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	**1- 7 weeks: Adél Len Dr.** **8-15 weeks: Vanda Olimpia Pomezanski Dr.**

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*	Matrix differential equation of 2DOF mechanical systems. Examples.
Week 9	Stiffness matrix definition by the flexibility matrix. Examples.
Week 10	Stiffness matrix definition by the elementary siffness matrixes. Examples.
Week 11	Solution of 2DOF mechanical systems in the field of eigenvalues. Examples.
Week 12	2DOF damped vibration systems. Examples.
Week 13	Midterm exam 2.
Week 14	Support vibration of 1DOF and 2DOF mechanical systems. Examples.

ATTENDANCE AND GRADING

Attendance:

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student

may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description. 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, opportunity and procedure for re-takes:

Accumulated knowledge is tested in two midterm exams.
Failed or skipped midterm exam can be repeated once (first week of the exam period).

Mid-term assessments, performance evaluation and their ratio in the final grade *(The samples in the table to be deleted.)*

Type	Assessment	Ratio in the final grade
Test 1	*100 points*	*50 %*
Test 2	*100 points*	*50 %*

Requirements for the end-of-semester signature

Mid-term assessment of 40%

Type of examination (written, oral):

The final exam will be written or oral (2x100 points for the two part), with personal presence or on-line according to the COVID-19 situation. The result of each exam part has to reach the minimum acceptable level (40% of the maximum points).

Registering for the final exam is only possible with the completed midterm exam.

The exam is successful if the result is minimum 40%.

Calculation of the grade (TVSz 47§ (3))

The mid-term performance accounts for 200 points, 50%, the performance at the exam accounts for 200 points, 50% in the calculation of the final grade.

Calculation of the final grade based on aggregate performance in percentage.

Course grade	Performance in %
excellent (5)	85 % …100 %
good (4)	70 % … 85 %
satisfactory (3)	55 % … 70 %
pass (2)	40 % … 55 %
fail (1)	0 % … 40 %

The lower limit given at each grade belongs to that grade.

READINGS AND REFERENCE MATERIALS

[1.] J.L. Meriam, L.G. Kraige: Engineering Mechanics, Dynamics. John Wiley and Sons. 2003

[2.] Beer, F.P., Johnston, E. R.: Vector Mechanics for Engineers. Dynamics, McGraw-Hill, 2004

[3.] William T. Thomson: Theory of Vibration with application, Chapman & Hall

[4.] Exercise Material,

[5.] Electronic Aids on TEAMS/Moodle