COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Mathematics			**NQF level**	5
Course Title	Complex Analysis I	**Code**	505308	**Prerequisite**	505202
Credit Hours	3	**Theory**	3	**Practical**	0
Course Leader	Dr: Tariq Qawasmeh	**email**	ta.qawasmeh@jadara.edu.jo		
Lecturers	Dr: Tariq Qawasmeh	**emails**	ta.qawasmeh@jadara.edu.jo		
Lecture time	08:30-10:00 Mon, Wen	**Classroom**	D403	**Attendance**	Fulltime
Semester	First Semester 2021\2022	**Production**	2008	**Updated**	2021

Short Description
The objective of this course is to introduce the fundamental ideas of the functions of complex variables and developing a clear understanding of the fundamental concepts of Complex Analysis such as analytic functions, complex integrals and a range of skills which will allow students to work effectively with the concepts.
Course Objectives
Algebraic of properties complex numbers, Exponential, Logarithmic and trigonometric functions, and their inverses, Analytic functions: Cauchy – Riemann equations, polar coordinates and Harmonic functions, Integrals: Cauchy–Goursat theorem and Cauchy integral formula.Intended Learning

Learning Outcomes
A. Knowledge - Theoretical Understanding
a1) Discuss fundamentals and basic properties of the complex number. a2) Compare the fundamentals and basic properties between the real Numbers and Complex Numbers.
B. Knowledge - Practical Application
a3) Demonstrate the fundamental concepts of complex analysis and their role in modern mathematics.
C. Skills - Generic Problem Solving and Analytical Skills
b1) Develop Theorems and Lemmas from real Analysis to complex.

D. Skills - Communication, ICT, and Numeracy
b2) Illustrate Cauchy Riemann Equation and Cauchy Coursat Theorem.
E. Competence: Autonomy, Responsibility, and Context
Teaching and Learning Methods
Lectures, discussions, and solving selected problems.
Assessment Methods
• Discussion and Interaction • Mid Term Exam, Final exam, Class Assignment Quizzes,

Course Contents						
Week	**Day**	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1.	Mon	1.5	a1, a3, b2.	Complex numbers: sums and products, Algebraic properties,.	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1, a3, b2.	Moduli and conjugates		
2.	Mon	1.5	a1, b1, b2	Triangle Inequality.	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1, b1, b2	Polar coordinates and Euler's formula.		
3.	Mon	1.5	a1, a2. a3, b2,	Root in complex plane.	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1, a2. a3, b2,	Regions in the complex plane.		
4.	Mon	1.5	a1, b2. a3	Analytic functions: Functions of complex variable.	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1, b2. a3	limits, Theorem on limits.		
5.	Mon	1.5	a1, b1,	Continuity of complex functions	Lecturing, examples, Discussion	Assignments
	Wen	1.5	a1, b1,	Derivatives, Differentiation formulas.		
6.	Mon	1.5	a1, b2,	Cauchy-Riemann Equations.	Lecturing, examples, Discussion	Assignments
	Wen	1.5	a1, b2,	sufficient conditions for Differentiability.		
7.	Mon	1.5	a1, b2. a3	Polar coordinates analytics	Lecturing,	Assignments

				functions.	examples, Discussion	
	Wen	1.5	a1, b2. a3	Harmonic functions.		
8.	Mon	1.5	a1, b2. a3	Elementary Functions: The exponential function.	Lecturing, examples, Discussion	Mid -Exam
	Wen	1.5	a1, b2. a3	Trigonometric Function, Hyperbolic Function.		
9.	Mon	1.5	a2, a3	The logarithmic function and its Branches.	Lecturing, examples, Discussion	Assignments
	Wen	1.5	a2, a3	some identities involving logarithms, complex exponent.		
10.	Mon	1.5	a2, a3	Integrals: complex-valued functions.	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a2, a3	Integrals: contours, contours integrals.		
11.	Mon	1.5	a1, b2. a3	Examples, Antiderivatives.	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1, b2. a3	Examples, Antiderivatives.		
12.	Mon	1.5	a1, b2. a3	Cauchy-Goursat Theorem,	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1, b2. a3	simply and multiply connected domains		
13.	Mon	1.5	a1	Cauchy integral formula.	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1	Derivative of analytic functions		
14.	Mon	1.5	a1	Morera's theorem	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1	Liouvlle's Theorem		
15.	Mon	1.5	a1, a3	Fundamental theorem of algebra,	Lecturing, examples, Discussion	Quizzes Assignments
	Wen	1.5	a1, a3	Maximum moduli of function		
16.		Final Exam				

Infrastructure	
Textbook	Complex Variables and Applications, By James Ward Brown, Ruel V. Churchill
References	1- J.Paliouras 8 D.S. Meadows, “Complex variables for scientists and Engineers” .2nd Edition 2-Marsden, J.E.& M.J. Hoffmann “Basic complex Analysis."

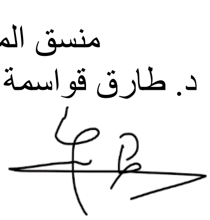
	3-Alfors, L.V, “Complex Analysis”.
Required reading	
Electronic materials	
Other	

Course Assessment Plan								
Assessment Method		**Grade**	**CLOs**					
			a1	a2	a3	b1	b2	
First (Midterm)		30	10	5	5	4	6	
Second (if applicable)		0						
Final Exam		50	12	8	18	7	5	
Coursework								
Coursework assessment methods	Assignments							
	Case study							
	Discussion and interaction			5				
	Group work activities	-						
	Lab tests and assignments	5		5				
	Presentations	-						
	Quizzes	10	5		5			
Total		100	27	23	28	11	11	

Plagiarism

Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).
Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.

منسق المادة
د. طارق قواسمة



رئيس قسم الرياضيات
د. ايمن هزايمـــــــــــــــــــــــــــــــه