

Study programme(s): Master in Mathematics Teaching (MP), Mathematics (MA)				
Level: master				
Course title: Measure and integral (MA-07)				
Lecturer: Dora Đ. Seleši				
Status: obligatory				
ECTS: 5				
Requirements: none				
Learning objectives Studying the theory of Lebesgue measure through the abstract theory of Lebesgue-Stieltjes measures. Studying the differences between the Riemann integral and the Lebesgue integral as a basis for further study of function spaces.				
Learning outcomes <i>Minimal:</i> Essential understanding of the concepts of measure and Lebesgue integral. <i>Expected:</i> Additionally, students should master the technique of calculating the Lebesgue integral and understand the applications of L_p -spaces in probability theory.				
Syllabus <i>Theoretical instruction</i> Sigma algebras. Measurable functions. Measure. Complete measure. Outer measure. Caratheodory's theorem. Construction of Lebesgue-Stieltjes measures on the real line. Lebesgue measure. The Lebesgue-Stieltjes integral of a nonnegative and of a complex function. Products of measure spaces and Fubini's theorem. Comparison between the Riemann integral and the Lebesgue integral. Introduction to L_p -spaces. Applications of measure theory and Lebesgue integration in probability theory. <i>Practical instruction</i> The exercises follow the topics covered in theoretical lectures. Solving examples and exercises. The Cantor set and other fractals.				
Literature 1. S. Pilipović, D. Seleši, <i>Mera i integral – fundamenti teorije verovatnoće</i>, Zavod za udžbenike, 2012. 2. W. Rudin, <i>Principles of Mathematical Analysis</i>, McGraw-Hill, Auckland, 1976. 3. P. R. Halmos, <i>Measure Theory</i>, D. Van Nostrand Comp., 1954. 4. R.G. Bartle, <i>A Modern Theory of Integration</i>, AMS, 2000. 5. M. Capinski, E. Kopp, <i>Measure, Integral and Probability</i>, Springer, 2005. 6. G. B. Folland, <i>Real Analysis – Modern Techniques and their Applications</i>, Wiley, 1984.				
Weekly teaching load				Other:
Lectures: 2	Exercises: 2	Other forms of teaching:	Student research:	
Teaching methodology Classical plenary lectures on the blackboard. Discussion with students. On problem sessions, typical problems, examples and exercises are solved.				
Grading (maximum number of points 100)				
Pre-exam obligations	points	Final exam	points	
Colloquia	50	Oral exam	50	

