Math 4360 Syllabus
Complex Variables I
Fall 2023 Sul Ross State University

Secs. **Math 4360 001**, **V01**,	Tue, Thu: 6-7:15p in ACR 206
MTH 4360 V01:	
Instructor:	Dr. Kris Jorgenson
Office:	ACR 109D
E-mail:	kjorgenson@sulross.edu
Office Hours:	Mon, Tue, Wed, Thu: 10-11a; Fri: 10a-12p; Mon: 2:30-3:30p;
	Wed, Thu, Fri: 3:30-4:30p;
	also available by appointment

Course Description: The prerequisite is Calculus III (Math 3415). This course is an introductory course covering functions of one complex variable. Topics will include: the algebra of complex numbers, geometry in the complex plane, polar representation of complex numbers, analytic functions, mappings, continuity, differentiability, Cauchy-Riemann equations, elementary functions of a complex variable, contour integrals and the Cauchy integral formula.

Student Learning Objectives Successful students will demonstrate correct understanding and knowledge of the topics including but not limited to those of the preceding paragraph. Students will extend, and apply concepts and problem-solving methods to different problem-solving situations. Students will demonstrate correct knowledge of the difference between numbers (perhaps in the context of another mathematical object such as a function or algebraic expression) that are in exact form and numbers that are approximate and will be able to report numbers in exact form and with a correct approximation when required. Students will express their solutions clearly in writing using complete sentences when appropriate.
This course is supportive of the
Student Learning Outcomes for the Bachelor of Science degree in Mathematics:

1) The student will be able to demonstrate content knowledge of basic mathematical principles.
2) The student will be proficient in logic, able to negate statements, provide counterexamples to false statements, and determine the validity of arguments.
3) The student will be able to communicate mathematical content clearly and with valid reasoning.

Required Textbook: Schaum's Outline of Complex Variables, by Murray R. Spiegel, et al., 2nd Edition, 2009, ISBN: 978-0-07-161569-3, McGraw-Hill Co., Inc.
Optional Resource: Complex Variables and Applications, by Ruel V. Churchill and James

Ward Brown, any edition, McGraw-Hill Co., Inc.
Class Materials: Students are expected to be prepared in every class with pencils and paper to take notes of lecture content and examples, and you are required to be involved in in-class assignments and discussion. This will be part of your grade.
Blackboard: Also you are required to have access to Blackboard and have an e-mail address that you check regularly be your e-address registered in Bb since I may need to contact you outside of class with important information.
Grading and Assignments: The assignments discussed below will help students achieve all of the Learning Objectives mentioned previously through active learning and assessment. Your total grade will break down as follows:
Grading: Your grade will be based on **homework grade** (worth 20%), **3 tests** (each worth 20%), **Class Study Grade** (worth 10%), and **Individual Project Problem** (**IPP**) (worth 10%).

The **tests** will be based on assigned homework and will be given on the following dates:

Test 1	**Thu**, **Oct**. **5**
Test 2	**Thu**, **Nov**. **9**
Test 3	**Mon**, **Dec**. **11**, **6-8p**

A **Class Study Grade** (**CSG**) will be based on credit for attendance and involvement in class activities on days for which there is no in-class test or quiz. This will be connected to student in-class presentations of homework assignments.
Individual Project Problem (**IPP**) Students will be required to pick a complex variable problem of particular interest by Thursday, Nov. 16 at the latest. This must be one approved by me by Nov. 16. This will be longer or more involved than a homework problem, but shorter or less involved than a research paper. Students will present their IPP to the rest of the class on Thursday Nov. 30.

Late Work, **Rescheduled Quizzes**/**Tests** To ensure you receive full credit on a homework assignment you hand in, an in-class quiz, or a test that you miss due to your absence for a personal event, such as a university organization trip, or a personal medical issue, you must be sure to do ALL of the following:

* Let me know of your impending absence before or by the day of your absence.
* Supply documentation for your school trip (if this is the case), or a note from a medical professional (in the case of a medical absence) soon after your absence if not prior. In the case of a university organization-related absence, you must notify me of this authorized absence in writing with your name, the name of your organization and the date(s) of your absence, and your name must appear on a published explained absence list that I am provided (or this is verified by a faculty sponsor).
* You and I must set up a time for you to make up the quiz or test within a reasonable time period (not more than 1 to 3 days) before or after the time of the missed grade.

Note: Usually I will let you make up a grade according to the above conditions if it is due to

another one-time occurrence, such as the care of someone else in your family or a friend, or for a work-related excuse as long as you can document your absence and you let me know BY THE DAY OF THE ABSENCE AT THE LATEST.

Attendance I will be taking attendance as university policy precludes you from missing 3 weeks or more of classes for anything other than authorized university activities. To excuse an absence for a university activity, in addition to letting me know of the absence by the day of the absence (as explained previously) you must also spend at least 60 minutes outside of class on this course with me. Also I will allow you to excuse a test day for a documented medical absence as long as you also make up the test. If you have 3 weeks or more of unexcused absences, I reserve the right to drop you from this class with a grade of 'F', which is university policy.

Good Advice Concentrate on learning the material of the course rather than worrying about your grade. Your time is best spent concentrating on the material to be learned in the impending assignments, asking questions, and devoting yourself to activities that will help you learn the material and do better in the course. I will worry about the details of your grade since you doing so does not help you earn a higher grade. But learning the material and doing well on the tests *will* help your grade. **Remember that math is not a spectator sport**, so the more problems you work yourself, the more practice you will get, the more confident you will be, and the better you will do in this course. Working on the problems helps you to figure out what your specific questions are. Remember an individual homework or quiz grade may not count for a lot in your overall grade, but working and learning from the homework is **essential** because this is where you learn the topics that will appear on the tests, which do count for a lot of your grade. The best lessons learned often come from correcting a quiz or homework problem in which you have made a mistake.

More Good Advice Keep absences to a minimum. You never know when you might miss something important either from the lecture or class discussion such as questions other students ask. Remember: YOU ARE RESPONSIBLE FOR EVERYTHING THAT IS DISCUSSED DURING CLASS WHETHER YOU ARE PRESENT OR NOT.

Also do not allow yourself to develop bad habits such as missing classes. It's human nature to be controlled by our habits, so once you develop a weekly habit for the semester, it can be hard to break this habit. So be sure that you allow the necessary time for this course FROM THE BEGINNING OF THE TERM, ESPECIALLY if you consider mathematics to not be your best subject. If you have trouble in math, then you should attend EVERY class of a college mathematics course. Not showing up to class or not doing the required work will not cause this class to magically go away. If you are not understanding the material and/or have fallen behind in your work, missing class will not help. IF YOU FALL BEHIND, PLEASE DO NOT DROP THIS COURSE WITHOUT TALKING TO ME FIRST. Making mistakes or falling behind is natural, so it is best to talk to me about this. If you do have to miss class, let me know beforehand. Discuss with me what you are not understanding. It is essential to get your questions answered. But

meeting with me outside of class is not a substitute for attending class.

Ask questions no matter how easy or trivial they may seem. There is no such thing as a bad or silly question. Questions result when you are interested and have been thinking about areas, such as mathematics, in which you have limitations in your educational background. Being in a college mathematics course means you will have questions both obvious and more subtle. Asking questions is a very important part of learning.

Study and work problems regularly–every day or every other day. Work on assignments discussed in class as soon as you can after class while the methods discussed are still fresh in mind. You can't expect to succeed in a math course by waiting till the last minute to only study and cram prior to a test. If you promise yourself you will study for a ½-hour, get into the work, forget the clock, then the next thing you know, you've studied and worked for one to two hours. Remember that

LEARNING FROM MISTAKES + PERSISTENCE = SUCCESS!

Classroom Conduct It is important to conduct yourself in a college classroom so that everyone can benefit from good communication between instructor and students. My goal is to create an environment in which everyone can do their best work, learn, and make the best grades possible.

I think you will find that I am a very friendly, sympathetic, and generous instructor as long as you are sincerely working to succeed in this course and certain guidelines for classroom behavior are followed to allow a sanctity of study for your fellow students. Habits such as holding conversations during class, or being engaged in activities not related to this course such as working on a different course or reading your cell-phone will work against the goals of this course and cause you to be counted absent and you will lose Class Study Grade credit. Also engaging with electronic communication devices of any kind during class or coming into class more than 5 minutes late or leaving early before class is dismissed circumvent the goals of this course and cause you to lose credit. My sympathy and generosity will quickly evaporate if I find that you are working against the goals of the course or that you are simply trying to get a good grade without learning or without honestly doing the required work. I want you to have every opportunity to learn and succeed in this course.

Please be aware of the rules for Academic Honesty that you will find in the Sul Ross Student Handbook. Use commonsense to think of anything else that will allow you to learn and do the best work that you can in this class, and for me to better help you do your best work. Remember that being registered for this course does not allow you to behave in any manner you wish during class. You must keep other people in mind. It is within university policy for me to send a student out of this class on a temporary or permanent basis if disruptions or interruptions like the types listed above persist.

ADA Statement

SRSU Accessibility Services. Sul Ross State University (SRSU) is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the

student's responsibility to initiate a request each semester for each class. Students seeking accessibility/accommodations services must contact Mrs. Mary Schwartze Grisham, LPC, SRSU's Accessibility Services Director at 432-837-8203 or email mschwartze@sulross.edu. Our office is located on the first floor of Ferguson Hall, room 112, and our mailing address is P.O. Box C122, Sul Ross State University, Alpine. Texas, 79832.

Program Marketable Skills:
Marketable Skill (MS) 1: Students Demonstrate Logical and Analytical Skills.
MS 2: Students Demonstrate Problem-Solving Using Analytic and Algebraic Methods.
MS 3: Students Use Technology in Problem-Solving and Presentation.
MS 4: Students Use Communication and Pedagogical Skills.

Pandemic Restrictions It is strongly encouraged that students get a vaccination and a booster for the Covid-19 Corona Virus. Students are also encouraged to wear a proper face covering and follow social distancing guidelines based on your own personal decision as there have been recent increases in contagious diseases such as Covid-19.

Classroom Climate of Respect

Importantly, this class will foster free expression, critical investigation, and the open discussion of ideas. This means that all of us must help create and sustain an atmosphere of tolerance, civility, and respect for the viewpoints of others. Similarly, we must all learn how to probe, oppose and disagree without resorting to tactics of intimidation, harassment, or personal attack. No one is entitled to harass, belittle, or discriminate against another on the basis of race, religion, ethnicity, age, gender, national origin, or sexual preference. Still we will not be silenced by the difficulty of fruitfully discussing politically sensitive issues.

Important Dates

Mon, Aug. 28	First day of classes, first day of late registration
	and schedule changes
Thu, Aug. 31	Last day for late registration and schedule changes
Mon, Sep. 4	Labor Day Holiday, No Classes
Wed, Sep. 13	12th Class Day: Last Day to Drop a Class Without
	Creating an Academic Record for 16- week Courses
Wed, Sep. 27	University as a Community Meal on the Mall
Fri, Nov. 17	Last day to drop a class with a grade of "W"
	by 4 pm in University Registrar's Office
Wed-Fri, Nov. 22-24	Thanksgiving Holidays
Wed, Dec. 6	Last Day of Class before Finals
Thu, Dec. 7	Dead Day, No Classes
Fri, Mon-Wed: Dec. 8, 11-13	Final Exams, End of Term

Fall 2023	**Math 4360 Complex Variables I**	**Tentative Course Outline**
X = No Class	Tue	Thu
Aug. 29, 31	Complex Numbers Arithmetic, Polar Forms	Complex Numbers Polynomial Equations
Sept. 5, 7	Complex Numbers Stereographic Projection	Functions, Limits, Continuity
Sept. 12, 14	Functions, Limits, Continuity	Functions, Limits, Continuity
Sept. 19, 21	Complex Differentiation	Complex Differentiation
Sept. 26, 28	Complex Differentiation	Complex Differentiation
Oct. 3, 5	Review for Test 1	**Test 1**
Oct. 10, 12	Complex Integration	Complex Integration
Oct. 17, 19	Complex Integration	Complex Integration
Oct. 24, 26	Cauchy Integrals	Cauchy Integrals
Oct. 31, Nov. 2	Cauchy Integrals	Cauchy Integrals
Nov. 7, 9	Review for Test 2	**Test 2**
Nov. 14, 16	Residue Theorem Evaluation of Integrals	Residue Theorem Evaluation of Integrals
Nov. 21	Conformal Mappings	**X - Thanksgiving Holidays** **Nov. 22-24**
Nov. 28, 30	Conformal Mappings	IPP Presentations
Dec. 5	Review Test 3	**X - Dead Day, No Classes**
Dec. 11	**Test 3, 6-8 pm, Mon Dec. 11**	