

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)						
<b>Predmet:</b>		Izbrana poglavja iz geometrije				
<b>Course title:</b>		Topics in geometry				
<b>Študijski program in stopnja</b>		<b>Študijska smer</b>		<b>Letnik</b>		<b>Semester</b>
<b>Study programme and level</b>		<b>Study field</b>		<b>Academic year</b>		<b>Semester</b>
Doktorski študijski program Matematika in fizika		Matematika		1 ali 2		prvi ali drugi
Doctoral study programme Mathematics and Physics		Mathematics		1 or 2		first or second
<b>Vrsta predmeta / Course type</b>				izbirni / elective		
<b>Univerzitetna koda predmeta / University course code:</b>				M3124		
<b>Predavanja</b>	<b>Seminar</b>	<b>Vaje</b>	<b>Klinične vaje</b>	<b>Druge oblike</b>	<b>Samost. delo</b>	<b>ECTS</b>
<b>Lectures</b>	<b>Seminar</b>	<b>Tutorial</b>	<b>work</b>	<b>študija</b>	<b>Individ. work</b>	
30					150	6
<b>Nosilec predmeta / Lecturer:</b>		prof. dr. Miran Černe, prof. dr. Franc Forstnerič, prof. dr. Tomaž Košir, prof. dr. Janez Mrčun, prof. dr. Pavle Saksida				
<b>Jeziki / Languages:</b>		<b>Predavanja / Lectures:</b> slovenski / Slovene, angleški / English				
		<b>Vaje / Tutorial:</b> slovenski / Slovene, angleški / English				
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>		
Vpis v letnik študija.				Enrolment in the programme.		
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>		

Izbrane bodo nekatere standardne podiplomske teme iz geometrije, ki vključujejo teorijo shem, teorijo snopov, teorijo realnih (semi)algebraičnih množic, teorijo simplektičnih in kontaktnih mnogoterosti, teorijo foliacij, teorijo simetrij nelinearnih diferencialnih enačb, umeritvene teorije, homologije Floerovega tipa, teorijo Steinovih ploskev itd. Izbira je odvisna od interesov in raziskovalne usmeritve študentov.

The content consists of a selection of standard graduate topics in geometry, such as the theories of schemes, sheaves, real (semi)algebraic sets, symplectic and contact manifolds, foliations, symmetries of nonlinear differential equations, Stein surfaces, gauge theories, homologies of Floer type etc. The choice depends on students' research interests.

#### **Temeljni literatura in viri / Readings:**

- [1] T. Broecker, T. tom Dieck, Representations of Compact Lie Groups, Springer, 1985.
- [2] P. Griffiths, J. Harris, Principles of algebraic geometry, Wiley, 1978.
- [3] R. Hartshorne. Algebraic Geometry, GTM 52, Springer-Verlag, 1977.
- [4] D. Husemoller, Fibre bundles, Springer, 1994.
- [5] S. Kobayashi, K. Nomizu, Foundations of differential geometry, Wiley, 1963.[6] J. Milnor, J. D. Stasheff, Characteristic classes, Princeton University Press, 1974.
- [7] I. Moerdijk, J. Mrčun, Introduction to Foliations and Lie Groupoids, Cambridge University press, 2003.[8] F. W. Warner, Foundations of differentiable manifolds and Lie groups, Springer, 1983.

#### **Cilji in kompetence:**

Namen predmeta je seznaniti študente z nekaterimi pomembnimi temami geometrije.

#### **Objectives and competences:**

The main goal of the course is to provide students with some important topics in geometry.

**Predvideni študijski rezultati:**

Znanje in razumevanje predstavljenih konceptov.

Sposobnost uporabe pridobljenega znanja in spretnosti.

**Intended learning outcomes:**

Knowledge and comprehension of presented concepts.

Ability to use acquired knowledge and skills.

**Metode poučevanja in učenja:**

Predavanja, konzultacije, reševanje problemov

**Learning and teaching methods:**

Lectures, consultations, problem sessions

**Načini ocenjevanja:**

Delež (v %) /

Weight (in %)

**Assessment:**

Pisni izpit (domače naloge), ustni izpit

Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)

100 %

Written exam (homeworks), oral exam

Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

**Reference nosilca / Lecturer's references:**

ČERNE, Miran, ZAJEC, Matej. Boundary differential relations for holomorphic functions on the disc. Proceedings of the American Mathematical Society, ISSN 0002-9939, 2011, vol. 139, no. 2, str. 473-484 [COBISS.SI-ID 15710553]

ČERNE, Miran, FLORES, Manuel. On Beurling's boundary differential relation. Israel journal of mathematics, ISSN 0021-2172, 2014, vol. 199, iss. 2, str. 831-840 [COBISS.SI-ID 17144153]

ČERNE, Miran. Beurling's boundary differential relations on multiply connected domains. Journal of mathematical analysis and applications, ISSN 0022-247X. [Print ed.], 2015, vol. 428, iss. 1, str. 544-562 [COBISS.SI-ID 17270873]

FORSTNERIČ, Franc. A complex surface admitting a strongly plurisubharmonic function but no holomorphic functions. The Journal of geometric analysis, ISSN 1050-6926, 2015, vol. 25, iss. 1, str. 329-335. [COBISS.SI-ID 17136217]

FORSTNERIČ, Franc, LÁRUSSON, Finnur. Holomorphic flexibility properties of compact complex surfaces. International mathematics research notices, ISSN 1073-7928, 2014, vol. 2014, no. 13, str.

3714-3734. [COBISS.SI-ID 17143641]

FORSTNERIČ, Franc. Stein manifolds and holomorphic mappings : the homotopy principle in complex analysis, (Ergebnisse der Mathematik und ihrer Grenzgebiete, Folge 3, vol. 56). Heidelberg [etc.]: Springer, cop. 2011. X, 489 str., ilustr. ISBN 978-3-642-22249-8. ISBN 978-3-642-22250-4. [COBISS.SI-ID 16008025]

BUCKLEY, Anita, KOŠIR, Tomaž. Plane curves as Pfaffians. Annali della Scuola normale superiore di Pisa, Classe di scienze, ISSN 0391-173X, 2011, vol. 10, iss. 2, str. 363-388. [COBISS.SI-ID 15928409]

KOŠIR, Tomaž, OBLAK, Polona. On pairs of commuting nilpotent matrices. Transformation groups, ISSN 1083-4362, 2009, vol. 14, no. 1, str. 175-182. [COBISS.SI-ID 15077977]

KOŠIR, Tomaž, SETHURAMAN, B. A. Determinantal varieties over truncated polynomial rings. Journal of Pure and Applied Algebra, ISSN 0022-4049. [Print ed.], 2005, vol. 195, no. 1, str. 75-95. [COBISS.SI-ID 13266265]

MOERDIJK, Ieke, MRČUN, Janez. Introduction to foliations and Lie groupoids, (Cambridge studies in advanced mathematics, 91). Cambridge, UK: Cambridge University Press, 2003. IX, 173 str., ilustr. ISBN 0-521-83197-0. [COBISS.SI-ID 12683097]

MOERDIJK, Ieke, MRČUN, Janez. On integrability of infinitesimal actions. American journal of mathematics, ISSN 0002-9327, 2002, vol. 124, no. 3, str. 567-593. [COBISS.SI-ID 11700057]

MOERDIJK, Ieke, MRČUN, Janez. On the integrability of Lie subalgebroids. Advances in mathematics, ISSN 0001-8708, 2006, vol. 204, iss. 1, str.101-115. [COBISS.SI-ID 14074201]

KALIŠNIK, Jure, MRČUN, Janez. A Cartier-Gabriel-Kostant structure theorem for Hopf algebroids. Advances in mathematics, ISSN 0001-8708, 2013, vol. 232, iss. 1, str. 295-310. [COBISS.SI-ID 16432473]

SAKSIDA, Pavle. On the nonlinear Fourier transform associated with periodic AKNS-ZS systems and its inverse. Journal of physics. A, Mathematical and theoretical, ISSN 1751-8113, 2013, vol. 46, no. 46, 465204 (22 str.). [COBISS.SI-ID 16833369]

SAKSIDA, Pavle. On the generalized Maxwell-Bloch equations. Symmetry, integrability and geometry: methods and applications, ISSN 1815-0659, 2006, vol. 2, paper 038 (14 str.). [COBISS.SI-ID 13932633]

SAKSIDA, Pavle. Lattices of Neumann oscillators and Maxwell-Bloch equations. Nonlinearity, ISSN 0951-7715, 2006, vol. 19, no. 3, str. 747-768. [COBISS.SI-ID 13932377]