MA420 Complex Variable (Online)

Instructor Information	Jin Zhang Home Institution: Shanghai Maritime University Email: zhj0314@hotmail.com		
Term	December 13, 2021 - January 7, 2022	**Credits**	4 units
Course Delivery	The class will be delivered in the format of online. Other than recorded lecture videos, the instructor will arrange 12 hours' real-time interactions with students per week (via Tencent Meeting and WeChat group). The workload students are expected to complete to properly pass this course is about 10-15 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, Power series, 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

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

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

Grading Policy

Type	Description	Weight
Homework	Short answer questions	35%
Midterm Examination	Written Test; On-line Submission	25%
Final Exam	Written Test; On-line Submission	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
$\leq$59	F (Failure)	0

Class Schedule

Date	Lecture	Readings	Online Teaching Arrangement
Day 1	Introduction and preliminaries	Chapter 1	approximately 60 minutes pre-recorded video lectures
Day 2	Holomorphic functions	Chapter 1	approximately 60 minutes pre-recorded video lectures
Day 3	Cauchy Riemann Equations	Chapter 2	approximately 60 minutes pre-recorded video lectures
Day 4	Cauchy's theorem	Chapter 2	approximately 60 minutes pre-recorded video lectures
Day 5	Application of Cauchy's theorem	Chapter 2	approximately 60 minutes pre-recorded video lectures plus 120 minutes online interaction via Zoom
Day 6	Integration	Chapter 4	approximately 60 minutes pre-recorded video lectures
Day 7	Zeros, poles	Chapter 6	approximately 60 minutes pre-recorded video lectures
Day 8	Residue formula	Chapter 6	approximately 60 minutes pre-recorded video lectures
Day 9	Midterm review		approximately 60 minutes pre-recorded video lectures plus 120 minutes online interaction via Zoom
Day 10	Midterm Exam		online Midterm Exam
Day 11	The complex logarithm	Chapter 3	approximately 60 minutes pre-recorded video lectures
Day 12	The Taylor series	Chapter 5	approximately 60 minutes pre-recorded video lectures
Day 13	Laurent series	Chapter 5	approximately 60 minutes pre-recorded video lectures
Day 14	Power series	Chapter 5	approximately 60 minutes pre-recorded video lectures
Day 15	Infinite products	Chapter 8	approximately 60 minutes pre-recorded video lectures plus 120 minutes online interaction via Zoom
Day 16	Conformal mappings	Chapter 9	approximately 60 minutes pre-recorded video lectures
Day 17	The Riemann mapping theorem	Chapter 9	approximately 60 minutes pre-recorded video lectures
Day 18	The Fourier transform and Exercises	Chapter 8,9	approximately 60 minutes pre-recorded video lectures plus 120 minutes online interaction via Zoom

Day 19	Final Review		approximately 60 minutes pre-recorded video lectures
Day 20	Final Exam		On-line Submission