MATHEMATICS 2280
Introduction to Differential Equations
Spring Semester 2006

Time: T-Th 4:30–6:15pm LS 102

Instructor: Professor Grant B. Gustafson[1], JWB 113, 581-6879.

Office Hours: JWB 113, MWF 8:50-10:15am and Tu-Th 3:15-4:15pm. Other times will appear on my door card and on the internet page below, door card link.

Telephone: 581-6879. Please use email whenever possible.

Email and web site: `ggustaf@math.utah.edu` `http://www.math.utah.edu/~gustafso/`

Tutoring: The Math Department Tutoring Center is located in LCB, and it is open for free tutoring from 8 a.m. to 8 p.m. on M-Th, and from 8 a.m. to 6 p.m. on Friday. Some, but not all of the math tutors welcome questions from Math 2280 students. To see the times and specialities of various tutors, consult the web address `www.math.utah.edu/ugrad/tutoring.html`.

Texts:

Differential Equations and Boundary Value Problems, 3rd edition, by Edwards and Penney, Prentice-Hall 2005 (the required text)

Student Solution Manual, for the Edwards-Penney text *Differential Equations and Boundary Value Problems*, 3nd edition.

WWW documents for 2280, by GB Gustafson, at web site `www.math.utah.edu/~gustafso/`. All are pdf or text documents that can be printed from `Netscape`, `Mozilla Thunderbird` or `MS explorer` web browsers.

Prerequisites:

Math 1210 and 1220 (Calculus I and II) or the equivalent and Math 2270 (Linear Algebra). The first two courses are first-year Calculus, with a very brief introduction to linear differential equations. The old Math courses 111-112-113 of 1997-98 fulfill the requirement. In addition, background is required in planar curves, line integrals, Divergence Theorem, velocity and acceleration vectors from Physics 2210 or Math 2210 (Calculus III), or their equivalent courses.

A passive knowledge of `maple` is assumed. The entire course can be done without `maple`, but all computer code examples are supplied in `maple` only.

Persons without the passive knowledge of `maple` and `unix` may attend one of the *tutorials* on the subject offered during the first two weeks of the term. The instructor for these tutorials is Angie Gardiner, 585-9478, `gardiner@math.utah.edu`. The dates and times are available at the tutoring web address cited above. Free tutoring is available in the LCB tutoring center 8:00 a.m. to 8:00 p.m. daily except until 6:00pm on Friday, closed weekends and semester holidays.

Course content:

This course is an introduction to differential equations for mathematics majors and science majors. All chapters of the Edwards-Penney text plus class and web notes will make up the course material.

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[1]Pronunciation: In the phrase *Gust of Wind* change *Wind* to *Sun*

Grading:

Final grades will be based on:

> Textbook problems and maple problems, call **dailies**, 102 scores.
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> The dailies include four computer projects, 12 problems.
>
> Written midterm examinations (3).
>
> An in-class 2-hour final examination that counts as two additional midterm scores.

Written In-Class Exams:

There are three (3) midterm exams. There is a final exam (in-class, 2 hours) as scheduled by the university. The midterm and final exams are graded by G.B. Gustafson.

Hand-written Dailies:

There will be 102 dailies due during the semester, including textbook problems and maple labs. They will be graded by a staff of readers employed by Angie Gardiner. The 102 dailies, including maple labs, will be checked checked by a grader employed by Angie Gardiner (score 100 each). The other assigned problems will not be graded, but the class effort will be to contribute complete solutions, to be checked by class members, and eventually published at the web site.

Textbook problems:

Textbook problems to be submitted for grading are listed on the `gradesheet` for the course and also below (boldface). Tentative dates are set for each problem set. Visit the web site for extra copies. The actual due dates for problems appear *only* on the web site and they are dynamically updated to reflect the reality of what was discussed in class. Generally, problems are submitted shortly after they are discussed in class, and hopefully on the date printed on the gradesheet.

All students must complete each textbook problem and submit their work in their own handwriting. Collaboration is encouraged.

There are certain **rules** or **suggestions** for writing up the textbook problems. A full accounting of the *format rules* contributed by Utah students appears on the internet course page as *format for submitted work*. Kindly apply the ideas therein to your written work, both textbook problems and take-home midterm exam problems.

In-class midterm exam problems:

A midterm sample in-class exam is supplied a few days before the in-class exam. Exam problems are modelled after those already solved on the take-home portion of the exam.

Books, tables, notes and calculators are not allowed on exam day.

An in-class Midterm exam has different presentation rules, and none of the textbook problem rules apply in this case. Basically, the in-class exam is a first draft.

Computer projects:

There will be a few computer projects assigned during the semester, related to the classroom material. They will be written by hand and use in addition the software package `maple`as a computer algebra assist. There is a Math Department Computer Lab in building LCB at which registered students automatically own accounts. Drop-in tutoring in the computer lab in building LCB starts the second week of the semester.

Final exam:

Two hours are reserved for this written exam. As published by the university, the final exam for the 4:30 T-Th class is Wednesday May 5, 8-10am in the regular classroom.

The final exam is comprehensive. About one hour of the exam covers the last three weeks of the course. The remaining time covers all topics that appeared on the previous three midterm exams.

No notes, calculators, tables, books or aids of any kind are allowed on the final exam. Please bring pencils and eraser. Paper will be supplied.

Withdrawal:

It is the Math Department policy, and mine as well, to grant any withdrawal request until the University deadline. This promise also means that such a withdrawal requires no explanation. Withdrawals are always initiated by the registered student. All paperwork is the duty of the student. My job is the signature.

ADA statement:

The American with Disabilities Act requires that reasonable accommodations be provided for students with physical, sensory, cognitive, systemic, learning, and psychiatric disabilities. Please contact me at the beginning of the semester to discuss accommodation (113 JWB or 581-6879), which is to say, accommodation shall be made.

Grading Scale:

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A  = 95-100, A- = 92-94, B+ = 88-91, B  = 84-87,
B- = 80-83,  C+ = 75-79, C  = 65-74, C- = 60-64
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This scale is determined from 40% passing using GPA increments. It is used for grading and for final letter grade reporting. This scale is for internal use only. The letter grades are assigned from integers only. Any decimal score will be truncated, not rounded up), to an integer before fitting to the letter grade.

Grading Details:

Rite of passage: A passing grade in the course requires at least 60 of the 102 dailies to be submitted. A grade of E is assigned if less than 60 Dailies are submitted. The scores on the 60 dailies are expected to be passing at C level or higher.

The right of passage is absolute, similar to the European system, which requires a body of work to be presented before written and oral final exams are taken. For example, the Czech *vypočet* is a requirement to show a body of completed work as the entrance requirement to administration of written and oral final exams.

Final grade: It will be determined as follows:

$$\text{Final Grade} = \frac{30}{100}(\text{Dailies Average}) + \frac{70}{100}(\text{Midterm+Final Average}).$$

An example: the Dailies Average for 102 textbook problems and maple labs is 91% and the Exam Average of the three midterms and the final exam is 86%. The final grade is $0.3(91) + 0.7(86) = 87.5\%$, which by the scale above is a B. While 87.5 rounds to 88, a $B+$, the deciding factor is really the exam average of 86, which is squarely a B. The final grade is B. If the dailies average was 93 or higher, then the final grade would be 88.1 or higher for a B+.