

NEAR EAST UNIVERSITY-FACULTY OF ARTS AND SCIENCES



Department of Mathematics
Course Information Sheet & Course Outline
2021-2022 Fall Semester

Course Code MTH241	Course Name Complex Analysis	Credit 3	ECTS 5			
Pre-requisite: MTH102						
Language: English		Course Type: Compulsory		Year: 2021-2022		
Weekly Hours		Class Hours	Laboratory	Practicum	Learning Sessions	
		3	-	-	PS	C
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Course Lecturer/Coordinator	Assist.Prof.Dr. Firudin Muradov					
	E-mail address	firudin.muradov@neu.edu.tr				
Learning Outcomes	After the completion of this course, the student will be able to <ul style="list-style-type: none"> - use computational techniques and algebraic skills essential for the study of complex numbers, complex functions, limits and continuity, differentiable and analytic functions, complex sequences and series, complex integrals - use visualization, spatial reasoning, as well as geometric properties and strategies to model, solve problems - analyze and construct mathematical arguments that relate to the study of complex analysis - use technology, where appropriate, to enhance and facilitate mathematical understanding, as well as an aid in solving problems and presenting solutions 					
Course Description	The Algebra of complex numbers, The geometry of complex numbers, The topology of complex numbers, Complex Functions and Linear Mappings. The Mappings $w = z^n$ and $w = z^{1/n}$, Complex Limits and Continuity, differentiable and analytic functions, Cauchy-Riemann Equations, harmonic functions, complex sequences and series, The Complex Exponential Function, The Complex Logarithm Function, Complex Exponents and Powers, Trigonometric and Hyperbolic Functions complex integrals, Inverse Trigonometric and Hyperbolic Functions, Complex Integrals, Contours and Contour Integrals, The Cauchy-Goursat Theorem.					
Course Objectives	The course is standard second-year course on complex analysis providing basic definitions, concepts and methods. The main objectives are two: to make students ready to see applications of complex analysis on subsequent courses and to enable them to continue their study on more advanced level.					
Textbooks and/or References	1	COMPLEX ANALYSIS for Mathematics and Engineers, 5th edition, John H.Mathews, Russel W.Howell, 2006				
	2	A First Course in COMPLEX ANALYSIS with Applications, Jones and Bartlett Publishers, D.G.Zill, P.D.Shanahan, 2003				
	3					
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Course Content						
Methods and Techniques Used in the Course						
WEEKLY OUTLINE						
Week	Date	Topic	Activities			Reference
1	20-24 Sep	Introduction to the Course				
2	27Sep-01Oct	The origin of complex numbers. The Algebra of complex numbers. The geometry of complex numbers.				Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006
3	04-08 Oct	The topology of complex numbers. Complex Functions and Linear Mappings. The Mappings $w = z^n$ and $w = z^{1/n}$. Complex Limits and Continuity.				Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006
4	11-15 Oct	Branches of Complex Functions. The Reciprocal Transformation $w = \frac{1}{z}$.				Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006
5	18-22 Oct	Differentiable and Analytic Functions. The Cauchy-Riemann				Complex Analysis for Mathematics and

		Equations. Harmonic Functions.		Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
6	25-29 Oct	Complex Sequences and Series. Geometric Series and Convergence Theorems. Power Series Functions.		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
7	01-06 Nov		Midterm Exam		
8	08-12 Nov	The Complex Exponential Function. The Complex Logarithm Function. Complex Exponents and Powers.		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
9	15-19 Nov	Trigonometric and Hyperbolic Functions		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
10	22-26 Nov	Inverse Trigonometric and Hyperbolic Functions.		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
11	29Nov-03 Dec	Complex Integrals. Contours and Contour Integrals.		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
12	06-10 Dec	The Cauchy-Goursat Theorem.		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
13	13-17 Dec	The Fundamental Theorem of Integration.		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
14	20-24 Dec	Integral Representations For Analytic Functions.		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
15	27-30 Dec	The Theorems of Morera and Liouville and Applications		Complex Analysis for Mathematics and Engineers, 5th edition, J.H.Mathews, R.W.Howell, 2006	
16	03-12 Jan	Final Exam			
Attendance: Minimum 70 %					
Assessment Breakdown		Type	%	Reference/ Source	Relevant Competencies

	1	Quiz	15%		
	2	Home Work	15%		
	3	Midterm Exam	30%		
	4	Final Exam	40%		
Learning Program					
Educational Tool	Amount	Student Work Load (Hours)	Educational Tool	Amount	Student Work Load(Hours)
Lesson hour	16*3	64 hours	Homework	1*2	2 hours
Quiz	3*1	3 hours	Midterm examination study	1*14	14 hours
Final examination study	1*30	30 hours	Self study	14*4	56 hours
			Total	143	
		Recommended ECTS Credit (Total Hours / 30):		143/30 = ~ 5	