Study programme(s): Mathematics (M3)

Level: bachelor

Course title: Complex Analysis (M3-18)

Lecturer: Arpad Takači

Status: obligatory for the module of Theoretical mathematics

ECTS: 7

Requirements: passed exam in *Analysis 1*

Learning objectives

Study of the basic notions and theorems from the Complex Analysis, their learning and teaching through examples. Connecting the notions and theorems from real analysis with the corresponding ones from complex analysis.

Learning outcomes

Minimal: Students should learn the standard notions and theorems from the Complex Analysis course and demonstrate knowledge in proving the main theorems from the course and the ability to solve average examples from Complex Analysis.

Desirable: Students should show the ability to understand and prove the more complex theorems and solve the more difficult examples from Complex Analysis. Besides that, students should show understanding of the connection between some other curricula from mathematical analysis and mathematics in general.

Syllabus

Theoretical instruction

The field of complex numbers and its topological structure. The complex function of real and complex and variable, its limit, continuity and analicity, Cauchy-Riemann equations. Elementary functions, branch points, Riemann surfaces. Power series. Integral of a complex function, Cauchy's theorem and formula, Theorems of Taylor and Laurent, Zeros and singularities of an analytic function, The maximum principle. Antiderivative and Morera's theorem. The residuum of an analytic function and its applications. The argument principle and Rouche's theorem. Analytical continuation and examples. The monodromy theorem, singularities of the total analytic function

Practical instruction

Solving examples in the classes and/or at home, writing seminar papers..

Literature

1. B. Stanković, *Teorija funkcija kompleksne promenljive*, Naučna knjiga, Beograd 1972 (in Serbian).
2. H. Kraljević, S. Kurepa, *Matematička analiza–funkcija kompleksne varijable*, 4/I, Tehnička knjiga, Zagreb 1986 (in Croatian).
3. M. Mateljević, *Kompleksne funkcije 1 & 2*, Društvo matematičara Srbije, Beograd 2006 (in Serbian).
4. W. Rudin, *Real and Complex Analysis*, McGraw-Hill Book Co., New York 1966.
5. E. Pap, *Zbirka rešenih zadataka iz teorije funkcija kompleksne promenljive*, Naučna knjiga, Beograd 1989.
6. D.Nikolić-Despotović, M. Budinčević, *Zbirka rešenih zadataka iz kompleksne analize*, Univerzitet u Novom Sadu, PMF, Novi Sad, 1998 (in Serbian).

Weekly teaching load				Other: 0
Lectures: 3	Exercises: 3	Other forms of teaching: 0	Student research: 0	

Teaching methodology relies on classical teaching methods.

Grading (maximum number of points 100)

Pre-exam obligations	**points**	**Final exam**	**points**
Colloquia	50	Oral exam	50