

CS 3513: Numerical Methods for Digital Computers Spring 2020

Course Information (Last Revised on January 13, 2020)

1. General Information

Instructor: H. K. Dai Teaching Assistant: [refer to class Webpage]
Office Location: Mathematics, Statistics, and Computer Science Building
Room 209
Office Hours: Monday/Wednesday 12:00 – 1:00
(or by appointment)
Office Phone: 744-7207
email Address: dai@cs.okstate.edu
Universal Resource Locator: <http://www.cs.okstate.edu/~dai/>

2. Course Description in Current University Catalog

CS 3513: Numerical Methods for Digital Computers. Prerequisites: MATH 2153 (Calculus II); MATH 3013 (Linear Algebra) or concurrent enrollment; or MATH 3263 (Linear Algebra and Differential Equations) and knowledge of programming. Errors, floating point numbers and operations, interpolation and approximation, solution of nonlinear equations and linear systems, condition and stability, acceleration methods, numerical differentiation and integration.

3. Course Materials and References

1. Lecture Notes: [Cha10] J. P. Chandler. *Elements of Numerical Computation*. Recent Edition (2010).
2. References and Supplementary Materials (suggested in previous offerings by J. P. Chandler):
[CB80] S. D. Conte and C. de Boor. *Elementary Numerical Analysis*. McGraw-Hill, 1980.
[DB03] G. Dahlquist and A. Bjorck. *Numerical Methods*. Dover Publications, 2003.
[IS87] B. Irons and N. Shrive. *Numerical Methods in Engineering and Applied Science: Numbers are Fun*. Ellis Horwood Ltd , 1987.
[KMN88] D. Kahaner, C. Moler, and S. Nash. *Numerical Methods and Software*. Prentice Hall, 1988.
[Sha73] L. F. Shampine. *Numerical Computing: An introduction*. Saunders, 1973.
[SAP97] L. F. Shampine, R. C. Allen, and S. Pruess. *Fundamentals of Numerical Computing*. Wiley, 1997.

Software available from:

<http://gams.nist.gov/>

<http://www.netlib.org/>

<http://archives.math.utk.edu:80/>

<ftp://ftp.wiley.com/public/college/math/sapcodes> (software in C, C++, FORTRAN77, Fortran 90, and MATLAB)

3. Class pages (<http://www.cs.okstate.edu/~dai/course/CS3513/2020spring/2020spring.html>).

4. Homework and Examinations

There will be about 5 homework/programming assignments, 1 test, and 1 final examination.

5. Course Grade

The course grade is based on the homework (40%), test (25%), and final examination (35%). The passing letter-grade is determined by the following partition of the course grades:

D : [50, 60); C : [60, 70); B : [70, 85); and A : [85, 100]

6. Miscellaneous

1. **Lectures:** Lectures are not mandatory, but historically, students with active attendance have done significantly better on examinations than their less frequently attending classmates.
2. **Homework:** Problem sets form an important part of the learning in the course, and thus, you are required to do them in order to pass.

3. **Collaboration:** You are encouraged to collaborate in study groups on the solution of the homework. If you do collaborate you must write up solutions on your own and acknowledge your collaboration in the write-up for each problem. If you obtain a solution with help (e.g., through library work, another student, etc.), acknowledge your source, and write up the solution on your own.

7. Student Disability Services

Student Disability Services and other Student Services are committed to providing support services to students with physical and learning disabilities. Please advise the instructor of desired academic accommodations, and notify Student Disability Services.

8. Academic Dishonesty or Misconduct

Refer to the section in “University Academic Regulations” in current “University Catalog” (<http://registrar.okstate.edu/>)

9. Adding/Dropping/Withdrawing, Important Dates, and Syllabus Attachment

1. **Tests and Final Examination:** Tentative date for the test is March 4 (Wednesday), 2020.
Adopting “Spring 2020 Final Exam Schedule”, the firm time/date for final examination is 6:00 – 7:50 pm, May 4 (Monday), 2020 in regular class meeting place.
Refer to the section in “Spring 2020 Final Exams”:
<http://registrar.okstate.edu/Exams>
2. **Adding/Dropping/Withdrawing and Important Dates:** Refer to the section in “Current Syllabus Attachment”:
<http://registrar.okstate.edu/>
3. **Syllabus Attachment:** Refer to:
<http://academicaffairs.okstate.edu/content/resources-students>

1. Errors
2. Floating Point Numbers and Arithmetic
3. Taylor Series and Numerical Differentiation
4. Roots of Nonlinear Equations
5. Accelerating Convergence
6. Condition and Stability
7. Systems of Linear Equations
8. Interpolation and Extrapolation
9. Approximation and Definite Integrals