M015	Obligatory semester 4	**Complex Analysis**	L	S	E	ECTS
			2	0	2	6

Course objectives. Present to students the classical theory of complex functions of a complex variable and introduce them to specific properties of these functions, with emphasis on the essential difference in relation to the functions of real variables.

Course prerequisites. Differential Calculus. Integral Calculus. Multivariable Calculus.

Syllabus.

1. Complex numbers and elementary functions. Polynomials, exponential and logarithmic functions, power, trigonometric and hyperbolic functions.
2. Analyticity. Cauchy-Riemann conditions. Harmonic functions. Conformal mapping. Möbius transformations.
3. Integral of the function of a complex variable. Cauchy theorems. Properties of analytic functions: maximum modulus principle, the existence of derivatives of any order, Morera and Liouville theorem.
4. Series of functions. Weierstrass theorems. Power series. Abel's theorem. Taylor series. Convergence radius. Series for elementary functions.
5. Zeros and isolated singularities. Laurent series. Resudie theorems. Jordan's lemma. Applications in computation of integrals.

LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	Recognize the properties of elementary complex functions of a complex variable.
2.	Use the Cauchy-Riemann theorem for the identification and retrieval of analytical functions.
3.	Use conformal mappings, and especially Moebius transformation to map parts of the complex plane.
4.	Connect the Cauchy theorems and basic properties of analytic functions following from them.
5.	Compute the Taylor and Laurent series of a function.
6.	Use the Residue theorem for calculating integrals of complex functions of complex variables.
7.	Use complex integrals for computation of real integrals.

CONNECTING LEARNING OUTCOMES, ORGANIZATION OF TEACHING PROCESS AND ASSESSMENT OF STUDENT LEARNING OUTCOMES

TEACHING PROCESS ORGANIZATION	ECTS	LEARNING OUTCOME **	STUDENT ACTIVITY*	EVALUATION METHOD	SCORE	
					min	max

Attending lectures	1	1-7	Attending lectures, discussinon, teamwork and individual work on given tasks.	Participant lists, monitoring activities on class	0	4
Mid-term exam (preliminary exam)	2	1-7	Preparing for written exam.	Checking the correctness of solutions	25	48
Final exam	3	1-7	Revision of the subject matter	Oral exam	25	48
TOTAL	6				50	100

Teaching methods and student assessment.
Lectures and exercises are mandatory. The exam consists of a written and an oral part, and it is taken after the completion of lectures and exercises. Acceptable mid-term exam scores replace the written examination.

Can the course be tauhgt in English: Yes.

Basic literature:

1. H. Kraljević, S. Kurepa, Matematička analiza 4/I, Funkcije kompleksne varijable, Tehnička knjiga Zagreb, 1986.

Recommended literature:

1. I. Ivanšić, Funkcije kompleksne varijable. Laplaceova transformacija. Liber, Zagreb, 1978.
2. A. Sveshnikov, A. Tikhonov, The theory of functions of a complex variable, Mir Publishers, Moscow, 1978.
3. B. Stanković, Teorija funkcija kompleksne promenjive, Naučna knjiga, Beograd, 1972.
4. Ž. Marković, Uvod u višu analizu II. Školska knjiga Zagreb, 1952.
5. Lj. Jarnjak, A. Rašidagić-Finci, M. Vuković, Zbirka zadataka iz teorije funkcija kompleksne promjenjive, IP Svjetlost, Sarajevo, 1975.