Ordinary Differential Equations (MATH 312)
Spring Quarter, 2003

Time/Place: MTWF 8:00-8:50 a.m. KRH 205
Instructor: Jonathan Duncan (duncjo@wwc.edu)
Office: Kretchmar Hall 330, phone: 527-2097
Office Hours: 10:00 MTWRF, 4:00 MWR, or by appointment

Webpage: http://math.wwc.edu/courses/312/

This course covers the study of solutions of first order differential equations, solutions of linear differential equations of order $n$, linear systems, and series solutions. We will cover selected sections from chapters 1-8 of your text, in order. The deadline for withdrawing from the course is **Tuesday, 20 May** and the final will be given on **Tuesday, 10 June**.

Topics

1. First-order Differential Equations (Chapters 1, 2 & 3):
   - definitions and terminology, initial-value problems, mathematical models, solution curves, separable variables, linear equations, exact equations, solutions by substitution, linear models, non-linear models

2. Higher-order Differential Equations (Chapters 4, 5 & 6):
   - higher-order equation theory, reduction of order, homogeneous equations, undetermined coefficients, variation of parameters, Cauchy-Euler equation, linear initial-value problems, linear boundary-value problems, series solutions, singular points

3. Laplace Transformations (Chapter 7):
   - definition, inverse transformation, translation theorems, transformations of derivatives, Dirac delta function, systems of linear equations

4. Systems of Differential Equations (Chapter 8):
   - first-order systems, homogeneous linear systems, non-homogeneous linear systems.

Objectives

Upon completion of this course, students will have

1. developed demonstrable understanding of the topics outlined above.
2. successfully engaged in mathematical reasoning and proof, both formally and informally.
3. become proficient in expressing clear and accurate solutions to mathematical problems in written form.

The following requirements encourage and measure the successful completion of these objectives.

Homework

Daily 10 point assignments will be give, each due at the beginning of the next class period. Homework which is more than one class period late will be discounted at a rate of 2 points per day late. Please see your instructor about homework which is late due to illness or other **appropriate and verifiable** reasons. Late homework will not be accepted after the start of review week. Your lowest homework score will be dropped at the end of the quarter.
Please observe the following guidelines when preparing your homework. You may be asked to redo assignments which do not meet these criteria. In such cases, normal late homework discounts will apply.

1. Use 8.5 × 11 paper with clean edges (not torn out of a notebook). Staple multiple pages together, fold them lengthwise like a book, and write your name and assignment number(s) on the front cover.
2. Use a pencil, write legibly, and organize your problems and solutions in a logical manner.
3. Show all steps in solving the problem, include figures and notes when appropriate. A reader must be able to easily verify that you not only have the correct answer, but have also expressed the correct solution to the problem.

Exams

There will be four exams during the course of the quarter, including the two-hour comprehensive final. You must attend the final exam at the scheduled time. Make-ups for other exams will only be given for written, verifiable excuses, with notification given to your instructor in advance.

Exam I  Chapters 1, 2 and 3          18 April
Exam II  Chapters 4 and 5          12 May
Exam III Chapters 6 and 7          28 May
Final    Comprehensive, emphasis on 8   Tue, 10 June 8:00 a.m.

Grades

Your final letter grade will be assigned as shown below based on your quarter average. Your quarter average is made up of three scores: your homework average, hour-exam average, and your final exam score. Weights for each of these are shown below. Appropriate (to your instructor) modifications of the final letter grades may be made in individual cases for progress, unusual circumstances, etc.

<table>
<thead>
<tr>
<th>Average Weights</th>
<th>Letter Grades (lowest percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final</td>
<td>A+ 98%  B+ 88%  C+ 76%  D+ 63%</td>
</tr>
<tr>
<td>Exams I-III</td>
<td>A  92%   B  82%   C  67%   D  57%   F  0%</td>
</tr>
<tr>
<td>Homework</td>
<td>A- 90%   B- 80%   C- 65%   D- 55%</td>
</tr>
</tbody>
</table>

Disabilities

Students with a physical and/or learning disability who require accommodations should contact the instructor or Disability Support Services at 527-2366. This syllabus is available in alternative formats upon request.