ROMANIAN ACADEMY
School of Advanced Studies of the Romanian Academy
(SCOSAAR)

SUMMARY OF THE COURSE: "Mechanics of the deformable media"

1. Program data

1.1 Department	Department Engineering, Mechanical and Computer Sciences
1.2 Institution	Romanian Academy
1.3 Field of study	Mechanical Engineering
1.4 Study Cycles	PHD Doctoral study

2. Discipline data

2.1 Name of discipline		Mechanics of the deformable media					
2.2 Titular of course activities		CSI dr. DHL Veturia Chiroiu					
2.3 Titular of seminar activities		CSI dr. DHL Veturia Chiroiu					
2.4 Titular of lab activities		-					
2.5 Year of study	1	2.6 Semester	2	2.7 Type of assessment	E	2.8 Discipline regime	DS

3. Estimated total workload (hours per semester of didactic activities)

3.1 Number of hours per week		15	**From which:**			
3.2 cours		9	3.3 seminar	3	3.4 laboratory	3
3.5 Total hours from the curriculum		210	**From which:**			
3.6 cours		126	3.7 seminar	42	3.8 laboratory	42
3.9 Number of hours per semester	210					
3.10 Number of credits	15					

4. Course content

1. Stretch-compression experiments. The requirement of the continuously deformable medium.
2. Displacement status. The general theory of infinitesimal deformation. Geometric equations.
3. The deformation tensor. Deformation quadricles. Invariants.
4. External and internal forces. Tensions. Cauchy's relations.
5. Cauchy's equations. Reciprocity theorem.
6. The tension tensor. The tension squares.
7. Hooke's law. Hooke's tensor. Anisotropy. Orthotropy. Isotropy.
8. The Young's Modulus. Poisson's ratio. Hydrostatic compression module.
9. Notions of thermodynamics of deformation. The principles of thermodynamics.
10. The elastic potential. The mechanical work of deformation. Elastic energy. Elastic bodies and hyperelastic bodies.
11. The complete system of equations of the theory of linear elasticity.
12. Resistance criteria.
13. Existence theorems. Uniqueness theorems.
14. Variational equations of elasto-statics. Reissner's variational equation.
15. The system of equations in displacements. The system of equations in stresses.
16. Waves. Lamé's dynamic and static equations.

*E = Examen. C = Colocvium.
**DF = Fundamental Discipline. DS = Specialized Discipline

5. Objectives of the discipline and the specific acquired skills

1. The general objective of the discipline: deepening the basic notions of mechanics of deformable media
2. Acquiring knowledge specific to the mechanics of deformable media

6. References

1. L Solomon, Elasticitate liniară. Introducere matematică în statica solidului elastic, Editura Academiei, București, 1969.
2. A.C. Eringen, Mechanics of Continua, Wiley&Sons, New York, 1967.
3. G.Thomas Mase, George E. Mase, Continuum mechanics for engineers, CRC Press, Boca Raton, 1999.
4. W. Nowacki, Dinamica sistemelor elastice, Editura Tehnică, București, 1969.
5. S. Vlase, Mecanică. Cinematică, Editura Infomarket, Brașov, 2006; Mecanică. Dinamică, Editura Infomarket, Brașov, 2005; Mecanică. Statică, Editura Infomarket, Brașov, 2004.

7. Assessment

Activity type	5.1 Evaluation Criterias	5.2 Evaluation methods	5.3 Weight of the final grade
5.4 Cours	Acquired Knowledge	Oral Exam	50%
5.5 Seminar+laborator	Activity	Study cases	50%

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Course structure

Nov 2022 – Febr 2023 – Didactic activity - Laboratory of Mechanics of

Deformable Media, IMSAR

Exam

Mars-april 2023

Course owner: Dr. Veturia Chiroiu

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