

FIȘA DISCIPLINEI

1. Date despre program

1.1 Instituția de învățământ superior	West University of Timisoara
1.2 Facultatea / Departamentul	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// fizician (211101); profesor în învățământul liceal și gimnazial (232201 - în condițiile legii); asistent de cercetare (248102); referent de specialitate în învățământ (235204); analist (213101)

2. Date despre disciplină

2.1 Denumirea disciplinei	NANOPARTICLE SYSTEMS IN ELECTROMAGNETIC FIELDS PTAM1204						
2.2 Titularul activităților de curs	IOSIF MALAESCU						
2.3 Titularul activităților de seminar	IOSIF MALAESCU						
2.4 Anul de studiu	II	2.5 Semestrul	2	2.6 Tipul de evaluare	E	2.7 Regimul disciplinei	Ob

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

3.1 Număr de ore pe săptămână	3	din care: 3.2 curs	2	3.3 seminar/laborator	1
3.4 Total ore din planul de învățământ	42	din care: 3.5 curs	28	3.6 seminar/laborator	14
Distribuția fondului de timp:					ore
Studiul după manual, suport de curs, bibliografie și notițe					56
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate / pe teren					21
Pregătire seminare / laboratoare, teme, referate, portofolii și eseuri					28
Tutoriat					7
Examinări					28
Alte activități					140
3.7 Total ore studiu individual	140				
3.8 Total ore pe semestru	76				
3.9 Numărul de credite	5				

4. Precondiții (acolo unde este cazul)

4.1 de curriculum	•
4.2 de competențe	•

5. Condiții (acolo unde este cazul)

5.1 de desfășurare a cursului	Obligatory (required) disciplines:
-------------------------------	------------------------------------

	- Electricity and Magnetism, Mathematics Analysis Recommended disciplines: • - Microwaves, Electrodynamics
5.2 de desfășurare a seminarului / laboratorului	• Skills to compute an electric circuit, using the complex impedance method and then the determination the components of the dielectric or magnetic susceptibility of analyzed material from circuit.

6. Obiectivele disciplinei - rezultate așteptate ale învățării la formarea cărora contribuie parcurgerea și promovarea disciplinei

Cunoștințe	- 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;
Abilități	- Understanding physical processes on the relaxation and ferromagnetic resonance, electromagnetic pollution, their interpretation and modeling; - The knowledge certain applications and techniques for measuring specific.
Responsabilitate și autonomie	- The using specific methods, technique and tools of computing 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 knowing typical the applications

7. Conținuturi

8.1 Curs	Metode de predare	Observații
1. Magnetic behaviour of the nanoparticle systems. Magnetic fluids (magnetic properties of materials; superparamagnetism; colloidal suspensions; magnetic fluids; models for the magnetization of the nano-structured systems – Langevin, Ivanov and Zubarev).	Online Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	8 ore (C1 – C4)
2. Relaxation processes in magnetizable nanosystems in electric and magnetic fields (dielectric and magnetic complex susceptibillity; dielectric relaxation processes in nano-structures systems. Schwarz model; Brown and Neel relaxation processes).	Online Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	10 ore (C5 – C9)
3. Nanofluids in microwave 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.)	Online Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	6 ore (C10 – C12)
4. Electrical and Thermal Properties of	Online	

Nanoparticle Systems (Electrical resistivity and conductivity, Complex impedance, theoretical models, thermal conductivity, applications)	Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	4 ore (C13 – C14)
Bibliografie : 1. I. Mălăeșcu , "Ferofluide în câmp de radiofrecvență", Editura Mirton, Timișoara 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. Claiți, 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. I. Malaescu , "Materiale dielectrice și aplicații", Tipografia Universității de Vest, Timișoara, 2002 8. Mălăeșcu, I. , Marin, C.N. , Study of magnetic fluids by means of magnetic spectroscopy, <i>Physica B: Condensed Matter</i> 365 (1-4), pp. 134-140, 2005 9. Fannin, P.C. , Marin, C.N. , Malaescu, I. , Giannitsis, A.T. , Microwave absorption of composite magnetic fluids, <i>Journal of Magnetism and Magnetic Materials</i> 289, pp. 78-80, 2005 10. Fannin, P.C. , Malaescu, I. , Marin, C.N. , The effective anisotropy constant of particles within magnetic fluids as measured by magnetic resonance, <i>Journal of Magnetism and Magnetic Materials</i> 289, pp. 162-164, 2005 11. Fannin, P.C. , Marin, C.N. , Malaescu, I. , The influence of particle concentration and polarizing field on the resonant behaviour of magnetic fluids, <i>Journal of Physics Condensed Matter</i> 15 (27), pp. 4739-4750, 2003 12. I. Malaescu , "Materiale și dispozitive electronice în câmp de înaltă frecvență", Ed. Eurobit, Timișoara 2008 [13] P.C.Fannin, I. Malaescu, C. N. Marin, N. Stefu , Microwave propagation parameters in magnetic fluids, <i>The European Physical Journal E</i> , 29 (3) 299-303 (2009) [14] P. C. Fannin, C. N. Marin, I. Malaescu, N. Stefu, P. Vlăzan, S. Novaconi, S. Popescu , "Effect of the concentration of precursors on the microwave absorbent properties of Zn/Fe oxide nanopowders", <i>Journal of Nanoparticle Research</i> , 13 311–319 (2011) [15] Cecilia N. Obeada, I. Malaescu , "The temperature effect on the combined Brownian and Neel relaxation processes in a water-based magnetic fluid", <i>Physica B-Condensed Matter</i> , 424 (2013) 69-72 [16] A. Lungu, I. Malaescu, C. N. Marin, P. Vlăzan, P. Sfirloaga , The electrical properties of manganese ferrite powders prepared by two different methods, <i>Physica B: Condensed Matter</i> , 462 (2015) 80-85. [17] I. Malaescu, A. Lungu, C. N. Marin, P. Vlăzan, P. Sfirloaga, G. M. Turi , Experimental investigations of the structural transformations induced by the heat treatment in manganese ferrite synthesized by ultrasonic assisted coprecipitation method, <i>Ceramics International</i> 42 (15) (2016) 16744-16748. [18] P. Sfirloaga, C. N. Marin, I. Malaescu, P. Vlăzan , The electrical performance of ceramic materials with perovskite structure doped with metallic ions, <i>Ceramics International</i> Vol. 42, Nr.16 (2016) 18960-18964 [19] P. C. Fannin, C. N. Marin, I. Malaescu, K. Raj, C. Popoiu , Local arrangement of particles in magnetic fluids due to the measurement alternating field, <i>JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS</i> , 438 (2017) 116-120, DOI: 10.1016/j.jmmm.2017.02.053 [20] P. Sfirloaga, M. Poienar, I. Malaescu, A. Lungu, C. V. Mihali, P. Vlăzan , Electrical conductivity of Ca-substituted lanthanum manganites, <i>CERAMICS INTERNATIONAL</i> , 44 (6) (2018) 5823-5828, DOI: 10.1016/j.ceramint.2018.01.029 [21] I. Malaescu, A. Lungu, C. N. Marin, P. Sfirloaga, P. Vlăzan, S. Brindusoiu, M. Poienar , Temperature dependence of the dynamic electrical properties of $Cu_{1+x}Mn_{1-x}O_2$ ($x=0$ and 0.06) cerdnerite materials, <i>CERAMICS INTERNATIONAL</i> , 44 (10) (2018) 11610-11616, DOI: 10.1016/j.ceramint.2018.03.229 [22] S. Brindusoiu, M. Poienar, C.N. Marin, P. Sfirloaga, P. Vlăzan, I. Malaescu , The electrical conductivity of $Fe_3(PO_4)_2 \cdot 8H_2O$ materials, <i>Journal of Materials Science: Materials in Electronics</i> , 30(16) (2019) 15693-15699,		

DOI: 10.1007/s10854-019-01952-3		
8.2 Seminar / laborator	Metode de predare	Observații
1. The determination of the input impedance of the coaxial line	Online seminar Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	2 ore
2. Electrical models for inductive or capacitive measuring cell	Online seminar Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	2 ore
3. Study of the dielectric and magnetic losses in nanoparticle systems	Online seminar Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	2 ore
4. The Schwarz theoretical model applied to dielectric relaxation processes in ferrofluids	Online seminar Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	2 ore
5. Microwave propagation parameters in magnetic fluids	Online seminar Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	2 ore
6. Study of the electrical conductivity of some oxide materials in low frequency field, using the complex impedance technique	Online seminar Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	2 ore
Colloquium: presentation of a seminar topic	Online seminar Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	2 ore
<p>Bibliografie :</p> <ol style="list-style-type: none"> Mălăeșcu, "Ferofluide în câmp de radiofrecvență", Editura Mirton, Timișoara 1998, ISBN 973-578-499-8 I. Hrianca, I. Malaescu, "The RF magnetic permeability of statically magnetized ferrofluids", J. Magn. Magn. Mater., 150, (1995), 131-136 I. Malaescu, I. Hrianca, "Relaxation processes magnetite-based ferrofluids in RF magnetic fields", J. Magn. Magn. Mater., 157/158, (1996), 585-586 I. Malaescu, C. N. Marin, "Deviation from the superparamagnetic behaviour of fine-particle systems", J. Magn. Magn. Mater., 218, (2000), 91-96 P.C.Fannin, I. Malaescu, C. N. Marin, N. Stefu, <i>Microwave propagation parameters in magnetic fluids</i>, The European Physical Journal E, 29 (3) 299-303 (2009) P. Sfirloaga, M. Poienar, I. Malaescu, A. Lungu, C. V. Mihali, P. Vlazan, <i>Electrical conductivity of Ca-substituted lanthanum manganites</i>, CERAMICS INTERNATIONAL, 44 (6) (2018) 5823-5828, DOI: 10.1016/j.ceramint.2018.01.029 S. Brindusoiu, M. Poienar, C.N. Marin, P. Sfirloaga, P. Vlazan, I. Malaescu, <i>The electrical conductivity of Fe₃(PO₄)₂·8H₂O materials</i>, Journal of Materials Science: Materials in Electronics, 30(16) (2019) 15693-15699, DOI: 10.1007/s10854-019-01952-3 G. Matu, C. N. Marin, I. Malaescu, FREQUENCY AND TEMPERATURE ANALYSIS OF THE CLAUSIUS-MOSSOTTI FACTOR OF A KEROSENE-BASED FERROFLUID IN LOW FREQUENCY FIELD, J. Ovonic Research, 16(2) (2020) 89-96 		

8. Coroborarea conținuturilor disciplinei cu așteptările reprezentanților comunității epistemice, asociațiilor profesionale și angajatori reprezentativi din domeniul aferent programului

--

9. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	- final evaluation Mark 10 at the test paper and correct answers to 100% of the final evaluation questions.	Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	75%
10.5 Seminar / laborator	- evaluation (colloquium) in seminar activity	Link-ul intalnirii online este: https://meet.google.com/xdh-sefx-jme	25%
10.6 Standard minim de performanță			
- Mark 5 at the test paper and correct answers to 50% of the final evaluation questions.			

Data completării
30.01.2022

Titular de disciplină
Prof. Dr. Emekit Iosif Malagacu

Data avizării în departament

Director de departament
Prof. Dr. Catalin N. Marin