Course Syllabus

Complex Variables (MATH 334-A)

Description:	*A study of mathematics in the complex plane, including analytic functions, derivatives, power and Laurent series, integrals, residues, and conformal mapping, with applications to partial differential equations.*
Credit Hours:	3
Audience:	Elective for math, engineering.
Prerequisites:	Passing grade in MATH 253
Textbook:	*Fundamentals of Complex Analysis with Applications to Engineering and Science, (3rd Edition)*, by E. B. Saff and A. D. Snider. (Required) ISBN: 9780139078743
Technology:	Use of *Maple* is recommended but not required (available on campus computers).
Access and Accommodations Resource Center:	The Access & Accommodation Resource Center (AARC) is the campus office that works with students to provide access and accommodations in cases of diagnosed mental or emotional health issues, attentional or learning disabilities, vision or hear limitations, chronic diseases, or allergies. You can contact the office at aarc@valpo.edu or 219.464.5206. Students who need, or think they may need, accommodations due to a diagnosis, or who think they may have a diagnosis, are invited to contact AARC to arrange a confidential discussion with the AARC office. Further, students who are registered with AARC are required to contact their professor(s) if they wish to exercise the accommodations outlined in their letter from the AARC.
Notice of Cancellation:	Notifications of class cancellations will be made through Blackboard with as much advance notice as possible. It will be both posted on Blackboard and sent to your Valpo e-mail address. If you don't check your Valpo e-mail account regularly or have it set-up to be forwarded to your preferred e-mail account, you may not get the message. Please check Blackboard and your Valpo e-mail (or the e-mail address it forwards to) before coming to class.
Emergencies:	VU's Emergency Notification System (ENS) uses multiple forms of communication, including e-mail, building alarms, outdoor sirens, message boards, computer alerts, Twitter, and public address messaging. Please review the specific procedures for this class found in Blackboard. Remember: "Siren inside, GO outside; Siren outside, GO inside." To evacuate, gather your personal belonging quickly and proceed to the nearest exit. Do not use the elevator. To shelter in place, move away from the windows and stay low to the ground; lock or barricade the door if there is a threat of violence.
Statement of Non-Discrimination:	No student shall be discriminated against or harassed based on race, color, sex, age, disability, veteran status, religion, national origin, or sexual orientation.

Course Goals

    A. Students <u>understand</u> fundamental concepts of complex variables.
    B. Students <u>extend</u> their knowledge of calculus to solve problems involving complex variables.
    C. Students <u>improve</u> problem solving skills.

Topical Objectives.   Preface: *Students will be able to ...*

1. perform arithmetic with complex numbers.
2. swap between various forms of rectangular and polar coordinate representations of complex numbers
3. represent sets and regions within the complex plane
4. find complex roots of various functions
5. differentiate complex functions
6. determine analyticity of a function
7. integrate complex functions
8. compute infinite series of complex numbers
9. understand and utilize the Residue Theorem
10. use conformal maps (time permitting)

General Objectives (with goals addressed).   Preface: *Students will be able to ...*

11. identify when certain theorems apply, and if not, identify what hypothesis is violated (A)
12. carry over and apply knowledge from Calculus such as differentiability and integration (A,B)
13. prove some theorems involving complex variables (A,B,C,D)
14. check results (produced both manually and with technology) and recognize those which are obviously false or suboptimal (A,B,C,D)
15. write clear and detailed solutions to assigned problems in both mathematical jargon and the jargon of the field of application (C,D)