COURSE SYLLABUS SEMESTER

Name of Course	***STRUCTURAL DYNAMICS I***
Course Code	**MSB387AN-EA-00**
Allotment of Hours per Week	**2 lecture**
Number of Credits	**2**
Program	**Civil Engineering BSc**
Evaluation	**EXAM**
Semester	**Autumn 2020/2021**
Prerequisites	**Mechanics II. (Dynamics), Statics III**
Department	**Department of Civil Engineering**
Instructor	**Dr Pomezanski Vanda, Dr Adél Len**

INTRODUCTION, GENERAL COURSE DESCRIPTION

The aim of the course is to present the basics of vibrations of mechanical structures in civil engineering: elements of vibrating mechanical models (mass, stiffness, rigid and elastic elements); to introduce the students into the analysis of the vibration of one, two or more degrees of freedom mechanical systems, into the modelling of these systems and into the study of the response of mechanical structures to dynamic loads.

LEARNING OBJECTIVES

Methodology: The objective of the course is to introduce the students into the topic of Vibrations, starting from the basics to the analysis of simple vibrating systems.

The following topics will be discussed:
- one degree of freedom vibrating systems: modelling, undamped and damped vibrations, free and excited vibrations
- two or more degrees of freedom systems free and excited vibrations, analytical and numerical methods, the effect of damping on these systems
- excitation by support displacement, mechanical background of seismic design

Schedule:

Week 1	Introduction. Types of 1DoF mechanical systems. Modelling vibrating systems
Week 2	Free, undamped vibrating systems
Week 3	Vertical, undamped vibrations in gravitational field
Week 4	Linearization. Pendulum. Damping
Week 5	Free, damped, harmonic vibrating systems
Week 6	Excited vibrations
Week 7	*Midterm exam 1.*
Week 8	*AUTUMN HOLIDAY*
Week 9	Matrix differential equation of 2DOF mechanical systems. Examples.
Week 10	Stiffness matrix definition by the flexibility matrix. Examples.
Week 11	Stiffness matrix definition by the elementary siffness matrixes. Examples.
Week 12	Solution of 2DOF mechanical systems in the field of eigenvalues. Examples.
Week 13	2DOF damped vibration systems. Examples.
Week 14	Midterm exam 2.
Week 15	Support vibration of 1DOF and 2DOF mechanical systems. Examples.

ATTENDANCE AND GRADING

Attendance:

Attending (personal presence or on-line) is required in all classes. Personal presence needs to be made by taking into account the

measures in the fight against COVID-19 pandemic, announced at the "https://english.mik.pte.hu/news/information-for-students-and-colleagues-on-the-epidemiological-situation-related-to-the-spread-of-the-coronavirus" web page of the University.

Grading:

Accumulated knowledge is tested in two midterm exams.
The first Midterm exam will be written or on-line, according to the COVID-19 situation. The result of the midterm exam has to reach the minimum acceptable level (50% of the maximum points). Failed or skipped midterm exam can be repeated once (first week of the exam period). The final exam will be written or oral, with personal presence or on-line according to the COVID-19 situation. Registering for the final exam is only possible with the completed midterm exam.

Offered exam grade:

Evaluation in percent	Numeric grade
85%-100%	5
74%-84%	4
63%-73%	3
50%-62%	2
0-49%	1

READINGS AND REFERENCE MATERIALS

- J.L. Meriam, L.G. Kraige: Engineering Mechanics, Dynamics. John Wiley and Sons. 2003
- Beer, F.P., Johnston, E. R.: Vector Mechanics for Engineers. Dynamics, McGraw-Hill, 2004
- William T. Thomson: Theory of Vibration with application, Chapman & Hall