COURSE SYLLABUS SEMESTER SPRING 2020/2021

Name of Course	**Stability of Structures**
Course code	**MSM411ANEP**
Weekly hours: lect/pract/lab	**2 / 0 / 0**
Number of Credits	**3**
Program	**Structural Engineering MSc/ obligatory**
Evaluation	**exam**
Semester	**spring semester**
Prerequisites	**MSM405ANEP Structures 1.**
Department	**Department of Civil Engineering**
Responsible and lecturers	**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) behavior 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) behavior 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:

0 – 50 % failed (1)
51 – 62 % passed (2)
63 – 75% satisfactory (3)
76 – 87 % good (4)
88 – 100 % excellent (5)

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				
2020/2021. II. SEMESTER	**1.**	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**	**1.**	**2.**	**3.**	**4.**	**5.**
Number of Lecture and Practice	1	2	3	4	4	5	6	6	7		8	9	10	11				Signature, midsemester grade can not be fulfil		
Exams														×	×					
Signature and midsemester grade															sign.					
Planed exam time																				

2nd February 2020.

Dr. Attila FÜLÖP

responsible lecturer