

MATHEMATICS 231- DIFFERENTIAL EQUATIONS- FALL 2007

Time and place: Tu+Th, 12:40-1:55, Ayres 129

Instructor: Dr. A. Freire, office: Ayres 207A, 974-4313

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Office hours: Tu+Th, 10:30-12:30 and 2:00-3:30

Remark: let me know in class (or by phone or e-mail) if you plan to come.

References: (1) *Differential equations and their applications: an introduction to applied Mathematics*, by Martin Braun, Springer-Verlag, 1993 (recommended)

(2) Online handouts (see *course log* link from the course web page)

(3) Other possible references: see below

Goal and prerequisites: First course on differential equations, intended primarily for students in science and engineering. Prerequisite: Calculus II (142 or 148).

COURSE POLICIES

1. *Attendance:* students are expected to come to every class. Each lecture will include new material, occasionally not found in the text. (Take notes!) I will take attendance, and missing too many classes will affect your grade.
2. *Course log:* This link to the course web page will contain a brief listing of the material covered in each lecture, the topics planned for the next lecture and homework problems to be discussed in class. It will be updated after every class and should be consulted prior to the following one. It will greatly help with understanding the lecture if the material in the text is read in advance.
3. The most important concepts and examples for each topic will be presented in class, but for thorough understanding you are expected to (i) *read* the textbook and your class notes; (ii) work on the *homework* problems *individually*; (iii) *ask questions* when there is something you don't understand.
4. The link [classroom behavior expectations](#) includes a list of behaviors considered disruptive (math department policy). Please familiarize yourself with it, as this policy will be enforced.
5. Students with disabilities: if you need special arrangements to take this class (including exams), please contact the Office of Disability Services (2227 Dunford Hall, 974-6087 V/T, <http://ods.utk.edu/>)

HOMEWORK, EXAMS and GRADING.

HOMEWORK- Problem sets for each topic presented in class will be given on the course web page, with the choice of problems turned in for grading left *to the student* (among the problems given in each problem set), subject only to the rule that a problem already solved in class *may not* be turned in for grading. (also: in problems with many items of the same kind, turn in only one.) The *course log* will list the due dates for each section; homework must be turned in at the beginning of class on the due date, and late homework will not be accepted. The number of problems turned in for each section is left to the student; 40 correct problems (over the semester) will correspond to a 100% HW grade (and proportionally for fewer problems; a number greater than 40 will not affect the HW grade.) Homework problems will be graded on an *'all or nothing'* basis (exception: problems including more than one item- rule applies to each item), and will not be graded if not written in a clear, detailed, organized way. A student who volunteers to explain to the class one of the problems selected for class discussion (and does so correctly) will have that problem count as 1.5 problems if it is also turned in in writing. (If there is more than one volunteer, I'll pick one.)

EXAMS- There will be two in-class written exams, with dates announced one week in advance. (Closed book and notes, no calculators.) Students who have to miss an exam due to a university activity or for a *documented* medical reason must inform the instructor no later than the class preceding the exam. In these cases the student will have the opportunity to take a public oral exam (see below). *'No shows'* to an exam without prior announcement will result in a grade zero for the exam, which cannot be replaced. There will also be a comprehensive final exam.

ORAL EXAM- At my discretion, a student may be given the opportunity to take a public oral exam, to replace *one* low test grade or a justified absence to *one* test. The exam will be scheduled for a late afternoon/evening, and at least eight students must be present for it to take place. It will include theory questions and problems to be solved *'in real time'*.

GRADE COMPUTATION- HW: 30%, Exams: 20% each, Final: 30%
Expected scale: below 50: F; 55-69: C or C+ (satisfactory/fair); 70-84: B or B+ (good/very good); 85-100: A (superior). *I do not 'grade on a curve'*.

IMPORTANT DATES: Add/drop without W: Aug 31; drop with W: Oct 2; drop with WP/WF: Nov. 13; last class: Dec. 4; final exam: Dec. 11, 12:30-2:30.

Other acceptable references: (1) Tenenbaum-Pollard, Ordinary Differential Equations; (2) Nagle and Saff (bookstore); (3) Boyce-DiPrima (bookstore)

COURSE OUTLINE (tentative):

1-First-order equations: 1.1 to 1.10 [3.5 weeks]: 1st-order linear eqns (1.2)/ separable eqns. (1.4)/ applications I (1.3, 1.5)/ applications II (1.6,1.7,1.8)/exact eqns, Picard iteration (1.9, 1.10)

2-Second-order linear equations: 2.2 to 2.13 [3.5 weeks]: constant coeffs. (2.2)/ non-homogeneous (2.3, 2.4, 2.5)/ applications (2.6, 2.7)/ series slns (2.8)/ Laplace transforms (2.9, 2.10)/ Dirac delta, convolution (2.12, 2.13)

3-Linear algebra and systems of first-order equations: chapter 3 [3 weeks]

4-Separation of variables and Fourier series: chapter 5 [3 weeks]