



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Air Traffic Management

Course

Field of study

Aerospace Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

practical

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

30

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Krzysztof Banaszek

Responsible for the course/lecturer:

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ul. Wieżowa 8 02-147 Warszawa

Prerequisites

Course objective

Providing knowledge about background and functions of the air traffic engineering taking account the legal aspects, ATM organisation and single European system.

Course-related learning outcomes

Knowledge

1. Has extended knowledge necessary to understand the profile subjects and specialist knowledge about the construction, methods of construction, production, operation, air traffic management, safety systems, impact on the economy, society and the environment in the field of aviation and cosmonautics [K2A_W01]



2. Has basic knowledge of aviation organizations and the applicable Polish and European aviation law [K2A_W08]
3. Has basic knowledge of aircraft movement in the air and air traffic services [K2A_W10]
4. Has basic knowledge of law, in particular civil aviation law, copyright and industrial property law and its influence on the development of technology, can use patent information resources [K2A_W18]

Skills

1. Has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books [K2A_U03]
2. Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions [K2A_U04]

Social competences

1. Understands the need for lifelong learning; can inspire and organize the learning process of other people [K2A_K01]
2. Is able to interact and work in a group, assuming various roles in it [K2A_K04]
3. Correctly identifies and resolves dilemmas related to the profession [K2A_K06]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written exam (test)

Programme content

1. International Civil Aviation Organization (ICAO) (and other international and Polish institution (Eurocontrol, EASA, ULC, PAŻP). ICAO Convention and Appendixes, European Union law related to Air Traffic Management. Single European Sky, historical background and law evolution due to air traffic growth, law enforcement in Republic of Poland.
2. Air Traffic Flow (and Capacity) Management ATFM/ATFCM – EU regulations and Polish Aviation Law Act and implementing regulations. Polish airspace structure for ATM, controlled and uncontrolled airspace, rules and conditions of airspace utilisation, flexible use of airspace - FUA, AFUA, FRA.
3. Air Traffic Management System in Poland, Europe and other ICAO states. Basic regulations and requirement, technical implementation of the automated air traffic control systems. ATM system planning, research and development, deployment – global and regional coordination of activities.



4. Advanced navigation and positioning systems for aircraft: RNAV, RNP-RNAV, PBN, Data-Link implementation, SatCom (satellite-based air traffic services datalink) and Automatic Dependent Surveillance–Broadcast (ADS–B) surveillance technology.
5. Communications, navigation and surveillance (CNS) technologies and infrastructure: VHF band 8.33 kHz channel spacing, Multilateration (MLat), ADS-B surveillance technique, primary/secondary radars, Mode S radar, VOR/D-VOR, DME, ILS system, MLS and GLS, GNSS system, SBAS (EGNOS) and GBAS.
6. Air Traffic Management in Europe, Single European Sky (SES) and the second regulatory package (SES II). SESAR - Single European Sky ATM Research project, SESAR2020 and SESAR3 - European Partnership for integrated air traffic management (Horizon Europe programme), partnership for coordination all air traffic management (ATM) research, development and validation activities in the EU.
7. The future of SES, SES2+ - revision of the current SES framework to improve the overall efficiency of air traffic management (ATM). Integrated air traffic management (ATM), digitalisation.

Teaching methods

Informative (conventional) lecture (transfer of information in a systematic way) - can be (propedeutical) or monographic (specialist)

Seminar lecture ("external dialogue" of the lecturer with the student; students participate in solving the problem)

Bibliography

Basic

1. Skorupski J., Współczesne problemy inżynierii ruchu lotniczego: modele i metody: praca zbiorowa Warszawa 2014
2. Malarski M., Inżynieria ruchu lotniczego, Warszawa 2006
3. Domicz J., Szutowski L., Podręcznik pilota samolotowego, Poznań 2008
4. Wyzwania inżynierii ruchu lotniczego. Praca zbiorowa pod redakcją J.Skorupskiego. Wydział Transportu Politechniki Warszawskiej, Warszawa 2016. ISBN 978-83-7814-547-9, Drukarnia Oficyny Wydawniczej Politechniki Warszawskiej
5. Compa T., Zarządzanie przestrzenią powietrzną, AON, Warszawa 2003

Additional

1. ICAO Konwencja "Chicagowska" (Dz. U z 1959 r. Nr 35, poz. 212, z późn. zm). Link: <https://ulc.gov.pl/pl/prawo/prawo-miedzynarodowe/206-konwencje>
2. Ustawa Prawo Lotnicze. Link: <https://ulc.gov.pl/pl/prawo/prawo-krajowe/ustawa-prawo-lotnicze-i-akty-wykonawcze/4851-ustawa-prawo-lotnicze>



3. Rozporządzenie MI z dnia 17 lipca 2020 r. w sprawie przepisów ruchu lotniczego.
4. Rozporządzenie MI z dnia 27 grudnia 2018 r. w sprawie struktury polskiej przestrzeni powietrznej oraz szczegółowych warunków i sposobu korzystania z tej przestrzeni
5. ICAO Załączniki do konwencji. Aneks 2, Aneks 10, Aneks 11 oraz ICAO Doc. 4444. Link: <https://ulc.gov.pl/pl/prawo/prawo-miedzynarodowe/206-konwencje>
6. Rozporządzenia dot. żeglugi powietrznej (SES oraz SESAR). Link: <https://ulc.gov.pl/pl/prawo/prawo-uni-europejskiej/prawo-ue-akty-prawne/zegluga-powietrzna>.
7. Raport Europejskiego Trybunału Obrachunkowego "Jednolita europejska przestrzeń powietrzna – mimo zmiany nastawienia przestrzeń powietrzna wciąż nie jest jednolita" (18/2017). Link: https://www.eca.europa.eu/Lists/ECADocuments/SR17_18/SR_SES_PL.pdf
8. Przepisy/Zalecenia EASA oraz Rozporządzenie wykonawcze komisji (UE) 2017/373 z dnia 1 marca 2017 r. ustanawiające wspólne wymogi dotyczące instytucji zapewniających zarządzanie ruchem lotniczym (...)
9. Easy Access Rules for Air Traffic Management/Air Navigation Services (Regulation (EU) 2017/373), Revision from November 2020 (currently applicable). Link: <https://www.easa.europa.eu/document-library/easy-access-rules/easy-access-rules-air-traffic-managementair-navigation-services#group-publications>

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	75	3,0
Student's own work (literature studies, preparation for test, project preparation) ¹	25	1,0

¹ delete or add other activities as appropriate