

SYLLABUS FOR MA 412, SPRING 2018

Professor: Maciej Szczesny
Office: MCS 273
Email: szczesny@math.bu.edu
Office Hours: Wed. 1-3, Fri. 1-2
Lecture: Tues./Th. 2-3:15, PHO 211

TF: Roderic Guigo Corominas
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TF Office Hours: TBA
Discussion: Tues. 3:35-4:25 CAS 214, Tues. 5-5:50 CAS 214

Text: Complex Variables and Applications, Brown & Churchill (9th Ed.), McGraw-Hill.

Homework: Homework will be assigned every lecture and collected each week in discussion. Late homework will not be accepted. However, your lowest homework grade will be dropped.

Quizzes: There will be a quiz every week in discussion. The problems will closely follow those in the homework. No make-up quizzes will be given. However, your lowest quiz grade will be dropped.

Important Dates: The last day to drop the course without a "W" is Feb. 22, and with a "W", March 30.

Exams: There will be two in-class exams and a final exam at the end. The dates are as follows:

Exam I Th., Feb. 15
Exam II Th., March 29
Final Exam: TBA.

Note: No calculators, books, notes, or cellphones are allowed during exams/quizzes.

No make up exams will be given, with the exception of serious illness, in which case you will be required to provide a note from a physician.

Grading Policy:

Homework:	10 %
Quizzes:	20 %
In-class Exam I:	20 %
In-class Exam II:	20 %
Final:	30 %

The minimum final grades based on the above breakdown are guaranteed to be as follows: **A** 90-100 %, **B** 80-89, **C** 70-79, **D** 60-69.

Academic Honesty: You are encouraged to discuss homework problems with other students. However, your write-ups should ALWAYS be your own. If you are caught plagiarizing, you will be referred to the University Academic Standards Committee for disciplinary action.

Standards of Civilized Behavior: Lecture is a time devoted to learning. Activities which interfere with this process will not be tolerated. For this reason, laptops are not allowed in class. Please turn off your cell-phone before coming to class.

Material to be covered: Chapters 1-7 of the textbook, namely:

- (1) Complex numbers - exponential form, roots, geometric properties
- (2) Analytic functions - limits, derivatives, the Cauchy-Riemann equations, harmonic functions, analyticity. Mapping of regions under analytic functions.
- (3) Elementary functions - $\sin(z)$, $\cos(z)$, $\exp(z)$, $\log(z)$, z^α etc. as analytic functions, branch cuts.
- (4) Integrals - contour integrals, estimates on size, Cauchy-Goursat Theorem, Cauchy integral formula, topology of regions, Liouville's theorem fundamental theorem of algebra, maximum modulus principle
- (5) Series - Taylor and Laurent series, convergence properties, differentiation and integration of series, multiplication and division of series,
- (6) Residues and poles - types of singular points, Cauchy Residue Theorem, meromorphic functions, behavior near a singular point.
- (7) Applications of residues - improper integrals, Jordan's lemma, integration along branch cuts, argument principle, Rouché's theorem.