San Jose State University  
**Fall 2015**  
MATH 238  
Section 1 (Class Number 48855)  
ADVANCED COMPLEX VARIABLES  
(TR 10:30 - 11:45 - MH 424)

**Instructor:** Dr. S. Obaid  
**Office:** 412 MacQuarrie Hall  
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**URL** www.math.sjsu.edu/~sobaid/

**Office Hours:**  
Monday 10:00 - 11:00 a.m.  
3:30 - 4:30 p.m.  
Tuesday 12:00 - 1:00 p.m.  
Wednesday 10:00 - 11:00 a.m.

**Prerequisites:** Math 138 or any undergraduate course in complex variables or consent of instructor.

**Text:** Complex Function Theory, by Anthony S.B. Holland  
North Holland. The text is out of print. Up to 10 students can borrow the text from me.

**Topics From:** Advanced applications of complex numbers, applications of the residue theorem, Poisson and Schwarz's formula for harmonic functions, complex methods for solving boundary value problems, Laurent series with Bernoulli and Euler numbers, Mittag-Leffler's expansion, open mapping theorem, conformal mapping and its applications, infinite products, entire functions, univalent and elliptic functions.

**Course Objectives:** Learning some applications of complex numbers to solve research problems. Learning how to use complex analysis in solving research problems in applied mathematics. Learn some applications of the residue theorem in other areas of mathematics. Finding the connection between the Bernoulli numbers, Euler numbers and Laurent series. Studying conformal mappings and their applications in solving physical problems. For more see the topics above.

**Grading Policy:** There will be two exams and a final. All of these exams are equally weighted. It is optional to replace either exam I or exam II (but not both) by writing a paper on a topic in complex analysis. The topic can be material discussed in books or in a research paper. A preferred length is 5 to 10 pages. Working on the paper alone or with another student from the class is allowed. **All students must take the comprehensive final exam.**  
I will not collect homework. Make attempts to solve the homework. You can discuss the problems with your colleagues and you are encouraged to discuss your difficulties with me.
Exam Schedule:  Exam I  (Thursday 10/01)
Exam II  (Tuesday, 11/17)
Final Exam  (Wednesday, 12/16 between 9:45 - 12:00 noon)
The final exam is comprehensive.

Grading Scale:  Here are some ideas: The student with the highest average will receive a grade A+. Occasionally two or three students receive A+. If your average is 90 or higher your grade will be either A or A+. The rest of the grades depend on the performance of a student relative to the class.

Tentative Grade Scale:
90 or higher  A or A+
86 - 89  A-
82 - 85  B+
77 - 81  B
74 - 76  B-
70 - 73  C+
65 - 69  C

Remarks:  No make-up exams will be given.
Reasons to exceptions must be convincing to me and officially documented, and presented to me before the missed exam.

Cell - Phone  Shut it down and keep it away from your desk during the exams.

Integrity Policy:  It is very important that you get familiar with this policy. See http://www.sjsu.edu senate/docs/S07-2

Disabilities:  Any student who has any disability should discuss it with me in my office as soon as possible.

Last day to drop without documentation:  Tuesday, September 1,2015.
After 9/01/2015"a student may withdraw from class only for 'serious and compelling reasons' which shall be defined as circumstances and genuine emergencies beyond the student's control. These circumstances must be documented ... Failure, or anticipated failure, or non-attendance is not a valid reason for withdrawing from a course."

Please look for information about math 238 on my web page. There will be a homework list, examples and a list of topics for writing papers.
Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of 45 hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf

References:

1. Complex Variables with Applications by Brown and Churchill
2. Schaum outline series- Complex Variables by Murray Spiegel
3. Complex Analysis by L. Ahlfors
4. Invitation to Complex Analysis by R. P. Boas
5. Conformal Mapping by Z. Nehari
6. Univalent Functions by Peter Duren
7. Contour Integration with Applications by Misako Van Der Poel, Masters Thesis, San Jose State University (2007)
8. Fundamentals of Complex Analysis by E. Saff and A. Snyder
9. Functions of One Complex Variable by J. Conway
10. Univalent functions, Volume I by A. W. Goodman