

# MAT514 - Analysis for Teachers II - Summer II 2019

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## Syllabus

*Tu/Th: 1:30- 4:55 PM, Earth&Space 181*

**Instructor:** Jack Burkart

**Office Location:** 2-105 in Math Tower

**Email:** jack.burkart@stonybrook.edu

**Office hours:** Wednesdays, 1:30pm-2:30 in my office, 11:00am-1:00pm MLC. I am generally around starting at 10:00am most days; feel free to email me to set up an appointment or swing by if my door is open.

**Course Description:** MAT514 is a course on the theory of functions of one complex variable. We will review the basics of algebra, geometry, and topology in the complex plane from scratch. We will study the complex variable analog of the elementary functions we know from calculus courses. We will study what it means for a function to be *complex* differentiable and its consequences. We will study what it means to integrate complex valued functions; the tools of complex analysis will allow us to compute certain integrals much more easily than if we only used real methods. In lecture, we will discuss the proofs of the major milestone theorems in class, but overall, the emphasis will be on understanding the statements of the main theorems and the definitions, and using those theorems and definitions to perform calculations and to prove other interesting facts.

### Course Pages:

1. Course Website: <http://www.math.stonybrook.edu/~jburkart/MAT514Summer19>
2. Blackboard: <http://blackboard.stonybrook.edu>.

**Course Textbook:** *A First Course in Complex Analysis*, by Matthias Beck, Gerald Marchesi, Dennis Pixton, and Lucas Sabalka. The textbook is available for free at <http://math.sfsu.edu/beck/complex.html>.

**Homework:** There will be weekly homework assignments (5 sets in total), due in class each Tuesday. The homework grade will be determined by the average of the best 4 homeworks. Homework assignments will be posted on the course webpage, and will be a mixture of problems from the textbook and other problems. You are encouraged to study with and discuss problems with others from the class, but write up your own homework by yourself, and make sure you understand how to do the problems. **Late Homework will not be accepted under any circumstances.** Late homework that is the result of an excused absence will not count for, or against, your overall course grade. In general, it is best to keep me updated ahead of time with late homework, so we may make appropriate accommodations ahead of time.

**Exams:** There will be one in-class midterm and the final exam. The tentative dates and times are listed below. Success on the exams will not be from memorizing difficult proofs or doing difficult exercises on the spot. The exams will aim to test your knowledge of the basic theorems, definitions, and important examples; any proofs on exams will be aimed to be more elementary in nature. Math is cumulative in nature, but the final will focus on topics covered after the midterm.

**Term Paper:** There will be one term paper on a topic related to the course of your choosing. The goal of this paper is to learn more about a more advanced and specific topic related to complex analysis. A list of suggested topics will appear on the course website; of course, any independent ideas will also be welcome! A successful term paper will be well written and mathematically correct and include proofs of some interesting theorems or interesting examples; it may also include interesting history, connections to what we studied in the course or in other fields of mathematics, motivation for the topic of the paper, or even useful figures and diagrams. I will assist each member of the class as you choose a topic and prepare your paper. There will be no formal requirements as for length or format, and I will help guide you to what is a sufficient amount of work.

**Final Presentation:** The week of class will be dedicated to individual presentations on a topic of your choosing. The topic of your term paper will make for a great choice, although you are free to choose to do something else related to the course. The presentation will be 20 minutes, and it should be approachable to the students in the course based on what we have covered in the class so far. 20 minutes is a very small amount of time, so while you may not be able to prove every claim you make, the audience should have a good understanding of the main theorem, examples, or ideas you discuss, and why they are important or interesting.

**Midterm: Thursday, July 25, in class**

**Final: Tuesday, August 13, in class**

**Term Paper First Draft Due: Tuesday, August 5**

**Final Presentation: Tuesday, August 13 and Thursday, August 15**

**Term Paper Final Draft Due: Thursday, August 15**

Make sure that you can attend the exams at the scheduled times; *make-ups will not be given*. If the midterm exam is missed because of a serious (documented) illness or emergency, the semester grade will be determined based on the balance of the work in the course.

**Grading Policy:** The final grade will be computed based on three categories, each of equal weight: 1. Homework and classroom participation 2. Midterm and Final Exam 3. Presentation and Term Paper. Grades will be kept on Blackboard.

**Schedule of Topics:** A schedule of the course will be made available and kept updated on the course webpage. You should read the sections we cover, or at least skim the sections, before you come to class.

**Americans with Disabilities Act:** If you have a physical, psychological, medical, or learning disability that may impact on your ability to carry out assigned course work, please contact Disability Support Services at (631) 632-6748 DSS . DSS office: EEC (Educational Communications Center) Building, Room 128. DSS will review your concerns and determine, with you, what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. Arrangements should be made early in the semester so that your needs can be accommodated. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and DSS. For procedures and information go to the DSS website above.

**Academic Integrity:** Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another persons work as your own is always wrong. Faculty are required to report any suspected instances 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 here.

**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 University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits the students' ability to learn. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Handbook and the Faculty-Employee Handbook.