Program	Level	First cycle
	Name of the program	Pure Mathematics, Applied Mathematics, Mathematics Education, Mathematics and Informatics Education

COURSE

Course title	**Complex Analysis I**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
PMAT 320	V	Mandatory course	6	3+3+0
Lecturer				
Course Goals	The goal of the course is to introduce students to the basic methods of complex analysis. Methods include properties of holomorphic functions and their applications as well as integration methods and their applications. The goal is to equip students with usefull techniques for applications in physical sciences and other areas of mathematics.			
Learning Outcomes	Upon the successful completion of the course we expect the student to be able to: - Understand basic concepts and methods of complex analysis as an introductory course - successfully complete other courses in which they will need complex-analytic techniques - solve Cauchy-Riemann equations and represent a complex function as a Taylor or Laurent series - understand Cauchy theorems and residue theorem and apply those - apply a variety of basic complex-analytic techniques in solving problems.			

COURSE CONTENT

- Complex numbers and their basic properties; Stereographic projection and Riemann sphere
- Topology of the complex plane. Sequences, series and infinite products of complex numbers
- Complex-valued functions of a complex variable, continuity and differentiability
- Cauchy-Riemann equations. Geometric interpretation and modular surfaces
- Conformal mappings. Moebius transformation
- Power series, elementary functions; Riemann surfaces of multi-valued elementary functions
- Integration along a simple curve; Cauchy theorems, primitive functions and indefinite integral
- Cauchy integral formulas and its applications
- Taylor series and uniqueness of analytic continuation
- Singular points; Laurent series and classification of singular points
- Series of holomorphic functions and their properties; term wise integration and differentiation
- Residue theorem and its applications
- Argument principle and Rouché's theorem

LITERATURE

[1] A. Odžak, L. Smajlović, Kompleksna analiza, Prirodno-matematički fakultet Sarajevo, 2013.

[2] J. L. Taylor, Complex Variables, AMS, Providence, Rhode Island, 2011.

[3] J. P. D'Angelo, An Introduction to Complex Analysis and geometry, Pure and Applied Undergraduate texts, AMS, Providence, Rhode Island, 2010.

STUDENT WORKLOAD (hours in a semester)

Lectures	45	Exercises	45	Individual work	60	T o t a l	150

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Midterm exams	50	25	
Final exam	50	30	
T o t a l	100	55	