Department of …Mathematics……….

College of …Science…………………….

University of …Salahaddin/ Erbil………….

Subject: …Complex Analysis………….

Course Book – 3rd *Year* Mathematics

Lecturer's name PhDDr. Hazha Zirar Hussain

Academic Year: 2023/2024

Course Book

1. Course name	Complex Analysis
2. Lecturer in charge	Dr. Hazha Zirar Hussain
3. Department/ College	Mathematics Department/College of Science
4. Contact	e-mail: hazha.hussain@su.edu.krd
5. Time (in hours) per week	For example Theory: 3 Practical:
6. Office hours	Monday 12:30-2:30 Or Tuesday 1:30-3:30
7. Course code	
8. Teacher's academic profile	**2003** Awarded M.Sc. in Mathematics, Department of Mathematics, College of Science, University ofSalahaddin-Erbil,Iraq. **2003** Assistant lecturer at Department of Mathematics, College of Science, University of Salahaddin-Erbil,Iraq. **2014** Awarded PhD in Mathematics, Department of Mathematics, College of Science, University of Salahaddin-Erbil,Iraq. **2018** Assistant Professor at Department of Mathematics, College of Science, University of Salahaddin-Erbil,Iraq.
9. Keywords	Complex Number, Modulus, Analytic Function, Complex Functions

10. Course overview:
Complex Analysis will cover many important materials like complex numbers and their geometric representation, harmonic functions complex functions , …, and some important concepts.

11. Course objective:
The overall goal of the field of complex analysis is the study of complex numbers and its representation with elementary complex functions. Also to introduce students to the topic of Complex Analysis and some of the major issues involved, including Analytic Functions, Complex Elementary functions.

12. Student's obligation
   a. Students reign an commitment to come on time and remain in the classroom for the duration of scheduled classes .
   b. Nothingness speak students with each other during lecture.
   c. All devices must be turned off.
   d. When teacher ask question, Students will be toriseyour hand before answer his question.
   a.

13. Forms of teaching

First I remember students about previous lecture, and then I start new lecture. At the end of the lecture give a note for the next lecture. During this process I am use presentation and whiteboard.

14. Assessment scheme

Theoretical: 40% (Midterm exams and other activities).

Final Exam: Theoretical: 60%

15. Student learning outcome:
   a. Students will be learn to concept of Complex analysis.
   b. Students will be learn to find powers and roots of complex numbers..
   c. Students will be learn to find limits and Derivative of complex functions.
   d. Students will be learn the concept of analytic functions.

16. Course Reading List and References:

1) **Complex Variables and Applications, Seventh Edition, Jamies Ward Brown and Ruel V. Churchill, 2003.**

2) **Complex Variables, by Herb Silverman, Houghton Mifflin Company, Boston, 1975.**

3) **Elements of complex variables, by Louis L. Pennisi, Holt Rinehart Winston New York, 1976.**

4) **Applied Complex Variables for scientists and engineers, by Yue Kuen Kwok, Combridge University Press, 2010.**

17. The Topics:	Lecturer's name
Chapter One: <u>Complex Numbers:</u> Sums and Products, Basic Algebraic Properties, Further Properties, Moduli, Complex Conjugates, Exponential Form, Products and Quotients in Exponential Form, Roots of Complex Numbers, Examples, Regions in the Complex Plane. **Chapter Two: <u>Analytic Functions:</u>**Functions of a Complex Plane, Mappings, Mappings by the Exponential Function, Limits, Theorems on Limits, Limits Involving the Point at Infinity, Continuity, Derivatives, Differentiation Formulas, Cauchy- Riemann Equations, Sufficient Conditions for differentiability, Polar	This Column are not applicable because timetables of holidays will be change that is I cannot Determine a week by week review of the topics

Coordinates, Analytic Functions, Examples, Harmonic Functions, Uniquely Determined Analytic Functions, Reflection Principle.

Chapter Three: __Elementary Functions:__The Exponential Function , The Logarithmic Function, Branches and Derivatives of Logarithms, Some Identities Involving Logarithms, Complex Exponents, Trigonometric Functions, Hyperbolic Functions, Inverse Trigonometric and Hyperbolic Functions.

18. Practical Topics (If there is any)	

19. Examinations:
Questions in the examination will be arranged the matching mode by way of the examples and exercises that I give delivered in the lecture notes.
Sometimes will be have extra mark in examination for worthy students.

20. Extra notes:

21. Peer review