Topics: Introduction to Complex Analysis Math 4390.001
Department of Mathematics and Statistics
Fall 2017

A. COURSE INFORMATION

Course number/section: MATH 4390.001
Class meeting time: TR 09:30 – 11:45 AM
Class location: IH – 156
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: George Tintera
Office location: EN 314D
Office hours: Tuesday to Thursday, 1:30 to 3:30 pm
Telephone: 361-825-6028
E-mail: george.tintera@tamucc.edu
Appointments: Appointments outside of office hours are available by request

C. COURSE DESCRIPTION

An introduction to functions of a complex variable and their applications. Differentiation and integration; zeros, poles and residues; conformal mappings.

D. PREREQUISITES AND COREQUISITES

MATH 2415 or (MATH 2414 and MATH 3314). There are no co-requisites.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES


Calculator: Any graphing calculator will help you, but is not required. I will support the TI-84. The calculator will serve as a tool for understanding and solving problems encountered in this course.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The students learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.
Upon successful completion of this course, students should be able to:
1. Perform calculations with complex numbers and functions.
2. Determine limits and derivatives for complex valued functions in general and for elementary functions.
3. Understand and implement integration of complex functions of a complex variable over various domains and relevant theorems.
4. Use series for functions to determine zeros, residues and poles of functions.
5. Understand and apply transformations and conformal mappings and their applications.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Methods and activities for instruction include lecture by the instructor and participation by the students by doing problems in class.

- **Homework**: Homework will be assigned after each class. It will be due one week after it is assigned.
- **Test**: There will be two in-class tests. They are tentatively scheduled for
  - Test 1: October 20
  - Test 2: November 21
- **Final Exam**: 8 – 10:30 AM, Tuesday, December 12th. It will be comprehensive.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Grades will be calculated by homework, test, and exam, according to the following percentages.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test1</td>
<td>25%</td>
</tr>
<tr>
<td>Test2</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
</tbody>
</table>

Your final grade will be assigned according to the following table:

*Percentage Grade*

<table>
<thead>
<tr>
<th>Percentage Grade</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥90.0%</td>
<td>A</td>
</tr>
<tr>
<td>≥80.0%</td>
<td>B</td>
</tr>
<tr>
<td>≥70.0%</td>
<td>C</td>
</tr>
<tr>
<td>≥60.0%</td>
<td>D</td>
</tr>
<tr>
<td>Below 60%</td>
<td>F</td>
</tr>
</tbody>
</table>

I. COURSE CONTENT/SCHEDULE

Important dates:
August 28       First Day of Classes
October 10      Test 1
?? ??           Last Day to Drop a Class
November 21     Test 2
November 23     Thanksgiving Day – No class
December 5      Last Day of Classes
December 7      Reading Day
December 12     Final Exam 8:00 AM-10:30 AM

Course Schedule:

<table>
<thead>
<tr>
<th>Week of</th>
<th>Tuesday</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 28</td>
<td>Syllabus and Introduction to Complex Numbers and Arithmetic</td>
<td>Geometric Properties of Complex Numbers</td>
</tr>
<tr>
<td>Sept 4</td>
<td>Exponential Form and properties</td>
<td>Roots and Regions of the Plane</td>
</tr>
<tr>
<td>Sept 11</td>
<td>Functions and Mappings, $z^2$</td>
<td>Limits for Complex Numbers and continuity</td>
</tr>
<tr>
<td>Sept 18</td>
<td>Derivatives and rules for differentiation</td>
<td>The Cauchy Riemann equations, sufficient conditions for differentiability</td>
</tr>
<tr>
<td>Sept 25</td>
<td>Analytic and Harmonic functions</td>
<td>Extension of Analytic Functions</td>
</tr>
<tr>
<td>Oct 2</td>
<td>The exponential and logarithmic functions</td>
<td>Branches of Logarithms</td>
</tr>
<tr>
<td>Oct 9</td>
<td>Test 1</td>
<td>Power Functions</td>
</tr>
<tr>
<td>Oct 16</td>
<td>Sine and Cosine functions</td>
<td>Zeros and Singularities of Trig Functions</td>
</tr>
<tr>
<td>Oct 23</td>
<td>Hyperbolic functions</td>
<td>Derivatives and integrals of parameterized functions</td>
</tr>
<tr>
<td>Oct 30</td>
<td>Contours and Contour Integrals</td>
<td>Branch Cuts</td>
</tr>
<tr>
<td>Nov 6</td>
<td>Upper bounds of Moduli</td>
<td>Anti-derivatives</td>
</tr>
<tr>
<td>Nov 13</td>
<td>Cauchy Goursat Theorem</td>
<td>Cauchy Integral Theorem</td>
</tr>
<tr>
<td>Nov 20</td>
<td>Test 2</td>
<td>Thanksgiving - No Class</td>
</tr>
<tr>
<td>Nov 27</td>
<td>Sequences and Series</td>
<td>Taylor and Laurent Series</td>
</tr>
<tr>
<td>Dec 4</td>
<td>Residues, Poles and the Cauchy Residue Theorem</td>
<td>Reading Day – No Class</td>
</tr>
<tr>
<td>Dec 11</td>
<td>Review</td>
<td>Final Exam</td>
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</table>

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.
J. COURSE POLICIES

• **Attendance/Tardiness**
  I will check the attendance in every class. Attendance is mandatory by Texas A&M University. Please save absences for emergencies.

• **Late Homework Assignments**
  Late assignments will not be accepted, unless exceptional circumstances prevent you from completing them. Extension of deadlines will be at the instructor’s discretion. Late assignments may result in partial or total loss of credit. There are **NO** make-ups for exams or in-class activities.

• **No Make-up for Midterm/Final Exams**
  **Missed Exam:**
  No make-ups will be given without written evidence of an Official University excused absence. For an absence to be considered excused, the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident or emergency) the student must provide notification by the end of the second working day after the absence. In the case of illness or injury, students are required to obtain a confirmation note from a health care professional affirming date and time of a medical office visit regarding the illness or injury.

• **Extra Credit**
  There will be no extra credit for this course. Do your best to complete the work assigned.

• **Cell Phone Use**
  Please silence phone before coming to class. If you need to make a call, please go outside the classroom. ANY USE OF A CELL PHONE OR WIRELESS DEVICE DURING A TEST CARRIES THE PRESUMPTION OF CHEATING. A GRADE OF 0 WILL BE AWARDED FOR THAT ASSIGNMENT FOR USING, TOUCHING OR GLANCING AT A CELL PHONE OR WIRELESS DEVICE.

• **Laptop Use**
  Laptops, or any form of a new technology device is NOT allowed in the classroom during lecture and exam.

• **Food in Class**
  Food is not allowed in the classroom.

K. COLLEGE AND UNIVERSITY POLICIES

• **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject
to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- Classroom/Professional Behavior
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- Statement of Civility
Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- Deadline for Dropping a Course with a Grade of W (University)
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- Grade Appeals (College of Science and Engineering)
As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules
website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.
  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816. [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

M. **GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.