Department of Mathematics & Statistics

NUMERICAL ANALYSIS

MAT 542 – CRN 84314

Course Section: 1 – Credit Hours: 3

FALL 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

Numerical Analysis

II   Catalog Description

Numerical solutions of differential equations, iterative techniques for solving linear systems, discrete least-squares methods, orthogonal polynomials, and approximating eigenvalues. Prerequisites: MAT 411 and either MAT 442 or consent of instructor. Requires knowledge of a scientific programming language.

III   Purpose

The purpose of this course is to acquaint students with the potentialities of the modern computer for solving numerical problems that may arise in science, mathematics, engineering etc.

IV   Course Objectives

Students will:

1) utilize numerical techniques to solve systems of linear equations.

2) perform linear and nonlinear regression analysis of a set of data points using the method of least squares.

3) use the Taylor Series and Runge-Kutta Methods to solve ordinary differential equations.

V Content Outline

- Iterative Solutions of Linear Systems

- Approximation of Eigenvalues and Eigenvectors

- Numerical Solutions for Ordinary and Partial Differential Equations

- Smoothing of Data and the Method of Least Squares

We shall cover the contents of chapters 8, 10, 11, 12, 14, 15.

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, Lab (Computer) grades, and the FINAL EXAM. Forty five percent of the course grade will come from 3 major exams (each exam counts 15 percent of the grade) and twenty five percent of the course grade will come from the final exam. The homework grade will contribute 15 percent while the lab 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 three semester exams will be **September 10, October 11,** and **November 8**.

Final: The Final will be a comprehensive exam covering any material addressed that semester. The Final exam will be on **Tuesday, December 7th 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 Labs: Computer assignments will be given with each chapter involving the computer language ©$MATLAB$. The student is responsible for gaining access to the software (©$Matlab$) which is available in the computer lab on the first floor of Faculty Hall. Programs and any other work will be submitted in hard-copies.

Important Grade-dates: The last day to drop a course without receiving a grade (or a W) is Tuesday, August 24th. The last day to change from Audit to Credit is Tuesday, August 24th. The last day to drop individual courses and receive a grade of "W" is Monday, November 1st. Students who withdraw from all classes between Tuesday, November 2nd and November 23rd will receive a 'WP' or a 'WE'. The last day to change from Credit to Audit is Monday, November 1st, 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 Graduate Students

Students receiving graduate credit will be required to do additional work as stated below:

- Students will be required to complete additional problems for most homework assignments (marked with a G).

- Project difficulty should be at a high level.

- For each in class exam, students will have a take home portion worth 40 points.

XII 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 loose $\frac{1}{4}$ 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 September 6 (Labor Day), Thursday September 30 – October 1 (Fall Break) and from Wednesday November 24 through 26 (Thanksgiving Break).

XIII   Academic Honesty

Cheating and plagiarism (submitting another person's material a is 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 pre-meditated 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 Honesy in the current Catalog: (online at http://www.murraystate.edu/provost/catalogs/010507.html#Po

XIV   Texts and references

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

XV   Prerequisites

MAT 411 and either MAT 442 or consent of instructor.

XVI   Statement of Affirmative Action and Equal Opportunity

Murray State University endorses the intent of all federal and state laws created to prohibit discrimintation. 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).

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Please fill out this portion, detach it and return to the instructor by **Friday August 20, 2010**.

By my signature below, I certify that I have received a copy of the course syllabus for MAT 542 taught by Dr. Donald Adongo during the Fall 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 ....