# Fall 2025: Math 5320-001 Complex Variable I

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| **Instructor:** Dr. Alexander Solynin | **Place:** MATH 109 |
| **Office Hours:** TR 9:00 - 10:30, W 10:00 - 12:00 or by appointment | **Text:** *Class Notes* |
| **Office:** MATH 231 | **Time:** 11:00 -12:20 TR |
| **Email:** alex.solynin@ttu.edu | **Prerequisite:** MATH 4350 or 4356 |

- **Course Prerequisite:** Sets, functions, vector fields, partial derivatives, power series, theory of integration, line, surface, and multiple integrals.

**Instructor's Note:** Some familiarity with real analysis of one variable and multivariable calculus as well as basic knowledge of high school algebra and trigonometry is required. The fundamental necessary ideas will be reviewed.

**Complementary Texts:**

1) *Functions of One Complex Variable,* 2nd Edition by John Conway
2) *Complex Analysis* by Theodore W. Gamelin (useful for Homework Assignments).

**Learning Outcomes:** Upon completion Complex Variable I and Complex Variable II students will master concepts and theories of calculus of one complex variable, geometry and topology of the complex plane. In particular, for the Fall Semester I plan to cover the following topics:

- analytic functions,
- conformal mapping,
- complex integration,
- harmonic functions,
- power series in the complex plane,
- isolated singularities,
- the residue calculus.

**Assessment of the learning outcomes** will be achieved through one or more activities such as class discussion, board work, selected non-graded homework, and other optional activities deemed appropriate by the instructor. It is important to note that these assessments are for learning benefit.

**Formula sheets:** At least one class before the Final and in-class exams, I will provide students with a one-quarter page, valid for that particular exam, where you may write (do not type!) formulas and theorems, which you are going to use in class. Students are not allowed to use their own pages as formula sheets in the class.

**General Policies:** *Texas Tech Policies Concerning Academic Honesty, Special Accommodations for Students with Disabilities, Student Absences for Observance of*

*Religious Holy Days, and Statement of Accommodation for Pregnant Students may be found on Blackboard.* Relevant Texas Tech policies can be found here:

- https://www.depts.ttu.edu/tlpdc/RequiredSyllabusStatements.php
- https://www.depts.ttu.edu/tlpdc/RecommendedSyllabusStatements.php

In general, no missed in class exams and quizzes will be made up and no homework will be accepted after the deadline. Whether an absence is excused or unexcused is determined solely by the instructor with the exception of absences due to religious observance and officially approved trips described below.

***Absence due to religious observance*:** The Texas Tech University OP 34.19 states that a student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. As your instructor, I request that notification be made in writing and submitted no later than the 15th class day of the semester. Absence due to officially approved trips - The Texas Tech University OP 34.04 states department chairpersons, directors, or others responsible for a student representing the university on officially approved trips must notify the student's instructors of the departure and return schedules. The instructor so notified must not penalize the student, although the student is responsible for material missed. Any student absent because of university business must be allowed to make up missed work within a reasonable span of time or have alternate grades substituted for work due to an excused absence. Students absent because of university business must be given the same privileges as other students.

***Academic Integrity* (extracted from OP 34.12):** It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.
Scholastic dishonesty includes, but it not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

***Civility in the Classroom:*** Incivility is any action that interferes with the classroom learning environment. This includes, but is not limited to, eating, arriving late, leaving early, a ringing cell phone, text messaging, sleeping, chatting during class, dominating the class discussion by not allowing other students to speak, and putting books away before the end of class. Be respectful to the instructor and to your fellow students. I will ask anyone participating in what I perceive to be inappropriate behavior to stop immediately.

***Accommodation for Students with Disabilities* (extracted from OP 34.22):** Any student who, because of a disability, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make the necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until the appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806-742-2405.

***Absence due to officially approved trips:*** The Texas Tech University Catalog states that the person responsible for a student missing class due to a trip should notify the instructor of the departure and return schedule in advance of the trip. The student may not be penalized and is responsible for the material missed.

**Title IX Syllabus Statement - TTU Resources for Discrimination, Harassment, and Sexual Violence:** Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Report any incidents to the *Office for Student Rights & Resolution*, (806)-742-SAFE (7233) or file a report online at titleix.ttu.edu/students. Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are: **TTU Student Counseling Center,** 806-742-3674, https://www.depts.ttu.edu/scc/ *(Provides confidential support on campus.)* **TTU Student Counseling Center 24-hour Helpline**, 806-742-5555, *(Assists students who are experiencing a mental health or interpersonal violence crisis. If you call the helpline, you will speak with a mental health counselor.)* **Voice of Hope Lubbock Rape Crisis Center**, 806-763-7273, voiceofhopelubbock.org *(24-hour hotline that provides support for survivors of sexual violence.)* **The Risk, Intervention, Safety and Education (RISE) Office**, 806-742-2110, rise.ttu.edu *(Provides a range of resources and support options focused on prevention education and student wellness.)* **Texas Tech Police Department**, 806-742-3931, http://www.depts.ttu.edu/ttpd/ *(To report criminal activity that occurs on or near Texas Tech campus*.)

**Important Dates:**

Thursday, August 25 – Classes begin.
September 1 - Labor Day Holiday.
November 26-30 - Thanksgiving Vacation.
November 17 - Last day to drop a course.
December 3 - Last Day of classes.
November 25 – December 4 – Period of no examinations.

**Friday, December 5, 10:30 a.m. to 1:00 p.m. Final Exam.**

Wednesday, December 11 at noon - Grades Due for Graduating Students via Raiderlink.
Monday, December 15 at 5:00 p.m. - Final Grades Due via Raiderlink.

# STUDENT EVALUATION:

- The final exam is comprehensive. It consists of:
  1) **Take Home Segment** **100 pts (17%)**
  2) **In-Class Segment (which is Optional!)** **100 pts**
     These points can be used to substitute for any other exam of your choice.
- ♦ **Friday, December 5 FINAL EXAMINATION 10:30 am – 1:00 pm**
  This exam is scheduled before the semester begins.
  Students should **eliminate any conflicts NOW.**

- **IN-CLASS EXAMS:** October 2 and November 6 **2x100 = 200 pts (34%)**
- **HOMEWORK**: There will be 6 homework assignments **6×30 = 180 pts (31%)**
- 5 min **QUIZZES**:
  There will be several 5-minute quizzes (first 5 minutes of a class), total = **60 pts (11%)**
  where students will be asked to write a particular formula/definition/theorem/etc.
- **Perfect attendance** (≤ 3 missed classes,
  all excused absences must be supported by official notes) **40 pts (7%)**

- **MAXIMAL TOTAL:** **580 pts (100%)**

- **Optional Research Projects:** Research projects are optional and may be used to substitute one exam of your choice. You may continue this project in the Spring Semester. Currently I suggest five topics listed below, so my policy will be:
  First come-first served.
  1. Geometric transformations with complex numbers.
  2. Analytical Geometry from the complex analysis point of view.
  3. Catalog of conformal mappings.
  4. Series solutions of ordinary differential equations.
  5. Applications in electrostatics, heat flow, and fluid mechanics.

# GRADING PROCEDURE:

**A - 90 - 100%**
**B - 80 - 89%**
**C - 70 -79%**
**D - 60 - 69%**
**F - ≤ 59%**