COURSE DESCRIPTION CARD - SYLLABUS

Course name
Air Navigation

Course

Field of study
Aerospace Engineering
Area of study (specialization)

Level of study
First-cycle studies
Form of study
full-time

Year/Semester
2/3-4; 3/5-6
Profile of study
general academic
Course offered in
polish
Requirements
compulsory

Number of hours

Lecture
60
Laboratory classes
30
Other (e.g. online)

Tutorials
90
Projects/seminars

Number of credit points

12

Lecturers

Responsible for the course/lecturer:
mgr Tomasz Zdziarski

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Responsible for the course/lecturer:
dr hab. inż. Agnieszka Wróblewska, prof.PP

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tel. 61 665 2201

Prerequisites

The student starting this subject should have basic knowledge of basic knowledge about the shape of the Earth, coordinate systems and reference as well as the basics of radio navigation. He should also

have the ability to apply the scientific method in solving problems and be ready to cooperate within a team.

Course objective

To acquaint the student with the practical performance of navigation tasks related to the planning, preparation and execution of a flight in selected environmental and operational conditions, change of time, use of typical navigation and radio navigation devices, use of radar devices, interpretation of measurement results, assessment of correctness of functioning and estimation of navigation and radio navigation equipment errors . Ability to use satellite system receivers used in navigation, interpretation of indications and assessment of the possibility of using satellite systems in particular types and phases of navigation, use of navigation methods in professional air operations. The ability to put into practice calculations of grouping parameters.

Course-related learning outcomes

Knowledge

1. has detailed knowledge related to selected issues in the field of navigation of flight mechanics and piloting techniques, and the use of flight simulators.

2. has basic knowledge of technical vocabulary, in particular specialized terminology used in the fields of science and technology related to aviation engineering.

3. has basic knowledge necessary to understand profile subjects and specialist knowledge about construction, methods of construction, manufacture, operation, aircraft control, safety systems, economic, social and environmental impact in the field of aviation engineering for selected specialties:

1. Piloting of aircraft

2. Aero engines and airframes.

Skills

1. knows how to use a language to a degree enabling understanding of technical texts in the field of aviation (knowledge of technical terminology).

2. has the ability to self-study using modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books.

3. can obtain information from literature, the Internet, databases and other sources. Is able to integrate obtained information, interpret and draw conclusions from them.

Social competences

1. is aware of the importance of maintaining the principles of professional ethics.

2. is able to properly set priorities for the implementation of the task specified by him or others based on available knowledge.

3. understand the need for critical assessment of knowledge and continuous education.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- assessment of knowledge and skills demonstrated on the written test - 1.5 hour

Exercises:

The knowledge acquired as part of the exercises is verified by two 45-minute colloquia carried out during 3 and 7 classes (in semesters 5 and 6) and by two 45-minute colloquia carried out in 7 and 15 classes (in semesters 3 and 4);

Laboratory:

Skills acquired as part of the laboratory are verified on the basis of reports and answers specific to each issue.

Programme content

Lecture:

semester 3 - 6:

Earth, Earth's movement, directions, course, distance, units, distances, speed. Ascent / descent rate gradient. Navigation speed triangle. Flight log.

exercises:

semester 3-6:

WGS-84 ellipsoid. Airline miles. Flight speed (TAS), mach (M). CAS / TAS / M relations. Ground speed (GS). The design and use of a navigational speed triangle.

Laboratories:

semester 5-6:

learning from instruments - navigation calculators, maps

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board.

2. Exercises: examples given on the board and performance of tasks given by the teacher - practical exercises.

3. Practical exercises at the didactic and laboratory positions.

Bibliography

Basic

1. Narkiewicz J., Podstawy układów nawigacyjnych, PWN, Warszawa 1999 r.

2. Ortyl A., Autonomiczne systemy nawigacji lotniczej, WAT, Warszawa 2000 r.

3. Janik F., Malinowski C., Podstawowa nawigacja lotnicza, Wydawnictwa komunikacyjne, Warszawa 1957 r.

4. Wyrozumski W., Podręcznik nawigacji lotniczej, Aeroklub PRL,

6. Wolper James S., Understanding mathematics for aircraft navigation, McGraw-Hill Companies Inc, 2001 r.

7. Narkiewicz J., Globalny system pozycyjny. WKiŁ 2003 r.

8. Advanced Avionics Handbook FAA-H-8083-6, Federal Aviation Administration. Washington 2009 r.

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	301	12,0
Classes requiring direct contact with the teacher	201	8,0
Student's own work (literature studies, preparation for exercises, preparation for colloquium / credit; preparation for laboratory classes, preparation of report) [1]	100	4,0

[1] delete or add other activities as appropriate