General Information:

Name of Course: # THEORY OF STRUCTURAL STABILITY

Course Code: PMTSTNM066OA
Semester: 2nd
Number of Credits: 3
Allotment of Hours per Week: 2 Lectures + 1 practical class /Week
Evaluation: Signature (with grade)
Prerequisites: **none**

Instructor: **Dr. Attila FÜLÖP**
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Introduction, General Course Description:

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.

Learning Objectives:

Methodology:

- **Lectures**: will give an introduction to the basic knowledge of the design of the mechanics materials.
- **Practical class**: Students will be able to practice the basic calculations and design through sample examples.
- **Exams:** Accumulated knowledge is tested in two exams: a midterm exam, and a final exam.

Schedule:

Week	Topic of lecture
Week 1	Course description.
Week 2	Introduction
Week 3	Plane Buckling of Struts
Week 4	Stability Functions
Week 5	Stability Functions
Week 6	Concepts and Applications of the Imperfect Steel Frames
Week 7	Spatial Buckling of Struts
Week 8	Elastic Critical Plate Buckling Loads
Week 9	Behaviour of Plate Elements of Steel Frames

Week 10	Stability and Ductility of Steel Frames
Week 11	*Spring break – no classes*
Week 12	Semi-Rigid Connections in Steel Construction
Week 13	Stability and Ductility of Steel Frames with Semi-Rigid Connections
Week 14	**Final exam**
Week 15	**Re-exam** (only if required)

Attendance:

Attending is required all classes, and will impact the grade (max. 10%). Unexcused absences will adversely affect the grade, and in case of 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.

Grading:

10% - Attendance
90% - Final Exam

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

Students with Special Needs:

Students with a disability and needs to request special accommodations, please, notify the Deans Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

Readings and Reference Materials:

- 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
- Timoshenko, S. – Gere, J.M.: Theory of elastic stability, McGraw-Hill Book, New York, 1961
- Stephen P. Timoshenko, James M. Gere : Theory of Elastic Stability, Dover Publications, 2012
- Chajes, A.: Principles of structural stability theory, Prentice-Hall, 1974, ISBN 978 013 7099 64 1
- Zdenek P. Bazant, Luigi Cedolin: Stability of Structures, Courier Dover Publications, 1991
- Theodore V. Galambos ed.: Guide to stability design criteria for metal structures, 5th ed., John Wiley & Sons, Inc., 1998
- ftp://witch.pmmf.hu:2001/Tanszeki_anyagok/Epitomernok_Tanszek/Fulop_Attila/Stabilitaselmelet/