GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Air navigation and meteorology, PG_00053254		
Field of study	Geodesy and Cartography		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Burdziakowski	
	Teachers		

Lesson types and methods of instruction

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 purpose of the course is to teach the student the basics of aerial navigation and meteorology for the preparation and implementation of unmanned aircraft flights.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U01] can apply the principles of physics and mathematics to a simple verification of measurement and computational methods and their results	Able to determine aircraft positions using available navigation equipment. Knows how to use on-board navigation equipment. Can determine the current meteo conditions and their impact on the navigation of the unmanned platform.	[SU2] Assessment of ability to analyse information
[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 make a BSP path plan and program it into the BSP software. Can calculate the deviation and declination corrections of the BSP compass. Can perform compass calibration. Can calculate the observed position of the BSP using position lines. Can interpret numerical weather forecasts. Can use basic sources of meteo data.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K6_W02] has basic 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 elementar topology	Knows and understands the principles of BSP navigation route planning. Can describe the basic elements of route planning in the context of current meteorological conditions. Knows and can perform basic meteorological analysis.	[SW3] Assessment of knowledge contained in written work and projects
[K6_W01] has basic 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 the basic concepts of aeronautical navigation (course, bearing, way, route, waypoints). Knows and understands the basic concepts of meteorology. Knows the basics of the formation of baric systems, can describe the phenomena affecting BSP flight and hazards.	[SW2] Assessment of knowledge contained in presentation

Subject contents	1. fundamentals of aeronautical meteorology a. Atmosphere, exosphere, ionosphere, aerial part of the atmosphere, tropopause, standard atmosphere2. weather reporting a. Weather information, surface reports, data from higher layers of the atmosphere, synoptic maps3. assessment of meteorological conditions based on published meteorological information a. TAF, METAR, GAMET, AIRMET, Significant, Storms, other available sources of meteo information.4. assessment of the compatibility of current atmospheric conditions with the operating conditions of the unmanned aircraft a. principles and conditions of operation of unmanned aircraft5. assessment and impact of hazardous meteorological phenomena on the performance of unmanned flight. a. Dangerous meteorological phenomena in aviation, icing, thunderstorms, gusty winds, wind faults6 Fundamentals of aviation navigation. a. Basic concepts and definitions, types of air navigation7. Discuss basic geographic definitions used in aviation. a. Directions on the globe, geographic and magnetic path angle, course, wind direction and speed designation, airspeed8. satellite navigation systems a. Types, principle of operation, indications and their interpretation, coverage area, errors and accuracy, factors affecting coverage and accuracy9. navigational flight preparation. a. determination and use of navigation points, speed triangle navigation10. navigation systems and instruments used in the unmanned aircraft used for practical training. a. "Navigation according to the data from the systems used to operate the unmanned aircraft used for practical training."11. operation of the ground control station a. Types of ground control stations, construction, principle of operation12. navigation on the basis of video camera image a. Methods of BSP navigation on the basis of video camera image13. navigation using other data sources a. Navigation onboard instruments and methods of their use
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Report	80.0%	50.0%
Prezentation	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	Adresy na platformie eNauczanie: Nawigacja lotnicza i meteorologia 2022/2023 - Moodle ID: 26647 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26647
Example issues/ example questions/ tasks being completed	Development of a selected topic in meteorology.Development of a selected technical issue in the field of navigationProgramming a task in flight planning software.	
Work placement	Not applicable	