

Aircraft Systems and Avionics

Code: MK3RERAJ04JL20-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Semester: 6th semester

Its prerequisite(s): Control Theory II

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 2+2

Topics: Aircraft on-board systems: steering control, power (fuel, hydraulic, pneumatic, (fuel, hydraulic, pneumatic, electric), passenger and cargo transport, passenger comfort and rescue, flight safety enhancing (temperature control and air-conditioning, fire extinguishing, de-icing, emergency evacuation), primary and navigational instruments (traditional and electronic), autopilot, radio altimeters, radar, ground proximity warning, flight monitoring systems.

Associated sensors and controllers and ground support systems.

Literature:

Compulsory:

- Fielding, John P.: Introduction to Aircraft Design, CAMBRIDGE University Press, 2000

Aircraft Operations and Airworthiness

Code: MK3LEGUJ05JL20-EN

ECTS Credit Points: 5

Evaluation: mid-semester grade

Semester: 6th semester

Its prerequisite(s): Aircraft Constructions

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 5+3

Topics:

Characterization of aviation through the use of aircraft. The organization, organizational design, operation, current problems of air transport, and their solution options.

Aircraft operation; Operating methods; Monitoring and diagnostic systems. Service, maintenance, repair organization, technology and procedural technical solutions. Airports: description of the most important organizational units of airports. Flight safety and related basic concepts Regulations and methods of accident investigation. Airworthiness issues in Hungary. Production of parts, equipment, main parts. Operating, maintenance and repair procedures, continuing airworthiness.

Literature:

Compulsory:

- Dole, C.E. – Lewis, J.E.: Flight Theory and Aerodynamics – a Practical Guide for Operational Safety (2nd Ed.), John Willey and Sons, 2000

- Krause, S.: Aircraft Safety: Accident Investigations, Analyses & Applications (2nd Ed.) 2003
- Wood, R. H., Swegennis, R. W.: Aircraft Accident Investigation (2nd Edition), ISBN-10: 1892944170, 2006.
- Florio, F.: Airworthiness: An Introduction to Aircraft Certification; a Guide to Understanding JAA, EASA and FAA Standards, 2006, ISBN: 0750669489

Schedule

1st week Registration week	
2nd week: Lecture: Characterization of aviation, use of aircraft Practice: Case studies 4th week: Lecture: Modelling the operational process. Operating methods. Operation according to condition. monitoring and diagnostic systems. Service, maintenance, repair organization, technology and procedural technical solutions Practice: Laboratory practice, operational calculations 6th week: Lecture: Aviation management: definition and description of individual parts. Description of the ATC used in the current aviation system. Practice: Airport visit	3rd week: Lecture: Interpretation of the aircraft operation process and system, characterization of the operation processes Practice: Laboratory practice, operational calculations 5th week: Lecture: Description of the most important organizational units of airports: terminals, concourses, runways, taxiways, electrical systems, lighting, navigation devices, etc. Design principles of airports. Practice: Airport visit 7th week: Lecture: Current ATM limitations. The future of ATC and ATM. Description of the main objectives of SESAR. Practice: Case studies
8th week: 1st drawing week	1st Mid-term test
9th week: Lecture: Analysis of the total lifetime cost of an aircraft: development, design, production, certification and testing, use, recycling costs. Practice: Laboratory practice, operational calculations 11th week: Lecture: Flight safety and related basic concepts. Dangerous flight modes and pilot	10th week: Lecture: Models for cost estimation and their application. Comparison of the operating costs of airplanes with other transportation methods Practice: Laboratory practice, operational calculations 12th week: Lecture: The influence of weather, maintenance and technical condition on flight safety. Driving and other errors

behaviour leading to a dangerous flight condition.

Practice: Case studies

13th week:

Lecture: System of ICAO Annexes, airworthiness standards (FAA and EASA). Type and individual airworthiness.

Practice: Airworthiness issues in Hungary.

occurring during take-off and landing. Statistical data of air events. Regulations and methods of accident investigation.

Practice: Case studies

14th week:

Lecture: Production of parts, equipment, main parts. Operating, maintenance and repair procedures, continuing airworthiness. Personal qualifications of aviation workers

Practice: Basics of production processes.

15th week: End-term test

Requirements

A, for a signature:

Attendance at **lectures** is recommended, but not compulsory.

Participation in **practice** is compulsory. Students must attend the practice classes and may not miss more than three classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students cannot make up a practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is counted as an absence. Missed practices should be made up for at a later date, being discussed with the instructor.

Students have to write two midterm tests and create a project task during the semester.

B, for a grade:

The course ends in a mid-semester grade based on the average grade of the two tests and the grade for the project task.

Special Aircraft

Code: MK3KULJJ03JL20-EN

ECTS Credit Points: 3

Evaluation: mid-semester grade

Semester: 7th semester

Its prerequisite(s): Thermodynamics

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 2+0

Topics: The main objective of the course is to familiarise students with special aircrafts and provide a broader understanding of the aircraft and their operating principles. The operating principles of drones, helicopters and rotary wing aircrafts, sports aircrafts, fixed and rotary wing drones, gliders, low Reynolds number flows. On-board gas turbines, propeller fan engines, lifting engines, jet engines, rocket engines, nozzles. Learning the software of robotic aircraft in practice. Legal and regulatory aspects of the use of drones, construction and operating principles of drones and their electronics; Smart flight modes, fleet management; Aerial photography and videography tools; GIS utilization of special aircrafts.

Literature:*Compulsory:*

- Treager I. E.: Aircraft Gas Turbine Engine Technology. McGraw-Hill. 2000.
- Rácz Elemér: Repülőgéptervezés, Tankönyvkiadó, Budapest, 1955
- Samu Béla: Repülőgépelemek, Tankönyvkiadó, Budapest, 1951
- Dr. Petúr Alajos: Repülőgépelemek, Tankönyvkiadó, Budapest, 1953
- Alex Elliott: Drónok kézikönyve - Alkalmazás - Karbantartás - Működtetés – Építés ISBN 9789632785219, 2017., CSER KÖNYVKIADÓ ÉS KER. Kft.