(B) Course information in English

General course information:

Course title:	Structural Analysis I	**Course code:**	CE04-S02
Credits:	5	**Work load (hours):**	127
Course level:	Undergraduate ☒	Graduate ☐	
Course type:	Mandatory ☒	Selective ☐	
Course category:	Basic ☒	Orientation ☐	
Semester:	4th	**Hours per week:**	4

Course objectives (capabilities pursued and learning results):

The main objective is the understanding of the principles of structural analysis. The lectures concern the determination of the stress and deformation of statically determinate structures and the determination of influence lines. Finally, the students are introduced to the principle of virtual work, the reciprocal theorems and their applications in structural analysis. The result is the familiarization of the students with the statically determinate structures and the comprehension of the stress flow in different structural systems.

Prerequisites:

Mechanics I

Instructor's data:

Name:	Euripidis Mistakidis
Level:	Professor
Office:	101
Tel. – email:	24210 74171 – emistaki@uth.gr
Other tutors:	

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Statically determinate structures. Basic principles. The support of rigid bodies. Determination of reactions and internal forces.	4	2
2	Diagrams of bending moments, shear and axial forces due to concentrated and distributed loads. Properties and interrelation of the diagrams. The diagrams of polygonal structures.	4	2
3	Frame structures. The construction of the M,Q diagrams through the diagrams of the simply supported beam.	4	2
4	The notion of influence lines. The influence lines of simple beams.	4	2
5	Formulation and analysis of complex structures. The influence lines of complex structures.	4	2
6	Formulation and analysis of simple and complex trusses. The influence lines of truss structures.	4	2
7	The curved beam. Applications in tension and compression structures. Applications of symmetry in structural analysis.	4	2
8	Stable and unstable structures. The motion of rigid bodies in two dimensions. The study of one-degree-of-freedom unstable rigid systems. Applications.	4	2
9	Generalized forces and displacements. Fundamental displacements. The principle of virtual work for rigid systems with bilateral and unilateral supports.	4	2
10	Applications of the principle of virtual work for rigid systems. Calculation of internal or external forces.	4	2
11	Deformations of beams. Virtual displacements. The principle of virtual work for deformable systems.	4	2
12	The reciprocal theorems and their applications. The determination of deflections.	4	2
13	Deflections from external loading, support displacements, internal discontinuities and themperature effects.	4	2
14	Determination of the deflected shapes of beams	4	2

	and trusses.		

Additional hours for:			
Class project	**Examinations**	**Preparation for examinations**	**Educational visit**
20	3	20	-

Suggested literature:
1. Ι. Αβραμίδης, Στατική των Κατασκευών, Τόμος Ι (Θεωρία), Εκδόσεις ΣΟΦΙΑ, Θεσσαλονίκη 2008. 2. Ι. Αβραμίδης-Κ. Μορφίδης, Στατική των Κατασκευών, Τόμος Ια (Ασκήσεις), Εκδόσεις ΣΟΦΙΑ, Θεσσαλονίκη 2008. 3. Γ. Νιτσιώτας, Στατική των Γραμμικών Φορέων, Τόμος Ι Εκδόσεις ΖΗΤΗ, Θεσσαλονίκη 1980. 4. A. Armenakas, Classical Structural Analysis: A Modern Approach, McGraw Hill Text, 1988. 5. A. Ghali, A.M. Neville, Structural Analysis, SPON Press.

Teaching method *(select and describe if necessary* - **weight)**:		
Teaching	☒	40 %
Seminars	☐	
Demonstrations	☐	
Laboratory	☐	
Exercises	☒	60 %
Visits at facilities	☐	
Other *(describe):*	☐	
Total		100%

Evaluation method *(select)*- **weight:**				
	written	*%*	*Oral*	*%*
Homework	☐		☐	
Class project	☒	30%	☐	
Interim examination	☐		☐	
Final examinations	☒	70%	☐	

Other *(describe):*	☐		☐	