



Subject card

Subject name and code	Air navigation and meteorology, PG_00053254						
Field of study	Nawigacja lotnicza i meteorologia						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group		Optional subject group		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Burdziakowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	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	60		7.0		83.0	150
Subject objectives	The aim of the course is to teach students the basics of aeronautical navigation and meteorology for the purpose of preparing and conducting flights with unmanned aerial vehicles.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W02] has knowledge and understands mathematics concepts useful for coordinate calculus (in a set of real and complex numbers), for the purpose of field and volume calculations, mathematical statistics and vector calculus, as well as elementary topology	Knows and understands the principles of planning a UAV navigation route. Knows aviation navigation devices and can describe how they work. Can describe the basic elements of flight route planning in the context of current meteorological conditions. Knows and can perform basic meteorological analyses based on available forecasts.	[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym
	[K6_W01] has knowledge and understands the concepts of physics which allow to use optical and immersive instruments as well as positioning and satellite imaging	Knows and understands basic concepts in the field of air navigation (course, bearing, route, route points). Knows and understands basic concepts in the field of meteorology. Knows the basics of barometric systems formation, can describe phenomena affecting UAV flight and hazards.	[SW2] Ocena wiedzy zawartej w prezentacji
	[K6_U06] can solve geodetic tasks and select measurement methods for typical engineering tasks including the curvature of the Earth and the impact of gravity	Can draw up a BSP route plan and programme it into the BSP software. Can calculate corrections for deviation and declination of the BSP compass. Can calibrate the compass. Can calculate the observed position of the BSP using position lines. Can interpret numerical weather forecasts. Can use basic meteorological data sources.	[SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu
	[K6_U01] can apply the principles of physics and mathematics to a simple verification of measurement and computational methods and their results	Can determine the position of an aircraft using available navigation equipment. Knows how to use on-board navigation equipment. Can determine current weather conditions and their impact on the navigation of an unmanned platform.	[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU2] Ocena umiejętności analizy informacji
Subject contents	Course content – lecture 1. Fundamentals of aviation meteorology a. Atmosphere, exosphere, ionosphere, aviation part of the atmosphere, tropopause, standard atmosphere 2. Weather reporting a. Weather information, surface reports, data from higher layers of the atmosphere, synoptic maps 3. Assessment of meteorological conditions based on published meteorological information a. TAF, METAR, GAMET, AIRMET, Significant, Storms, other available sources of meteorological information. 4. Assessment of the compliance of current atmospheric conditions with the operating conditions of unmanned aircraft a. Rules and conditions for the operation of unmanned aircraft 5. Assessment and impact of hazardous meteorological phenomena on the performance of unmanned flights. a. Hazardous meteorological phenomena in aviation, icing, storms, gusty winds, wind shear 6. Basics of aeronautical navigation. a. Basic concepts and definitions, types of aeronautical navigation 7. Discussion of basic geographical definitions used in aviation. a. Directions on the globe, geographical and magnetic angle of route, course, indication of wind direction and speed, flight speed 8. Satellite navigation systems a. types, principle of operation, indications and their interpretation, coverage area, errors and accuracies, factors affecting range and accuracy 9. Flight navigation preparation. a. determining and using navigation points, speed triangle navigation 10. Navigation systems and instruments used in unmanned aircraft used for practical training. a. navigation according to data from systems used to operate unmanned aircraft used during practical training 11. Ground control station operation a. Types of ground control stations, construction, principle of operation 12. Navigation based on video camera images a. Methods of UAV navigation based on video camera images 13. Navigation using other data sources a. On-board navigation instruments and methods of their use		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Subject	80.0%	50.0%
	Subject	80.0%	50.0%
Recommended reading	Basic literature https://calypteaviation.com/nauka-latania/ Nawigacja lotnicza S.S Fiedczyn Podręcznik nawigacji lotniczej - W. Wyrozumski Meteorologia i klimatologia - Krzysztof Kożuchowski, PWN		

	Supplementary literature	Mechanika lotu szybowców - szkolenie szybowcowe, Dr inż. Wiesława Łanecka-Makaruk,
	eResources addresses	
Example issues/ example questions/ tasks being completed	Preparation of a selected topic in the field of meteorology. Preparation of a selected technical issue in the field of navigation. Programming tasks in flight planning software.	
Practical activities within the subject	Not applicable	

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