

**Fall 2012:**

## **Math 5320-1 Complex Variable I**

<b>Instructor:</b> Dr. Alexander Solynin	<b>Place:</b> MA 108
<b>Office Hours:</b> MWF 10:00-11:00am or by appointment	<b>Text:</b> <i>Class Notes</i> and <i>Functions of One Complex Variable</i> , 2nd Edition by John Conway
<b>Office:</b> MA 231	<b>Time:</b> 12:00-12:50 MWF
<b>Phone:</b> 742-2580x256	<b>Email:</b> <a href="mailto:alex.solynin@ttu.edu">alex.solynin@ttu.edu</a>

• **Course Prerequisite:** **Department:** MATH 4350 or 4356. Sets, functions, vector fields, partial derivatives, power series, theory of integration, line, surface, and multiple integrals.

**Instructor:** 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.

**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 Chapters I-V. Students will learn the following subjects:

- 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.

### **STUDENT EVALUATION:**

- The final exam is a comprehensive, course wide exam.
- ◆ **Wednesday, December 12 FINAL EXAMINATION 1:30 – 4:00 pm 200 pts**  
This exam is scheduled before the semester begins.  
Students should **eliminate any conflicts NOW.**

- **MIDTERM EXAM:** (October 15) **160 pts**  
Midterm exam consists of **In-Class Hourly Segment** @ 80 pts  
and **Take Home Segment** @ 80 pts

- **HOMEWORK:** There will be 8 homework assignments **8×30 = 240 pts**

- **5 min QUIZZES:**  
There will be several 5 minute quizzes (usually first 5 minutes of a class) total = **60 pts**  
where students will be asked to write a particular formula/definition/theorem/etc.

- **Perfect attendance** (  $\leq 3$  missed classes,  
all excused absences must be supported by official notes) **30 pts**

- **MAXIMAL TOTAL:** **690 pts**

- **Problem Solving Session:** All students are invited to attend an optional problem solving session which will be held every second Friday from 4:00 to 5:00 pm, Room: MA 011. During these sessions I will answer some of your questions and give hints to solutions of some homework exercises.

- **Optional Research Projects:** Research projects are optional and may be used to substitute midterm exam or 95% of the actual maximal score on the Final Exam. You may continue this project in the Spring Semester. Currently I suggest six topics listed below so my policy will be: First come-first served.

1. Analytical Geometry from the complex analysis point of view.
2. Doubly-periodic functions of one complex variable.
3. Catalog of conformal mappings.
4. Special functions of one complex variable and their properties.
5. Basic notions of complex dynamics.
6. Applications in electrostatics, heat flow, and fluid mechanics.

## **GRADING PROCEDURE:**

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

**Students with Disabilities:** Any student who because of a disability may require special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary accommodations. Students should present appropriate

verification from AccessTECH. No requirement exists that accommodations be made prior to completion of this approved university procedure.

**Absence due to religious observance:** The Texas Tech University Catalog states that a student who is absent from classes for the observance of a religious holy day will be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. Notification must be made in writing and delivered in person no later than 15<sup>th</sup> class day of the semester.

**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.

**Academic Integrity:** It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. There will be no tolerance for cheating or plagiarism. Texas Tech University policies will be enforced in such cases.

**Important Dates:**

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| August 27          | - Classes begin                              |
| September 3        | - Labor Day Holiday.                         |
| September 12       | - Last day to drop a course without penalty. |
| October 29         | - Last day to drop a course with penalty.    |
| November 21-25     | - Thanksgiving Vacation.                     |
| December 5         | - Last Day of classes.                       |
| <b>December 12</b> | <b>1:30 – 4:00pm MA 108 FINAL EXAM</b>       |

## Course Calendar

Date	Tentative Lecture Topics
Aug. 27,29,31 Sept. 5,7 Sept. 10,12,14,17 Sept. 19,21,24,26,28 Oct. 1,3,5,8,10,12	Complex Numbers Geometry and Topology of the Complex Plane Functions: Basic Properties and Examples Theory of Differentiation: Analytic Functions
<b>Oct. 15</b>	<b>Midterm Exam</b>
Oct. 17,19,22,24,26,29,31 Nov. 2,5,7,9,12,14,16 Nov. 19,26,28,30,Dec. 3 Dec. 5	Complex Integration Complex Integration - Continuation Laurent Series and Singularities Review of the Course. Last day of classes.
<b>December 12 MA108</b>	<b>FINAL EXAMINATION 1:30 –4:00 pm</b>