



**University of International Business and Economics
International Summer School**

MAT 300 Complex Variable

Term: December 19th, 2022 – January 13th, 2023

Instructor: Xiang Zhang

Home Institution: Shanghai Jiao Tong University

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Class Hours: Monday through Friday, 120 minutes each day (2,400 minutes in total)

Office Hours: TBD

Discussion Session: 2 hours each week

Total Contact Hours: 64 contact hours (45 minutes each, 48 hours in total)

Credit: 4 units

Location: WEB

Course Description:

The course will cover functions of a complex variable, Cauchy-Riemann equations, Cauchy's theorem and its consequences. Additional topics include uniform convergence on compacta, Taylor and Laurent series, open mapping theorem, Rouché's theorem, the argument principle, calculus of residues and conformal mappings.

Prerequisite:

Multivariable Calculus, Real Analysis

Course Goals:

By the end of course the student should be able to:

1. Show if a function is holomorphic.
2. Understand Cauchy's theorem and its consequences.
3. Find the Laurent series of a complex function.
4. Evaluate integrals using the residue theorem.
5. Find Conformal mappings between sets.

Required Textbook:

Complex variables and applications. James Ward Brown, Ruel V. Churchill. McGraw-Hill, 2004
ISBN: 7-111-47087-7

Grading Policy:

Grades for this course will be based on the following:

Type	Description	Weight
Homework	Short answer questions	35%
Midterm Examination	Written Test	25%
Final Exam	Written Test	40%

Exams:

1 Midterm + 1 Final (closed book)

Midterm Exam (25%): 2 hours' Written Test

Final Exam (40%): 2 hours' Written Test

Homework:

There will be 1 or 2 homeworks/week

Grading Scale:

Assignments and examinations will be graded according to the following grade scale:

A	90-100	C+	72-74
A-	85-89	C	68-71
B+	82-84	C-	64-67
B	78-81	D	60-63
B-	75-77	F	below 60

Academic Integrity:

Students are responsible for knowing policy regarding academic honesty. The University of International Business and Economics expects students to be honest in their academic work. Academic dishonesty is viewed as a serious violation of university rules and such misconduct is not accepted by academic community. In particular, students must refrain from plagiarism, cheating and collusion in connection with examinations, submitting substantially the same piece of work to different classes and must fully acknowledge all the sources of ideas and all assistance received in work submitted to the instructor for evaluation. Violation of the rules of academic honesty may lead to suspension or disqualification of the student from further study at the University.

Course Schedule:

Date	Lecture	Readings
Day 1	Introduction and preliminaries	Chapter 1
Day 2	Holomorphic functions	Chapter 1
Day 3	Cauchy Riemann Equations	Chapter 2
Day 4	Cauchy's theorem	Chapter 2
Day 5	Application of Cauchy's theorem	Chapter 2
Day 6	Elementary Functions	Chapter 3
Day 7	Integration	Chapter 4
Day 8	Zeros, poles	Chapter 6
Day 9	Midterm review	
Day 10	Midterm Exam	
Day 11	The complex logarithm	Chapter 3
Day 12	Power series	Chapter 5
Day 13	The Taylor series	Chapter 5
Day 14	Laurent series	Chapter 5
Day 15	Residue formula	Chapter 6
Day 16	Application of Residues	Chapter 7
Day 17	Conformal mappings	Chapter 9
Day 18	The Riemann mapping theorem	Chapter 8,9
Day 19	Final Review	
Day 20	Final Exam	

Please note that online teaching arrangement is possible to be adjusted.