

# MATH 286: INTRODUCTION TO DIFFERENTIAL EQUATIONS PLUS FALL 2008 SYLLABUS

**Instructor:** Alexander Yong

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(Contains daily updates about this course.)

**Meeting times:** Mondays, Tuesdays, Wednesdays and Thursdays, 12:00-12:50PM

**Meeting location:** room 229, Natural History Building

**Office hours:** Mondays, Wednesdays and Thursdays, 2:00-3:00PM

0.1. **Brief biography.** I was born and raised in Toronto, Canada. My father sorted mail at the post office and my mother was a nurse. I studied at the University of Waterloo and obtained my Ph.D in mathematics at the University of Michigan in 2003. I taught at the University of California, Berkeley and the University of Minnesota before coming to the University of Illinois this year. A strong believer in public education, I am excited to be a member of this fine institution with its excellent students and research. I'm married to Anh Chu, a financial engineer, and together we have a son David, who, at the time of writing is four months old. My main area of research is combinatorics, which concerns discrete objects and their structure, in connection to pure and applied topics. My interests (but perhaps not my competencies!) also include basketball and chess. I watched too much television as a child.

0.2. **Basic information about the course content:** The theory of differential equations has wide applicability to modelling interesting phenomena in nature, as well as being a beautiful subject in its own right. This course extends and using techniques from calculus as well as linear algebra. The aim of this course is to provide you with:

- techniques, both explicit and numerical, to solve important classes of ordinary differential equations
- practice in understanding how differential equations model physical phenomena
- the ability to interpret the solutions that are found

**Textbook:** "Differential Equations & Boundary Value Problems" 4th edition, by Edwards and Penney.

**Coverage:** We will cover Chapter 1.1-1.6, 2.1, 2.3, 3.1-3.8, 4.1, 5.1-5.6, 9.1-9.7, 10.1-10.3

0.3. **Grading.** Your grade will be determined by three midterms (15% each), ten homeworks (15%), and a final examination (40%).

There will be no make up tests for any reason. If you have a medical reason for missing a test, you must provide documentation from a doctor or campus health official within

seven days of the missed test. In that case, I will take the points assigned to the test correspondingly weigh your final exam more heavily.

The tests and exams are all closed notebook, closed textbook and no calculator.

No late homeworks will be accepted. However, I will drop your lowest two homeworks.

The course will **not** be graded on a curve, i.e., there is no bound on the numbers of A's, B's, C's etc that will be handed out. Every student who achieves a cumulative score of 90%, 80%, 70% or 60% is guaranteed a score of A, B, C or D respectively, or higher.

**Test dates:** Each will occur during regular class time, and will last 50 minutes. The dates are

- Thursday September 18, 2008
- Thursday October 23, 2008
- Monday December 4, 2008

**0.4. What can you expect from me?** My goal is to help as best I can to impart my sincere interest in mathematics to you. This includes not only the specific content we will cover, but also problem solving skills that I believe that the study of mathematics helps develop. In order to achieve this, I hope to always encourage you to do your very best, by, e.g.:

- not focusing on “getting through the material”, but rather focusing on “enriched understanding of the core concepts of the material” through problems, proofs and analogy
- I will go over worked examples in the textbook, as well as definitions and concepts stated there. I do this to give you an opportunity to ask questions while at the same time having the text as companion resource.
- providing active learning time during class
- seeking to hear *all* your questions and concerns about the material, and careful and respectful consideration of them
- teaching how to achieve logical precision in your analysis of the material
- Providing examinations that both reflect the homework, but also contain intellectual challenge
- Daily updates of my website reflecting interesting questions, further clarifications etc of class material
- An early opportunity during the term for you to evaluate of my teaching, so that I can best adjust to reflect your needs
- Respectful communication with you at all times, including in verbal conversation and in email
- My best effort to learn your names and to get to know you

**0.5. What my expectations are of you?** In order to provide the optimum chance for an excellent learning experience, not only for you, but also your classmates, I expect you to, e.g.,

- attend class
- high standards of intellectual involvement (e.g., no headphones blaring music please)
- introduce yourself to me in person

- Learn Polya's method for problem solving, either by buying his book "How to solve it", or by reading about it on Wikipedia
- Do your assigned homework, since this will strongly reflect exam problems
- Homework solutions that are professionally produced, with clear English explanations of your thought process
- As best you can given the time constraints, the same for examinations
- Addressing both your fellow students and myself respectfully, both in and out of class, verbally and through email
- That you complete the survey on your familiarity with mathematical concepts (separate handout)
- That you write me an email about yourself and your educational/professional interests. *If you feel comfortable*, please include a representative photo to help me learn your name.
- If you obtained help for a homework question, that you acknowledge who helped you
- No cheating during tests and examinations, this includes *no* use of calculators during tests or examinations

In general, mathematical understanding of a concept takes *a lot* of time. In my own experience as an undergraduate, sometimes I took days of devoted thought on just *one* problem. I encourage you to collaborate and consult myself, your fellow students and the TA's. However, I sincerely believe that attempts to shortcut understanding by merely "getting the answer" will in the longrun negatively affect your performance. The flip side of mathematics is that once you understand the fundamentals of the concept, "hard" problems become "easy".

0.6. **Finally...** Have I missed anything?

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