

UČNI NAČRT PREDMETA / COURSE SYLLABUS							
Predmet:		Uvod v algebraično geometrijo					
Course title:		Introduction to algebraic geometry					
Študijski program in stopnja Study programme and level		Študijska smer Study field		Letnik Academic year		Semester Semester	
Magistrski študijski program Matematika		ni smeri		1 ali 2		prvi ali drugi	
Master's study programme Mathematics		none		1 or 2		first or second	
Vrsta predmeta / Course type				izbirni			
Univerzitetna koda predmeta / University course code:				M2310			
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS	
45		30			105	6	
Nosilec predmeta / Lecturer:		prof. Tomaž Košir					
Jeziki / Languages:		Predavanja / Lectures:		slovenski/Slovene, angleški/English			
		Vaje / Tutorial:		slovenski/Slovene, angleški/English			
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:			
Vsebina:				Content (Syllabus outline):			

<p>Osnovni del:</p> <p>Afine raznoterosti. Hilbertov izrek o ničlah. Kolobar polinomskih funkcij. Racionalne funkcije.</p> <p>Lokalne lastnosti ravninskih krivulj.</p> <p>Projektivne raznoterosti. Regularne in racionalne funkcije.</p> <p>Projektivne ravninske krivulje. Bezoutov izrek. Izrek Maxa Noetherja.</p> <p>Preslikave med raznoterostmi. Resolucije singularnosti krivulj.</p> <p>Hilbertov polinom in Hilbertova funkcija.</p> <p>Delitelji na raznoterostih.</p> <p>Krivulje. Ravninske kubične krivulje. Linearni sistemi na krivulji. Projektivne vložitve krivulj.</p> <p>Izbirne vsebine:</p> <p>Riemann-Rochov izrek.</p>	<p>Fundamental part:</p> <p>Affine varieties. Hilbert Nullstellensatz.</p> <p>Ring of polynomial functions. Rational functions.</p> <p>Local properties of plane curves.</p> <p>Projective varieties. Regular and rational functions.</p> <p>Projective plane curves. Bezout's Theorem.</p> <p>Max Noether Theorem.</p> <p>Affine and rational maps. Resolutions of singularities.</p> <p>Hilbert polynomial and Hilbert function.</p> <p>Divisors on varieties.</p> <p>Curves. Plane cubic curves. Linear systems on curves. Projective embeddings of curves.</p> <p>Elective topics:</p> <p>Riemann-Roch Theorem.</p>
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Temeljni literatura in viri / Readings:

- B. Hassett. Introduction to algebraic geometry. Cambridge Univ. Press, 2007.
- M. C. Beltrametti, E. Carletti, D. Gallarati, G. Monti Bragadin. Lectures on Curves, Surfaces and Projective Varieties. A Classical View of Algebraic Geometry, EMS Text-books in Mathematics, 2009.
- I. Shafarevich: Basic Algebraic Geometry I : Varieties in Projective Space, 2nd edition, Springer, Berlin, 1994.
- K. Hulek: Elementary Algebraic Geometry, AMS, Providence, 2003.
- W. Fulton: Algebraic Curves, Addison-Wesley, Redwood City, 1989.
- J. Harris: Algebraic Geometry : A First Course, Springer, New York, 1995.

Cilji in kompetence:

Objectives and competences:

Študent se spozna z osnovnimi pojmi in izreki algebraične geometrije.

Student masters basic concepts and tools of algebraic geometry.

Predvideni študijski rezultati:

Znanje in razumevanje: Poznavanje pojmov in izrekov algebraične geometrije in njihovo prepoznavanje v drugih vejah matematike. Uporaba: V področjih matematike, ki delajo z geometričnimi objekti, v teoretični fiziki, in drugje.

Refleksija: Razumevanje teorije na podlagi primerov in uporabe.

Prenosljive spretnosti – niso vezane le na en predmet: Formulacija problemov v primernem jeziku, reševanje in analiza dobljenih rezultatov na primerih, prepoznavanje algebraičnih struktur v geometriji.

Intended learning outcomes:

Knowledge and understanding: Understanding of basic concepts and theorems of algebraic geometry, and their role in some other areas. Application: In the areas of mathematics that deal with geometric objects, in theoretical physics, and elsewhere.

Reflection: Understanding the theory on the basis of examples and applications.

Transferable skills: Formulation and solution of problems in an appropriate setup, solution and analysis of the results in examples, recognizing algebraic structure in geometric objects.

Metode poučevanja in učenja:

predavanja, vaje, domače naloge, konzultacije

Learning and teaching methods:

Lectures, exercises, homeworks, consultations

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt):
izpit iz vaj (2 kolokvija ali pisni izpit)

Delež (v %) /
Weight (in %)

50%
50%

Assessment:

Type (examination, oral, coursework, project):
2 midterm exams instead of written exam, written exam

ustni izpit		oral exam
Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)		Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Tomaž Košir:

– GRUNENFELDER, Luzius, KOŠIR, Tomaž. Geometric aspect of multiparameter spectral theory. Transactions of the American Mathematical Society, ISSN 0002-9947, 1998, let. 350, št. 6, str. 2525-2546 [COBISS.SI-ID 8449113]

– 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]

– 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]