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| **1. Course title:** Measures and Integrals | | | | |
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| **2. Code:** | | **3. Type (lecture, practice etc.):** lecture | | |
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| **4. Contact hours: 3** hoursper week | | **5. Number of credits (ECTS):** 5 | | |
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| **6. Preliminary conditions (max. 3):**  Analysis in Several Variables lecture and discussions | | | | |
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| **7. Announced: x** fall semester, spring semester, ☐both | | | | |
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| **8. Limit for participants:** 40 | | | | |
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| **10. Responsible teacher (faculty, institute and department):**  Alice Fialowski PhD, DSC, dr. Habil (Faculty of Science, Institute of Mathematics and Informatics, Department of Mathematics) | | | | |
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| **11. Teacher(s) and percentage:** | | Alice Fialowski PhD, DSC, dr.Habil | | 100 % |
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| **12. Language:** English | | | | |
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| **13. Course objectives and/or learning outcomes:** To get acquainted with Lebesgue measure and integral.  **Objectives:**  **Learning outcomes:**. | | | | |
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| **14. Course outline**   1. Notion of measure, examples. Definition of a measurable space. 2. Sigma algebra, sigma finiteness. Examples. 3. Definition of outer measure, construction of complete measure from a set function. 4. Lebesgue measure on **R**. Lebesgue measurable sets. Vitali set. Borel measurable sets. 5. Measurable functions, sequences of measurable functions. 6. Step functions. Basic theorem of measurable functions. 7. Jegorov Theorem. 8. Lebesgue Theorem. 9. Integration of step functions, properties. 10. Integral of non-negative measurable functions. 11. Monotone convergence Theorem. 12. Lebesgue Majorated Convergence Theorem. 13. Connections between Riemann and Lebesgue integral. | | | | |
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| **15. Mid-semester works**  Attending lectures is highly recommended. | | | | |
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| **16. Course requirements and grading**  The semester ends with an 100 point written exam. Depending on the score the grades are the following:  0%–41% fail (F)  42%–54% satisfactory (D)  55%–67% average (C)  68%–83% good (B)  84%–100% excellent (A) | | | | |
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| **17. List of readings**   1. Gail Nelson: A User-Friendly Introduction to Lebesgue Measure and Integration, AMS 2015. 2. Martin Brokate, Götz Kersting: measure and Integral, Birkhauser 2011. | | | | |
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| **18. Recommended texts, further readings**  . | | | | |
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| **Date** | 10 May, 2017 | **Prepared by** | Alice Fialowski PhD, DSC, dr. Habil, responsible teacher | |
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| **Endorsed by** | | | László Tóth, PhD, Dr. Habil program supervisor | |