

Ministry of Higher Education and Scientific research



Physics department

College of Education

Salahaddin University-Erbil

Subject: Complex Function

Course Book – (Third year Physics Student)

Lecturer's name: Dr. Mohammad Mustafa Dzayi

Academic Year: 2023/2024

Course Book

1. Course name	Complex Function
2. Lecturer in charge	Dr. Mohammad Mustafa Dzayi
3. Department/ College	Physics, Education
4. Contact	e-mails: muhamad.othman@su.edu.krd
5. Time (in hours) per week	Theory: 2 Hours
6. Office hours	Saturday: GB 8:30 AM To 10:30 AM Saturday: GA 10:30 AM To 12:30 AM
7. Course code	

Contents of Course Book

Chapter 1. Complex Numbers and the Complex Plane

- 1.1 Complex Numbers and Their Properties
- 1.2 Complex Plane
- 1.3 Polar Form of Complex Numbers
- 1.4 Powers and Roots
- 1.5 Sets of Points in the Complex Plane
- 1.6 Applications

Chapter 2. Complex Functions and Mappings

- 2.1 Complex Functions
- 2.2 Complex Functions as Mappings
- 2.3 Linear Mappings
- 2.4 Special Power Functions
 - 2.4.1 The Power Function Z^n
 - 2.4.2 The Power Function $Z^{1/n}$
- 2.5 Reciprocal Function
- 2.6 Limits and Continuity
 - 2.6.1 Limits
 - 2.6.2 Continuity
- 2.7 Applications

Chapter 3. Analytic Functions

- 3.1 Differentiability and Analyticity
- 3.2 Cauchy-Riemann Equations
- 3.3 Harmonic Functions
- 3.4 Applications

Chapter 4. Elementary Functions

- 4.1 Exponential and Logarithmic Functions
- 4.2 Complex Exponential Function
- 4.3 Complex Logarithmic Function
- 4.4 Complex Powers
- 4.5 Trigonometric and Hyperbolic Functions
- 4.6 Applications

Chapter 5. Integration in the Complex Plane

- 5.1 Derivative and functions
- 5.2 Real Integrals

Ministry of Higher Education and Scientific research

5.3 Complex Integrals

5.4 Cauchy's Integral Formulas

5.5 Applications