

Syllabus

Math 410: Numerical Methods for Scientists and Engineers

Fall 2011

Catalog description: Prerequisites: CS 111 or ES 111; MATH 231 passed with grade C– or better. Co-requisite: MATH 335, 3 credit hours, 3 class hours.

Floating point arithmetic, solution of linear and nonlinear systems of equations, interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, approximation.

Class: TR 9:30–10:45 A.M., Jones Annex 102

Instructor: Dr. Rakhim Aitbayev, Weir 236, x5463, aitbayev@nmt.edu

Office hours: MWF 1:00–3:00 P. M. or by appointment.

Course webpage: <http://www.nmt.edu/~aitbayev/math410/>

Textbook: *A First Course in Numerical Methods*, 1st edition, by U. M. Ascher and C. Greif, SIAM, 2011, ISBN 978-0-898719-97-0 (required).

Recommended Matlab reference: “*Matlab Guide*” by D.J. Higham and N.J. Higham, SIAM (available on reserve at the Skeen Library).

Course outline: Chapters 1–3 and 9–16 of the textbook. The covered topics are as follows: Numerical algorithms, roundoff errors, numerical solution of nonlinear equations and systems, polynomial and spline interpolation, function approximation, discrete Fourier transform, numerical differentiation and integration, numerical solution of problems with differential equations. Note that the content of chapters 4–8 is covered in Math 411, numerical linear algebra, offered in spring.

Homeworks: Homework assignments will be posted on the course webpage. Some assignments will require composing and debugging computer programs. You may use any programming language, but Matlab is recommended. Your program output should be clearly formatted. Composed computer programs should have a reasonable amount of comments. Numerical results should be carefully analyzed and reported in a concise form (in a table or as a plot).

Grades:

- Final score composition:

Homeworks	Test 1	Test 2	Test 3
55%	15%	15%	15%

- Grade scale:

Score (%)	0–60	60–66	66–69	69–72	72–76	76–79	79–82	82–86	86–89	89–92	92–100
Grade	<i>F</i>	<i>D</i>	<i>D+</i>	<i>C–</i>	<i>C</i>	<i>C+</i>	<i>B–</i>	<i>B</i>	<i>B+</i>	<i>A–</i>	<i>A</i>

Course Rules:

- Follow the *NMT Academic Honesty* policy that is available in the NMT Course Catalog.
- Work individually on homeworks and tests. You may use Maple software for any part of your homework or test.
- Homeworks are due in class. Late homeworks are not accepted. Two lowest homework scores will not count in the final score.
- Auditors should report their auditing status to the instructor at the beginning of the semester. 90% attendance is required to get the SA grade.