Budapest University of Technology and Economics
Faculty of Transportation Engineering and Vehicle Enginee

1. Subject name	**Aircraft design and production I.**				
2. Subject name in Hungarian	Repülőgépek tervezése, gyártása I.				
3. Code	**BMEKOVRM629**	4. Evaluation type	**exam grade**	5. Credits	**4**
6. Weekly contact hours	**2 (10) Lecture**	**0 (0) Practice**	**2 (11) Lab**		
7. Curriculum	**Vehicle Engineering MSc (J)**	8. Role	**Specialization (sp) at Vehicle Engineering MSc (J)**		
9. Working hours for fulfilling the requirements of the subject					**120**
Contact hours	56	Preparation for seminars	18	Homework	26
Reading written materials	10	Midterm preparation	0	Exam preparation	10
10. Department	**Department of Aeronautics and Naval Architectures**				
11. Responsible lecturer	Dr. Rohács Dániel				
12. Lecturers	Dr. Beneda Károly, Prof. Rohács József, Dr. Sziroczák Dávid, Dr. Veress Árpád				
13. Prerequisites					

14. Description of lectures

Aircraft development philosophy. Role of aviation in economy. Problems to be solved in the fields of aviation and aircraft. Fundamental equations of aircraft development. Goodness and economic factors. Change of factors as a function of development philosophies. General description of development. Technology protection and the role of technology transfer. Aircraft development and design methods. Control of the development process.
Role of aircraft structures and systems. Determination of loads and power requirements. Preliminary design based on estimated loads, sizing of main elements. Preliminary design of aircraft as group project. Aerospace materials, manufacturing technology and good design practice. Basic composite calculations.
Basics of CAD design. CATIA specifics. Solid parts, assemblies, surfaces modelling.
Theoretical and practical aspects of gas turbine engine design: thermodynamic cycle analysis, determination of the main geometrical sizes, mean line design, blade twisting, 3D component design and creating 3D CAD models.

15. Description of practices

16. Description of labortory practices

Preliminary design of aircraft, sizing of main components. Gas turbine engine design. Learning CATIA, and application of knowledge for design tasks.

17. Learning outcomes

A. Knowledge
- The student knows the steps of preliminary aircraft design and the aerodynamic design of gas turbine engines (determination of loads, sizing of main components, thermodynamic cycle analysis, determination of the main geometrical sizes, mean line design, blade twisting, 3D component design and creating 3D CAD models) and the theoretical and practical aspects of each design step.

B. Skills
- The student is able to complete a gas-turbine design task with supervision.
- The student is able to generate preliminary level design of an aircraft component as a group task.

C. Attitudes
- The student aims to complete his/her specified tasks at the highest level, under the shortest time, by providing his/her knowledge and capacity at the best to obtain knowledge for deep and independent professional work.
- The student cooperates with professors and mates during the studies.
- The student continuously increases his/her knowledge independently by having information from the external literature to complete his/her studies given by the lectures

D. Autonomy and Responsibility
- The student takes responsibility for guiding mates by the quality of his/her work and by keeping ethic norms.
- The student takes responsibility for applying the knowledge in line with the studied conditions, limitations and

constraints.
- The student can friendly accept the well-established constructive criticism and can utilize that in future.
- The student can accept the form of the cooperation; he/she can work alone or in a team member depends on the actual situation.

18. Requirements, way to determine a grade (obtain a signature)

Design task: Design of gas turbine engine based on the steps defined in the subject description via weekly consultations. The outcome of the design process is the calculation table (in Excel, Matlab, Mathcad, Mathematica, etc. environment) and project report (in MS Word format). There is also a group project involving the preliminary design of an aircraft component as a group project.
Mid-term requirement: Delivery of design task until one week before examination period of semester. The final grade of the subject is the mathematical average of the grade given for the exam and for the design task.

19. Opportunity for repeat/retake and delayed completion

The delivery date of the design task and the documentations is the last week of the semester. If it is not delivered in time, it is also possible to deliver the design task and documentations in the supplementary week besides paying the administration fee.

20. Learning materials

The presentation about the lectures
Literature

Effective date	10 October 2019	**This Subject Datasheet is valid for**	Inactive courses