

M115	Selected Topics on School Mathematics	L	P	S	ECTS 5
		2	3	0	

Course objectives. Remember and expand fundamental knowledge in mathematics. Familiarize students with the basic inequalities and their applications in different areas of mathematics. Students will learn process the basic concepts and methods of financial mathematics and their applications in everyday business situations.

Prerequisites. Undergraduate mathematics or computer science study programme.

Course content.

1. Real numbers. The field of complex numbers. Trigonometric form of a complex number. The exponential form of a complex number. Applications of complex numbers in algebra, analysis and geometry.
2. Equations and inequalities. Rational and irrational equations and inequalities. Equations and inequalities with absolute values. Exponential and logarithmic equations and inequalities. Trigonometric equations and inequalities.
3. Inequalities. The arithmetic, geometric, harmonic and quadratic mean, and associated inequalities. Jensen's inequality. Cauchy inequality. Holder inequality. Chebyshev inequality. Young inequality.
4. Financial mathematics. Interest. Monthly and yearly compounding. The present value of cash flows. Annuities. Repayment of the loan and the annual annuities. Repayment of the loan and interest rate.

LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	Build fields of real and complex numbers axiomatically and inductively.
2.	Apply properties of elementary functions for solving equations and inequalities.
3.	Solve problems in different areas of mathematics using basic inequalities.
4.	Apply arguments in simple and compound interest account in financial mathematics.
5.	Determine the present value of cash flows, financial annuities, loan repayment and compounding in applications.

RELATING THE LEARNING OUTCOMES, ORGANIZATION OF THE EDUCATIONAL PROCESS AND ASSESSMENT OF THE LEARNING OUTCOMES

TEACHING ACTIVITY	ECTS	LEARNING OUTCOME **	STUDENT ACTIVITY*	EVALUATION METHOD	POINTS	
					min	max
Attending lectures and exercises	1	1-5	Lecture attendance, discussion, team work and independent work on given tasks	Attendance lists, tracking activities	0	4
Written exam (Mid-terms)	2	1-5	Preparing for written exam	Evaluation	25	48

Final exam	2	1-5	Revising	Oral exam	25	48
TOTAL	5				50	100

Teaching methods and knowledge assessment. Lectures and exercises are Obligatory. The exam consists of written and oral part, which can be taken after the completion of lectures and exercises. During semester, students can take mid-terms which can replace the written examination.

Can a subject taught in English: Yes

Basis literature:

1. M. Crnjac, D. Jukić, R. Scitovski, Matematika, Ekonomski fakultet Osijek, Osijek, 1994.
2. J. Pečarić, Nejednakosti, Element, Zagreb, 1996.

Recommended literature:

1. D. Bakić, D. Francišković, Financijska i aktuarska matematika, Odjel za matematiku Sveučilište J. J. Strossmayera u Osijeku, 2013, skripta.
2. P. Cerone, S. S. Dragomir, Mathematical Inequalities, CRC Press, New York, 2011.
3. S. Lang, Basic Mathematics, Springer Verlag, Berlin, 1988.
4. D. S. Mitrinović, J. E. Pečarić, A. M. Fink, Classical and New Inequalities in Analysis, Kluwer Academic Publishers, Dordrecht, 1993.
5. B. Pavković, D. Veljan, Elementarna matematika II, Školska knjiga, Zagreb, 2003