FISA DISCIPLINEI
Syllabus

1. Information about the program

1.1. University	West University of Timisoara
1.2. Faculty	PHYSICS
1.3. Department	PHYSICS
1.4. Study direction	PHYSICS
1.5. Study cycle	MASTER
1.6. Study program / qualification	METODE AVANSATE DE CERCETARE IN FIZICA/ ADVANCED RESEARCH METHODS IN PHYSICS

2. Subject matter information

2.1. Subject matter			**Scientific research internship**				
2.2. Subject teacher			Dr. Negrilă Andrei-Radu				
2.3. Subject applications teacher (seminar / laboratory)			Dr. Negrilă Andrei-Radu				
2.4. Study year	2	2.5. Semester	2	2.6. Assessment type	**E**	2.7. Subject type	DS, DO

3. Study time distribution

3.1. Nr. of hours/week	4	In which: 3.2 course	0	3.3. seminar/laboratory	4
3.4. Total hours in educational plan	48	In which: 3.5 course	28	3.6. seminar/laboratory	48

Time distribution:	**hours**
Study after lecture notes, bibliography or notes	20
Additional documentation in the library, electronic specialty platforms/ field	50
Seminar / laboratory preparations, homework, portfolio and essays	32
Tutoring	50
Exams	
Other activities...	-

3.7. **Total number of personal study hour**	152
3.8. **Total number of hours in semester**	200
3.9. **Number of credits**	8

4. Preconditions (where appropriate)

4.1. curriculum	•
4.2. Competences	•

5. Conditions (where appropiate)

5.3 for course	•
5.4 for seminar/lab	•

6. Objectives of the discipline - expected learning outcomes to the formation of which the completion and promotion of the discipline contribute

Knowledge	• to know the advanced notions in the field of Physics, which involves a critical understanding of theories and principles • to know the language specific to the field • to know physical phenomena and interpret them by formulating hypotheses and operationalizing key concepts and the appropriate use of laboratory equipment
Skills	• to compare the theoretical results provided by the specialized literature with those of an experiment carried out within a professional project • To describe physical systems using specific theories and tools (experimental and theoretical models, algorithms, schemes, etc.) • to use the computer and calculation programs for the numerical simulation of the physical processes. • to apply the principles and laws of physics in solving theoretical or practical problems, under conditions of qualified assistance • to characterize the specific properties of some materials taking into account the field in which they are used
Responsibility and autonomy	• to critically analyze a specialized report, scientific communication with a medium degree of difficulty in the field of physics • to be autonomous in the context of handling laboratory equipment, including in situations requiring an interdisciplinary approach • to autonomously use information sources and resources for communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation

7. Table of content

7.1 Course – 28 hours	**Teaching methods**	**Observations**
1.		
7.2 Seminar / labs	**Teaching methods**	**Observations/Bibliography**

1. 2D Magnetostatic Analysis 2. Magnetostatic 3D Analysis of Coil and Magnet 3. 3D Eddy Current Analysis with a Spiral 4.1 2D Magnetic Transient Analysis 4.2 3D Magnetic Transient Analysis 4.3 Maxwell A-Phi Transient Solver 5.1: 3D Electrostatic Analysis 5.2: 2D Electrostatic Analysis - Planar Capacitor 5.3: 2D Electrostatic Analysis Cylindrical Capacitor 5.4: 3D DC Conduction Analysis, 3D AC Conduction Analysis 6. Parametric Analysis 7. Post Processing - 2D Eddy Current 8. Radial, Tangential, Trapezoidal and Caretzian Magnetization 9. Halbach Array Mageys 10. Demagnetization due to fault and temperature 11. PMSM Example Motor Simulation (Cogging Torque, Motor Power Balance, Torque Rpm Map) 12. Solenoidal Actuator plunger design	Practical activities, data manipulation and interpretation	
Bibliography: Module Workshop Ansys Learning Hub: - Ansys Maxwell Getting Started - Introduction to Electric Machines - Ansys Maxwell Magnets - Ansys Maxwell Advanced Motor Traning - Maxwell Actuator Training Electronic Transformer Training		

8. Relation between subject content and the expectations of employers

• The content is extracted from the simulation capabilities presentation modules used in the industrial environment with a special focus on electrification in the automotive field

9. Assesment

Activity type	9.1 Assesment criteria	9.2 Assesment method	9.3 Percent in final mark
9.4 Course			
9.5. Seminar/labs	Knowledge for grade 10 Attendance: 100% Carrying out the work, theoretical presentation, working method, data processing.	*Formative assessment:* The laboratory activity ends with an evaluation in which the student explains a random laboratory work from those carried out during the semester.	**100%**
9.6 Minimum performance standards			
Minimum knowledge for grade 5: Attendance: minimum 80% of the works; The summary approach of a laboratory work from those carried out.			

Completion date: 31.01.2025

Subject applications teacher's signature:
Dr. Negrilă Andrei-Radu

Department Director' Signature:
Associate Professor Dr. Nicoleta STEFU,