

# Math 410

## Numerical Methods for Scientists and Engineers

### Syllabus

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

**Term:** Fall 2005

**Description:** Floating point arithmetic, solution of linear and nonlinear systems of equations, interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, approximation (3 cr, 3 cl hrs).

**Prerequisite:** CS 111 or ES 111; MATH 231 passed with grade  $C-$  or better.

**Co-requisite:** MATH 335

**Time and place:** TR 8:00–9:15 A.M., Weir 203

**Instructor:** Dr. Rakhim Aitbayev, Weir 236, x5463, [aitbayev@nmt.edu](mailto:aitbayev@nmt.edu)

**Office hours:** TR 11:00–12:00 A.M., F 2:00–4:00 P.M.

**Textbook:** *Numerical Analysis*, 8th edition, by J.D. Faires and R. Burden, Brooks/Cole

#### Additional references:

1. *Numerical mathematics and computing*, Kincaid and Cheney, Brooks/Cole.
2. *Analysis of numerical methods*, Isaacson and Keller, New York, Wiley
3. (Matlab reference) “*Matlab Guide*” by D.J. Higham and N.J. Higham, SIAM (available on reserve at the Skeen Library).

#### Homeworks:

- Posted on the course webpage.
- Problems require use of programs provided on the book Internet site at [www.as.yasu.edu/~fares/Numerical-Analysis/](http://www.as.yasu.edu/~fares/Numerical-Analysis/)
- Some homeworks involve computer programming and graphing.
- Homeworks should be neatly written or typed.
- Numerical results should be carefully analyzed and reported in tables.
- Computer programs should have a reasonable amount of comments.

**Tests:** There will be 3 take-home tests. The following are preliminary test dates:

Test 1, September 22, Thursday

Test 2, October 27, Thursday

Test 3, December 1, Thursday

**Grade composition:** Homeworks 55%, tests 45% (15% each)

### Final 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 policy:

1. It is your responsibility to know and understand academic policies of NMT. The university students and instructors must follow the *NMT Academic Honesty* policy that is available at <http://externalweb/aaffairs/new/policies/policies.htm>
2. You must work individually on your homeworks and tests.
3. Homeworks are due in class.
4. Late homeworks are accepted for one more day after the due date with 20% score reduction.
5. Make-up tests are given only in exceptional situations with a documented evidence of the reason for missing the test.

## Course Outline

**Chapter 1.** Mathematical preliminaries. §1.2

**Chapter 2.** Solutions of equations in one variable. §§2.1–2.4

**Chapter 10.** Numerical solution of nonlinear systems of equations. §§10.1–10.5

**Chapter 3.** Interpolation and polynomial approximation. §§3.1–3.4

**Chapter 4.** Numerical differentiation and integration. §§4.1–4.7

**Chapter 5.** Initial-value problems for ODEs. §§5.1–5.11