TEXTBOOK
The textbook for this course is *Elementary Differential Equations with Linear Algebra*, Fourth Edition, by Albert L. Rabenstein. Bring your book to class; we will be working problems from the book in class. **Read the textbook.** I do not necessarily cover in class all the material for which you are responsible, so you must read the textbook.

ATTENDANCE
Attendance is taken at every class meeting. Regular attendance is necessary for optimum performance. Each class will begin and end at the time scheduled. Being late and/or attempting to leave early is rude and disruptive to the class. Not only should you be physically present during the class but you should be ready to learn. Students are responsible for all information given in class (changes in homework, test dates, etc.) and all material covered in class, even if they were absent from class. Any student missing 2 class meetings risks being dropped from the class.

TUTORING
The Mathematics Study Center is located in MCS 106. Tutors are available there. The tutors can help you best if you have tried to work the problems and have specific questions. You are encouraged to seek out extra help whenever necessary in the tutoring room. Due to financial cutbacks there may be few tutors capable of helping with the material for this course.

OFFICE HOURS
My office hours are listed at the top of this page. These are times when I can give you individual attention. This time can be used to work tricky homework problems, explain difficult topics, discuss course progress, or address other course concerns.

EXAMS
There will be 5 exams in this course. The tentative dates for these are March 9, March 25, April 22, May 30, and June 10. Some of the exams may have take-home portions.

HOMEWORK
Math is not a spectator sport. Homework assignments will be given for each section covered. It is assumed that you have completed the homework problems by the class session after the one in which the material was presented. Homework problems are not usually discussed in class. If you have questions about the homework, come and see me during office hours. That is the purpose of office hours. It is expected that a typical student will need to spend 11 - 12 hours per week studying this material outside of class. Your requirements may vary depending upon your ability and your motivation. There will be a few (1 – 3) Mathematica projects which will be collected and graded.
EXTRA CREDIT

It is possible to earn extra credit points by correcting mathematical errors committed by the professor during lectures or on handouts (if you are the first to catch the error and do so in a timely manner).

GRADING

Each exam is worth 135 points. The projects will be worth a total of 75 points, for a total of 750 points for the semester. The grading scale for the semester will be:

- 90% - 100% A
- 80% - 89% B
- 70% - 79% C
- 60% - 69% D
- 0% - 59% F

MISCELLANY

Please turn off cell phones while you are in class. If you absolutely must have your phone turned on, set it to vibrate instead of ring. Do not answer your phone in the classroom.

On the days of the big exams be prepared to sit for 2 1/2 hours. Please plan ahead; bathroom breaks (during exams) are not allowed except in case of illness (and if you are ill, you probably should not be taking an exam).

Cheating violates Section I.B.1 of El Camino College’s Board Policy 5138, Standards of Student Conduct. The full policy can be found on page 27 of the 2009 – 2010 El Camino College Catalog and on pages 6 & 7 of the Winter/Spring 2010 Schedule of Classes.

COURSE DESC.

This course consists of a study of first-order ordinary differential equations, systems of linear equations, matrices, determinants, vector spaces, linear transformations, linear second-order ordinary differential equations, power series solutions, numerical methods, Laplace transforms, eigenvalues, eigenvectors, systems of linear differential equations and applications.

COURSE OBJECTIVES

The following 19 goals are the course objectives for Math 270, taken from the official course outline. The material for which you will be responsible this semester will include, but not be limited to, the items in this list.

1. Solve various types of ordinary differential equations: separable; exact; first-order linear; two special types of second-order; linear, higher-order differential equations with constant coefficients; Cauchy-Euler equations, and non homogeneous equations.
2. Solve differential equations using the following numerical methods, including: Euler method, Taylor series methods, and Runge-Kutta methods.
3. Find power series solutions to differential equations.
4. Perform operations on matrices and prove theorems involving matrices.
5. Prove theorems about determinants and solve problems involving determinants.
6. Solve linear systems of equations, both dependent and independent.
7. Determine whether a given set constitutes a vector space or a subspace of a known vector space.
8. Determine whether a given set of vectors or functions is independent.
9. Determine whether a set of vectors spans a given vector space.
10. For some common vector spaces find a basis and the dimension, and prove the result.
11. Use the Gram-Schmidt procedure to find an orthonormal basis for a given subspace.
12. Determine whether or not a given operator is a linear transformation.
13. Carry out a variety of proofs and problems involving the kernel, range, composition and inverse of linear transformations.
14. Carry out a variety of proofs and problems involving the kernel, range, composition and inverse of linear transformations.
15. Work with differential operator notation.
16. Find eigenvalues and eigenvectors of a matrix.
17. Solve systems of first-order linear differential equations using eigenvectors.
18. Find the Laplace and inverse transformations of various functions using the definition, tables and shifting theorems.
20. Use a computer algebra system to solve problems in differential equations and linear algebra; and solve application problems.

**SLO STATEMENTS**

The following 5 statements are the Student Learning Objectives for this course. They are meant to be representative, not exhaustive. This means that you will be responsible for everything on this list as well as topics which are not on this list.

1. Student will solve both linear and nonlinear 1st and 2nd order ordinary differential equations (O.D.E.s) and higher order linear O.D.E.s and their applications
2. Student will understand linear algebra (linear system, matrix, determinant, vector space, linear transformation) as a first step to generalize the procedure to solve higher order linear O.D.E.s.
3. Student will find or approximate solutions of O.D.E.s algebraically, graphically, and numerically.
4. Student will solve systems of O.D.E.s, especially with eigenvalues & eigenvectors in order to effectively solve linear systems of O.D.E.s.
5. Student will use Laplace transform to find particular solutions directly for both O.D.E.s and systems of linear O.D.E.s.