

Faculty of Transportation Engineering and Vehicle Engineering

1. Subject name	Structural vibrations					
2. Subject name in Hungarian	Szerkezetek lengései					
3. Code	BMEKOJSM665	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	20	
Reading written materials	12	Midterm preparation	4	Exam preparation	10	
10. Department	Department of Railway Vehicles and Vehicle System Analysis					
11. Responsible lecturer	Dr. Béda Péter					
12. Lecturers	Dr. Béda Péter, Dr. Pápai Ferenc					
13. Prerequisites	strong: KOJSM663 - Mechanics of superstructure materials					
14. Description of lectures						
Application of the La conditions of exister	agrange equation of s nce of stable equilibriu	econd kind for holon um. Small vibrations,	omic and scleronomic approximative determ	c conservative sytem mination of natural fre	s.Study and equencies.	

Oscillation of bars, axles, strings and membranes. Basics of modal analysis. Criterion of motion stability. Study methods for nonlinear problems. Bifurcation, post-critical states, soft and hard loss of stability

15. Description of practices

16. Description of labortory practices

Individual and guided practice lessons

17. Learning outcomes

A. Knowledge

- the student knows the Lagrange equations of the second kind describing holonomic and scleronomic sytems
- · knows the existence criteria of the stable equilibrium
- · knows the equations describing longitudinal, torsional and bending vibrations of rods
- · knows the vibration theory of shafts, cords and membranes
- · knows the basics of modal analysis
- · knows the motion stability criterium for both linear and nonlinear cases
- · knows the notions of bifurcation and postcritic state, as well as the theory of stability loss

B. Skills

- the student is able to check the stability of a structure
- · is able to analyze the possible vibrations
- is able to build linear and non-linear models
- is able to study models and to discuss results
- C. Attitudes
 - the student makes an effort to gather all the available informations in a given domain
 - · cooperates with his fellow students and the teacher
 - · is open minded towards new and innovative ideas and researches
 - · uses informatical and computational devices for his work
- D. Autonomy and Responsibility
 - the student is conscient about his responsibility towards the society and his company
 - asks for the colleagues' expertise and judgement when working
 - · considers challenges with responsibility

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

For signature: 2 semestrial homeworks, 2 midter tests with 50% result. Final mark equals to the result of the exam.

19. Opportunity for repeat/retake and delayed completion							
Second test possibility for those not present on the test, possibility of delayed deadline for homework							
20. Learning materials							
Lecture notes							
Effective date	10 October 2019	This Subject Datasheet is valid for	Inactive courses				