



COURSE DESCRIPTION CARD - SYLLABUS

Course name

General knowledge about the aircraft 2

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

75

Laboratory classes

Other (e.g. online)

Tutorials

60

Projects/seminars

Number of credit points

8

Lecturers

Responsible for the course/lecturer:

Sławomir Błocki

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Responsible for the course/lecturer:

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Prerequisites

The student starting this subject should have basic knowledge of airframe assemblies, control systems, hydraulic, pneumatic, fuel, air-conditioning and emergency systems. 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 construction of the aircraft, its executive teams.

Course-related learning outcomes

Knowledge

1. has detailed knowledge related to selected issues in the construction of manned and unmanned aircraft, including on-board systems and their main components.



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

3. has a basic knowledge of the basic processes occurring in the life cycle of devices, facilities and technical systems, as well as their technical description in the field of aviation engineering.

Skills

1. ma umiejętność samokształcenia się z użyciem nowoczesnych narzędzi dydaktycznych, takich jak zdalne wykłady, internetowe strony i bazy danych, programy dydaktyczne, książki elektroniczne.

2. potrafi pozyskiwać informacje z literatury, internetu, baz danych i innych źródeł. Potrafi integrować uzyskane informacje, interpretować i wyciągać z nich wnioski.

3. potrafi analizować obiekty i rozwiązania techniczne, potrafi wyszukiwać w katalogach i na stronach producentów gotowe komponenty maszyn i urządzeń, w tym środków i urządzeń transportowych i magazynowych, ocenić ich przydatność do wykorzystania we własnych projektach technicznych i organizacyjnych.

Social competences

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

2. understands the need for critical assessment of knowledge and continuous education.

3. is aware of the social role of a technical university graduate, and in particular understands the need to formulate and communicate to the public, in particular through the mass media, information and opinions on the achievements of technology and other aspects of engineering activities; endeavors to provide such information and opinions in a generally understandable way.

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 (semesters 3-5)

- assessment of knowledge and skills demonstrated in the exam - 1.5 hours (semester 6)

Exercises:

- knowledge acquired during the exercises is verified by two 45-minute colloquia carried out during 3 and 7 classes

Programme content

Lecture:

semester 3:



System design. Design concepts. Level of certification. Loads and stresses. Fatigue and corrosion. Describe and explain fatigue and corrosion. Maintenance methods: hard-time and on-condition monitoring. Maximum structural masses.

semester 4:

Hydromechanics: basic principles. Hydraulic systems. Hydraulic fluids: types, characteristics, limitations. System components: design, operation, degraded modes of operation, indications and warnings. Landing gear, wheels, tyres, brakes. Anti-skid. Autobrake.

semester 5:

Aeroplane: primary flight controls - definition and control surfaces. Pneumatic/bleed-air supply. Piston-engine air supply. Gas turbine engine: bleed-air supply. Anti-icing and de-icing systems. Fuel system.

semester 6:

Sensors and instruments. Measurement of air-data parameters. Gyroscopic instruments. Inertial navigation. Aeroplane: automatic flight control systems. Trims - yaw damper - flight-envelope protection.

Exercises:

semester 3:

Attachment methods and detecting the development of faulty attachments. Composite and other materials. Aeroplane: wings, tail surfaces and control surfaces - design. Loads, stresses and aeroelastic vibrations (flutter). Fuselage, landing gear, doors, floor, windscreen and windows.

semester 4:

Nose-wheel steering - design, operation. Brakes - types and materials. Piston engines. Turbine engines.

semester 5:

Electrics. Protection and detection systems. Oxygen systems. Communication systems. Flight management system (FMS). Alerting systems, proximity systems. Integrated instruments - electronic displays.

semester 6:

Magnetism - direct-reading compass and flux valve. Autothrust - automatic thrust control system. Maintenance, monitoring and recording systems. Digital circuits and computers.



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

1. Cichosz E., Konstrukcja i praca płatowca, WAT, Warszawa 1986 r.
2. Olejnik A., Budowa statków powietrznych, WAT 1984 r.
3. Błaszczak J., Konstrukcja samolotów, cz.I., Obciążenia zewnętrzne, WAT, Warszawa 1984 r.
4. Danilecki S., Projektowanie samolotów, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000 r.
5. Polak Z., Rypulak A., Bilski J., Awionika, przyrządy i systemy pokładowe, WSOSP, Dęblin 1999 r.
6. Spitzer Cary R., The Avionics Handbook, AvioniCon Inc, Williamsburg 2001 r.
7. Kazana J., Lipski J., Budowa i eksploatacja pokładowych przyrządów lotniczych, WKiŁ, Warszawa 1983 r.

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	200	8,0
Classes requiring direct contact with the teacher	163	6,5
Student's own work (literature studies, preparation for written tests) ¹	37	1,5

¹ delete or add other activities as appropriate