The Hashemite University
Faculty of Science
Department of Mathematics

Course Description

Year : 2013/2014 **Second Semester**

Course Information	
Course Title	**Complex Analysis**
Course Number	**101413**
Course Credits	**3 Hours**
Course Time& section	**Section 1** (Monday, Wednsday 11:00: – 12:30)
Course Duration	**One semester**
Prerequisite(s)	101211
Instructor	**Dr. Sa'ud AL-Sa'di**
Office Location	**IT, first Floor, office number 146**
Office Phone	
Office Hours	**10:00- 11:00 (Sunday, Tuesday, Thursday)**
E- mail	**saud@hu.edu.jo**
Course Web Site:	http://www.staff.hu.edu.jo/saud
Text Book	
Title	***Complex Variables and Applications***
Author	**James W. Brown and Ruel V. Churchill**
Publisher	**McGraw-Hill**
Year	***2004***
Edition	7^{th}
References(s)	1. Fundamentals of Complex Analysis for Mathematics, Science, and Engineering by Saff and D. Snider. 2. Complex Variables, by Silverman, H.
Grading plan	
First Exam	**20 %**
Second Exam	**20 %**
Other Activities	**10%**
Final Exam	**50 %**

Course Objectives
To study complex valued functions, their limits; continuity, and analyticity. To study the integrals of complex valued functions, sequences and power series of complex functions and the application of Residue theorem in evaluating real integrals of certain types.

Daily Schedule: *The following is a **tentative** schedule for this class. All dates are subject to change:*

Week	Section	Topics
		Chapter (1): Complex Numbers
1	1 2 3 4	Sums and Products Basic Algebraic Properties Further Properties Moduli
2	5 6 7 8 9 10	Complex Conjugates Exponential Form Products and Quotients in exponential Form Roots of Complex Numbers Examples Regions in the Complex Plane
		Chapter (2): Analytic functions
3	11 12 13 14 15 16 17	Functions of a Complex Variable Mappings Mappings by the Exponential Function Limits Theorem on Limits Limits Involving the Point at Infinity Continuity
4	18 19 20 21 22 23 24 25	Derivatives Differentiation Formulas Cauchy-Riemann Equations Sufficient Conditions For Differentiability Polar Coordinates Analytic Functions Examples Harmonic Functions
		Chapter (3): Elementary Functions
5	28 29 30 31	The Exponential Function The Logarithmic Function Branches And Derivatives of Logarithms Some Identities Involving Logarithms
6	32 33 34 35	Complex Exponents Trigonometric Functions and Its Branches Hyperbolic Functions Inverse Trigonometric and Hyperbolic Functions
		Chapter (4): Integrals
7	36 37 38 39 40 41	Derivatives of Functions w(t) Definite Integrals of Functions w(t) Contours Contour Integrals Examples Upper Bounds For Moduli of Contour Integrals

8	42 43 44 45 46 47 48 49 50	Antiderivatives Examples Cauchy - Goursat Theorem Proof of the Theorem Simply and Multiply Connected Domains Cauchy Integral Formula Derivatives of Analytic Functions Liouville's Theorem and the Fundamental Theorem of Algebra Maximum Moduli of Principle
		Chapter (5): Series
9	51 52 53 54 55	Convergence of Sequences Convergence of Series Taylor Series Examples Laurent Series
10	56 57 58 59 60 61	Examples Absolute and Uniform Convergence of Power Series Continuity of Sums of Power Series Integration and Differentiation of Power Series Uniqueness of Series Representations Multiplication and Division of Power
		Chapter (6): Residues and Poles
11	62 63 64 65	Residues Cauchy's Residue Theorem Using A single Residue The Three Types of Isolated Singularities Points
12	66 67 68 69 70	Residues at Poles Examples Zeros of Analytic Functions Zero's And Poles Behavior of f Near Isolated Singular Points
		Chapter (7): Application of Residues
13	71 72 73 74 75 76 77 78 80	Evaluation of Improper Integrals Involving Trigonometric Functions; Examples Improper Integrals From Fourier Analysis Jordan's Lemma Indented Paths An Indentation Around a Branch Cut Integration Along a Branch Cut Definite Integrals Involving Sines and Cosines Rouche’s Theorem