COURSE DESCRIPTION CARD - SYLLABUS

Course name
Flight planning and monitoring 2

Course

Field of study
Aviation

Year/Semester
2/4

Area of study (specialization)
Flight Training For Civil Aviation

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)

Tutorials
15

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
mgr inż. Wojciech Nowaczyk

Responsible for the course/lecturer:
58

mgr inz. Tomasz Duda

Prerequisites

The student starting this subject should have a basic knowledge of flight planning. 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 rules of flight planning and monitoring in accordance with applicable regulations, developing an operational flight plan and flight plan for air navigation services.

Course-related learning outcomes

Knowledge

1. has detailed knowledge related to selected issues in the field of the most important phenomena occurring in the Earth's atmosphere, the possibility of their prediction, recognition, research, as well as limiting the negative impact of human activity on the surrounding environment

2. has detailed knowledge related to selected issues in the field of navigation, flight mechanics and piloting techniques, the use of simulators, flight rules, its preparation, and related operating procedures

Skills

1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret them and make a critical evaluation, draw conclusions and exhaustively justify the opinions they formulate

2. can, when formulating and solving tasks related to civil aviation, apply appropriately selected methods, including analytical, simulation or experimental methods

3. is able to organize, cooperate and work in a group, assuming various roles in it, and is able to properly define priorities for the implementation of a task set by himself or others

Social competences

1. understands that in technology, knowledge and skills very quickly become obsolete

2. correctly identifies and resolves dilemmas related to the profession of an aerospace engineer

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:

- knowledge acquired as part of the exercises is verified by two 45-minute colloquia carried out in 3 and 7 classes

Programme content

Lecture:

semester 4:

MASS AND BALANCE - AEROPLANES/HELICOPTERS

PURPOSE OF MASS-AND-BALANCE CONSIDERATIONS

Mass limitations

Importance with regard to structural limitations

Importance with regard to performance. Remark: See also Subjects 032/034 and 081/082.

Centre-of-gravity (CG) limitations

Importance with regard to stability and controllability. Remark: See also Subjects 081/082.

Importance with regard to performance. Remark: See also Subjects 032/034 and 081/082.

LOADING

Terminology

Mass terms

Load terms (including fuel terms) Remark: See also Subject 033.

Mass limits

Structural limitations

Performance and regulated limitations

Cargo compartment limitations

Mass calculations

Maximum masses for take-off and landing

Allowed traffic load and fuel load

Use of standard masses for passengers, baggage and crew

MASS-AND-BALANCE DETAILS OF AIRCRAFT

Contents of mass-and-balance documentation

Datum, moment arm

CG position as distance from datum

CG position as percentage of mean aerodynamic chord (% MAC). Remark: Knowledge of the definition of MAC is covered under Subject 081 01 01 05.

Longitudinal CG limits

Lateral CG limits

Details of passenger and cargo compartments

Details of fuel system relevant to mass-and-balance considerations

Determination of aircraft empty mass and CG position by weighing

Weighing of aircraft (general aspects)

Calculation of mass and CG position of an aircraft using weighing data

Extraction of basic empty mass (BEM) and CG data from aircraft documentation

BEM or dry operating mass (DOM)

CG position or moment at BEM/DOM

Deviations from standard configuration

DETERMINATION OF CG POSITION

Methods

Arithmetic method

Graphic method

Index method

Load and trim sheet

General considerations

Load sheet/balance schedule and CG envelope for light aeroplanes and for helicopters

Load sheet for large aeroplanes

Trim sheet for large aeroplanes

Other methods to present load and trim information

Repositioning of CG

Repositioning of CG by shifting the load

Repositioning of CG by additional load or ballast or by load or ballast removal

CARGO HANDLING

Types of cargo

Types of cargo (general aspects)

Floor-area load and running-load limitations

Floor-area load and running-load limitations in cargo compartments

Securement of load

Securement of load (reasons and methods)

Exercises:

semester 4:

CS-23/APPLICABLE OPERATIONAL REQUIREMENTS PERFORMANCE CLASS B - THEORY

Airworthiness requirements

Airworthiness requirements and definitions

Take-off and landing

Take-off and landing (definitions and effects)

Climb, cruise and descent

Climb, cruise and descent (requirements and calculations)

CS-23/APPLICABLE OPERATIONAL REQUIREMENTS PERFORMANCE CLASS B - USE OF AEROPLANE PERFORMANCE DATA FOR SINGLE- AND MULTI-ENGINE AEROPLANES

Use of aeroplane performance data

Take-off

Climb

Landing

CS-25/APPLICABLE OPERATIONAL REQUIREMENTS PERFORMANCE CLASS A - THEORY

Take-off

Take-off performance, definitions of and relationships between terms

Take-off distances

Accelerate-stop distance

Balanced field length concept

Unbalanced field length concept

Field-length-limited take-off mass (FLLTOM)

Contaminated runways

Take-off climb

Obstacle-limited take-off

Performance-limited take-off mass (PLTOM) and regulated take-off mass (RTOM) tables

Take-off performance on wet and contaminated runways

Use of reduced (flexible or flex) and derated thrust

Take-off performance using different take-off flap settings

Take-off performance using increased V2 speeds (‘improved climb performance’)

Brake-energy and tyre-speed limit

Climb

Climb techniques

Influence of variables on climb performance

Cruise

Long-range cruise

Cruise altitudes

Cost index (CI)

En-route one-engine-inoperative

Drift-down

Influence of variables on the en-route one-engine-inoperative performance

Descent

Descent techniques

Energy management in the descent

Approach and landing

Approach requirements

Landing-field-length and landing-speed requirements

Influence of variables on landing performance

Quick turnaround limit

CS-25/APPLICABLE OPERATIONAL REQUIREMENTS PERFORMANCE CLASS A - USE OF AEROPLANE PERFORMANCE DATA

Take-off

Take-off (performance data)

Drift-down and stabilising altitude

Drift-down and stabilising altitude (performance data)

Landing

Landing (performance data)

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.

Bibliography

Basic

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	55	2,5
Student's own work (literature studies, preparation for written tests)[1]	45	1,5

[1] delete or add other activities as appropriate