General Information:

Name of Course: # Structural Analysis 3. - Finite Element Modelling

Course Code: **MSB386AN (**PM-TSTNB042CA)
Semester: 6st
Number of Credits: 3
Allotment of Hours per Week: 1 lecture and 2 Laboratory practice /Week
Evaluation: Exam (with grade)
Prerequisites: **Structural Analysis 1.**

Instructors: **Dr Vanda Olimpia Pomezanski, associate professor**
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Introduction, Learning Outcomes:
This course is aimed to provide basic and advanced knowledge on the principles and solution methods of the finite element method. Topics covered by the course include: General formulations and basic steps of the FEM design. Geometrical finitization, local coordinate systems, calculation of elementary matrixes, the stiffness matrix, the load vector. Controlling methods. Examples like frames, beams, grids, plates, walls, shells. Usage of an industrial code AXIS.

Methodology:
The course is based on individual engineering skills with regular consultations and presentations.

Topics:
The semester is divided into two principle periods and attendant exercises.

The rough outline of the schedule is as follows:
Lectures:

1. Models of 2D and 3D Truss type structures, equilibriums.
2. Matrix solution of a 2D Truss. The Matrix of Geometry.
3. The State Equation of a Truss. The Stiffness Matrix of a Truss.
4. The Flexibility and Stiffness Matrixes of a Beam. FE Models for simple supported beams.
5. The elementary stiffness matrixes and the structural stiffness matrixes. Local and global coordinates.
6. Plane surfaces like slabs or walls, 3D elements. FE Meshes.
7. Plane surfaces like slabs or walls, 3D elements.

Labor practices:

1. 1 Node Model of 2D and 3D Truss type structures, equilibriums.
2. Matrix solution of a 2D Truss. The Matrix of Geometry.
3. 2D Truss with different types of supports: bar support, spring support.
4. Statically Indeterminate 2D Truss
5. 2D Truss, Load combinations.
6. The Flexibility and Stiffness Matrixes of a Beam
7. FE Models for simple supported beams, continuous beams and Gerber-beams.
8. Frame Structures.
9. Multi-level frames.
10. Grillages, 3D Frames.
11. The geometrical finitization, the shape functions.
12. Plane surfaces like slabs or walls, 3D elements
13. 3rd Test
14. Summary, Axis documentation

Studio Culture:
The course is based on through collaboration, participation and discussions trough lessons. This is an interaction between Students and Faculty; used the teaching methods like 'Problem-based learning' and 'learning-by-doing'. The communication and work should be reflect a respect for fellow students and their desire to work with regard to noise levels, noxious fumes, etc – from each site of participants.

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.

Attendance:
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.

Signature / semester mark condition
3 midterm test: 50-50 points =>150 points.
Test1-2 should be submitted by the specified deadline or thereafter, in addition to the payment of a defense fee, by the date of the last lesson in the 14th week. Test1-2 must be submitted in print and electronically (TEAMS). Test3 should be written at the time of the schedule. At the end of the diligence period, we provide once a replacement!

Recognition of the semester is subject to minimum of 40% (20 points) each, and of 50% (75 points) for all and attendance at lectures and practice.

Exam: presentation, 150 points, min.: 50%

Evaluation + Grading
Grading will follow the course structure with the following weight:
Midterm Work 50% + Exam 50%.

Grading Scale:

Numeric Grade:	5	4	3	2	1
	excellent	good	satisfactory	pass	fail
Evaluation in points:	91%-100% 271-300 points	76%-90% 226-270 points	60%-75% 180-225 points	50%-59% 150-179 points	0-49% 0-149 points

PTE Grading Policy:
Information on PTE's grading policy can be found at the following location:

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:

- Daryl L. Logan: **A first course in the FINITE ELEMENT METHOD**, Sixth edition, SI, 2016 USA, ISBN-13: 978-1-305-63734-4

SCHEDULE

		WORKING PERIODS, TEACHING WEEKS														Exam period				
Semester 2020/2021. II.		**1.**	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**	**1.**	**2.**	**3.**	**4.**	**5.**
Serial number of presentation			1		2, 3				3, 4		5		6		7						
Serial number of practice/laboratory		1	2	3	4	5, 6		6, 7	8	9	10		11	12	13	14					
Midterm test															T3				Signature and midterm mark cannot be corrected		
Home Work	**promulgation**					T1					T2										
	submission deadlines							T1					T2								
Records	**submission deadlines**																				
Others	**eg. reports,**																				
	etc.																				
Signiture / semester mark																A					
Scheduled dates for exams																	X	X		X	

February 07. 2022.

Vanda Olimpia Pomezanski Dr.

associate professor.