ECTS

(B) Course information in English

General course information:

Course title:	Analysis of Surface Structures	**Course code:**	ΔΟ1501
Credits:	6	**Work load (hours):**	144
Course level:	Undergraduate ☒	Graduate ☐	
Course type:	Mandatory ☐	Selective ☒	
Course category:	Basic ☐	Orientation ☒	
Semester:	9th	**Hours per week:**	4
Course objectives (capabilities pursued and learning results):			
Introduction to the properties and the mechanics of surface structures and presentation of analytical and numerical methods for evaluating the developed stresses and deformations under different types of loading.			
Prerequisites:			
• Differential equations • Solid Mechanics • Static I			

Instructor's data:

Name:	Stylianos Pardalopoulos
Level:	Teaching Staff
Office:	
Tel. – email:	pardalopoulos@uth.gr
Other tutors:	-

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Introduction – Typology of surface structures, Bending moments, Displacements, Deformations, Stresses, Stress Resultants.	4	2
2	Equations of equilibrium, Inconsistencies of plate theory, Differential equation for plates.	4	3
3	Plane transformations (slopes, curvature, moments), Boundary conditions, Numerical examples.	4	3
4	The Navier method, Numerical examples.	4	3
5	The Levy method, Numerical examples.	4	3
6	Practical/engineering solution methods for plates, The Markus and Czerny methods, Numerical example-comparison with analytical methods.	4	3
7	Continuous plates with varying span-length, The Cross method for plates.	4	3
8	Surface structures with in-plane loading, Boundary conditions. Differential equation for discs.	4	3
9	Numerical examples of estimating the response of discs utilizing analytical methods.	4	3
10	Special types of surface structures: Plates of infinite length, Circular plates, Circular discs.	4	3
11	Introduction to the Finite Element (FE) method for analyzing surface structures, Triangular and Quadrilateral plate-shell elements.	4	3

12	Analysis of R.C. building plates utilizing FE and practical methods. Evaluation of the analyses results.	4	3
13	Analysis of masonry structures utilizing FE and practical methods. Evaluation of the analyses results.	4	3
14	Analysis of complex surface structures utilizing FE and practical methods. Evaluation of the analyses results.	4	2

Additional hours for:			
Class project	**Examinations**	**Preparation for examinations**	**Educational visit**
30	**3**	**15**	

Suggested literature:

1. Makarios T.K., Manolis G.D. (2018). “Surface structures: Discs, Plates and Shells”, 2018, Tziolas Publications (in Greek).
2. Sapountzakis E.I. (2005). “Theory of Plates”, NTUA Publications (in Greek).
3. Valiasis T. (2000). “Surface Structures-Theory and solution methods”, Ziti Publications (in Greek).
4. Szilard R. (1974). «Theory and analysis of plates, Classical and numerical methods», John Wiley , ISBN: 978-0471429890
5. Timoshenko S., Woinowsky-Krieger S. (1959). «Theory of plates and shells», McGraw Hill.
6. Ventsel E., Krauthammer T. (2001). «Thin plates and shells. Theory, analysis and applications», Marcel Dekker Inc., ISBN:0-8247-0575-0.

Teaching method *(select and describe if necessary -* **weight***):*		
Teaching	☒	60 %
Seminars	☐	
Demonstrations	☐	
Laboratory	☒	20 %
Exercises	☒	20 %
Visits at facilities	☐	
Other *(describe):* ……	☐	
Total		100%

Evaluation method *(select)*- **weight:**				
	Written	*%*	*Oral*	*%*
Homework	☐		☐	
Class project	☒	25%	☒	25%
Interim examination	☐		☐	
Final examinations	☒	50%	☐	
Other *(describe):* ……	☐		☐	