MATH 373: INTRODUCTION TO SCIENTIFIC COMPUTING  
TTh 11:00AM – 12:15PM, 32 CARVER HALL  
http://www.public.iastate.edu/~rossmani/math373/ 

INSTRUCTOR  
James Rossmanith  
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E-mail: rossmani@iastate.edu  
Office Hours: Tues. & Thurs. 10:00am – 11:00am 

PREREQUISITES  
• Math 265 (Calculus III) or equivalent  
• Basic computer programming skills (any language is fine) 

TEXTBOOK  

COMPUTER LANGUAGE  
MATLAB (MATrix LABoratory)  
• This software is available in computer labs around campus.  
• Student version can be purchased (NOT REQUIRED).  
• RECOMMENDED for students with limited programming experience.  

– or –  
SciPY (Scientific Python)  
• This software (and all dependencies) can be freely to download via  
• May be available in some computer labs.  
• NOT RECOMMENDED for students with limited programming experience. 

GOALS OF THE COURSE  
1. Develop numerical methods for approximately solving problems from continuous mathematics on the computer  
2. Analyze these methods in terms of accuracy, stability, and efficiency  
3. Implement these methods in a computer language  

COURSE TOPICS  
1. Chap 1: Introduction (Brief Calculus review, Taylor series, rates of convergence, floating point numbers)  
2. Chap 2: Root finding (bisection, false position, Newtons method, secant method, roots of polynomials)  
3. Chap 6: Direct methods for solving linear systems (Gaussian elimination, LU factorization, Newton’s method for nonlinear systems)  
4. Chap 3: Interpolation and curve fitting (Lagrange form, Newton form, cubic splines, least squares)  
5. Chap 4: Numerical differentiation and integration (finite differences, Richardson extrapolation, Newton-Cotes, Gaussian quadrature, Romberg integration, adaptive quadrature, improper integrals)  
**Grading**

- 40% — ~10 Homework assignments (1 and 2 week assignments)
- 30% — 1 Midterm exam (75 minutes, in-class, no calculators)
- 30% — 1 Final exam (2 hours, in-class, no calculators)

**Homework Policy**

NO LATE homework will be accepted. Homework will be due on **Thursdays** at the **BEGINNING** of class.

**Attendance**

I do not take attendance, but it is very likely if you skip classes that you will not do well in the course. If you decide to skip class for no good reason, then you are deciding that you are okay with missing what I teach that day. In this case, do not come to my office hours expecting me to teach you the things you missed.

**Reading**

It is important that you read the textbook carefully for understanding. We will not be able to cover all examples and ideas in the textbook in class, but you are responsible for the content in the textbook. It is important that you read for understanding, not just to get the reading over with. This will likely mean reading each section 3 or 4 times, doing some pencil and paper work on your own to understand some transitions, etc. Reading math can be a slow process, but each section in the book is short so you will have time for multiple readings.

**Disability Accommodations**

If you have a disability and require accommodations, please contact the instructor early in the semester so that your learning needs may be appropriately met. You will need to provide documentation of your disability to the Student Disability Resources (SDR) office, located on the main floor of the Student Services Building, Room 1076, 515-294-7220.
## Class Days

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**FINAL EXAM:** Monday December 16\(^{th}\) (9:45am – 11:45 am).