UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Algebraične krivulje
Course title:	Algebraic curves

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program Matematika	ni smeri	2	drugi
First cycle academic study programme Mathematics	none	2	second

Vrsta predmeta / Course type	izbirni

Univerzitetna koda predmeta / University course code:	M0219

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work		ECTS
30		30			90		5

Nosilec predmeta / Lecturer:	prof. Pavle Saksida, prof. Tomaž Košir

Jeziki / Languages:	Predavanja / Lectures:	slovenski/Slovene
	Vaje / Tutorial:	slovenski/Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Opravljen predmet Algebra 1.	Completed course Algebra 1.

Vsebina:	Content (Syllabus outline):

Afine algebraične krivulje. Nerazcepnost in povezanost.	Affine algebraic curves. Irreducibility and connectedness.
Projektivno zaprtje. Presečna večkratnost med krivuljo in premico. Bezouteva lema.	Projectivization. Multiplicity of intersection between a line and a curve. Bezout lemma.
Tangente. Singularnosti.	Tangents. Singularity.
Polare in Hessove krivulje.	Polars and Hess curves.
Dualna krivulja. Plückerjeva formula.	Dual curve. Plücker formula.
Racionalne krivulje. Stožnice.	Rational curves , Conics.
Kubične krivulje.	Cubic curves.
Izrek o rodu in stopnji nesingularne krivulje.	Degree-genus formula for nonsingular curves.

Temeljni literatura in viri / Readings:

G. Fisher: Plane Algebraic Curves, AMS, Providence, 2001.

C. G. Gibson: Elementary Geometry of Algebraic Curves, Cambridge Univ. Press, Cambridge, 1998.

M. Reid: Undergraduate Algebraic Geometry, Cambridge Univ. Press, Cambridge, 1988.

K. Hulek: Elementary Algebraic Geometry, AMS, Providence, 2003.

F. Kirwan: Complex Algebraic Curves, Cambridge Univ. Press, Cambridge, 1992.

C. H. Clemens: A Scrapbook of Complex Curve Theory, 2nd edition, AMS, Providence, 2003.

Cilji in kompetence:	Objectives and competences:
Je eden od treh osnovnih predmetov, pri katerem študent spozna geometrijski način razmišljanja. Osnovni cilj je spoznati temeljne pojme in lastnosti algebraičnih krivulj.	This is one of the three basic courses in which students learn to think geometrically. The basic goal is to understand the basic definitions and properties of algebraic curves.

Predvideni študijski rezultati:	Intended learning outcomes:
Znanje in razumevanje: Razumevanje povezave med algebraičnimi enačbami in geometrijskimi objekti. Sposobnost obravnave geometrijskih objektov s pomočjo orodij iz teorije polinomov.	Knowledge and understanding: Understanding the relation between the algebraic equations and the geometric objects. Ability of treating some geometric problems by means of tools,

Poznavanje in razumevanje osnovnih pojmov in definicij iz teorije algebraičnih krivulj in algebraične geometrije. Uporaba: Algebraični opis objektov, ki se pojavljajo pri problemih v drugih vejah matematike in njene uporabe. Uporaba algebraično-geometrijskih sredstev pri obravnavi teh problemov. Refleksija: Dojemanje istih objektov (krivulj) z različnih aspektov. Razvijanje geometrijskega razmišljanja pri reševanju problemov iz prakse. Prenosljive spretnosti – niso vezane le na en predmet: Formulacija problemov v primernem jeziku, reševanje in analiza doseženega na primerih. Ker je za razumevanje predmeta potrebno solidno obvladanje nekaterih vsebin iz analize in linearne algebre, se študent nauči uporabljati znanje, pridobljeno pri drugih predmetih. Nauči se tudi spretnosti uporabe tuje literature.	coming from the theory of polynomials. Knowledge and understanding of the fundamental concepts of the theory of algebraic curves and algebraic geometry. Application: Algebraic description of objects, appearing in problems from other areas of mathematics and its applications. Application of algebro-geometric methods in the treatment of such problems. Reflection: Ability of percieving mathematical object from different points of view. Development of the geometric approach to solving problems in applicative mathematics. Transferable skills: Formulation of problems in suitable contexts, evaluation of developed tools in concrete examples. This course demands a firm knowledge of certain chapters from mathematical analysis and algebra. Therefore students learn how to use previously acquired knowledge in new situations. Students learn the use of study literature in foreign languages.

Metode poučevanja in učenja: **Learning and teaching methods:**

Predavanja, vaje, konzultacije	Lectures, exercises, consultations

Načini ocenjevanja: | Delež (v %) / Weight (in %) | **Assessment:**

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt): 2 kolokvija namesto izpita iz vaj, izpit iz vaj,	50% 50%	Type (examination, oral, coursework, project): 2 midterm exams instead of written exam, written exam

izpit iz teorije		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. Koszul cohomology for finite families of comudule maps end applications. Communications in algebra, ISSN 0092-7872, 1997, let. 25, št. 2, str. 459-479 [COBISS.SI-ID 7127641]

– GRUNENFELDER, Luzius, KOŠIR, Tomaž. Coalgebras and spectral theory in one and several parameters. V: GOHBERG, I. (ur.), LANCASTER, P. (ur.), SHIVAKUMAR, P. N. (ur.). Recent developments in operator theory and its applications : International Conference in Winnipeg, October 2-6, 1994, (Operator theory, ISSN 0255-0156, vol. 87). Basel, Boston, Berlin: Birkhäuser, cop. 1996, str. 177-192 [COBISS.SI-ID 7436889]

– GRUNENFELDER, Luzius, GURALNICK, Robert M., KOŠIR, Tomaž, RADJAVI, Heydar. Permutability of characters on algebras. Pacific journal of mathematics, ISSN 0030-8730, 1997, let. 178, št. 1, str. 63-70 [COBISS.SI-ID 7437145]

Pavle Saksida:

– SAKSIDA, Pavle. Nahm's equations and generalizations Neumann system. Proceedings of the London Mathematical Society, ISSN 0024-6115, 1999, let. 78, št. 3, str. 701-720 [COBISS.SI-ID 8853849]

– SAKSIDA, Pavle. Integrable anharmonic oscillators on spheres and hyperbolic spaces. Nonlinearity, ISSN 0951-7715, 2001, vol. 14, no. 5, str. 977-994 [COBISS.SI-ID 10942809]

– SAKSIDA, Pavle. Neumann system, spherical pendulum and magnetic fields. Journal of physics. A, Mathematical and general, ISSN 0305-4470, 2002, vol. 35, no. 25, str. 5237-5253 [COBISS.SI-ID 11920217]