



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Nanostrukturirani materiali in polimerni nanokompoziti
Course title:	Nanostructured Materials and Polymer Nanocomposites

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
FIZIKA, 3. stopnja		1. ali 2.	1., 2. ali 4.
PHYSICS, 3 rd cycle		1. or 2.	1., 2. or 4.

Vrsta predmeta / Course type

Izbirni za vse module/ Optional for all modules

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15					165	6

Nosilec predmeta / Lecturer:

Sabu Thomas

Jeziki /

Languages:

Predavanja /

Lectures:

Vaje / Tutorial:

angleško/English

angleško/English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Pogojev ni.

Priporočljiva so predznanje s področja kondenzirane materije

Prerequisites:

None.

Recommended is preknowledge of condensed matter science

Vsebina:

Content (Syllabus outline):

• Zgodovinski razvoj nanoznanosti in nanotehnologije • Osnovne zakonitosti nanoznanosti • Sinteza nanomaterialov • Karakterizacija nanomaterialov • Aplikacije nanomaterialov Polimerni nanokompoziti	• Historic development of nanoscience and nanotechnology • Fundamental aspects of nanoscience • Synthesis of nanomaterials • Characterization of nanomaterials • Applications of nanomaterials Polymer nanocomposites
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Temeljni literatura in viri / Readings:

1. Nanostructures and Nanomaterials: Synthesis, Properties, and Applications, Guozhong Cao, Ying Wang, Imperial College Press, London, 2004.
2. Nanotechnology: Importance and Applications- M.H. Fulekar, International Publishing House Pvt. Ltd., New Delhi, 2010
3. Fundamentals and Applications of Nanomaterials- Zhen Guo, Li Tan, Artech House, Boston, 2009
4. Polymer Nanocomposites: Processing, Characterization, And Applications- Joseph Koo, McGraw Hill Professional, 2006
5. Nanomaterials: Synthesis, Properties and Applications, Second Edition edited by A.S Edelstein, R.C Cammaratra, Taylor&Francis Group, New York, 1996

Cilji in kompetence:

Študenti pridobijo poglobljeno znanje s področja materialnih znanosti in različnih tehnoloških aplikacij

Objectives and competences:

Students acquire advanced knowledge on material science and various technological application.

Predvideni študijski rezultati:

Znanje in razumevanje:
Sinteza nanomaterialov in ustrezne strategije

Prenesljive/ključne spretnosti in drugi atributi:
Prilagoditev ustreznih metod za sintezo nanomaterialov. Razumevanje modernih instrumentalnih metod za karakterizacijo nanostrukturiranih materialov in polimernih nanokompozitov.

Intended learning outcomes:

Knowledge and understanding:
Nano materials synthesis methods and strategies

Transferable/Key Skills and other attributes:
Various methods adopted for the synthesis of Nano materials. Understanding of modern instrumental techniques for the characterization of nanostructure materials and polymer nanocomposites

Metode poučevanja in učenja:

Predavanja in reševanje zastavljenih problemov.

Learning and teaching methods:

Lectures and solving of defined problems.

Načini ocenjevanja:

Seminar.
Ustni izpit.

Delež (v %) /
Weight (in %)

Assessment:

Seminar.
Oral exam.

Reference nosilca / Lecturer's references:

1.

Joseph, T. M., Kar Mahapatra, D., Esmaili, A., Piszczyk, Ł., Hasanin, M. S., Kattali, M., ... & Thomas, S. (2023). Nanoparticles: Taking a unique position in medicine. *Nanomaterials*, 13(3), 574. <https://doi.org/10.3390/nano13030574>

Joseph, B., Sagarika, V. K., Sabu, C., Kalarikkal, N., & Thomas, S. (2020). Cellulose nanocomposites: Fabrication and biomedical applications. *Journal of Bioresources and Bioproducts*, 5(4), 223-237. <https://doi.org/10.1016/j.jobab.2020.10.001>

Ghosal, K., Augustine, R., Zaszczynska, A., Barman, M., Jain, A., Hasan, A., ... & Thomas, S. (2021). Novel drug delivery systems based on triaxial electrospinning based nanofibers. *Reactive and Functional Polymers*, 163, 104895. <https://doi.org/10.1016/j.reactfunctpolym.2021.104895>