



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:	SLOVENSKI/SLOVENE
	Vaje / Tutorial:	SLOVENSKI/SLOVENE

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

Prerequisites:

Vsebina:

Finančna matematika:
Temeljni računi
Teorija obrestnih mer
Enostavno obrestovanje
Nominalna in efektivna obrestna mera
Relativna in konformna obrestna mera
Intenziteta (moč) obrestovanja
Zvezno obrestovanje
Ocenjevanje investicijskih projektov
Rente in posojila
Spremenljive in zvezne rente

Content (Syllabus outline):

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

<p>Finančni instrumenti</p> <p>Aktuarska matematika: Verjetnost v aktuarstvu Življenske tablice Zavarovanje za doživetje Mešano zavarovanje Enkratne in večkratne premije Življenske rente Komutacijska števila Matematična rezerva</p>	<p>Actuarial mathematics: Probability models Life tables Life insurance Endowment insurance Net premiums Life annuities Commutational functions Mathematical reserves</p>
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Temeljni literatura in viri / Readings:

Obvezna študijska literatura (Compulsory textbooks):

1. Marovt J., Breznik K., Praktikum iz poslovno-finančne matematike, FNM, Maribor, 2014.
2. Marovt J., Aktuarski pristop k vrednotenju netveganih sredstev, FNM, Maribor, 2014.
3. Gerber H.U., Matematika življenjskih zavarovanj, DMFA, Zavarovalnica Triglav, Ljubljana, 1996.

Dodatna študijska literatura (Additional textbooks):

1. McCutcheon J.J., Scott W.F., An Introduction to the Mathematics of Finance, Institute of Actuaries and the Faculty of Actuaries, Edinburgh, 1985
2. Hull J., Options, futures, and other derivative securities, Prentice-Hall, Englewood Cliffs, New Jersey
3. Bowers N.L., Gerber H.U., Hickman J.C., Jones D.A., Nesbitt C.J., Actuarial Mathematics, Itasca, USA, 1986.

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 in aktuarskega dela.

Intended learning outcomes:

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

Sposobnost samostojnega praktičnega in teoretičnega dela. Zmožnost nadaljnje študija.		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:		Learning and teaching methods:
Predavanja, tehnične demonstracije, aktivne vaje, seminarska naloga		Lectures, technical demonstration, active work, seminary work
Načini ocenjevanja:		Assessment:
<u>Sprotno preverjanje:</u> Seminarska naloga (finančni del)	Delež (v %) / Weight (in %) 10 %	<u>Mid-term testing:</u> Seminary work (financial part)
<u>Izpiti:</u> Pisni izpit – problemi (finančni del) Pisni izpit – problemi (aktuarski del) Pisni izpit – teorija (aktuarski del)	45 % 30 % 15 %	<u>Exams:</u> Written exam – problems (financial part) Written exam – problems (actuarial part) Written exam – theory (actuarial part)
Opravljen sprotne obveznosti so pogoj za pristop k pisnemu izpitu – problemi in teorija.		Passing grade of mid-term testing is required for taking the written exam – problems and theory.
Pisni izpit – problemi in teorija se lahko nadomesti s tremi delnimi testi (sprotne obveznosti).		Written exam – problems and theory can be replaced with three mid-term tests.
Reference nosilca / Lecturer's references:		
1. Mosić, D., Marovt, J., Weighted weak core inverse of operators, Linear Multilinear Algebra 70 (2022), No. 20, 4991–5013. 2. Mosić, D., Dolinar, G., Marovt, J., EP-quasinilpotent decomposition and its generalizations, Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Math. RACSAM. 115 (2021), article number: 188. (25 pages). 3. Golubić, I., Marovt, J., Preservers of partial orders on the set of all variance-covariance matrices, Filomat 35 (2021), No. 2, 3015–3030. 4. Golubić, I., Marovt, J., Monotone transformations on the cone of all positive semidefinite real matrices, Math. Slovaca 70 (2020), No. 3, 733–744. 5. Dolinar G., Kuzma B., Marovt J., Poon E., Spectrum preservers revisited, J. Math. Anal. Appl. 489 (2020), No. 1, 124144 (13 pages).		