COURSE DESCRIPTION CARD - SYLLABUS

Course name
Human reliability in aviation [S1Lot2-BTL>NCwL]

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
30

Laboratory classes
15

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

5,00

Coordinators

dr inż. Marta Maciejewska
marta.maciejewska@put.poznan.pl

Lecturers

Prerequisites

Knowledge: Basic knowledge of transport safety, basic knowledge of air transport Skills: the ability to solve research problems using scientific methods the ability to find cause-and-effect relationships based on the acquired knowledge Social competences: the ability to precisely formulate questions; the ability to define priorities important in solving the tasks set for him; the ability to formulate a research problem and search for its solution, independence in problem-solving, the ability to cooperate in a group.

Course objective

1. To familiarize students with the basic concepts of the impact of the human factor on the safety of air transport 2. To familiarize students with various methods of assessing human reliability. Quantitative and qualitative 3. Familiarizing students with the pilot's capabilities and limitations, in particular diseases, illusions and elements of physiognomy 4. Introducing students to methods and means for testing the psychophysical abilities of pilots, in particular flight simulators, reaction time meters, electroencephalograph, etc. 5. Improving students' skills in defining and solving research problems 6. Indication of the essence of human predispositions to perform functions in air transport: pilot, aircraft crew, cabin staff

Course-related learning outcomes

Knowledge:
1. has ordered and theoretically founded general knowledge in the field of key technical issues and detailed knowledge of selected issues related to air transport, knows the basic techniques, methods and tools used in the process of solving tasks related to air transport, mainly of an engineering nature [L1_W03]
2. the student has knowledge of aviation safety and management. 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 the ability to perform air operations, as well as the possibility of improving the physical condition [L1_W14] .

Skills:
1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret and critically evaluate them, draw conclusions and exhaustively justify their opinions [L_U01]
2. can properly use information and communication techniques, applicable at various stages of the implementation of aviation projects [L_U02]
3. can properly plan and perform experiments, including measurements and computer simulations, interpret the results obtained, and correctly draw conclusions from them [L_U03]
4. can, when formulating and solving tasks related to civil aviation, apply appropriately selected methods, including analytical, simulation or experimental methods [L_U04].

Social competences:
1. understands that in technology, knowledge and skills very quickly become obsolete [L_K01]
2. is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning engineering projects that have led to serious financial and social losses, or to a serious loss of health and even life [L_K02].5. Abc.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
LECTURE: Assessment of knowledge and skills in a written or oral exam based on the explanation of selected issues.
TUTORIALS: Final colloquium. It is possible to be excused from the colloquium for active participation in classes. During each exercise, students perform tasks for which points can be obtained. At the end of the semester, a grade for activity is offered - the student can accept it or take the test.
LABORATORY: Current assessment of student"s activity in class, preparation and evaluation of student reports after each class.

Programme content

Classification and quantitative structure of errors made by a human/operator/pilot.
Analysis of selected sources of threats as factors escalating human errors in air transport systems.
Human reliability analysis methodology (HRA) - description of methods with examples.
Selected issues in physiology;
Selected issues in psychology;
Psychophysical burdens at work;
Psychosocial risks related to the profession;
Theories of air accidents.
Pilot errors, error taxonometry, examples of events caused by pilot errors.
Methodology for examining the pilot's psychophysical condition.

Course topics

The lecture program covers the following topics:
Introduction (M-T-E, Shell)
Human Reliability Analysis - general
Quantitative and qualitative HRA
Man senses

A man of delusion, diseases in flight.
Research methods on NCwL
Subjective methods
Objective methods
Statistical analysis in human research
ASHRAM - the newest, why it is better than standard HRA
HFACS in ATC - FAA research
FOSA, HERA, HRA in General Aviation
The training program covers the following topics:
Introduction + SHELL + taxonomy
creating a Bayesian network
Quantitative and qualitative HRA
Sten classification
NASA TLX weights vs raw
statistical analysis of objective test results
The laboratory curriculum covers the following topics:
Senses and illusions
Piórkowski Apparatus and Reaction Parameter Meter
Preparing your own subjective questionnaire
testing with a subjective questionnaire
electroencephalography and pulse measurement at various phases of flight
eyetracking measurement during a flight operation
eyetracking, analysis of results, creation of heat maps and AOI

Teaching methods

Informative (conventional) lecture (providing information in a structured manner) - may be of a course (introductory) or monographic (specialist) character
The exercise method (subject exercises, practice exercises) - in the form of auditorium exercises (application of acquired knowledge in practice - may take various forms: solving cognitive tasks or training psychomotor skills; transforming a conscious activity into a habit through repetition)
Laboratory (experiment) method (students independently conduct experiments)

Bibliography

Basic:
1. Lozia Z., Symulatory jazdy samochodem, WKŁ, Warszawa 2008
2. Makarowski R., Smolicz T., Czynnik ludzki w operacjach lotniczych, ADRIANA AVIATION, Kosowizna, 2012
3. Lewitowicz J., Kustroń K., Podstawy eksploatacji statków powietrznych, Własności i właściwości eksploatacyjne statku powietrznego, Wyd. ITWL, Warszawa, 2003
4. Zagdański Z., Stany awaryjne statków powietrznych, Wyd. ITWL, Warszawa, 1995

Additional:
1. Podręcznik zarządzania bezpieczeństwem, Doc 9859 ICAO Organizacja Międzynarodowego Lotnictwa Cywilnego, wydanie pierwsze 2006
2. Romanowska-Słomka I., Słomka A., Zarządzanie ryzykiem zawodowym. Wydawnictwo Tarbonus, Tarnobrzeg, 2005
3. Lewitowicz J. (red.) Podstawy eksploatacji statków powietrznych, Badania eksploatacyjne statków powietrznych, Wyd. ITWL, Warszawa, 2007
4. Domicz J., Szutowski L., Podręcznik pilota samolotowego, Wyd. Technika/Aerotechnika, Poznań 2008
5. Szutowski L., Poradnik pilota samolotowego, Wyd. Avia-test, Poznań 2007

Breakdown of average student's workload

	Hours	ECTS
Total workload	127	5,00
Classes requiring direct contact with the teacher	62	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50