Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Izbrana poglavja iz fizike**
Course title:	**Selected topics in physics**

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, 3rd cycle		1. or 2.	**1., 2. or 4.**

Vrsta predmeta / Course type	Izbirni za vse module
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Mentorstvo Mentorship	Samost. delo Individ. work	ECTS
10	**5**				**165**	**6**

Nosilec predmeta / Lecturer:	**Marko Robnik**

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski/Slovenian in/and angleški s slovenskim prevodom/English with translation in Slovenian
	Vaje / Tutorial:	/

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Ni posebnih zahtev.	No special prerequisites.

Vsebina:	**Content (Syllabus outline):**
Študenti se udeležijo seminarskih predavanj gostujočih znanstvenikov raziskovalcev, kolokvijev, poletnih šol, delavnic ter drugih simpozijev, ki jih organizirata CAMTP in FNM. Študenti se aktivno udeležijo ene izmed navedenih konferenc oz. šol. CAMTP organizira: - Mednarodne poletne šole in konference »Let's Face Chaos through Nonlinear Dynamics« (vsaka tri leta)	Students attend seminar lectures of visiting scientists researchers, colloquia, summer schools, workshops, and other symposia, organized by CAMTP and FNM. Students actively attend one of the proposed summer schools or conferences. CAMTP organizies: - International Summer Schools and Conferences

- European Advanced Studies Conferences (vsako leto) - Japan-Slovenia Seminars on Nonlinear Science (vsako leto) - Božicne simpozije fizikov (vsako leto) - SOCRATES Workshops (v sodelovanju z Univerzo v Marburgu, Nemčija) - Redne raziskovalne seminarje na vseh področjih fizike Izbiro druge konference, simpozija ali poletne šole potrdi Oddelek za fiziko FNM UM.	- »Let's Face Chaos through Nonlinear Dynamics« (every theree years) - European Advanced Studies Conferences (every year) - Japan-Slovenia Seminars on Nonlinear Science (every year) - Christmas Symposia of Physicists (every year) - SOCRATES Workshops (in collaboration with University of Marburg) - Regular research seminars in all fields of physics The selection of other conference, symposium or summerschool should be confirmed by the Department of Physics FNM UM.

Temeljni literatura in viri / Readings:

1) L.D. Landau, E. M. Lifshitz, Mechanics, Butterworth-Heinemann, 1982.
2) L.D. Landau, E. M. Lifshitz, The Classical Theory of Fields, Butterworth-Heinemann, 1980.
3) L.D. Landau, E. M. Lifshitz, Quantum Mechanics: Non-Relativistic Theory, Butterworth-Heinemann, 1981.
4) V.B. Berestetskii, L.P. Pitaevskii, E.M. Lifshitz, Quantum Electrodynamics, Butterworth-Heinemann, 1982.
5) L.D. Landau, Statistical Physics, Butterworth-Heinemann, 1984.
6) L.D. Landau, E. M. Lifshitz, Fluid Mechanics, Butterworth-Heinemann, 1987.
7) L.D. Landau, L.P. Pitaevskii, E.M. Lifshitz, A.M. Kosevich, Theory of Elasticity, Butterworth-Heinemann, 1986.
8) L.D. Landau, L.P. Pitaevskii, E.M. Lifshitz, Electrodynamics of Continuous Media, Butterworth-Heinemann, 1986.
9) Članki v revijah Evropskega (EPS) in Ameriškega (APS) fizikalnega združenja, Science, Nature, Scientific American. Physics World , Physik Journal, Physics Today, Nature Physics, News and Reviews in Astronomy and Geophysics / Papers in the journals of European (EPS) and American Phyiscal Society (APS) as well as Science, Nature, Scientific American, Physics World , Physik Journal, Physics Today, Nature Physics, News and Reviews in Astronomy and Geophysics

Cilji in kompetence:	**Objectives and competences:**
• Razumeti osnovne ideje na širokem področju moderne fizike ter povezave z drugimi področji	• Understanding the basic ideas in the broad domain of modern physics and the links to other fields

• Pridobiti dobro razgledanost nad aktualnimi tematikami sodobne fizike	• Gaining good overview on the topical themes of modern physics

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje:	Knowledge and understanding:
• Poglobljeno razumevanje idej, metod in rezultatov sodobne fizike	• Deeper understanding of ideas, methods and results of modern physics
Prenesljive/ključne spretnosti in drugi atributi:	Transferable/Key Skills and other attributes:
• sposobnost predstavitve pridobljenih raziskovalnih izsledkov s področja fizike v obliki javnih predstavitev na znanstvenih srečanjih	• Capability of public presentation of research results from the field of physics to scientific community at the meetings
• poglobljeno razumevanje teoretskih in metodoloških konceptov z različnih področij moderne fizike	• Deeper understanding of theoretical and methodological concepts from different areas of modern physics
• mednarodna komunikativnost v vrhunskem znanstvenem in strokovnem okolju	• Capability of communication in the top-level scientific community

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminar	Lectures, seminar

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
• Seminarska naloga	**50%**	• Seminar work
• Ustna predstavitev naloge	**50%**	• Oral presentation of the seminar work

Reference nosilca / Lecturer's references:

1. ROBNIK, Marko. Recent results on time-dependent Hamiltonian oscillators. *The European physical journal, Special topics*, ISSN 1951-6355, sep. 2016, vol. 225, iss. 6/7, str. 1087-1101. [COBISS.SI-ID 89308673]

2. MANOS, Thanos, ROBNIK, Marko. Studies of dynamical localization in a finite-dimensional model of the quantum kicked rotator. *Nonlinear phenomena in complex systems*, ISSN 1817-2458, 2015, vol. 18, no. 3, str. 335-355. http://www.j-npcs.org/abstracts/vol2015/v18no3/v18no3p335.html. [COBISS.SI-ID 85059329]

3. ROBNIK, Marko. Statistical properties of one-dimensional time-dependent Hamilton oscillators : from the parametrically adiabatic driving to the kicked systems. *Nonlinear phenomena in complex systems*, ISSN 1817-2458, 2015, vol. 18, no. 3, str. 356-380. http://www.j-npcs.org/abstracts/vol2015/v18no3/v18no3p356.html. [COBISS.SI-ID 85059841]

4. MANOS, Thanos, ROBNIK, Marko. Statistical properties of the localization measure in a finite-dimensional model of the quantum kicked rotator. *Physical review. E, Statistical, nonlinear and soft matter physics*, ISSN 1550-2376. [Online ed.], 2015, vol. 91, iss. 4, str. 042904-1 - 042904-11, graf. prikazi, doi: 10.1103/PhysRevE.91.042904. [COBISS.SI-ID 82151425]

5. ANDRESAS, Dimitris, ROBNIK, Marko. Statistical properties of the energy in time-dependent homogeneous power law potentials. *Journal of physics. A, Mathematical and theoretical*, ISSN 1751-8113, 2014, vol. 47, issue 35, str. 355102-1 - 355102-10, doi: 10.1088/1751-8113/47/35/355102. [COBISS.SI-ID 79388417]