Syllabus: Differential Equations  Math 337  Spring 2009

Dr. Kris Nairn

Class Schedule: PE 225 at 1 pm on days 1-3-5

Everything related to the course (posted homework assignments, solutions, and supplements) and anything else can be found on my webpage: www.users.csbsju.edu/~knairn

Office Hours: See the webpage for my current semester schedule.

Prerequisites: Math 120, Math 239

Text: A First Course in Differential Equations with Modeling Applications, by Dennis Zill (9th ed)

EXAM DATES: (http://www.csbsju.edu/registrar/terms/092/092schedule.pdf)

Midterm Exam: Friday, 27 February

Quizzes: randomly during the semester

Final Exam: Thursday, 7 May 1 – 3 pm

Grading: Your final grade will be based upon homework, quizzes, projects and exams with credit distributed as follows:

<table>
<thead>
<tr>
<th>Homework</th>
<th>Projects</th>
<th>Quizzes</th>
<th>Exam 1</th>
<th>Final Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>30%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
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Grades will be assigned according to the following scheme:

<table>
<thead>
<tr>
<th>94 +</th>
<th>89-93</th>
<th>84-88</th>
<th>79-83</th>
<th>74-78</th>
<th>69-73</th>
<th>64-68</th>
<th>Below 63</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>AB</td>
<td>B</td>
<td>BC</td>
<td>C</td>
<td>CD</td>
<td>D</td>
<td>F</td>
</tr>
</tbody>
</table>

Exams: You will have one in-class exam, quizzes on homework, and a comprehensive final exam. There are no make-up exams or quizzes unless you have documented evidence verifying exigent circumstances. Each exam will be a combination of an in-class and a take-home.

Homework: Homework is due on the date listed at the beginning of class time. You should do all the problems, including those suggested. Additional time will be given only if requested before the due date and if appropriate. I urge you to work with your peers on the homework but you must write up your
own solutions (not just copy!) to the problems. Solutions will be available shortly after the assignments are due.

**Projects:** There will be 3 in-class projects. A project is loosely defined as a collection of problems on one particular topic. The purpose is to familiarize you with both Mathematica and Matlab, in addition to improving your math communication and writing skills. You will work in pairs and I expect you to include a written description of the problem you are trying to solve and your complete solution including explanations of validity. You will get a grade of zero if you hand in a sheet of paper with haphazard formulas.

**Condensed Syllabus**

- Introduction to Differential Equations
- First order differential equations: slope fields, separable, linear and exact equations, solutions using a change of variable, Euler’s method, bifurcations
- Modeling with first order differential equations
- Higher-order differential equations: boundary value problems, reduction of order, homogeneous linear equations with constant coefficients, undetermined coefficients using superposition, variable of parameters, Cauchy-Euler equations, solving a system of linear equations by elimination
- Modeling with higher-order differential equations
- Series solutions to differential equations
- Systems of linear first-order differential equations
- Hamiltonian and gradient systems, Stability