ACADEMIA ROMÂNĂ - SCOSAAR
DOCTORAL SCHOOL OF ENGINEERING, MECHANICAL, COMPUTER SCIENCES (SD-SIMC)

DISCIPLINE SHEET
2023-2024

Name of discipline: ***Compound rheological models***
Holder of course activities: prof.univ.dr, CSI, Polidor Bratu
Year of study: I

Number of hours per week/Checking/Credits		
Course/seminar	**Form of examination**	**Credits**
44/28	Examination	30

A. DISCIPLINE OBJECTIVES (Objectives are formulated in terms of professional competences):

General objective of the discipline	• Understanding and ability to operate with compound rheological models for use in dynamic schematizations for the response analysis of viscoelastic bond systemsce.
Specific objectives:	• Acquisition of specific knowledge and representation of viscoelastoplastic properties • Ability to analyze and optimize according to the variation of specific parameters • Design and evaluation of dynamic tree models

B. CONDITIONS (where applicable)

course development	•

C. SPECIFIC SKILLS ACQUIRED (It targets the competences provided by the study program to which the discipline belongs)

Professional skills	• Increased ability to solve various issues • Ability to elaborate scientific papers and experimental reports • Ability to critically interpret research results • Ability to quickly and correctly understand and evaluate new information • Ability to identify alternative solutions and ability to demonstrate/support the relevance of these alternatives
Transversal competenţe	• Teamwork skills • Oral and written communication skills • Respecting and developing professional values and ethics • Adaptation to new technologies, professional and personal development, through continuous training

D. CONTENT OF THE DISCIPLINE

a) Course

Chapter	Content	No. of hours
1. Linear models Simple	Composite linear rheological models: mass subjected to external kinematic actions	4
2. Linear models Simple	Linear rheological models composed without mass subjected to dynamic external actions	4
3. Linear models Simple	Linear rheological models composed with mass subjected to external kinematic actions	4
4. Linear models Simple	Linear rheological models composed with mass subjected to dynamic external actions	4
5.Linear models Compound	Dynamic behavior of the rigid with rheological links Voigt-Kelvin, Maxwell and Zener	5
6. Linear models Compound	Dynamic behavior of the rigid with rheological bonds Hooke-Voigt_kelvin, Maxwell-Voigt-Kelvin and Newton-Voigt-Kelvin	5
7. Dynamic response	Dynamic analysis with compound rheological bonds at imposed harmonic excitations	5
8. Vibration transmission	Setting optimal parameters for forces transmitted to the base and for dissipated energy	5
9. Vibration transmission	Kinematic or dynamic transmissibility coefficient variation curves	4
10. Omptimization	Calculation and optimization algorithms for dynamic isolation at a predictable level.	4
	Total Hours	**44**

b) Seminar – 28 hours

E. EVALUATION (The methods, forms of evaluation and their weight in establishing the final grade are specified. Indicate minimum performance standards in relation to the competences defined in point **A. Objectives of the discipline**)

Activity Type	Assessment criteria	Assessment methods	Share of final grade
Course	Acquiring the knowledge gained during the course	-Oral exam	50%
Seminar	Activity	Case Studies Composite Materials	50%
The results of the discipline evaluation are expressed by the following grades: *"Very good*"; "*Okay*"; "*Satisfactory*"; "*Unsatisfactory*." The grades "*Very good*", "*Good" and "*Satisfactory*" allow the doctoral student to* obtain the credits.			

F. METHODOLOGICAL MILESTONES

Lecture combined with dialogue. Use of modern means of training (ppt). Course support.

F. CORROBORATING THE CONTENTS OF THE DISCIPLINE WITH THE EXPECTATIONS OF REPRESENTATIVES OF THE EPISTEMIC COMMUNITY, PROFESSIONAL ASSOCIATIONS AND EMPLOYERS REPRESENTATIVE IN THE FIELD RELATED TO THE PROGRAM

- The discipline provides a wide background of fundamental and practical knowledge on modern and sustainable methods of characterization of solid materials with applications in machine and machine construction, construction, transport, etc.
- The discipline provides basic elements that help the doctoral student in the specialties of mechanical engineering, industrial engineering and civil engineering

G. BIBLIOGRAPHY

1. Bratu, P. Vibrations of mechanical systems, Technical Publishing House, 2000
2. Bratu, P. Analysis of elastic structures, Impulse Publishing House, 2010
3. Pavel, C,Constantinescu A, Mechanical vibrations, Matrixrom Publishing House, 2010
4. Harris, C; Crede, C, Share and Vibration Handbook, Ed.McGraw-Hill, Book Comp, 1976
5. Stănescu, D, Munteanu, L,Chiroiu, V, Pandrea, N,N. Dynamic Systems, Vol.1,2, Ed.Academiei 2007,2011

Course holder	**Director of the Doctoral School**
prof.univ.dr, CSI, Polidor Bratu	**dr. ing.dr. CS I, Mihaiela Iliescu**