

UNIVERSITY OF BUCHAREST
FACULTY OF CHEMISTRY
Master: Chemistry of Advanced Materials

SYLLABUS

Dicipline: NANOMATERIALS

Lecturer: Dr. Octavian Pavel DUMITRU

No. of lecture hours: 20

No. of hours for practical activities: 20

Nr. of credits: 5

Form of examination: Written examination

Lectures: 20 hours

No.	Lecture topic	No. of hours
1	States of the art: the concept of nanomaterials, nanoscale, nanopores and nanostructures.	1
2	Nanomaterials synthesis by chemical, physical and biomimetics way. Synthesis of metallic and polymeric nanomaterials. Correlation structure - properties.	4
3	Classification of nanomaterials. Present and future applications of nanomaterials	2
4	Carbon Nanotubes - description, properties and applications.	2
5	Nanoparticles / nanopowder - description, properties and applications.	2
6	Nanocomposites - description, properties and applications.	2
7	Nanocapsules - description, properties and applications	2
8	Nanodots - description, properties and applications	2
9	Characterization of nanomaterials (SEM and AFM techniques)	1
10	Nanomaterials application: bio-nanomaterials with catalytic properties	2

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Practical activities: 20 hours

No.	Practical activity subject	No. of hours
1	Presentation of the laboratory: practical concepts, equipment and facilities. Laboratory work safety rules and fire protection.	2
2	Preparation of Ni nanoparticles using microwaves.	4
3	Determining the network parameters of a nanocrystalline structure. Analysis of crystalline solids by X-ray diffraction method	4
4	Determination of nanoparticle size.	4
5	Nanomaterials with catalytic properties. Application: hydrogenation reaction in the presence of Ni nanoparticles	4
6	Laboratory knowledge evaluation	2

Recommended bibliography

<ol style="list-style-type: none"> 1. Nanomaterials – Mechanics and Mechanisms ; K.T. Ramesh ; DOI 10.1007/978-0-387-09783-1 ; Springer Dordrecht Heidelberg London New York 2. Nanomaterials Handbook ; Edited by Yury Gogotsi 2006 by Taylor & Francis Group, LLC 3. Nanomaterials and Nanochemistry ; C. Brechignac, P. Houdy, M. Lahmani (Eds.) ; ISBN 978-3-540-72992-1 Springer Berlin Heidelberg New York 4. Nanomaterials - Synthesis, Properties and Applications ; Edited by A. S. Edelstein and R. C. Cammarata; ISBN 0 7503 0358 1 5. Nanomaterial Characterization – An Introduction; Edited by Ratna Tantra ; Published by John Willey & Sons, Inc., Hoboken, New Jersey 6. Nanomaterials Chemistry - Recent Developments and New Directions ; Edited by C.N.R. Rao, A. Müller, and A.K. Cheetham ; ISBN 978-3-527-31664-9 7. Introduction to Carbon Science ; Editor Professor Harry Marsh ; ISBN 0-408-03837-3

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