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**Numerical Analysis**

**Fall 2006**

12620    Math/CS 4334.501    TR    8:30 -9:45am    ECSS 2.201

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**Instructor Information**

Instructor: Dr. Bentley Garrett  
Office: FO 2.614  
Phone: 972-883-4236  
E-mail: WebCT preferred (see section below)\*  
Snailmailbox: EC 3.214 (Julie Welch's office)  
Office hours: TR 7:30-8:15 PM

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**Course Pre-requisites, Co-requisites, and/or Other Restrictions**

Prerequisites: MATH 2418, 2451, and CS 1337 or equivalent knowledge of a high level programming language.

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**Course Description**

- Section 1: Computer Arithmetic and Error Analysis
- Section 2: Roots of Nonlinear Equations
- Section 3: Solution of Linear Equations
- Section 4: Interpolation and Approximation
- Section 5: Numerical Differentiation and Integration
- Section 6: Solution of Ordinary Differential Equations

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**Student Learning Objectives/Outcomes**

Students will discern when analytical methods fail to be effective and when numerical methods need to be applied. Students will address the mathematical theory behind the numerical methods as well as apply numerical methods using a high-level programming language or by hand. Furthermore, students will learn the relative advantages and disadvantages of applying a certain numerical method when there is a choice of several methods. These advantages and disadvantages, among others, involve the conditions under which a particular method may be applied, the complexity of the method, and the stability of the method.

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**Required Textbooks and Materials**

Text: *Numerical Analysis*, Timothy Sauer, Pearson Addison-Wesley

Access to MATLAB software. You will be REQUIRED to use MATLAB for any programming assignments. See next section.\*

## Suggested Course Materials

Online resources: WebCT: <http://webct.utdallas.edu> You must enter your NETID username and password to logon to WebCT. Here, you will find the syllabus, problem sets, handouts, MATLAB tutorials, etc., as well as a record of your grades. Any messages/e-mails concerning the class may also appear on WebCT. **This is also where you should contact me; just click the Mail link/icon, click Compose Message, click Browse, and select the top name (which is mine.)**

A Student Solutions Manual for the textbook is also available from the publisher, and may be available through the UTD Bookstore.

\*Free access to MATLAB 7 is available to UTD students in all the UTD Microcomputer Labs: McDermott, Jonsson, and Bookstore Labs. The McDermott and Jonsson Labs are open everyday. See <http://www.utdallas.edu/ir/tcs/labs/hours.htm> for hours of operation. Note that, if you wish to make printouts in these labs, you will need to use your Comet Card. The cost is 6 cents/page. Of course, you may print elsewhere if you wish.

MATLAB 7, Student Version is also available for \$99.98 on the bookstore website and also may be available in the UTD Bookstore on campus. You DO NOT have to purchase this software.

## Additional Resources:

SWE-Society of Women Engineers, <http://swe.utdallas.edu/>

NSBE-National Society of Black Engineers, <http://www.utdallas.edu/orgs/nsbe/nsbehome.htm>

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## Academic Calendar/Assignments (subject to change)

Week	T		Th	
1			8/17	Introduction, MATLAB, Sec.1
2	8/22	Sec.1	8/24	Sec.1/Sec.2/HW1
3	8/29	Sec.2	8/31	Sec.2
4	9/5	Sec.2	9/7	Sec.2/Sec.3/HW1due/ HW2
5	9/12	Sec.3	9/14	Sec.3
6	9/19	Sec.3	9/21	Sec.3/HW2due/HW3
7	9/26	Sec.3/Sec.4	9/28	Sec.4
8	10/3	<b>Exam 1 (Secs.1,2)</b>	10/5	Sec.4
9	10/10	Sec.4/HW3due/HW4	10/12	Sec.4

10	10/17	Sec.4	10/19	Sec.5
11	10/24	Sec.5	10/26	Sec.5/HW4due/HW5
12	10/31	Sec.5	11/2	Sec.6
13	11/7	<b>Exam 2 (Secs.3,4)</b>	11/9	Sec.6/HW5due/HW6
14	11/14	Sec.6	11/16	Sec.6
15	11/21	Review/HW6due	11/23	<b>Thanksgiving Holiday</b>
16	11/28	No class	11/30	<b>Final Exam (Secs.5,6,etc.) 8-10:45 pm</b>

8/17 - 9/1 Students may withdraw from a class without record.  
9/2 - 9/20 Students may withdraw from a class with signatures and receive a W.  
9/21 - 10/19 Students may withdraw from a class with signatures of instructor and advisor receiving a WP(if passing) or WF(if failing).  
10/20 - EOT Students may withdraw from a class for non-academic reasons only.

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### Grading Policy

Homework Average*	30%
Exam 1	20%
Exam 2	20%
Final Exam	30%

(8:00pm, Thursday, November 30, 2006)

\*The Homework will consist of approximately 6 assignments (subject to change), each contributing about 5% of the final grade (subject to change). These assignments will consist of both theoretical and computational problems using MATLAB. You will be notified of the due dates when the assignments are given.

Grade Scale: A+	96.5-100	C+	76.5-79.4
A	92.5-96.4	C	72.5-76.4
A-	89.5-92.4	C-	69.5-72.4
B+	86.5-89.4	D+	66.5-69.4
B	82.5-86.4	D	62.5-66.4
B-	79.5-82.4	D-	59.5-62.4
		F	below 59.5

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## Course & Instructor Policies

Exams/assignments:

- (a) Homework assignments are NOT COLLABORATIVE. Feel free to consult me about assignments, but YOU CANNOT CONSULT YOUR CLASSMATES.
  - (b) I will accept handwritten assignments as long as they are neat and well-organized.
  - (c) Any programs must be well-documented - you must be able to explain your code.
  - (d) You must provide hard copies for all code and output along with the handwritten portions.
  - (e) There will be no make-up exams unless the circumstances are extraordinary.
  - (f) Exams are closed book, without notes, and without graphing calculators.
  - (g) SHOW ALL WORK on exams and assignments. Unsupported answers are considered miracles and, while inspirational, will receive little or no credit. Major exams and assignments will be returned to you as soon as possible. Any document not picked up by the end of finals week will be destroyed.
  - (h) Final exams are not returned to the student but are held for review for one year.
  - (i) It is essential that you attend all lectures to be successful in this class.
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Calculators: No graphing calculators are allowed. It will, however, be assumed that you do have a scientific calculator, and that you use it where appropriate for exams. If you don't have a scientific calculator, borrow one for the semester or buy one – they are inexpensive.

Citizenship: Any action that disturbs your classmates or interrupts the lecture is unacceptable. Examples of such actions are:

- (a) Entering the classroom late - be as punctual as possible.
- (b) Leaving the classroom before break or before the end of lecture.
- (c) Cell phones, ringers, buzzers, beepers, alarms, raspberries, blackberries - turn them off! unless you are a member of an emergency response team.

Student participation in class is desired, however, please raise your hand to speak and avoid having side conversations with your classmates.

There will be **no** extra credit

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## Intercollegiate Competitions

Students involved in a UTD sanctioned competitive activity must supply the instructor with a letter certifying his/her eligibility to participate in such a competition. Said letter may be obtained from the Intercollegiate Compliance Officer. It is the students' responsibility to discern scheduling conflicts and to inform the instructor well in advance of a class, quiz, or exam that will be missed due to a competition. The instructor will make reasonable accommodation to resolve the conflict.

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## Field Trip Policies

### Off-campus Instruction and Course Activities

*Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address [http://www.utdallas.edu/BusinessAffairs/Travel\\_Risk\\_Activities.htm](http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm). Additional information is available from the office of the school dean. Below is a description of any travel and/or risk-related activity associated with this course.*

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## Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

## Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

## Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

## **Withdrawal from Class**

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

## **Student Grievance Procedures**

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

## **Incomplete Grade Policy**

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

## **Disability Services**

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:

The University of Texas at Dallas, SU 22

PO Box 830688

Richardson, Texas 75083-0688

(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for

students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

### **Religious Holy Days**

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

***These descriptions and timelines are subject to change at the discretion of the Professor.***