included in study plan       Participation in consultation hours       Self-study         Number of study hours       30       4.0       16.0       16.0         Recore outcome       Student knows how to evaluate the obtained test results on dree to study measurements and system stelate to the field of study, ing suitable dree to subtere the obtained results may be used for assessment of the studies

Cubicat contanta	1 Introduction					
Subject contents	1. Introduction					
	2. Computer systems for electroacoustic measurements					
	3. Test signals and measurement units					
	4. Characteristics of the electroacoustic systems					
	5. Frequency response tests					
	6. Phase distortion tests					
	7. Nonlinear distortion tests					
	8. Intermodulation distortion tests					
	9. Other tests: signal-to-noise, crosstalk and separation, frequecy, phase, impedance					
	10. Digital signal generators and analysers					
	<ol> <li>Measurements of digital sound systems</li> <li>Testing compressors, expanders and other studio devices</li> </ol>					
	<ul> <li>13. Testing microphones, loudspeakers and earphones</li> <li>14. Quasi-anechoic measurements in enclosed spaces</li> <li>15. Digital systems for real-time measurements</li> <li>16. Subjective testing of sound quality</li> </ul>					
	17. Testing quality of the encodec speech and music					
	18. Video measurements					
Prerequisites and co-requisites						
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	Final exam	51.0%	50.0%			
	Practical exercises	51.0%	50.0%			
Recommended reading	Basic literature	Lecture presentations and supplementary materials: <u>http://</u> sound.eti.pg.gda.pl/student/materialy.html Instructions for laboratory classes: <u>http://sound.eti.pg.gda.pl/student/</u> laboratoria.html				

	Supplementary literature	J. Sereda: Pomiary w elektroakustyce. WKiŁ, Warszawa 1981.
		K. Blair Benson: Audio Engineering Handbook. McGraw Hill, 1988.
		H.B. Miller: Acoustical measurements. HRP Company, Pelsynwania 1982.
		Z. Żyszkowski: Miernictwo akustyczne. WNT, Warszawa 1987.
		G. Davis, R. Jones: The Sound Reinforcement Handbook. HP Hal Leonard Publishing Corp., 1990.
		J. Sereda: Pomiary w elektroakustyce. WKiŁ, Warszawa 1981.
	eResources addresses	Adresy na platformie eNauczanie: Pomiary w technice studyjnej 2023 - Moodle ID: 29768 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29768
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	