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

SUMMARY OF THE COURSE: "Technical mechanics and vibrations"

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			Technical mechanics and vibrations				
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. Statics of the material point and the rigid solid. Technical applications of statics.
2. Kinematics of the material point and the rigid solid.
3. Dynamics of material point systems.
4. Analytical mechanics. Lagrange's equations.
5. Rigid dynamics.
6. Kinematics of vibrations. Stability of movement.
7. Vibrations of linear systems with one degree of freedom.
8. Vibrations of linear systems with several degrees of freedom. Modal analysis. Friction systems.
9. Non-linear vibrations.
10. Vibrations of continuous systems. Types of depreciation.
11. Methods of measuring depreciation. Vibration control.
12. Parametric vibrations.
13. Hysteresis.

*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 vibration theory and vibration control
2. Acquiring knowledge specific to the theory of linear and non-linear vibrations

6. References

1. Clarence W, de Silva, Vibration engineering, vibration: fundamentals and practice, CRC Press Boca Raton, 2000.
2. F. Dincă, C. Teodosiu, Vibraţii neliniare şi aleatoare, Editura Academiei, Bucureşti, 1959.
3. Gh.Buzdugan, M.Radeş, Vibraţiile sistemelor elastice, Editura Didactica si Pedagogica, 1978.
4. Cr. Pavel, Al.Constantinescu, Vibratii mecanice, Editura Matrixrom, Bucuresti, 2010.
5. C.M.Harris, C.E.Crede, Eds.. Shock and Vibration Handbook, McGraw-Hill Book Company, 1976.
6. R. Bishop, D. Johnson, The Mechanics of Vibration, Syndics of the Cambridge University Press, 1979.
7. N.D. Stănescu, L. Munteanu, V. Chiroiu, N. Pandrea, Sisteme dinamice. Teorie şi aplicaţii, vol.1, 2, Editura Academiei, Bucuresti, 2007, 2011.
8. A. Guran, F. Pfeiffer, K. Popp (eds.), Series on Stability, Vibration and Control of Systems, Series B, vol.7: Dynamics witg friction. Modeling, Analysis and Experiment, part I, World Scientific, 2001.

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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5.6 Minimum performance standard: Knowledge of 80% of the information contained in the course

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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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