Detailed Course Description - Course Plan Development and Updating Procedures/ ..... Department	QF01/0408-3.0E

Faculty	**Science**	Department	**Mathematics**
Course number	**0101352**	Course title	**Complex Analysis 1**
Number of credit hours	**3**	Pre-requisite/co-requisite	**تحليل حقيقي 1 0101251**

Brief course description: Complex numbers and operations, functions of complex variable, derivative complex function and integrals.

	Course goals and learning outcomes
Goal 1	**1.** develop good skills at working with complex numbers and complex functions.
Learning outcomes	1.1 Students will be able to compute the arithmetic operations with complex numbers. 1.2 Students will be able to write algebraic and polar form of the complex number. 1.3 Students will be able to mapping the complex functions.
Goal 2	**1.** understand the main properties of analytic functions.
Learning outcomes	2.1 Students will be able to differentiate the complex functions. 2.2 Students will be able to distinguish analyticity and differentiation. 2.3 Students will be able to prove the analyticity of complex function.
Goal 3	**1.** compute limits, identify continuity, find derivative of different sorts of complex functions.
Learning outcomes	3.1 Students will be able to compute the limits of the complex functions . 3.2 Students will be able to calculate the derivative using the definition and the rules of differentiation. 3.3
Goal 4	**1.** find and compute integrals around closed curves.
Learning outcomes	4.1 Students will be able to calculate the integral of complex function along the contour. 4.2 Students will be able to compute integrals around closed curves. 4.3
Textbook	1.-Complex analysis , third edition by Dennis G. Zill & Patrick D. Shnahan. Jones & Bartlett LEARNING, 2015

	2.- "Complex Variables and Applications" . By: R . Churchil and J. Brown McGraw-Hill, 7th Edition (2003).
Supplementary references	1.- 2.- 3.-

Course timeline				
Week	**Number of hours**	**Course topics**	**Pages (textbook)**	**Notes**
01	**1** **1** **1**	Complex Numbers: Sums and Products, Further Properties, Moduli.	**3-9**	
02	**1** **1** **1**	Complex Conjugates Exponential Form Products and Quotients in Exponential Form	**16-27**	
03	**1** **1** **1**	Roots of Complex Numbers Regions in the Complex Plane	**22-33**	
04	**1** **1** **1**	Functions of a Complex Variable Mappings.	**47-71**	
05	**1** **1** **1**	Theorems on Limits Limits Involving the Point at Infinity Continuity	**103-120**	
06	**1** **1** **1**	**First Exam 20%** Derivatives Differentiation Formulas	**120-130**	
07	**1** **1** **1**	Cauchy-Riemann Equations Sufficient Conditions for Differentiability	**130-137**	
08	**1** **1** **1**	Cauchy Riemann Equations in Polar System Analytic Functions	**130-137**	
09	**1** **1** **1**	Harmonic Functions	**137-141**	
10	**1** **1** **1**	The Exponential Function and Logarithmic Function	**151-165**	

11	**1 1 1**	Derivatives of Logarithms Some Identities Involving Logarithms Complex Exponents	**151-165**	
12	**1 1 1**	Trigonometric Functions Hyperbolic Functions	**171-182**	
13	**1 1 1**	Inverse Trigonometric and Hyperbolic Functions Second Exam 20% Complex-Valued Functions w(t)	**183-190**	
14	**1 1 1**	Contours Contour Integrals	**201-217**	
15	**1 1 1**	Antiderivatives Cauchy-Goursat Theorem Simply and Multiply Connected Domains	**218-226**	
16	**1 1 1**	**Final Exam 50%**		

Theoretical course evaluation methods and weight	Participation = 10% First exam 20% Second exam 20% Final exam 50%	**Practical (clinical) course evaluation methods**	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%

Approved by head of department		**Date of approval**	

Extra information (to be updated every semester by corresponding faculty member)

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Office hours			