As specified on the syllabus, one of the course requirements is a project. Listed below are possible options, with general project guidelines afterwards.

1. *(Lab Reports)*:

The textbook contains an assortment of labs at the end of each chapter. Choose an appropriate pair of labs. Turn in a report for each.

2. *(Partial Differential Equations)*:

The differential equations that we are studying are *ordinary differential equations*, i.e., differential equations with one independent variable. Learn about *partial differential equations*, i.e., differential equations with more than one independent variable. Turn in a report containing common examples (natural and mathematical), detailing how they are similar and how they are different from ordinary differential equations, and explaining some of the methods used to solve them.

3. *(Computer Algebra Systems)*:

Many computer algebra systems have packages specifically designed for differential equations. Learn the functionality offered by Maple or Mathematica or another CAS. Turn in a report describing the functionality offered, detailing how the functionality is executed, and providing examples illustrating the functionality.

4. *(Computer Programs and Numerical Methods)*:

Several of the numerical methods for approximating differential equations are well-suited for computer programming. Implement Euler's Method, Improved Euler's Method, and Runge-Kutta. Turn in a report containing a printout of the source code, examples illustrating them, and an analysis of the affects of changing various parameters in the programs.

5. *(Uncovered Topics)*:

Several topics that could be covered in an ordinary differential equations course won't be because of time constraints.

Learn about such a topic (see the *schedule* for some such topics). Either (a) prepare a lesson, write a worksheet or a quiz, and teach the topic to the class or (b) turn in a report that explains the material with appropriate examples.

0. *(Suggest Your Own)*:

By no means are the above projects the only possibilities, but rather they are meant to be a list of some of the possibilities. Feel free to suggest any relevant project that sounds interesting. Alternately, ask me for a project related to whatever you are studying, be it astronomy, economics, engineering, history, or something else.

Before starting your project, let me know which project you'll be doing. Doing so will allow me to suggest and possibly provide useful resources (textbooks, webpages, software, etc.). It'll also assure we agree on what the project entails and gives me a chance to clarify the particular project expectations.

Regardless of which project you do, any submitted reports will be graded much as an English paper would be. Style and presentation are as important as mathematical content. Your project report should be typed as much as reasonably possible. Using complete sentences, it should answer all the relevant questions, with detailed explanations of the solutions.

As with an English paper, you should be sure to give credit to any resources you use. Any popular format (APA, MLA, etc.) is acceptable for references. The project is an individual project, and should be completed individually.

The project is due by the last day of class, Thursday, 30 April 2009. If you wish, I'll happily provide feedback on any rough drafts submitted to me on or before Friday, 3 April 2009. I strongly encourage all of you to take advantage of this — the grader of the final report makes a good editor for a rough draft. At the very least, please do not wait until the last minute to get started; remember that the project is a significant portion of your grade. Absolutely No Extensions will be given as you'll have had a large portion of the semester to have completed it.