

**SALISBURY UNIVERSITY**  
**DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE**  
**SYLLABUS (Tentative)**  
**MATH 458/558 Complex Analysis**

**Description:** Introduction to complex variables accessible to juniors and seniors in mathematics and the physical sciences. Topics will include the algebra of the complex number system, analytic functions, contour integrals, elementary functions, sequences, series and residues. More advanced topics may include conformal mapping, the Schwarz-Christoffel transformation, integral formulas of the Poisson type and Riemann surfaces.

**Intended for:** Advanced undergraduate students in science and mathematics who wish to have an introduction to the theory and application of complex numbers.

**Objective:** To study the theory and applications of the complex number system.

**Prerequisites:** MATH 310 and either MATH 210 or PHYS 309.

**Text:** Complex Variables and Applications, 8th Edition by Churchill and Brown, McGraw Hill, 2009, ISBN-13: 978-0-07-305194-9

<i>Topic</i>	<i>Weeks</i>
<b>Complex Numbers:</b> Basic algebra, vectors, exponential form, arguments and roots.	1
<b>Analytic Functions:</b> Mappings, limits, continuity, derivatives, Cauchy-Riemann equations, polar coordinates, harmonic functions and the reflection principle.	3
<b>Elementary Functions:</b> Exponential, logarithmic, trigonometric, hyperbolic, inverse functions, And branches.	2
<b>Integrals:</b> Definite and contour integrals, branch cuts, antiderivatives, the Cauchy-Goursat theorem. Simply and multiple connected domains, the Cauchy integral formula, and Liouville's theorem.	3
<b>Series:</b> Convergence, Taylor series, Laurent series, integration and differentiation of series.	2
<b>Residues and Poles:</b> Residues, isolated singular points, Cauchy's residue theorem, residues at poles, residues at infinity.	2
<b>Exams and Advanced Topics:</b>	1

**EVALUATION**

Homework 30-50%

Quizzes & Exams 30-50%

Final Exam 0-25%

**NOTE:** The Writing Across the Curriculum Program is supported strongly in this writing-intensive course. Students will be expected to communicate mathematics and mathematical ideas effectively in speech and writing.

**NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.