MA/CS 321 --- Introduction to Numerical Methods

Sections 1, Fall 2017

MWF 11:00 - 11:50am, CB 337

Instructor

Dr. Qiang Ye
Office: 735 Patterson Office Tower
Phone:257-4653
Email: qye3 "at" uky . edu
Office Hours: MWF 2:00-3:00 pm

Textbook

Numerical Mathematics and Computing, 7th edition, by Ward Cheney and David Kincaid , The book can be purchased directly from the publisher with various purchasing options at this site.

Course Coverage

In this course, we study numerical methods for solving some basic mathematical problems. We shall cover most sections in the following chapters of the textbook:

- Chapter 1. Mathematical preliminaries.
- Chapter 3. Nonlinear equation.
- Chapter 4. Interpolation and Numerical differentiation.
- Chapter 5. Numerical integration.
- Chapter 2. Linear systems.
- Chapter 8. More on Linear systems (Sec. 8.1).
- Chapter 6. Spline functions.

Prerequisites

MA 213 and CS 221 or equivalent. Knowledge of a procedural programming language (C/C++, Java, python, or MATLAB) is required.

Homework

Homework will be assigned weekly with the exception of the exam weeks. Homework will be a combination of written homework, online homework (WebWork), and programming projects. An account will be created for each enrolled student at WeBWorK. Please login at https://webwork.as.uky.edu/webwork2/MA321F17/ using your LinkBlue username (**in CAPITAL letters**) as the username and using your UK ID as the initial password. Once you have logged in, please change your password immediately by clicking on Password/Email in the Main Menu. You can then click on Homework Sets in the Main Menu to see a list of homework available. Be sure to check the Status column of homework sets, which is marked as open, closed, or not yet open. If the set is open, that means that when you solve a problem, it will be counted towards your grade. If the set is closed, you can still solve problems and get your answers checked, but your results will not be recorded.

More detailed information on WeBWork can be found HERE or in PDF file HERE. A brief instruction on how to enter answers in WeBWorK can be found HERE or in PDF file HERE.

File related to Projects, Exams, and Homework

- Project 1
- **Exam 1**: Monday Oct. 2. Coverage: Chapters 1 and 3.
- Project 2
- **Exam 2**: Wed. Nov. 1. Coverage: Chapters 4 and Sec. 5.1 and 5.3.
- Solution to Exam 2 .
- Project 3 (due Monday Nov. 13).
- Project 4 (due Friday Dec. 1).
- **Final Exam Coverage** (Tues. Dec. 12 at 10:30am): Chapters 1, 2.1, 2.2, Chapter 3, Chapter 4, 5.1, 5.2, 5.3, 6.1, 6.2, 8.1 and Appendix D.1. At least 2/3 of questions will be on the portion after the second midterm: 2.1, 2.2, 5.2, 6.1, 6.2, 8.1 and Appendix D.1.

Exams and Grades

There will be two midterm exams to be scheduled. There will also be a final exam of two hour duration. The course grade will be based on attendance, the homeworks, programming projects, and exams with the weights given as follows:

Attendance	3%
Homework and Projects	50%
Two midterm Exams	22%
Final Exam	25%

The scheme for assigning the course grade is given in the following table.

90%	A
80%	B
70%	C
60%	D
below 60%	E

If you miss an exam, you will automatically be given zero point unless legitimate reasons are provided with FULL documentations, in which case a make-up exam will be arranged.

For the exams, you are allowed to bring in one page of prepared note. You may use a graphing calculator on exams but may not use any electronic device with the ability to do symbolic computations such as the TI-89, TI-92, HP48 or a laptop computer. Cell phones must be turned off and put away out of sight during an examination.

Demonstration codes (MATLAB):

The following are some MATLAB demonstration codes that may help in understanding algorithms and related theory. You can run them online at Octave online.

- 1. Approximation by Taylor polynomials.
- 2. Loss of significant digits.
- 3. Local quadratic convergence of Newton's method.
- 4. Interpolation of given data points.
- 5. Interpolation of a given function on equally spaced points.

For those who have not used MATLAB before, this free book by Moler (Introduction to MATLAB) provides a good introduction.

The Free Software Foundation's Matlab clone called Octave may also be used by those who do not have access to MATLAB.

Midterm grades

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (http://www.uky.edu/Registrar/AcademicCalendar.htm)

Excused Absences

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit â€œreasonable cause for nonattendanceâ€ by the professor. Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754). Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request â€œappropriate verificationâ€ when students claim an excused absence because of

illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed. Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited. Part II of Student Rights and Responsibilities (available online http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission. When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone elseâ€™s work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a studentâ€™s assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add

an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations due to disability

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.