MA420 Complex Variable (Online)

Instructor Information	Jin Zhang Home Institution: Shanghai Maritime University Email: zhj0314@hotmail.com Office Hours: Determined by Instructor		
Term	June 27, 2022 - July 22, 2022	**Credits**	4 units
Course Delivery	The class will be delivered in online format. Other than recorded lecture videos, the instructor will arrange 2.5 hours' real-time interactions with students per week (via discussion forum, Zoom meetings, and WeChat). The workload students are expected to complete to properly pass this course is about 15 hours per week.		
Required Texts (with ISBN)	Complex variables and applications. James Ward Brown, Ruel V. Churchill. McGraw-Hill, 2004 ISBN: 7-111-47087-7		
Prerequisite	Multivariable Calculus, Real Analysis		

Course Overview

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, Rouche's theorem, the argument principle, calculus of residues and conformal mappings.

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.

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 Policy

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

Grading Scale

Number grade	Letter grade	GPA
90-100	A	4.0
85-89	A-	3.7
80-84	B+	3.3
75-79	B	3.0
70-74	B-	2.7
67-69	C+	2.3
65-66	C	2.0
62-64	C-	1.7
60-61	D	1.0
≤59	F (Failure)	0

Class Schedule

Date	Lecture	Readings	Online Teaching Arrangement
Day 1	Introduction and preliminaries	Chapter 1	Approximately 120 minutes recorded lecture video
Day 2	Holomorphic functions	Chapter 1	Approximately 120 minutes recorded lecture video
Day 3	Cauchy Riemann Equations	Chapter 2	Approximately 120 minutes recorded lecture video
Day 4	Cauchy's theorem	Chapter 2	Approximately 120 minutes recorded lecture video
Day 5	Application of Cauchy's theorem	Chapter 2	Approximately 120 minutes recorded lecture video
Day 6	Elementary Functions	Chapter 3	Approximately 120 minutes recorded lecture video
Day 7	Integration	Chapter 4	Approximately 120 minutes recorded lecture video
Day 8	Zeros, poles	Chapter 6	Approximately 120 minutes recorded lecture video
Day 9	Midterm review		Approximately 120 minutes online interaction
Day 10	Midterm Exam		Online exam
Day 11	The complex logarithm	Chapter 3	Approximately 120 minutes recorded lecture video
Day 12	Power series	Chapter 5	Approximately 120 minutes recorded lecture video
Day 13	The Taylor series	Chapter 5	Approximately 120 minutes recorded lecture video
Day 14	Laurent series	Chapter 5	Approximately 120 minutes recorded lecture video
Day 15	Residue formula	Chapter 6	Approximately 120 minutes recorded lecture video
Day 16	Application of Residues	Chapter 7	Approximately 120 minutes recorded lecture video
Day 17	Conformal mappings	Chapter 9	Approximately 120 minutes recorded lecture video
Day 18	The Riemann mapping theorem	Chapter 8,9	Approximately 120 minutes recorded lecture video
Day 19	Final Review		Approximately 120 minutes online interaction
Day 20	Final Exam		Online exam

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