Anexa nr. 2

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	West University of Timisoara
1.2 Facultatea	Physics
1.3 Departamentul	Physics Department
1.4 Domeniul de studii	Physics
1.5 Ciclul de studii	Master
1.6 Programul de studii / Calificarea	**Physics and Technology of Advanced Materials**

2. Date despre disciplină

2.1 Denumire disciplina			**NANOSYSTEMS IN ELECTROMAGNETIC FIELDS**				
2.2 Titular activităţi de curs			**IOSIF MALAESCU**				
2.3 Titular activităţi de seminar							
2.4 Titular activităţi de laborator/lucrari			Aurel Ercuta				
2.5 Anul de studiu	II	2.6 Semestrul	2	2.7 Tipul de evaluare	E	2.8 Regimul disciplinei	Ob

3. Timpul total estimat (ore pe semestru al activităţilor didactice)

3.1 Număr de ore pe săptămână	3	din care ore curs	2	seminar		laborator	1
3.2. Numar ore pe semestru	42	din care ore curs	28	seminar		laborator	14
3.3.Distribuţia fondului de timp:							**ore**
Studiul după manual, suport de curs, bibliografie şi notiţe							56
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate / pe teren							21
Pregătire seminarii / laboratoare, teme, referate, portofolii şi eseuri							28
Tutoriat							7
Examinări							28
Alte activităţi……						TOTAL	**140**

3.4 Total ore studiu individual	**140**	
3.5 Total ore pe semestru [1]	**70**	
3.6 Numărul de credite	**6**	

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	•
4.2 de competenţe	•

[1] Numărul total de ore nu trebuie să depăşească valoarea (Număr credite) x 27 ore

5. Condiţii (acolo unde este cazul)

5.1 de desfăşurare a cursului	Obligatory (required) disciplines: - Electricity and Magnetism, Mathematics Analysis Recommended disciplines: - Microwaves, Electrodynamics
5.2 de desfăşurare a seminarului	•
5.3 de desfăşurare a laboratorului	• Practical skills to achieve a minimum circuit, correct placement and measurement devices for consumers in the circuit.

6. Competenţele specifice acumulate

Competenţe profesionale	**Cognitive:** - The knowledge and use of some theoretical models on magnetization processes of the magneto-dielectric nano-systems; - The study of the dielectric and magnetic relaxation processes and the ferromagnetic resonance in magneto-dielectric nano-systems; **Technical or professional:** - Understanding physical processes on the relaxation and ferromagnetic resonance, electromagnetic pollution, their interpretation and modeling; - The knowledge certain applications and techniques for measuring specific.
Competenţe transversale	- The using specific methods, technique and tools of laboratory in practical activities. - The attitude positive and responsible towards their professional development through skills training regarding implementation of the behavior the nanosystems in electromagnetic field and solving typical the electromagnetic pollution problems.

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	•
7.2 Obiectivele specifice	•

8. Conţinuturi

8.1 Curs	Metode de predare	Observaţii
1. Magnetic behaviour of the nanoparticle systems. Magnetic fluids (superparamagnetism; models for the magnetization of the nano-structured systems – Langevin, Ivanov and Zubarev; magnetic fluids)		8 h
2. Relaxation processes in magnetizable nanosystems in electric and magnetic fields (dielectric and magnetic complex		10 h

susceptibillity; dielectric relaxation processes in nano-structures systems. Schwarz model; Brown and Neel relaxation processes; Dormann Bessais-Fiorani (BDF) model)		
3. Nanofluids in microwave electromagnetic field (precession movement of the magnetization vector; ferromagnetic resonance in particle nano-structures systems, The propagation of the microwave electromagnetic field in magnetic fluids. Applications: electromagnetic absorbers; microwave devices; etc.)		6 h
4. Electrical and Thermal Properties of Nanoparticle Systems (Electrical **r**ezistivity and conductivity, theoretical models, thermal conductivity, applications)		4 h

References

1. **I. Mălăescu**, "*Ferofluide în câmp de radiofrecvenţă*", Editura Mirton, Timişoara 1998, ISBN 973-578-499-8
2. I. Hrianca, **I. Malaescu**, "*The RF magnetic permeability of statically magnetized ferrofluids*", J. Magn. Magn. Mater., 150, (1995), 131-136
3. **I. Malaescu**, I. Hrianca, "*Relaxation processes magnetite-based ferrofluids in RF magnetic fields*", J. Magn. Magn. Mater., 157/158, (1996), 585-586
4. **I. Malaescu**, C. N. Marin, "*Deviation from the superparamagnetic behaviour of fine-particle systems*", J. Magn. Magn. Mater., 218, (2000), 91-96
5. **I. Malaescu**, L. Gabor, F. Claici, N. Stefu "*Study of some magnetic properties of ferrofluids filtered in magnetic field gradient*", J. Magn. Magn. Mater., 223, (2000), 8-12
6. C. N. Marin, **I. Malaescu**, A. Ercuta, "*The dependence of the effective anisotropy constant on particle concentration within ferrofluids, measured by magnetic resonance*", J. Phys. D: Appl. Phys., 34, (2001), 1466-1469.
7. R. A. Waldron, „*Ferrites – Principes et applications aux hyperfrequences* », Dunod Paris, 1964
8. **I. Malaescu**, "*Materiale dielectrice şi aplicaţii*", Tipografia Universităţii de Vest, Timişoara, 2002
9. **I. Malaescu**, "*Materiale si dispozitive electronice in camp de inalta frecventa*", Ed. Eurobit, Timisoara 2008

8.2 Seminar	**Metode de predare**	**Observaţii**
8.3 Laborator		
Applications: 1. Magnetization curve of a magnetic fluid (application to the Langevin theory)	Experimental	**2 h**
2. Deviation from the superparamagnetic behaviour of single-domain particles systems	Experimental	**2 h**
3. Brown and Neel relaxation processes in magnetic fluids	Experimental	**2 h**
4. Determination of the effective anisotropy constant of nanoparticles using magnetic relaxation measurements	Experimental	**2 h**
5. Study of the dielectric relaxation in low frequency field in colloidal particles		

systems. Schwarz. Model	Experimental	**2 h**
6. Action microwaves on living organisms. Applications	Experimental	**2 h**
7. Study of the ferromagnetic resonance in ferrofluids	Experimental	**2 h**
Bibliografie		

9. Evaluare

Tip activitate	Criterii de evaluare	Metode de evaluare	Pondere din nota finală
9.1 Curs	- final evaluation		**75%**
	Mark 10 at the test paper and correct answers to 100% of the final evaluation questions.		
9.2 Seminar			
9.3 Laborator/lucrari	- evaluation (test) in laboratory activity		**25%**
9.4 Standard minim de performanță			
Passing the test paper and correct answers to 50% of the final evaluation questions **E –test paper +applications and oral esamination**			

Data completării:

26.09.2016

Titular curs (Semnătura):

Prof. dr. I. Malaescu

Data avizării în departament

Director departament (Semnătura):

Conf. dr. M. Lungu