

Department of Mathematics & Statistics

INTRODUCTION TO NUMERICAL ANALYSIS

MAT 442 – CRN 11720

Course Section: 1 – Credit Hours: 3

SPRING 2010 – Course Syllabus

Meeting: M W F 11:30–12:20 PM; FH 108

Instructor: Dr. Donald Adongo, FH 6A-7

Contact: donald.adongo@murraystate.edu, 809-2490

Office Hours: M W F 12:30–1:20 PM

Web site: <http://campus.murraystate.edu/academic/faculty/donald.adongo>

I Title

Introduction to Numerical Analysis

II Catalog Description

Taylor polynomial approximation, numerical root finding methods and fixed-point iteration, polynomial and spline interpolation, numerical differentiation and integration, and direct methods for the solutions of linear systems . Prerequisite: MAT 308 or consent of instructor.

III Purpose

The purpose of this course is to give an introduction to numerical analysis for undergraduates in sciences, mathematics, engineering, etc.

IV Course Objectives

Students should:

- 1) obtain an intuitive and working understanding of some numerical methods for basic problems of numerical analysis.
- 2) gain some appreciation of the concept of mathematics in applications through the error control and the need of mathematics to analyze and predict it.
- 3) develop a reasonable amount of experience in the implementation of numerical methods using computers. This should include an appreciation of computer arithmetic and its effects.

V Content Outline

- Computer Representation of numbers
- Locating Roots of Equations
- Interpolation
- Solution of system of linear equations
- Numerical differentiation and integration
- Taylor Polynomials

We shall cover the contents of chapters 2–7, 9. Chapter 1 will be reviewed.

VI Instructional Activities

Classroom discussions, group work, lectures, and homework.

VII Calculator

A scientific calculator is adequate for the course.

VIII Electronic Communication Policy

It is the default policy of the Department of Mathematics and Statistics that, without the prior consent of the course instructor, no device may be used for electronic communication in class. This shall include cell phones, smart-phones, computers, laptops, and tablets. In addition, this includes verbal calling, incoming calls, email, text messaging, the use of cell phone calculators on tests and quizzes, and the use of the wireless capabilities of calculators or other electronic devices. Unless given special permission in advance from the course instructor for potential cases of emergency or critical family situations, cell phones must be kept on silent and out of sight (i.e. secured to a person's belt or kept in a bag or purse away from desks). Should a student's cell phone be visible, ring, or should the student be engaged in some other form of unauthorized usage that the course instructor finds to be disruptive to the class, the student may be asked to leave class and not return for that class period, and be counted absent for that day. Similar restrictions and penalties apply to use of other electronic devices, unless permitted by the instructor for that class period.

IX Resources

Textbook, instructor, MatLab Software. Occasionally handouts will be given to aid in the understanding and organization of the material. If you miss a class period, it is your responsibility to get a copy of any item handed out that day.

X Grading Procedures

Your grade will be based on EXAM grades, HOMEWORK grades, Project (Computer) grades, and the FINAL EXAM. Fifty percent of the course grade will come from 5 major exams (each exam counts 10 percent of the grade) and twenty percent of the course grade will come from the final exam. The homework grade will contribute 15 percent while the project grade is worth 15 percent of the course grade. The grading scale will be:

% Points (x)	90 - 100	$80 \leq x < 90$	$70 \leq x < 80$	$60 \leq x < 70$	$0 \leq x < 60$
Grade	A	B	C	D	E

Exams: The Exams will test your comprehension of concepts and skills not covered on a previous exam. Exams may contain both problem-solving questions and essay questions. Exams occur for everyone (to be fair to everyone) on the scheduled date. Sometimes, however, extenuating circumstances do exist. If you absolutely must miss an exam, you are to stop by or call me (or leave a message with the office if I am not in when you call) before the exam to tell me why you cannot be at the exam. In addition, you must complete the "missed exam form" (see the course website) within one week. If you do not, you will get a zero on that exam with no opportunity to make it up. An excused missed exam will be made up in my office within two weeks (an extension may be granted in rare cases), with the grade to be determined as explained at that time. Our five semester exams will be **February 5, February 26, March 11, April 12, and April 23.**

Final: The Final will be a comprehensive exam covering any material addressed that semester. The Final exam will be on **Tuesday, May 4th at 10:30 a.m.** in **FH 108.**

Homework: Homework will be assigned at the beginning of each section and will also be listed on the course web site. Homework will be collected weekly.

Computer Project: Computer assignments will be given with each chapter involving the computer language $\text{\textcircled{C}}MATLAB$. The student is responsible for gaining access to the software ($\text{\textcircled{C}}Matlab$) which is available in the computer lab on the first floor of Faculty Hall. A familiarity with Matlab will be one of the goals for this course. Programs and any other work will be submitted in hard-copies.

Important Grade-dates: The last day to change from Audit to Credit is Wednesday, January 13th. The last day to drop a course without receiving a grade (or a W) is Friday, January 15th. The last day to drop individual courses and receive a grade of "W" (no penalty) is Wednesday, March 31st. Students who withdraw from ALL classes from Thursday, April 1 – Friday, April 23 will receive a 'WP' or a 'WE'. The last day to change from Credit to Audit is Wednesday, March 31st, if you qualify for an Audit. (See the Audit policy below.)

Auditing: To Audit the course you need my permission. You will be expected to participate in all tests and assignments with a course average of at least 25%, and you will be expected to attend with no more than 5 absences for the whole semester. If you switch to 'Audit' in mid-semester, you must meet all of the requirements of an ordinary auditor (mentioned above). In addition, you may not miss more than 7% of the remaining class periods and you may not have more than 5 absences for the entire semester. Thus, if you have already missed 6 or more class periods, you may not change to 'Audit.' Failure to meet any of these after being granted an Audit will result in the grade 'Au' being changed to an 'E.'

XI Attendance Policy

If you miss class you are responsible for obtaining the day's notes and assignments. You are expected to attend every class period and your grade will suffer if you do not attend. For every class missed you will lose $\frac{1}{4}$ percentage points from your course grade. To level the playing field between those who must miss classes because of MSU and those who do not, the only kind of absence which will not be counted in this regard is a university-required absence. Thus, anything else (for instance, being sick, going on a job interview, taking care of a sick relative, etc.) will count as one of these absences. See the MSU policy on attendance in the current Catalog: (online at <http://www.murraystate.edu/provost/catalogs/010507.html#Policies>) Note the following provisions on arriving late to class or leaving early:

- (a) Every two tardies (arriving late) will count as an absence.
- (b) Leaving class early will count as an absence unless you provide me with a reason in advance.

Holidays: We will not have class on Monday January 18 (Martin Luther King Jr. Day), and from Monday March 22 through Friday March 26 (Spring Break).

XII Academic Honesty

Cheating and plagiarism (submitting another person's material as one's own, or doing work for another person which will receive academic credit) are all impermissible. This includes

- 1) the use of unauthorized notes on an exam,
- 2) looking at the exam of another or allowing another to look at your exam,
- 3) taking an exam for another or having another take an exam for you,
- 4) telling others the contents of an exam they have not yet taken or soliciting from others the contents of an exam which you have not taken, and
- 5) copying the contents of another's take-home assignment or allowing another to copy the contents of your take-home assignment (this does not include working together, with mutual understanding, on a take-home assignment).

The result of non-premeditated cheating (i.e. (2) or (5)) will be a zero for that assignment. The result of premeditated cheating (i.e. plagiarism or (1), (3), or (4)) will result in a grade of 'E' for the course. See the MSU policy on Academic Honesty in the current Catalog: (online at <http://www.murraystate.edu/provost/catalogs/010507.html#P>)

XIII Texts and references

Numerical Mathematics and Computing, sixth edition by Ward Cheney and David Kincaid 2008; Thomson Brooks/Cole

XIV Prerequisites

MAT 308.

XV Statement of Affirmative Action and Equal Opportunity

Murray State University endorses the intent of all federal and state laws created to prohibit discrimination. Murray State University does not discriminate on the basis of race, color, national origin, gender, sexual orientation, religion, age, veteran status, or disability in employment, admissions, or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities equal access to participate in all programs and activities. For more information, contact Sabrina Y. Dial, Director Equal Opportunity, Murray State University, 103 Wells Hall, Murray KY 42071-3318. Telephone 270-809-3155 (voice), 270-809-3361 (TDD).

Please fill out this portion, detach it and return to the instructor by **Friday January 15, 2010**.

By my signature below, I certify that I have received a copy of the course syllabus for MAT 442 taught by Dr. Donald Adongo during the Spring Semester of 2010. Furthermore, I certify that I have read and understand the contents of the contents of the course syllabus.

Printed Name

Signature

Date