

Fayetteville State University
College of Arts and Sciences
Department of Mathematics and Computer Science
FALL 2011

“In case FSU must close for an emergency during the semester, instruction will continue using Blackboard.”

I. LOCATION INFORMATION:

Instructor's Name: **Deepthika Senaratne**

Course Number & Name: **Math 492-Complex Variables**

Semester Hours of Credit: **3**

Days/Time Class Meets: **MWF 2.00-2.50 pm,**

Where Class Meets: **SBE 107**

E-mail address: **dsenaratne@uncfsu.edu**

Office Location: **SBE 344**

Office Telephone: **672-1668**

Office Hours: **MWF 1.15-2.00 p.m, TR: 10.45 a.m. -12.00p.m.,
R 11.00 a.m. -1.00 p.m., 2.00 -3.00 p.m.**

FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account (username@uncfsu.edu) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail.

Rules and regulations governing the use of FSU email may be found at
<http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf>

II. COURSE DESCRIPTION:

A rigorous study of elementary functions, differentiation and integration of analytic functions, Taylor and McLaurin series, Residue Theorem, and contour integration.

Prerequisites: MATH 412 or MATH461

III. Disabled Student Services: In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); 910-672-1203.

IV. TEXTBOOK:

Complex Variables and Applications, 8th Edition, James Ward Brown and Ruel V. Churchill, McGraw-Hill, Inc. 2004.

V. Student learning outcomes:

Upon completion of this course, students will be able to:

- Demonstrate the knowledge of basic algebraic properties of complex numbers including Cartesian representation and polar representation.
- Demonstrate the knowledge of continuity, limits and differentiability of functions of complex variables.
- Demonstrate the ability of using Cauchy Riemann equations to determine whether a given function of complex variables is differentiable or not.
- Demonstrate the ability of determining whether a given a function of complex variables is analytic or not.
- Demonstrate the knowledge of harmonic functions.
- Demonstrates the ability of integrating a function of complex variables along a given contour by using Cauchy Integral Formula.
- Demonstrate the knowledge of Taylor and Mclaurin Series and Residue theorem.

VI. Course Requirements and Evaluation Criteria:

Grading Scale:

A	91-100%	B	81-90%
C	70-80%	D	64-69%
F	below 64%		

- a. Attendance Requirements – Attendance is compulsory. Students whose class absences exceed 10% of the contact hours will receive a warning grade of EA=Excessive Absences. For more information, see the attached page “Revision of Grades – Student Responsibilities”.
- b. Graded Assignments – and value of each assignment.

Tests	:	40%
Homework:		25%
Quizzes	:	10%
Final	:	20%
Proper attendance and class participation: 05%		

Extra Credit: 05 points for completing HW on due date.

- c. Policy on Missed or Late Assignments - Each home work has a due date. However, students are allowed to complete the home work after the due date if able to provide a valid excuse. **No makeup tests for chapter tests.**

Student Behavior Expectations: -The instructor will respect all students and will make every effort to maintain a classroom climate that promotes learning for all students. Students must accept their responsibility for maintaining a positive classroom environment by abiding by the following rules:

1. Students are expected to arrive to class on time, remain in class until dismissed by the instructor, and refrain from preparing to leave class until it is dismissed.
2. Student/teacher relationships, as well as relationships among peers, must be respectful at all times.
- 3 Students are not permitted to wear headphones or other paraphernalia that may be distracting to the classroom environment.
4. Students must refrain from any activity that will disrupt the class; this includes turning off cell phones and pagers.
5. Students are not permitted to use profanity in the classroom.
6. Students will not pass notes or carry on private conversations while class is being conducted.

Consequences for Failing to Meet Behavioral Expectations: The first time a student violates one of these rules, the instructor will warn him or her privately, either after class or before the next class. (Faculty members reserve the right to warn students publicly if

needed.) The second time a student violates the guidelines; the instructor may deduct as many as twenty points from the student's next exam grade. If a student violates the guidelines three times, the instructor will report the student to the Dean of Students for disciplinary action according to the FSU Code of Student Conduct.

VI. Academic support: Please contact the instructor for academic support.

VII. Course Outline and Assignment Schedule: Assignments will be posted on the backboard separately.

Complex Numbers	
Sums and Products, Basic Algebraic Properties	
Further Properties, Vectors and Moduli	
Complex conjugates, Exponential form	
Products and Powers in exponential form, Arguments of products and quotients	
Roots of Complex Numbers, Examples	
Regions in the complex plane	
	Test #1
Analytic Functions	
Functions of Complex Variables, Mappings	
Mappings by the exponential functions, Limits, Theorems	
Continuity, derivatives	
Differential Formulas, Cauchy Riemann equations	
Sufficient conditions for differentiability, Polar coordinates	
Analytic functions, examples	
Harmonic functions, Review	
	Test # 2
Integrals	
Derivatives of functions, Definite integral of functions	
Contours, Contour Integrals,	
Some Examples	
Anti derivatives, Cauchy –Goursat Theorem	
Review	
	Test # 3
Series, residues and Poles	
Convergence of sequences	
Convergence of series, Taylor series, Maclaurin Series	
Examples, Absolute and Uniform Convergence	

Isolates singular points, Residues	
Cauchy Residue theorem	
The three types of isolated singular points	
Review	
	Test 4
	Final Exam

VIII. TEACHING STRATEGIES

Lecture, problem discussion, group presentations

IX Bibliography

Ahlfors, Lars V. Complex Analysis, McGraw-Hill, New York, (1979).

Fulks, Watson, Complex Variables, Marcel Dekker, New York, (1993).

Marsden, Jerrold E. and Michael J. Hoffman, Basic Complex Analysis, 3rd edition, W. H. Freeman and Company, New York, 1999

Rudin, W., Real and Complex Analysis, McGraw-Hill, New York, (1987).

Silverman, Richard A., Complex Analysis with Applications, Prentice-Hall, Inc. Englewood Cliffs, New Jersey, (1984).