

Syllabus for MATH 6303 Theory of Complex Functions 1

Course Information

Course Number/Section MATH 6303.001

Course Title: Theory of Complex Functions 1

Term: Spring 2022

Classroom: SCI 2.210

Time: M, W, 11:30-12:45

First day of classes: January 19, 2022

Last day of classes: May 4, 2022

Professor Contact Information

Professor Vladimir Dragovic

Office Phone 972 883 6694

Email Address Vladimir.Dragovic@utdallas.edu

Office Location BE 3.204A

Online Office Hours Monday 4:00 pm—5:00 pm or by appointment (in MS Teams, see eLearning for the link).

TA Contact Information

TA/Grader Name: Sushmita Sinha Roy

Email Address: sxs170121@utdallas.edu

Online Office Hours: Wednesdays 2.00 - 3.00 pm (or by appointment)

Please email Ms. Sinha Roy for the online meeting details for first few weeks.

Office No.: FO 3.608

Course Modality and Expectations

Instructional Mode: Face-to-face which can transform to online modality, depending of the situation with the epidemic. In particular, for the period January 18-February 3, according to President Benson's decision, the class will use an online modality.

Course Platform This course, while in online modality, will be delivered using MS Teams (please see <https://dox.utdallas.edu/instruction1160>) and BlackBoard Collaborate. Lectures will be given at scheduled times.

Expectations Students are expected to attend all course meetings at the scheduled time, ask questions during class, office hours and send emails to the instructor.

COVID-19 Guidelines and Resources

The information contained in the following link lists the resources for students and instructors of record. Please see COVID-19 Guidelines: <http://go.utdallas.edu/syllabus-policies>.

Classroom Conduct Requirements Related to COVID-19

UT Dallas strongly recommends that all students wear a face covering that covers the nose and mouth in all university buildings and classrooms.

Students who have tested positive for COVID-19 or may have been exposed should not attend class in person and should instead follow required disclosure notifications as posted on the university's website (see "[What should I do if I become sick?](#)" webpage)

Class Attendance

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected regardless of modality. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes. These attendance requirements will not be used as part of grading (see Class Participation below for grading information).

In-person participation records may be used to assist the University or local public health authorities in performing COVID-19 occurrence monitoring. Please note – in-person attendance requires consistently adhering to University requirements, including wearing a face covering and other public safety requirements related to COVID-19, as presented in this syllabus. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Participation

Regular class participation is expected regardless of course modality. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Note: if the instructor records any part of the course, then the instructor will need to use the following syllabus statement:

The instructor may record meetings of this course. Any recordings will be available to all students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded

to other online environments except to implement an approved Office of Student AccessAbility accommodation. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Materials

The Instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Course Pre-requisites:

MATH 5301&MATH 5302

Course Description

Topics covered during this class will include: algebra and geometry of complex numbers, complex differentiability, holomorphic functions, polynomials and rational functions, sequences and series of functions, Riemann surfaces, complex line integral, Cauchy's theorem, winding number, Cauchy's integral and differential formulas, singularities, zeros, and poles, open mapping theorem, maximum principle, Schwarz lemma, argument principle, Rouché's theorem, residue calculus, harmonic functions, Laurent series, fundamental theorem of algebra.

Student Learning Objectives/Outcomes

1. Students will be able to articulate the fundamental concepts and theorems of complex functions.
2. Students will be able to use Cauchy's Theorem, Cauchy's integral formula, and Residue calculus.
3. Students will be able to explain significance of Riemann surfaces, and other significant notions, examples, and results of the complex functions.

Recommended Course Materials

"Complex Analysis" by Lars V. Ahlfors.

Additional reading materials will also be provided by the instructor, including complete, typed lecture notes, presentations, and recordings of the materials, see eLearning.

Textbooks and some other bookstore materials can be ordered online through Off-Campus Books <http://www.offcampusbooks.com> or the UT Dallas Bookstore <http://www.bkstr.com/texasatdallasstore/home>. They are also available in stock at both bookstores.

Technical Requirements

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements <http://www.utdallas.edu/elearning/students/getting-started.html#techreqs> on the Getting Started with eLearning webpage <http://www.utdallas.edu/elearning/students/getting-started.html>.

Course Access and Navigation

The course can be accessed using the UT Dallas NetID account at: <https://elearning.utdallas.edu>. Please see the course access and navigation <http://www.utdallas.edu/elearning/students/getting-started.html#courseaccessandnav> section of the site for more information.

To become familiar with the eLearning tool, please see the Student eLearning Tutorials <http://www.utdallas.edu/elearning/students/eLearningTutorialsStudents.html>.

UT Dallas provides eLearning technical support 24 hours a day/7 days a week. The eLearning Support Center <http://www.utdallas.edu/elearninghelp> services include a toll free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

Communication

This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the eLearning Tutorials webpage <http://www.utdallas.edu/elearning/students/eLearningTutorialsStudents.html> for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

Distance Learning Student Resources

Online students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students page <http://www.utdallas.edu/elearning/students/cstudents.htm> for details.

Server Unavailability or Other Technical Difficulties

The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online eLearning Help Desk <http://www.utdallas.edu/elearninghelp>. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

Academic Calendar

WEEK/ DATES	TOPIC/LECTURE	READING	ASSESSMENT / ACTIVITY
1 01/19	Complex numbers	LN*: 1.1. – 1.2.	Worksheet 1 Homework 1
2 01/24 – 01/26	R-linearity vs. C-linear Sets of points in the complex plane.	LN: 1.3.- 1.7.	Worksheet 2
3 01/31 – 02/02	Complex functions Fractional-linear functions	LN: 2.1 – 2.4.	Worksheet 3 Homework 2
4 02/07 – 02/09	Differentiability Harmonic functions	LN: 3.1. – 3.5.	Worksheet 4
5 02/14 – 02/16	Polynomials Rational function	LN: 3.6. – 3.10.	Worksheet 5 Homework 3
6 02/21 – 02/23	Sequences and series Power series	LN: 4.1. – 4. 4.	Worksheet 6 Homework 4
7 02/28 – 03/02	Complex integration Line integrals	LN: 5.1. – 5.4.	Worksheet 7
8 03/07 – 03/09	Review Mid-term exam	LN: 1.1. – 5.4.	Exam 1
03/14 – 03/16			
9 03/21 – 03/23	Cauchy disk Cauchy integral	LN: 5.5. – 5.7.	Worksheet 8 Homework 5
10 03/28 – 03/30	Liouville's theorem General form Cauchy theorem	LN: 5.7., 5.8.	Worksheet 9
11 04/04 – 04/06	Removable singularities Taylor's theorem	LN: 6.1. – 6.3.	Worksheet 10
12 04/11 – 04/13	Laurent series Maximum principle	LN: 6.4. – 6.7.	Worksheet 11 Homework 6
13 04/18 – 04/20	The lemma of Schwarz The calculus of residues	LN: 6.8., 7.1., 7.2.	Worksheet 12
14 04/25 – 04/27	Integral using residues Real integrals Rouche's theorem	LN: 7.4. – 7.6.	Worksheet 13
15 05/02 – 05/04	Review Final Exam		Exam

Academic Calendar is subject to change at the discretion of the Professor

*LN – Lecture Notes provided by the Instructor, available in eLearning.

Proctored Final Exam Procedures

If your course has a proctored exam requirement, please see the UTD Student Success Center – Testing Center website <http://www.utdallas.edu/studentsuccess/testing-center/> to make arrangements.

Grading scale:

A	(90 – 100]	A-	(85 – 90]	B+	(80 – 85]
B	(75 – 80]	B-	(70 – 75]	C+	(65 – 70]
C	(60 – 65]	C-	(55 – 60]	F	(50 – 55]

Course Policies

The Course Grade will be based on the following assignments/tests:

Worksheet 10%

Homework 40%

Two exams 25% each.

Exams: Two exams will be given on March 09th and May 4th . Participation in the exams is mandatory.

Make-up exams: No make-up exams will be allowed unless exceptional circumstances occur. Examples of such are sickness, special family-related or special job-related situations. In each such case students need to inform the instructor prior the exam date (or as soon as possible) and provide the instructor with appropriate documents (e.g. excuse from doctor, letter from your boss, etc.).

Late Work: No late assignment will be accepted unless extraordinary circumstances occur for the student (see the rules for Make-up exams).

Special Assignments: The instructor may decide to give an extra assignment occasionally. The due date and the credit for such assignments will be announced separately.

Class Participation: Participation in all class activities is mandatory.

Classroom Citizenship: Students are required to be involved in all class activities and need to be respectful for their classmates and the instructor. A disruptive behavior is not serving to a good learning environment. Examples of such behavior involve: entering the classroom late; leaving the classroom before the end of the lecture; cell phones, ringers etc. need to be turned off unless you are member of an emergency response team; consuming food and drinks; posting on the discussion board topics unrelated to the course material, posting disrespectful messages to their classmates, etc. Although this is a class with some online component the same policies and procedures apply to students taking “online classes” as the regular “face-to-face classes”. UT

Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Student Code of Conduct, UTDSP5003 (<https://policy.utdallas.edu/utdsp5003>). See also Student Conduct and Discipline, Academic Integrity, Copyright Notice on UT Dallas Syllabus Policies and Procedures section of this syllabus.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

The University's concealed handgun policy is posted on the campus carry website: <https://www.utdallas.edu/campuscarry/>

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.