

COURSE SYLLABUS

University	Alexandru Ioan Cuza University of Iași	Course title	
Faculty	Physics	Advanced numerical methods. Finite Element Method.	
Department	Physics		
Domain	Physics	Course category (FC/SC/CC¹): SC	Term (1-4): 4
Level	Postgraduate (MA)	Course type (Co/EI/F²): Co	

I. Course structure

Number of hours/week				Credits	Total class hours/semester	Total hours of individual activity	Examination type (C/Ex/CE ³)	Teaching language
Course	Seminar	Lab.	Project	6	56	124	Ex	English
2	-	2	-					

II. Instructors

	Academic degree ⁴	Scientific degree	Name and surname	Faculty position (tenure/associate - organization)
Course	assistant professor	PhD	Dorin Cimpoesu	tenure
Seminar				
Laboratory	assistant professor	PhD	Dorin Cimpoesu	tenure

III. Prerequisites

Modeling and simulation.

IV. Course objectives

To introduce the theory and applications of the finite element method as a general and powerful tool to solve the variety of problems of engineering and physics. To learn and apply finite element solutions to problems in physics.

V. Course content

Course	Interpolation by algebraic polynomials. Spline functions. Spline functions of several variables and finite element method. Finite element method for solution of boundary problems for elliptic partial differential equations. The weak form of a boundary problem. Applications of finite element method (mechanics, electromagnetism, micromagnetism)
Seminar	-
Laboratory	Students applies the programs and methods presented during courses. One third of the lab time is dedicated to individual project time.

VI. Minimal required references

- [1] Dan Gârbea, „Analiză cu elemente finite”, Editura Tehnică, București, 1990.
 [2] C.Ilioi, G. Țârdea, „Splines and finite elements”, Editura Universității „Al. I. Cuza” Iași, 1998.
 [3] J.L. Volakis, A. Chatterjee, L.C. Kempel „Finite element method for electromagnetics”, IEEE/Oxford University Press, 1998.

VII. Didactic methods

Course: exposition, exemplification, discussions
 Laboratory: learning through applications, homework, projects

VIII. Assessment

¹ FC – fundamental course, SC – specialty course, CC – complementary course

² Co – compulsory, EI – elective, F – facultative

³ C – colloquium, Ex – exam, CE – colloquium AND exam

⁴ Professor / Associate professor / Lecturer / Assistant professor / Teaching assistant

Pre-conditions	attendance to laboratory, obtaining the minimal grade 5 for each ongoing assessment	
Exam dates	1st Assessment	April
	2nd Assessment	June

	Assessment means and methods	Percentage of the final grade
Exam/Colloquium	written and oral	50%
Seminar		
Laboratory	numerical implementations of models	50%