

# MATH 601

## Methods of Applied Mathematics I

Lecturer: Prof. Wolfgang Bangerth  
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Lecture: Mondays and Wednesdays, 4:10–5:25pm  
Blocker 161

Office hours: Wednesdays 2:00–3:00pm and by appointment

### Course Outline

The course is intended to give students an introduction into the tools and methods used throughout applied mathematics. In particular, the course covers two large topics: linear algebra and complex variables, both of which are widely used in both the analysis of problems as well as for their computational solution. An outline of topics to be covered is as follows:

- For linear algebra:
  - Introduction to vector spaces and matrices
  - Change of basis and similarity
  - Eigenvalues and spectral theory
  - Diagonalization and canonical forms.
- For complex analysis:
  - Introduction to functions of a complex variable
  - Harmonic functions and the Cauchy-Riemann equations
  - Analyticity
  - Cauchy's theorem and the Cauchy integral formula
  - Conformal maps
  - Laurent series and residue calculus
  - Harmonic functions and applications to potential theory.

### Prerequisites

MATH 308 or equivalent.

## Literature

We will use the following two books for the two parts of this class:

- Linear Algebra. S. Lipschutz. Schaum's outlines, fourth edition. ISBN 978-0-07-154352-1.
- Complex Variables. M. Spiegel, S. Lipschutz, J. Schiller and D. Spellman. Schaum's outlines, second edition. ISBN 978-0-07-161569-3.

## Webpage

Homework assignments and other course information will be posted at the course webpage

<http://www.math.tamu.edu/~bangerth/teaching.html>

## Exams + Grading

Final grades will be determined based on the following components:

- Weekly in-class quizzes: 30%
- Midterm, October 22nd, 2012, 4:10–5:25pm: 30%
- Final, December 10th, 2012, 3:30–5:30pm: 40%

Your minimum grade will be A, B, C, or D, for averages of 90%, 80%, 70%, and 60%, respectively.

Students must make arrangements in advance if they expect to miss an exam or quizz. Exam absences due to recognized University-related activities, religious holidays, verifiable illness, and family/medical emergencies will be dealt with on an individual basis. In all cases of absence from exams a written excuse is required. Ignorance of the time and place of an exam will not be accepted as an excuse for absence.

## Policies

*Academic integrity:* The usual rules of academic integrity apply. In particular, the Aggie Honor Code “An Aggie does not lie, cheat or steal, or tolerate those who do” should be self-evident, see

<http://aggiehonor.tamu.edu/>

Students may, and are encouraged to, work together and discuss homework problems with each other. However, copying work done by others is an act of scholastic dishonesty and will be persecuted to the full extent allowed by University policy.

*Disabilities:* If you have a disability and need special assistance, please contact me so we can make accommodations. The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation

requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accomodation of their disabilities. If you believe you have a disability requiring an accomodation, please also contact Services for Students with Disabilities, Cain Hall, Room B118, 845-1637.

For other policies and other information, please read  
<http://www.math.tamu.edu/courses/>