<table>
<tr><td>COURSE NAME</td><td colspan="7">Probability II</td></tr>
<tr><td>Code</td><td>PMM232</td><td>Year of study</td><td colspan="4">1st and 2nd year of graduate study</td></tr>
<tr><td>Course teacher</td><td>Snježana Braić</td><td>Credits (ECTS)</td><td colspan="4">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td></td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="4">0%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Course objective is stating and proving main results from advanced topics in classical probability theory. Student will be introduced to various methods for solving central limit problem. Conditional expectation and martingale theory will be presented.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Successful completion of course Measure and integral. Taken course Probability I.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">At the end of this course, students should be able to:
- Understand and apply probability theory concepts and methods
- Recognize central limit problems that can be solved using characteristic function method, Chen-Stein method or delta method and assess convergence rates
- Understand and interpret probabilistic properties of random walks and Brownian motion
- Understand definition, basic properties and application of conditional expectation and martingales
- Combine concepts and methods from this course for solving complex problems</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Central limit theorems with proofs. Lindeberg, Lindeberg Feller. (4)
2. Rate of convergence. Berry-Esseen. (2)
3. Additional results on rate of convergence. Portmanteau, Skorokhodov. (2)
4. Convergence of measures. Prokhorov, Levy-Prokhorov. (2)
5. Chen-Stein method. (2)
6. Delta method. (2)
7. Laws 0-1. (2)
8. Conditional expectation. (2)</td></tr>
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	9. Random walk. (4) 10. Martingale. (6) 11. Brownian motion. (4)
Format of instruction	Lectures and exercises section.
Student responsibilities	Students are obliged to regularly attend lectures and exercises.
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Attending lectures and exercises (2) Written final exam/mid-term exams (2) Oral exam (2)
Grading and evaluating student work in class and at the final exam	There are 2 mid-term exams during a semester. Passing both mid-term exams enables students to take an oral exam. Successfully passing the oral exam leads to successful completion of the course. Final grade is derived as the arithmetic mean of scores in mid-term exams (or a written exam) and the oral exam. In the case of failure in mid-term exams or the oral exam students must undergo a written exam before approaching oral exam again.
Required literature (available in the library and via other media)	1. N. Sarapa, *Teorija vjerojatnosti*, Školska knjiga, Zagreb, 2002. 2. Louis H.Y.Chen, Larry Goldstein, Qi-Man Shao, *Normal Approximation by Stein's method*, Springer Science & Business Media, 2010. 3. Patrick Billingsley, *Convergence of Probability Measures*, John Wiley & Sons, 1999.
Optional literature (at the time of submission of study programme proposal)	1. R. B. Ash, *Real Analysis and Probability*, Academic Press, New York, 1972. 2. M. M. Rao, *Probability Theory with Applications*, Academic Press, New York, 1984. 3. R. Durret, *Probability: Theory and Examples*, Wadsworth & Brooks, 1991
Quality assurance methods that ensure the acquisition of exit competences	Detailed statistics of student results, gathering feedback from students through official questionnaires and lecturer's self-evaluation.
Other (as the proposer wishes to add)	