Course information in English

General course information:

Course title:	Advanced Strength of Materials	**Course code:**	
Credits:	5	**Work load (hours):**	150
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):

The purpose of the course is the presentation of the complex macroscopic modeling of the mechanical behavior of materials (metals, polymers, etc.) under various loading conditions.

Prerequisites:

Strength of Materials
Mechanics of Deformable body
Theory of Elasticity

Instructor's data:

Name:	Christos Papakonstantinou
Level:	Assistant Professor
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Tel. – email:	2421074160 cpapak@uth.gr
Other Lecturers:	

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Behavior of Engineering materials; 1D Macroscopic Behavior; 1-D idealized Material Behavior (Phenomenological Model Classifications)	4	4
2	Review of Linear Elastic Behavior.	4	4
3	Linear Viscoelastic Behavior 1-D Simple Models and the standard test procedures.	4	4
4	1-D Complex Models, Creep Compliance & Relaxation Modulus Functions;	4	4
5	Multi-dimensional Linear Isotropic Viscoelastic Laws Postulates from Simple Tests, Extrapolation to 3-D	4	4
6	Non-Linear Viscoelastic Behavior in 1-D Non-Linear Viscoelastic Behavior in 3-D	4	4
7	Introduction to Plasticity. Plasticity: 1-D Plasticity and Viscoplasticity,	4	4
8	3-D Nonhardening plasticity Theory	4	4
9	3-D Nonhardening plasticity Theory	4	4
10	3-D Plasticity with Strain and Strain Rate Hardening	4	4
11	3-D Plasticity with Strain and Strain Rate Hardening	4	4
12	Applications to Simple Structural members: Flexure of Beams (Linear Elastic Beams, Linear Viscoelastic Beams, Non-Linear Viscoelastic Beams, Plastic Behavior of Beams)	4	4
13	Applications to Simple Structural members: Flexure of Beams (Linear Elastic Beams, Linear Viscoelastic Beams, Non-Linear Viscoelastic Beams, Plastic Behavior of Beams)	4	4
14	Applications to Plane-Strain, Plane-Stress	4	4

Additional hours for:			
Class project/Homework	Examinations	Preparation for examinations	Educational visit
15	3	20	

Suggested literature:
1. Stephen P. Timoshenko, J.N. Goodier, Theory of Elasticity, Mc Graw Hill, 1970. 7. R. Hill, *The Mathematical Theory of Plasticity,* Oxford University Press, 1950. 11. I. Finnie and W. R. Heller, *Creep* of *Engineering Materials,* McGraw Hill, 1959. 12 I. H. Shames and F. A. Cozzarelli, *Elastic and inelastic Stress Analysis*, Taylor and Francis, 1997.

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

Evaluation method *(select)-* **weight:**				
	Written	*%*	*Oral*	*%*
Homework	☐		☐	
Class project	☐		☐	
Interim examination	☐		☐	
Final examinations	☑	100%	☐	
Other *(describe):*…….	☐		☐	