UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)			
Predmet:	Konveksnost		
Course title:	Convexity		
Študijski program in stopnja **Study programme and level**	**Študijska smer** **Study field**	**Letnik** **Academic year**	**Semester** **Semester**
Magistrski študijski program Finančna matematika	ni smeri	1 ali 2	prvi ali drugi
Master's study programme Financial Mathematics	none	1 or 2	first or second

Vrsta predmeta / Course type	izbirni / elective
Univerzitetna koda predmeta / University course code:	M2312

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. dr. Franc Forstnerič, prof. dr. Boris Lavrič

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:**
Vpis v letnik študija.	Enrolment in the programme.

Vsebina:	**Content (Syllabus outline):**

Afine in konveksne množice. Topološke lastnosti konveksnih množic. Caratheodorijev in Radonov izrek. Separacijski izreki. Ekstremne točke. Politopi. Stožci in polare. Poliedri. Izrek Weyla in Minkowskega. Sistemi linearnih neenačb. Farkaseva lema in linearno programiranje. Posplošitve Hellyjevega izreka. Metrični prostor konveksnih množic. Blaschkejev izrek. Metrične lastnosti konveksnih množic. Konveksne funkcije. Zveznost, odvedljivost in subgradient. Ekstremi.	Affine and convex sets. Topological properties of convex sets. Theorems of Caratheodory and Radon. Separation theorems. Extreme points. Polytopes. Cones and polars. Polyhedra. The theorem of Weyl and Minkowski. Systems of linear inequations. The Farkas lemma and linear programming. Generalizations of the theorem of Helly. The metric space of convex sets. The Blaschke theorem. Metric properties of convex sets. Convex functions. Continuity, differentiability and the subgradient. Extrema.

Temeljni literatura in viri / Readings:

H. G. Eggleston: Convexity, Cambridge Univ. Press, Cambridge, 1958.

A. Brøndsted: An Introduction to Convex Polytopes, Springer, New York-Berlin, 1983.

F. A. Valentine: Convex Sets, Robert E. Krieger, Huntington, 1976.

R. T. Rockafellar: Convex Analysis, Princeton Univ. Press, Princeton, 1996.

A. W. Roberts, D. E. Varberg: Convex Functions, Academic Press, New York-London, 1973.

Cilji in kompetence:	**Objectives and competences:**
Študent spozna osnovne pojme konveksne geometrije in konveksne analize. Seznani se z lastnostmi konveksnih množic in konveksnih funkcij v evklidskih in normiranih prostorih ter z uporabo teorije na raznih področjih matematike. Pri tem povezuje geometrijsko intuicijo z algebro, analizo in kombinatoriko.	The student learns the basic concepts of convex geometry and convex analysis. The student gets familiar with the properties of convex sets and convex functions in euclidean and normed spaces and applications of the theory in different areas of mathematics. The student combines geometric intuition with algebra, analysis and combinatorics.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Poznavanje in razumevanje osnovnih pojmov teorije konveksnih množic in konveksnih funkcij. Sinteza metod iz linearne algebre, analize in geometrije.	Knowledge and understanding: Knowledge and understanding of basic concepts of the theory of convex sets and convex functions. A synthesis of methods of linear algebra, analysis and geometry.

Uporaba: Uporaba teorije pri reševanju problemov na raznih področjih matematike in drugih znanosti. Refleksija: Razumevanje teorije na podlagi primerov in uporabe. Prenosljive spretnosti – niso vezane le na en predmet: Postavitev problema, njegova matematična formulacija ter reševanje in analiza. Prenos teorije v prakso.	Application: Solving problems in different areas of mathematics and other sciences using the theory. Reflection: Understanding the theory on the basis of examples and applications. Transferable skills: Posing of a problem, its mathematical formulation, solving and analysis. The transfer of the theory into praxis.

Metode poučevanja in učenja:	**Learning and teaching methods:**
predavanja, vaje, domače naloge, konzultacije	Lectures, exercises, homeworks, consultations

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt): izpit iz vaj (2 kolokvija ali pisni izpit) ustni izpit Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	 50% 50%	Type (examination, oral, coursework, project): 2 midterm exams instead of written exam, written exam oral exam Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Franc Forstnerič:

FORSTNERIČ, Franc. Runge approximation on convex sets implies the Oka property. Annals of mathematics, ISSN 0003-486X, 2006, vol. 163, no. 2, str. 689-707. [COBISS.SI-ID 13908825]

FORSTNERIČ, Franc. Noncritical holomorphic functions on Stein manifolds. Acta mathematica, ISSN 0001-5962, 2003, vol. 191, no. 2, str. 143-189. [COBISS.SI-ID 13138009]

FORSTNERIČ, Franc. Embedding strictly pseudoconvex domains into balls. Transactions of the American Mathematical Society, ISSN 0002-9947, 1986, let. 295, št. 1, str. 347-368. [COBISS.SI-ID 8206425]

Boris Lavrič:

LAVRIČ, Boris. The isometries of certain maximum norms. Linear Algebra and its Applications, ISSN 0024-3795. [Print ed.], 2005, vol. 405, str. 249-263. [COBISS.SI-ID 13679961]

LAVRIČ, Boris. The isometries and the G-invariance of certain seminorms. Linear Algebra and its Applications, ISSN 0024-3795. [Print ed.], 2003, vol. 374, str. 31-40. [COBISS.SI-ID 12751193]

LAVRIČ, Boris. Monotonicity properties of certain classes of norms. Linear Algebra and its Applications, ISSN 0024-3795. [Print ed.], 1997, let. 259, str. 237-250. [COBISS.SI-ID 7388761]