



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Finančno-aktuarska matematika
Course title:	Financial and actuarial mathematics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika		3.	6.
Mathematics		3.	6.

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
60		30			90	6

Nosilec predmeta / Lecturer:

Jeziki / Languages:	Predavanja / Lectures:	<input type="text" value="SLOVENSKO/SLOVENE"/>
	Vaje / Tutorial:	<input type="text" value="SLOVENSKO/SLOVENE"/>

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: **Prerequisites:**

Vsebina:

Finančna matematika:
Temeljni računi
Teorija obrestnih mer
Nominalna in efektivna obrestna mera
Intenziteta obrestovanja
Zvezno obrestovanje
Ocenjevanje investicijskih projektov
Rente in posojila
Spremenljive in zvezne rente
Finančni instrumenti

Aktuarska matematika:
Verjetnost v aktuarstvu

Content (Syllabus outline):

Financial mathematics:
Foundations
Theory of interest rates
Nominal and effective rates of interest
The force of interest
Continuous compounding
Valuing cash flows
Annuities and loans
Varying annuities
Financial instruments

Actuarial mathematics:
Probability models
Life tables

Življenske tablice
Zavarovanje za doživetje
Mešano zavarovanje
Enkratne in večkratne premije
Življenske rente
Komutacijska števila
Matematična rezerva

Life insurance
Endowment insurance
Net premiums
Life annuities
Commutational functions
Mathematical reserves

Temeljni literatura in viri / Readings:

1. McCutcheon J.J. and Scott W.F., An Introduction to the Mathematics of Finance, Edinburgh, 1985.
2. Gerber H.U..1996. Matematika življenskih zavarovanj. DMFA Ljubljana, Zavarovalnica Triglav.
3. Bowers N.L., Gerber H.U., Hickman J.C., Jones D.A., Nesbitt C.J.: 1986. Actuarial Mathematics. Itasca, USA.
4. Gerber H.U..1996. Life Insurance Mathematics. Springer. Berlin, New York.

Cilji in kompetence:

Namen predmeta je posredovati temeljna teoretična in praktična znanja potrebna pri kvantitativnem in kvalitativnem obravnavanju nalog in procesov s področja finančne in aktuarske matematike. Prav tako je namen predmeta dati osnovo za spremljanje sodobne literature in nadaljnje strokovno izpopolnjevanje.

Objectives and competences:

The objective is to provide fundamental theoretical knowledge and practical skills of financial and actuarial mathematics. The objective is also to enable the students for additional learning and individual study of new methods.

Predvideni študijski rezultati:

Poglobljeno znanje in razumevanje temeljnih vsebin in orodij potrebnih za strokovno korektno vodenje poslov s področja finančne matematike inaktuarskega dela.

Sposobnost samostojnega praktičnega in teoretičnega dela. Zmožnost nadaljnega študija.

Intended learning outcomes:

Knowledge and Understanding:
Fundamental theoretical knowledge and practical skills of financial mathematics and actuarial work.

Transferable/Key Skills and other attributes:
Capability of understanding and application of knowledge in praxis. Ability of additional learning and individual study of new methods.

Metode poučevanja in učenja:

Predavanja, tehnične demonstracije, aktivne vaje, seminarska naloga

Learning and teaching methods:

Lectures, technical demonstration, active work, seminary work

Načini ocenjevanja:

Assessment:

	Delež (v %) / Weight (in %)	
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<p><u>Sprotno preverjanje:</u> Seminarska naloga (finančni del) 10%</p> <p><u>Izpit:</u> Pisni izpit – problemi (finančni del) 45% Pisni izpit – problemi (aktuarski del) 30% Pisni izpit – teorija (aktuarski del) 15%</p> <p>Opravljenе sprotne obveznosti so pogoj za pristop k pisnemu izpitu – problemi in teorija.</p> <p>Pisni izpit – problemi in teorija se lahko nadomesti s tremi delnimi testi (sprotne obveznosti).</p>	<p>10%</p> <p>45%</p> <p>30%</p> <p>15%</p>	<p><u>Mid-term testing:</u> Seminary work (financial part)</p> <p><u>Exams:</u> Written exam – problems (financial part) Written exam – problems (actuarial part) Written exam – theory (actuarial part)</p> <p>Passing grades of all mid-term testings are required for taking the written exam – problems and theory.</p> <p>Written exam – problems and theory can be replaced with three mid-term tests.</p>
<p>Reference nosilca / Lecturer's references:</p>		
<p>1. MASTINŠEK, Miklavž. On robustness of the black-scholes partial differential equation model. International journal of theoretical and applied finance, ISSN 0219-0249, 2016, vol. 19, no. 2, str. 1650013/1-11. http://dx.doi.org/10.1142/S0219024916500138, doi: 10.1142/S0219024916500138.</p> <p>2. MASTINŠEK, Miklavž. Reduction of the mean hedging transaction costs. Naše gospodarstvo, ISSN 0547-3101. [Tiskana izd.], 2015, letn. 61, št. 5, str. 23-31. https://dk.um.si/IzpisGradiva.php?id=65377, doi: 10.1515/ngoe-2015-0019.</p> <p>3. MASTINŠEK, Miklavž. Charm-adjusted delta and delta gamma hedging. The Journal of derivatives, ISSN 1074-1240, 2012, vol. 19, no. 3, str. 69-76, doi: 10.3905/jod.2012.19.3.069.</p> <p>4. MASTINŠEK, Miklavž. Financial derivatives trading and delta hedging = Trgovanje z izvedenimi finančnimi instrumenti ter delta hedging. Naše gospodarstvo, ISSN 0547-3101. [Tiskana izd.], 2011, letn. 57, št. 3/4, str. 10-15.</p> <p>5. MASTINŠEK, Miklavž. Discrete-time delta hedging and the Black-Scholes model with transaction costs. Mathematical methods of operations research, ISSN 1432-2994. [Print ed.], 2006, vol. 64, iss. 2, str. [227]-236, doi: 10.1007/s00186-006-0086-0.</p>		