Course Syllabus
Location: PTE-MIK, A-305

ADVANCED STRUCTURAL DYNAMICS

Course Code: PMTSTNM067OA-EA-00
PMTSTNM067OA-GY-01

Semester: 1st
Number of credits:
Allotment of Hours per Week: 1 Lecture + 1 Practical classes/Week
Evaluation: Signature (with grade)
Prerequisites: Dynamics
Instructor: Dr. Orbán Ferenc
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Introduction, General Course Description:
Dynamic effort of impulse loads for single degree of freedom systems in elastic and plastic states. Calculations of natural frequencies and mode shapes for beams. Free vibration of beams. Excitation of beams by moving force. Exact dynamic stiffness matrices of beam systems. Dynamic stiffness matrices in case of application of finite element method. Calculation of vibration equations using modal analysis and numerical integrations. Calculation of machine foundations. Dynamic calculation of structure in case of support movements. Earthquake response analysis for SDOF. Dynamic effects of wind loads. Equations of motion for multi degree of freedom structures.

Methodology:
Lectures: will give an introduction to the basic knowledge of the structural dynamics.
Practical class: students will be able to practise the basic calculations and design through sample examples.
Exams: accumulated knowledge is tested in one midterm exam and a final exam.

Schedule:

Week	**Topic of lecture**
Week 1	Basic Information
Week 2	Symbols. SDOF sytem
Week 3	Calculations of natural frequencies and mode shapes for beams. Cantilever beam. Example.
Week 4	Natural frequencies for simply supported beam.
Week 5	Dynamic effect of impulse loads for one degree of freedom systems in elastic and plastic states.
Week 6	Dynamic stiffness matrices in case of application of finite element method
Week 7	Post dynamic analysis with FEM
Week 8	Fall break – no classes
Week 9	Midterm tests

Week 10	Calculations of multi degree of freedom system.
Week 11	Earthquake Response Analysis for single degree of freedom structures.
Week 12	. Numerical examples for calculation. Earthquake effect.
Week 13	Dynamic effects of wind loads
Week 14	Calculation of machine foundations
Week 15	**Examinations**

Attendance

Attendance at all lectures is compulsory and will affect the grade (to 10 % at most). Absenteeism will impair the end-of-term grade. If the number of absenteeism exceeds 30 % of the total number of lectures, the performance of the semester will be denied. It is required to be in class at the starting time and stay until the ending time. A delay of more than 20 minutes will be regarded as absenteeism. In case of illness or family emergency, the student must provide a valid certificate, such as a sick note.

Grading:

10%- Attendance
30% - Midterm test
60% - Final exam

Grade	5	4	3	2	1
Evaluation in percent	85%-100%	74%-84%	63%-73%	51%-62%	0-50%

Students with special needs:
Students with a disability and/or special needs should notify the Dean's Office if they require special accomodation. Proper documentation of the disability will be required. All attempts to provide an equal learning environment for all students will be made.