
# Physics department

# College of Education

# Salahaddin University-Erbil

# Subject: Complex Function

# Course Book – (Third year Physics Student)

# Lecturer's name: Dr. Muhammed Mustafa Dzayi

# Academic Year: 2022/2023

# Course Book

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|---|---|
| **1. Course name** | Complex Function |
| **2. Lecturer in charge** | Dr. Muhammed Mustafa Dzayi |
| **3. Department/ College** | **Physics, Education** |
| **4. Contact** | e-mails: mohamed.othman@su.edu.krd |
| **5. Time (in hours) per week** | Theory: **2 Hours** |
| **6. Office hours** | **Monday:** **From** 12:30 AM To 2:30 PM |
| **7. Course code** | |

## Chapter 1.

Complex Numbers

1.1 Sums and Products

1.2 Basic Algebraic Properties

1.3 Further Properties

1.4 Moduli

1.5 Complex Conjugates

1.6 Exponential Form

1.7 Products and Quotients in Exponential Form

1.8 Roots of Complex Numbers

1.9 Regions in the Complex Plane

1.10 Applications

## Chapter 2.

Complex Numbers and the Complex Plane

2.1 Complex Numbers and Their Properties

2.2 Complex Plane

2.3 Polar Form of Complex Numbers

2.4 Powers and Roots

2.5 Sets of Points in the Complex Plane

2.6 Applications

# Chapter 3.

## Complex Functions and Mappings

3.1 Complex Functions

3.2 Complex Functions as Mappings

3.3 Linear Mappings

3.4 Special Power Functions

3.4.1 The Power Function zn

3.4.2 The Power Function z1/n

3.5 Reciprocal Function

3.6 Exponential and Logarithmic Functions

3.6.1 Complex Exponential Function

3.6.2 Complex Logarithmic Function

3.6 Limits and Continuity

3.7.1 Limits

3.7.2 Continuity

3.8 Applications

## Chapter 4.

Analytic Functions

4.1 Differentiability and Analyticity

4.2 L Hopital's Rule

4.3 Cauchy-Riemann Equations

4.4 Harmonic Functions

4.4 Applications

## Reference:

1. Complex Variables and Applications

James Ward Brown and Ruel V. Churchill

2. Advance Engineering Mathematics

H. K. Dass