UBC MATH 215/255, 2013W Term1

Elementary Differential Equations I/Ordinary Differential Equations

Pre-requisites: Math 101 (integral calculus) or equivalent; Math 152 (linear algebra) or equivalent.

Co-requisite: Math 200 (multivariable calculus) or equivalent.

Text: Jiri Lebl, Notes on Diffy Qs, a free online text: http://www.jirka.org/diffyqs

Optional Text (hardcopy): Boyce & DiPrima, Elementary Differential Equations and Boundary Value Problems (9th. ed., or earlier)

Sections:

- **101**: MWF 8-9, MacLeod 202. Instructor: Emil Wiedemann
- **102**: MWF 9-10, LSK 200. Instructor: Yue-Xian Li
- **103**: MWF 1-2, LSK 200. Instructor: Stephen Gustafson
- **104**: MWF 1-2, BUCH A103. Instructor: Frederic Robert
- **105**: MWF 9-10, CHEM C126. Instructor: Wang Hung Tse

Homework Assignments: will be due weekly. Part of each assignment will be done online, through WeBWorK: https://webwork.elearning.ubc.ca/webwork2/, and part part will be written and submitted in class. In-class quizzes may also be given.

Midterms: there will be two midterm exams, written in class (dates TBA).

Grading: your final grade will be based on your Term (homework/quizzes + midterms) Mark (50 %) and the Final Exam (50 %), which will be common to all sections.

Policies: missing an assignment, quiz, or midterm exam, except in case of a medical emergency (doctor’s note required) or with the instructor’s prior consent, will result in a mark of zero.

Tentative Schedule by Week (with suggested reading from the online text)

1. Introduction to ODEs: types of ODE, solutions (particular and general); slope/direction fields. Reading: 0.2,1.1-1.2.

2. Solving separable equations; solving linear equations by integrating factor; applications. Reading: 1.3,1.4.

3. Autonomous equations; numerical solutions: Euler’s method. Reading: 1.6-1.7.

5. Inhomogeneous second-order linear ODE; methods of undetermined coefficients & variation of parameters; application to mechanical vibrations. Reading: 2.4-2.6.


8. First-order linear systems: basic theory; constant-coefficient systems & review of matrices and eigenvalues. Reading: 3.1-3.3.

9. Solving first-order constant-coefficient systems: two-dimensional systems and their phase portraits; inhomogeneous systems. Reading: 3.4-3.5, 3.9.


13. Catch-up, and review.

*Aug. 30, 2013*