|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. Course title: Complex series seminar | | | | | |
|  | | | | |
| 2. Code: | | 3. Type (lecture, practice etc.): seminar | | | |
|  | | | | |
| 4. Contact hours: 2 hoursper week | | 5. Number of credits (ECTS): 2 | | | |
|  | | | | |
| 6. Preliminary conditions (max. 3): Analysis 1 lecture+ seminar | | | | | |
|  | | | | |
| 7. Announced:fall semester, spring semester, both | | | | | |
|  | | | | |
| 8. Limit for participants: 40 | | | | | |
|  | | | | |
| 10. Responsible teacher (faculty, institute and department):  Margit Pap PhD (Faculty of Science, Institute of Mathematics and Informatics, Department of Mathematics) | | | | | |
|  | | | | |
| 11. Teacher(s) and percentage: | | Dr. Margit Pap | | 100 % | |
| Dr. Tímea Eisner | | 100 % | |
|  | | | | |
| 12. Language:English | | | | | |
|  | | | | |
| 13. Course objectives and/or learning outcomes:  **Objectives**: The course intends to introduce students to the solutions of differential equations and investigation of real and complex series. The course helps the development of problem solving skills.  Learning outcomes: students completing the course will have *knowledge* on basic concepts and theorems of Mathematical Analysis. They will be *able* to apply the properties of these concepts. They will have a *competence* of evaluating readings in Analysis 2. Their positive *attitude* towards methods calculating limits will increase significantly. | | | | | |
|  | | | | |
| 14. Course outline   1. Separable differential equations. Differential equations reduced to separable ones. 2. First order linear differential equations. Bernoulli differential equations. 3. Incomplete second order differential equations. 4. Second order linear differential equations with constant coefficients. 5. Finding the sum of real and complex series applying the definition. Investigating convergence applying the Comparison Test. 6. 1st test. 7. Investigating convergence of series applying criteria (Leibniz, Cauchy’s root test, D’Alambert’s fraction test) 8. Investigating convergence of series applying criteria (Integral criterion. Condensation principle of Cauchy.) 9. Reordering of series. Applications. Cauchy product of series, rectangle product. 10. Investigating convergence sets of power series. Applying the differentiability, integrability of power series. 11. Taylor series. Applications of Taylor formula (to establish the rate of approximation or in proofs of inequalities). 12. Investigating convergence, uniform convergence of function sequences and series. 13. 2nd test. | | | | | |
|  | | | | |
| 15. Mid-semester works  Attending the seminar is compulsory. | | | | | |
|  | | | | |
| 16. Course requirements and grading  There are two written tests, both of which should be above 40% in order to pass. The final grade is obtained from the arithmetic mean of the 2 grades.  0–40% fail  41–55% acceptable  56–70% average  71–85% good  86–100% excellent | | | | | |
|  | | | | |
| 17. List of readings  Rudin, Walter. Principles of mathematical analysis. Vol. 3. New York: McGraw-Hill, 1964.  Stewart, James. Calculus: early transcendentals. Cengage Learning, 2015.  Stroyan, K. D. "A brief introduction to infinitesimal calculus." University of Iowa (2004).  Lang, Serge. Undergraduate analysis. Springer Science & Business Media, 2013. | | | | | |
|  | | | | |
| 18. Recommended texts, further readings  Joel R. Hass, Christopher D. Heil, Maurice D. Weir. Thomas' Calculus, 14th Edition. | | | | | |
|  | | | | |
| **Date** | 14 May, 2017 | **Prepared by** |  | | |
| **Dr. Margit PAP** responsible teacher | | |
|  | | | | |
| **Endorsed by** | | |  | | |
| Dr. László TÓTH program supervisor | | |