COURSE DESCRIPTION CARD - SYLLABUS

Course name
Aviation safety systems [S1Lot2-BTL>SBwL]

Course

Field of study
Aviation

Year/Semester
3/5

Area of study (specialization)
Air Transport Safety

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr hab. inż. Adrian Gill
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Lecturers

Prerequisites

Knowledge: Has knowledge of mathematics, physics and the basics of probability calculation in the scope presented during studies. Skills: Is able to apply the scientific method in solving research problems. Social competences: Can formulate questions precisely; is able to determine priorities important in solving the tasks set before him; demonstrates independence in solving problems, acquiring and improving acquired knowledge and skills.

Course objective

Learning the methods and acquiring practical skills in modeling and analyzing the functioning of safety systems, as well as learning about the basic space surveillance techniques and their impact on safety levels in aviation.

Course-related learning outcomes

Knowledge:
1.The student has knowledge of safety and management in aviation. The student knows the concept of the human factor and methods of assessing human reliability, has detailed knowledge related to selected issues in the field of human capabilities and limitations during aircraft operation in flight, its impact on

health and ability to perform flight operations, as well as possibilities of improving physical condition

Skills:
1. is able to obtain information from various sources, including literature and databases, both in Polish and English, integrate it properly, interpret and critically evaluate it, draw conclusions, and comprehensively justify the opinions he formulates

Social competences:
1. correctly identifies and resolves dilemmas related to the profession of an aviation and astronautics engineer

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written final tests.

Programme content

The programme content includes the fundamentals of safety systems management and modelling and the safety aspects of air traffic control.

Course topics

Safety systems against the background of hazard risk management methods. Basic concepts and definitions regarding. Models of safety systems. Elements and procedures for creating models of safety systems: identification of safety functions, selection of risk reduction measures, identification of threats. Methods of analyzing the functioning of safety systems. Examples of safety systems in air transport. Classification of surveillance techniques and their impact on ensuring safety in aviation (division into primary, secondary radars, MLAT and ADSB/C systems) with emphasis on the advantages and disadvantages of individual technologies). Surveillance data flow chain (SUR) and methods for verifying the correctness of this data according to Eurocontrol chain, implementation of SASS-C, the ASTERIX protocol and the ARTAS tracker as examples of evolution in ensuring and improving techniques for ensuring aviation safety. Development of surveillance techniques and their impact on the development of aviation safety, evolution of air traffic control systems, evolution of aircraft equipment (aircraft avionics, installed devices and on-board systems).

Teaching methods

Informative lecture (conventional)
Exercises: tasks and project work

Bibliography

Basic:
1. Cempel C., Teoria i inżynieria systemów. Wyd. Instytutu Technologii Eksploatacji - PIB, Radom 2006.
2. Center for Chemical Process Safety. (2001). Layer of Protection Analysis - Simplified Process Risk Assessment. Center for Chemical Process Safety/AIChE.
3. Gill, A., Warstwowe modele systemów bezpieczeństwa do zastosowań w transporcie szynowym [Layered models of safety systems for rail transport applications]. Wydawnictwo Politechniki Poznańskiej, Poznań, 2018.
4. Harms-Ringdahl, L. Guide to safety analysis for accident prevention, IRS Riskhantering AB, Stockholm, Sweden 2013, www.irisk.se/sabook.
5. Jaźwiński J., Ważyńska-Fiok K., Bezpieczeństwo systemów. Wyd. Naukowe PWN, Warszawa, 1993.
6. Kadziński A., Studium wybranych aspektów niezawodności systemów oraz obiektów pojazdów szynowych. Wyd. Politechniki Poznańskiej, seria Rozprawy, nr 511, Poznań 2013.
7. Szymanek A., Bezpieczeństwo i ryzyko w technice. Wyd. Politechniki Radomskiej, Radom 2006.
8. Szymonik A., Organizacja i funkcjonowanie systemów bezpieczeństwa. Zarządzanie bezpieczeństwem, Difin SA, Warszawa 2011.
9. Zintegrowany System Bezpieczeństwem Transportu. Tom 1 i 2. Redaktor pracy zbiorowej Krystek R., Politechnika Gdańska, Gdańsk 2009, WKŁ, Warszawa 2009.
10. Marian R. Sztarski, Radary, Wydawnictwo Ministerstwa Obrony, Warszawa 1981.

11. Zbigniew Czekała, Parada radarów. Wydawnictwo Bellona, Warszawa 1999-2014.

Additional:
1. Analiza ryzyka w transporcie i przemyśle, pod redakcją Marka Młyńczaka, Navigator 6, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 1997.
2. Bezpieczeństwo pracy i ergonomia, część 1 i 2, pod redakcją Danuty Koradeckiej, Wyd. Centralnego Instytutu Ochrony Pracy, Warszawa 1999.
3. Najmiec A., Widerszal-Bazyl M., Stres w pracy mechaników lotniczych, Zawody trudne i niebezpieczne, Bezpieczeństwo pracy nr 11/2006.
4. Pihowicz W., Inżynieria bezpieczeństwa technicznego. Wydawnictwa Naukowo- Techniczne, Warszawa 2008.
5. Terelak J.F., Człowiek i stres. Oficyna Wydawnicza BRANTA, Bydgoszcz-Warszawa 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00