

COURSE GUIDE – short form

Academic year 2024-2025

Course name	FINITE ELEMENT ANALYSIS					Course code	4EPI14DD-1			
Course type	DD	Category	DO	Year of study	4	Semester	8	Number of credit points	5	

Faculty	Materials Science and Engineering				Number of teaching and learning hours					
Field	Mechanical Engineering				Total	L	T	LB	P	IS
Specialization	Equipment for industrial processing				120	42		28		50

Pre-requisites from the curriculum	Compulsory	
	Recommended	

General objective	Knowledge of the principles of using the finite element method, with direct applications in the design of industrial processing equipment or products that can be obtained with them. Knowing how to use dedicated software will eliminate boundary states that can jeopardize the functionality of a part, assembly, or equipment. Making the right decisions for choosing materials processing technologies and putting into practice approaches based on coherent scientific arguments, regarding the correct operation of parts or assemblies in service, respecting the requirements of quality engineering.
Specific objectives	Materials selection depending on the application. Investigation of materials characteristics and properties. Investigation of the components behavior in an assembly or even the equipment that include them. Developing skills for elaborating specific reports and scientific articles.
Course description	Introduction to the finite element method. Types of analysis. Basics of strength of materials Notions of finite elements and the network of finite elements. One-dimensional finite elements. Two-dimensional finite elements. Three-dimensional finite elements. Simulation of non-removable assemblies. Materials properties and boundary conditions. Linear static analysis. Nonlinear analysis. Dynamic analysis. Thermal analysis. Fluid dynamics analysis. Fatigue resistance analysis. Post-processing techniques. Experiment validation and data acquisition. Errors and errors in using the finite element method.

Assessment			Schedule	Percentage in the final grade (minimum grade)
A. Final assessment form:	Class tests along the semester	%		70% (minimum 5)
	Home works	%		
	Other activities	%		
	Examination procedures and conditions: 1. Category: theoretical; subject with closed questions; conditions: oral; weight in final grade: 50%; 2. Category: theoretical; subject with closed questions; conditions: oral; weight in final grade: 50%	100% (minimum 5)		
B. Seminar	Activity during seminar			% (minimum 5)
C. Laboratory	Activity during laboratory			30% (minimum 5)
D. Project	Activity during project			% (minimum 5)

Course organizers	Associate professor PH.D. eng. Ioan RUSU	
Teaching assistants	Associate professor PH.D. eng. Ioan RUSU	