ELASTICITY THEORY

1	Course Title:	ELASTICITY THEORY	
2	Course Code:	INS5011	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. BABÜR DELİKTAŞ	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	bdeliktas@uludag.edu.tr 224 2900744 Uludağ Univ. Müh.Mim Fak. İnşaat Müh. Böl. Görükle, Bursa	
17	Website:	http://insaat.uludag.edu.tr	
18	Objective of the Course:	To provide theoretical framework for determination of the stress, strain, and displacement distribution in an elastic solid under the influence of external forces. Following the usual assumptions of linear, small-deformation theory, to establish the formulation for a mathematical model that allows solutions to elasticity problems that have applications in many engineering and scientific fields.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Be able to extend skills of scientific problem solving in engineering mechanics problems related to field of interest
		2	Be able to describe the general features of elastic systems.
		3	Be able to overview of elastic analysis methods and able to doanalytical solutions to typical structural problems.
		4	Be able to derive approximation formulas using more advanced methods
		5	Be able to check the sufficiency of the strength, stiffness and stability of structural and machine elements
		6	Be able to solve elasticity problems faced in the field of interest by using the equations of elasticity theory and able to interpret the results in a way to develop new strategies
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21	Course Content:		

	Course Content:	
Week	Theoretical	Practice
1	Introduction	
2	Mathematical Preliminaries Vectors, Indicial Notations, Coordinate Transfromation, Cartesian Tensors	
3	Analysis of Strains Deformation, Displacement Transformation, Components of Strain	
4	Analysis of Strains principal Strains, Equation of Compatibility	
5	Analysis of Stresses Stress Tensor, Equation of Equilibrium,	
6	Analysis of Stresses Principal Stresses, Special State of Stress	
7	Constitutive Equation Stress-Strain Relations, Elastic Constants, I	
8	Constitutive Equation Isotropic Media, Strain Energy	
9	Basic Theorems	
10	Torsion of a Shaft, Torsion of Rectangular Cross Section	
11	Flexure Flexure of Rectangular, Cylindrical Beams	
12	Two Dimensional Problems Plane Strain, Generalized Plane Stress	
13	Boundary Value Problem in Plane Elasticity	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	6.00	84.00
Homeworks	10	8.00	80.00
Projects	2	16.00	32.00
Field Studies	0	0.00	0.00
Midterm Exams	1	3.00	3.00
Others	0	0.00	0.00
Final Exams	1	3.00	3.00
Total Work Load			244.00
Total work load/ 30 hr			8.13
ECTS Credit of the Course			6.00

22	Textbooks, References and/or Other Materials:	1.Theory of Elasticity, S. P. Timoshenko and J. N. Goodier, 3rd Edition, McGraw Hill Book Company, 1970, 1987. 2. Elasticity in Engineering Mechanics, 2nd Edition, A. P. Boresi and K. P. Chong, John Wiley & Sons, 2000. 3. Advanced Strength and Applied Elasticity, A. C. Ugural and S. K. Fenster, 2nd Edition, Elsevier Science Publishing Co., Inc., 1987. 4Elasticity: Theory, Applications and Numerics, by M.H. Sadd, Elsevier Butterworth-Heinemann, 2005.
23	Assesment	

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT

Midterm Exam	1	25.00
Quiz	0	0.00
Home work-project	10	25.00
Final Exam	1	50.00
Total	12	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		

24	**ECTS / WORK LOAD TABLE**

25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	0	3	0	0	0	4	5	0	0	0	0	0	0	0	0	0
ÖK2	0	3	0	3	0	4	5	0	0	0	0	0	0	0	0	0
ÖK3	4	4	5	5	0	0	0	0	0	4	0	0	0	0	0	0
ÖK4	5	0	5	4	0	0	0	0	0	4	0	3	0	0	0	0
ÖK5	4	4	4	5	0	4	4	0	0	0	0	4	0	0	0	0
ÖK6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**