

**Faculty of Transportation Engineering and Vehicle Engineer** 

## Subject name Modern 3D Design PhD

2. Subject name in Hungarian	Korszerű 3D ábrázolás PhD					
3. Code	BMEKOJSD006	4. Evaluation type	exam grade	5. Credits	2	
6. Weekly contact hours	0 (0) Lecture	2 (0) Practice	0 (0) Lab			
7. Curriculum	PhD Programme	8. Role	Specific course			
9. Working hours	for fulfilling the req	uirements of the s	ubject		120	
Contact hours	28	Preparation for seminars	10	Homework	62	
Reading written materials	0	Midterm preparation	0	Exam preparation	20	
10. Department	Department of Railway Vehicles and Vehicle System Analysis					
11. Responsible lecturer	Dr. Ficzere Péter					
12. Lecturers	Dr. Ficzere Péter					
13. Prerequisites						
14. Description of	lectures					
Types and descripti Demonstration of ap Modeling of prismat Modeling of revolved Creating 3D cuts, ac Examination of phys Create assemblies, Fit investigation, exp Renderings Generation of drafts Lofted and swept pr Basics of the finite e Shape optimisation Generative design Documentation	on of CAD systems oplications and role of ic bodies, preparation d bodies dding subtitle labels, sical properties, deter constraining of the pro- bloded views, motion (views, cuts, etc.), it otrusions and cuts element analysis (line	f 3D engineering mod n of patterns callouts, managing or rmination of center of arts simulation em numbers, parts lis ar static structural, no	eling software in r utput formats volume and mass st	machine design . Determination of the ar kling, steady state heat t	eas of the surfaces	

15. Description of practices

Exercising theoretical knowledge with examples and case studies.

16. Description of labortory practices

## 17. Learning outcomes

## A. Knowledge

- Knowledge of modeling, simulation and testing capabilities provided by design software.
- Knows the conditions for interoperability between CAD models.
- He understands the basic conditions of finite element analysis and can define the necessary conditions. He can define the conditions, variables, target functions needed for shape optimization.
- B. Skills
  - Able to create a model of any complex part.
  - Able to receive and modify any model made in another CAD system.
  - Able to perform physical examinations of the designed parts (determination of the center of volume and mass. Determination of the area of the surfaces.
  - Able to assemble parts and to constranin to function properly.
  - Able to test and control assemblies (Fit investigation, exploded view, motion simulation.
  - Able to produce proper documentation (use of sections, labels, pointing lines, colors) and assembly instructions. Able to create drawings and videos of structures
  - Able to create rendered, realistic graphs and place them in their real environment (virtual reality).

- Able to produce high quality marketing materials.
- Able to generate the necessary views, sections with the help of the prepared solid models. Able to produce correct technical drawings according to standard rules.
- Able to create a solid model based on drawings.
- Able to produce formats required for CAM software.
- Able to make finite element analysis on parts or on complex structures, assemblies.
- Able to define the needed constraints, loads, boundary conditions. Able to evaluate the results and to document them at the appropriate level.
- Able to perform shape optimization using finite element simulation results.
- Able to define the constraints, thresholds, design variables, convergence criteria and target function required for the optimisation process.
- Able to implement generative design in practice.

C. Attitudes

- Strive to maximize their abilities to make their studies at the highest possible level, with a profound and independent knowledge, accurate and error-free, in compliance with the rules of the applicable tools, in collaboration with the instructors.
- D. Autonomy and Responsibility
  - Take responsibility for the quality of the work and the ethical standards that set an example for the classmates, using the knowledge acquired during the course.

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

It is required to fulfill in time the individual student work.

19. Opportunity for repeat/retake and delayed completion

According to the TVSZ.

20. Learning materials

Effective date	27 November 2019	This Subject Datasheet is valid for	2024/2025 semester II
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