Instructor: Blaine Lawson
Office: 5-109. Hours: Mon. 4:00-5:30 and Tues. 2:30-4:00.

Grader: Xuntao Hu

Lectures Mon-Wed. 2:30 – 3:50 in Earth and Space Sciences 177.
Homework due: The beginning of class every Monday.

Midterm Exam: Monday, March 19th.
Final Exam: Tuesday, May 8th, from 5:30 to 8:00 PM.

Final Grade: 30% Homework, 30% Midterm, 40% Final.

DETAILED SYLLABUS

1. Complex Numbers.

2. Complex Differentials.
   - Holomorphic functions
   - Cauchy-Riemann equations
   - Properties
   - Power series
   - Elementary functions

3. Holomorphic functions as Mappings
   - Conformality
   - The Riemann sphere
   - Linear fractional transformations
   - Rational functions

4. The fundamental Theorem
   - Green’s Theorem
   - Complex differentials
   - Cauchy’s Theorem and Cauchy’s Integral Formula
   - Cauchy’s Inequalities and consequences
   - Uniform limits of holomorphic functions
   - Analyticity of holomorphic functions

5. Local Properties
• Removable singularities
• Zeros, poles and essential singularities
• Local form of a holomorphic function
• Maximum Modulus Principle
• Schwarz’s Lemma

6. Residues
• The Residue Theorem
• The Argument Principle and Rouché’s Theorem
• Applications to definite integrals

7. Infinite Series
• Taylor and Laurent series
• Infinite Products

8. Normal Families

9. The Riemann Mapping Theorem

10. Harmonic Functions
• Mean value property
• Poisson’s Formula
• Schwarz’s Theorem
• The Reflection Principle
• The Dirichlet Problem

11. The Big Picard Theorem

Disability Support Services: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, 128 ECC Building (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Arrangements should be made early in the semester (before the first exam) so that your needs can be accommodated. All information and documentation of disability is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: http://www.ehs.sunysb.edu and search Fire Safety and Evacuation and Disabilities.

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Faculty are required to report any
suspected instance of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, and/or inhibits students’ ability to learn.