

COURSE SYLLABUS SEMESTER SPRING 2021/2022

<i>Name of Course</i>	Stability of Structures
<i>Course code</i>	MSM411ANEP
<i>Weekly hours: lect/pract/lab</i>	2 / 0 / 0
<i>Number of Credits</i>	3
<i>Program</i>	Structural Engineering MSc/ obligatory
<i>Evaluation</i>	exam
<i>Semester</i>	spring semester
<i>Prerequisites</i>	MSM405ANEP Structures 1.
<i>Department</i>	Department of Civil Engineering
<i>Responsible and lecturers</i>	Dr. Attila FÜLÖP associate professor

OBJECTIVES

Introduction to the theory of structural stability. The possible ways of reaching load bearing capacity, definition of static loading, methods of producing structural static models. Mathematical backgrounds of stability design (static method /eigenvalue problem/, energy method /variational problem/, kinematic method). Planar and 3D buckling problems of general bars, frames and trusses. Investigation of the local plate buckling of plates and plated structures (linear and non-linear); analysis of the post-critical (post-buckling) behaviour and the post-critical load-bearing capacity.

CONTENTS

General Course Description and Main Content: Introduction to the theory of structural stability. The possible ways of reaching load bearing capacity, definition of static loading, methods of producing structural static models. Mathematical backgrounds of stability design (static method /eigenvalue problem/, energy method /variational problem/, kinematic method). Planar and 3D buckling problems of general bars, frames and trusses. Investigation of the local plate buckling of plates and plated structures (linear and non-linear); analysis of the post-critical (post-buckling) behaviour and the post-critical load-bearing capacity.

Schedule:

1. Introduction. Course description. Orientation.
2. Main rules of the theory of structural stability
3. Plane Buckling of Struts
4. Stability Functions
5. Buckling of columns. The buckling shape of the compressed bars and the determination of the buckling length.
6. Buckling resistance of compressed columns according to Eurocode 3
7. Stability of non-uniform, locally weakened and couple-sectioned columns.
8. Stability of arches.
9. Lateral torsional buckling of beams
10. Ayrton-Perry formula
11. Plate and shell buckling.

EVALUATION AND GRADING

Attendance: Attending is required all classes. In case of unexcused absence from more than 30% of the total number of lesson will be grounds for failing the class. To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 20 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

Signature / Grading: The exam grade is based on homework 65%, end semester exam 25%, and attendance 10%. Details discussed on the practice.

Grading Scale:

85 – 100 %	A (5, jeles, excellent, sehr gut)
71 – 84 %	B (4, jó, good, gut)
60 – 70%	C (3, közepes, average, befriedigend)
50 – 59 %	D (2, elégséges, satisfactory, genügend)
0 – 49 %	F (1, elégtelen, fail, ungenügend)

MASKING REQUIRED INDOORS

The University of Pécs requires masking indoors for both vaccinated and unvaccinated individuals per the following:

- Masks should properly cover both the nose and mouth.
- More protective surgical, KN95 or N95 masks are highly recommended; bandanas and gators are not permitted.
- Faculty may unmask while teaching if 4 m of distance is maintained. All students must always wear masks.
- Individuals may only remove masks indoors when:
 - in an enclosed room alone.
 - actively eating or drinking.

READINGS AND REFERENCE MATERIALS

- [1st] Iványi, M. - Skaloud, M.: Steel Plated Structures, CISM Courses and Lectures No 358, International Centre for Mechanical Sciences, SPRINGER - Verlag, Wien - New York, 1995, p. 373. ISBN: 3-211-82742-0
- [2nd] Timoshenko, S. – Gere, J.M.: Theory of elastic stability, McGraw-Hill Book, New York, 1961
- [3rd] Stephen P. Timoshenko, James M. Gere : Theory of Elastic Stability, Dover Publications, 2012
- [4th] Chajes, A.: Principles of structural stability theory, Prentice-Hall, 1974, ISBN 978 013 7099 64 1
- [5th] Zdenek P. Bazant, Luigi Cedolin: Stability of Structures, Courier Dover Publications, 1991
- [6th] Theodore V. Galambos ed.: Guide to stability design criteria for metal structures, 5th ed., John Wiley & Sons, Inc., 1998

SCHEDULE

	TEACHING PERIOD, TEACHING WEEKS															EXAM PERIOD						
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	1.	2.	3.	4.	5.		
2021/2022. II. SEMESTER																						
Number of Lecture and Practice	1	2	3	4	4		5	6	7	8		9	10	11				Signature, midsemester grade can not be fulfilled				
Exams														x	x							
Signature and midsemester grade														sign.								
Planned exam time																						

8th February 2022.

Dr. Attila FÜLÖP

responsible lecturer