

# MAT 683 Methods of Numerical Analysis I – Fall 2014

1. **Lecture Time and Place:** 14:15pm–15:35 pm, MW, *Carnegie Hall, Room 119*
2. **Instructor:** Lixin Shen. Office: Carnegie Hall, Room 206D
3. **Office Hours:** 11:00–11:50 am, MW, or by appointment
4. **Contact Information:**
  - (a) **Office Telephone Number:** (315)443-2889
  - (b) **E-mail Address:** lshen03@syr.edu
5. **Textbook:** *Numerical Analysis: Mathematics of Scientific Computing* by D. Kincard and W. Cheney, 3rd Edition.
6. **Prerequisites:** MAT 511, Mat 531. MATLAB will be used in some of our homework problems.
7. **Course Description:** This is an introductory graduate course in numerical analysis. We cover: computer arithmetic, approximation of functions, numerical differentiation and integration, solution of nonlinear equations. The course material will be selected from chapters 1,2,3,6,7 of the text.
8. **Course Content**
  - (a) Basic concepts in numerical analysis
    - i. Mathematical preliminaries
    - ii. Floating point arithmetic
    - iii. Sensitivity analysis
  - (b) Approximation of functions
    - i. Polynomial interpolation
    - ii. Hermite interpolation
    - iii. Spline interpolation
    - iv. Trigonometric interpolation
    - v. Least squares approximation
  - (c) Numerical intergation
    - i. Interpolatory quadratures
    - ii. Composite quadratures
    - iii. Gaussian quadratures
  - (d) Solutions of nonlinear equations
    - i. The bisection method

- ii. Fixed point iteration
- iii. Newton's method: its convergence and modifications

Students are responsible for all material in the text and all material presented in class. This includes any material not in the text and all material in the text that was not presented in class.

9. **Exams, Homeworks, Final Exam:** There will be two 80 minutes exams and a cumulative final exam given in this course. Homework will be given every week; selected problems will be graded. Dates of the exams will be announced approximately a week before the exam.
10. **Final Exam:** Wednesday December 10.
11. **Course Grades:** Course grades will be determined by: homework= 35%, 2 exams= 40%, final exam= 25%. Your letter grade for the term then comes from the following table.

93–100	A	77–79	C+
90–92	A-	73–76	C
87–89	B+	70–72	C-
83–86	B	60–69	D
80–82	B-	0–59	F

12. **Academic Integrity:** Syracuse University sets high standards for academic integrity. Those standards are supported and enforced by students, including those who serve as academic integrity hearing panel members and hearing officers. The presumptive sanction for a first offense is course failure, accompanied by the transcript notation "Violation of the Academic Integrity Policy". The standard sanction for a first offense by graduate students is suspension or expulsion. Students should review the Office of Academic Integrity online resource "Twenty Questions and Answers About the Syracuse University Academic Integrity Policy" and confer with instructors about course-specific citation methods, permitted collaboration (if any), and rules for examinations. The Policy also governs the veracity of signatures on attendance sheets and other verification of participation in class activities. Additional guidance for students can be found in the Office of Academic Integrity resource: "What does academic integrity mean?"

Related links:

The Academic Integrity Policy:

<http://academicintegrity.syr.edu/academic-integrity-policy/>

Twenty Questions and Answers about the Academic Integrity Policy:

<http://academicintegrity.syr.edu/faculty-resources/>

What does academic integrity mean?: <http://academicintegrity.syr.edu/what-does-academic-integrity-mean/>

13. **Religious observances policy:** SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to are religious observance provided they notify their instructors before the

end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services – > Enrollment – > My Religious Observances) from the first day of class until the end of the second week of class.

14. **Students with Disabilities:** Students who may need academic accommodations due to a disability are encouraged to discuss their needs with the instructor at the beginning of the semester. In order to obtain authorized accommodations, students should be registered with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498, and have an updated accommodation letter for the instructor. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance. For more information about services and policy, see <http://disabilityservices.syr.edu>

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Any suggestions and comments from you are **highly appreciated**.