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		**1**. ali 2.	**1., 2. ali 3.**
PHYSICS		1. or 2.	**1., 2. or 3.**

Vrsta predmeta / Course type

Izbirni za modula Biofizika 3 in Fizika 1, 2, 3

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Mentorstvo Mentorship	Samost. delo Individ. work	ECTS
5					**145**	**5**

Nosilec predmeta / Lecturer: **Sabu Thomas, Samo Kralj**

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski/Slovenian
	Vaje / Tutorial:	

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

Predznanje s področja kondenzirane materije

Prerequisits:

Pre-knowledge of condensed matter science

Vsebina:

- Zgodovinski razvoj nanoznanosti in nanotehnologije
- Osnovne zakonitosti nanoznanosti
- Sinteza nanomaterialov

Content (Syllabus outline):

- Historic development of nanoscience and nanotechnology
- Fundamental aspects of nanoscience
- Synthesis of nanomaterials

• Karaterizacija nanomaterialov • Aplikacije nanomaterialov • Polimerni nanokompoziti	• Characterization of nanomaterials • Applications of nanomaterials • Polymer nanocomposites

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:	**Objectives and competences:**
Študenti pridobijo poglobljeno znanje s področja materialnih znanosti in različnih tehnoloških aplikacij	Students acquire advanced knowledge on material science and various technological application.

Predvideni študijski rezultati:

Znanje in razumevanje: Sinteza nanomaterialov in ustezne strategije Prenesljive/ključne spretnosti in drugi atributi: Prilagoditev ustreznih metod za sintezo nanomaterialov. Razumevanje modernih instrumentalnih metod za karakterizacijo nanostrukturiranih materialov in polimernih nanokompozitov.	Knowledge and understanding: Nano materials synthesis methods and strategies Transferable/Key Skills and other attributes: Various methods adopted for the synthesis of Nano materials. Understating of modern instrumental techniques for the characterization of nanostructure materials and polymer nanocomposites

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja in reševanje zastavljenih problemov.	Lectures and solving of defined problems.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Seminar	**50%**	Seminar
Ustni izpit	**50%**	Oral exam

Reference nosilca / Lecturer's references:

1) Preparation and Characterization of Potato Starch Nanocrystal Reinforced Natural Rubber Nanocomposites, KR Rajisha, HJ Maria, LA Pothan, Z Ahmad, S Thomas, International Journal of Biological Macromolecules
2) Hybrid Nanoparticle-Based XLPE/SiO2/TiO2 and XLPE/SiO2 Nanocomposites: Nanoscale Hybrid Assembling, Mechanics and Thermal properties, JP Jose, Z Ahmad, S Thomas, InCIEC 2013, 895-902
3) S. Kralj, R. Rosso, E.G. Virga, Curvature control of valence on nematic shells. Soft matter 7, 670 (2011).
4) V. Popa-Nita, S. Kralj, Random anisotropy nematic model: nematic--non-nematic mixture, Phys. Rev. E 73, 041705 (2006).
5) Nanoclay effect on transport properties of thermoplastic polyurethane/polypropylene (TPU/PP) blends, M Kannan, SS Bhagawan, S Thomas, K Joseph, Journal of Polymer Research 20 (8), 1-15