COURSE DESCRIPTION CARD - SYLLABUS

Course name

General knowledge about the aircraft 2

Course

Field of study

Aviation and astronautics

Year/Semester

2/3-4; 3/5-6

Area of study (specialization)

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

75

Laboratory classes

Other (e.g. online)

Tutorials

60

Projects/seminars

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

Sławomir Błocki

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Responsible for the course/lecturer:

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 field of manned and unmanned aircraft construction, including on-board equipment and their main components

2. has expanded knowledge necessary to understand profile subjects and specialist knowledge about construction, methods of construction, manufacture, operation, air traffic management, security systems, impact on the economy, society and the environment in the field of aviation and space science for selected specialties:

1. Piloting of aircraft

2. Aero engines and airframe components

3. Aviation security and management

4. Air transport

Skills

1. is able to analyze objects and technical solutions, can search in the catalogs and on the manufacturers' websites ready components of machines and devices, including transport and storage devices and equipment, assess their suitability for use in own technical and organizational projects

2. can draw a diagram and a simple machine element in accordance with the principles of technical drawing

3. is able to develop a manual and repair instructions for a simple machine or its components from the group of machines covered by the selected specialty

Social competences

1. understands the need for lifelong learning; can inspire and organize the learning process of others

2. is aware of the social role of a technical university graduate, and in particular understands the need to formulate and convey 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. Intertial 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.

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

1. Cichosz E., Konstrukcja i praca płatowca, WAT, Warszawa 1986 r.

2. Olejnik A., Budowa statków powietrznych, WAT 1984 r.

3. Błaszczyk 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	149	5,0
Classes requiring direct contact with the teacher	135	4,5
Student's own work (literature studies, preparation for written tests)[1]	14	0,5

[1] delete or add other activities as appropriate