



**Course No.:** 54454114

**Course Name:** Complex Analysis I

**Course Website:**

**Time Division:** 4hr Theoretical and 1hr Practical

**Semester & Year:** One, 2022 / 2023

**Course Description:**

5 credit hours, Prerequisite [Mathematical Analysis, Functional Analysis, Calculus, Finite Mathematics].

This is a course provides an introduction to complex analysis which is starting from the complex space as a field, complex numbers with its properties, complex roots, Limits, Continuity, Differentiability, holomorphic function, Cauchy Riemann's Equations...etc.. Also, we study some of the most celebrated Theorems in analysis, as well as, Elementary of complex functions for instance: exponential function, logarithmic function and trigonometric functions, harmonic complex function and its conjugate, conformal mapping and its applications.

**Course Intended Outcomes:**

At the end of the Course, students are expected to learn. Complex analysis forms a basis for special functions of mathematical and quantum physics to understand the world and in which we live. The course covers fundamental knowledge in the theory of analytical functions with applications to definite harmonic functions and its conjugate and culminates with the study of conformal mapping.

**Course Outline:**

Week	Description depends on the timing table (Theoretical & Practical)
1	Definition of complex numbers with Algebraic Properties
2	Geometric Properties
3	Elementary Topology of the plane
4	Limits definition with some examples
5	Continuity definition with some examples
6	Differentiability and Analyticity
7	Cauchy -Riemann Equations with some related theorems
8	Harmonic functions and its conjugate.
9	Definition of holomorphic function with some notes and theorems with application to make it clear.
10	Elementary complex functions like exponential function, trigonometric and hyperbolic functions.
11	Logarithmic complex function, definition and properties.

12	Continuity and differentiability of logarithmic function.
13	Some examples about logarithmic function and its continuity
14	Definition on Conformal maps .
15	Families of Conformal maps, Important and useful Examples on conformal maps in order to make it so clear understanding

**Textbooks:**

- [1] J. Bruna and Julia Cufi , Complex Analysis, European Mathematical Society Puvlishing House, Germany, 2013
- [2] J.P.Gilman, Complex Analysis, Springer Science, 2013.
- [3] J. B. Conway, Functions of one complex variable II, Springer-Verlag , New York, 1996.
- [4] J.Garnett and D E.Marshall, Harmonic measure. Cambridge University Press, Cambridge, New York, 2005.
- [5] R. V. Churchill and James W. Brown, Complex Variables and Applications, New York ; McGraw-Hill, 1984.
- [6] H.A. Priestley, Introduction to Complex Analysis, Second Edition, Oxford University, Press .In, New York, 2003.

الكتاب المنهجي ( The book of systematic ) : المصدر رقم 5

**Suggested references:**

- [1]: J. Bruna and Julia Cufi . Complex Analysis, European Mathematical Society Puvlishing House, Germany, 2013.
- [2]: H.A. Priestley . Introduction to Complex Analysis, Second Edition, Oxford University, press .In, New York, 2003

**Marking:**

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
25	25	5	5	70

Assignment/ Project	Description	Due Date	Marking
test	written exam	25/11/2022	30
test	written exam	23/ 12/2018	30

**Instructor(s) information** [معلومات الأستاذ]

Section: (Mathematics) ; Lecture Room: [ A 202 ] . ; Office No.: ( 7 )

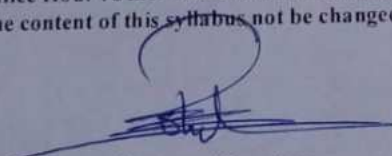
Instructor's Name: Assist .Prof. Dr. Shatha Sami Sejad & Asst.Lect. Faten Hashem,

E-Mail: shathamaths@uomustansiriyah.edu.iq

Office Hours : Mon : 8:30- 10:10 & Tus: 10:10- 12:00.

**NOTES:**

- Office Hour :Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

  
Lecturer Signature

  
Chairman Signature