

Course Information for Second Year Differential Equations, 2015

- **Lecturer:** Dr. Jesse Ratzkin
 - **Office:** Mathematics Building, room 307
 - **Consultation hours:** TBA
 - **Phone number:** 021-650-3211
 - **Email address:** jesse.ratzkin@uct.ac.za (This is the preferred method of contact.)
- **Lecture times and places:** Lectures will be Tuesdays, Fridays and alternate Wednesdays in Hahn 3 at 11:00.
- **Tutorials** You will also attend weekly tutorials, during which you will work through problem sheets posted on Vula. Dr. Ebobisse, who is the MAM2000 course convener, will arrange the times and venues for the tutorials. Please attend your assigned tutorial, so that none of the sessions become over-crowded. The tutorial sheets for each week will be available on Vula from the Monday, so you're encouraged to think about them throughout the week. We will **not** provide printed tutorial sheets for 2DE at the tutorial venues.
- **Homework assignments:** As part of this module, you will complete weekly homework assignments. You will enter your answers to the assignments online, using the website

<http://www.math.uct.ac.za/webwork2/2DE-2015>

You should already have an account set up; both your login name and your password are your student ID number. If you have any problems with the webwork program, please contact me as soon as possible. In particular, you will need a webwork account as soon as possible, so please **send an email to jesse.ratzkin@uct.ac.za if you intend to take 2DE and the university is still processing your registration.**

- **Syllabus:** Differential equations are tools used to model dynamical systems, *i.e.* systems that change over time. In this course we will learn about several varieties of differential equations, several techniques for finding solutions to these, and some applications. Specific topics include first order difference equations; equilibrium solutions and their stability properties; systems of first order differential equations; linear, second order difference and differential equations; systems of first order equations; Fourier series, and their application to the heat equation; partial differential equations and their solution by separation of variables.
- **Resources:** You can download a set of typed notes on the Vula site, and I will place video recordings of the lectures on the following website:

<http://www.mth.uct.ac.za/~jratzkin/2DE-2015>

Additionally, I have placed two books on three hour reserve at the main library: *Elementary Differential Equations and Boundary Value Problems* by W. Boyce and R. DiPrima and *Differential Equations, Dynamical Systems, and Linear Algebra* by M. Hirsch and S. Smale. You can access these books from the short loans desk. You can also look at the other differential equations textbooks in UCT's main library; they are listed under the call number 515.35 and there are many of them. You can find further course notes at the MIT open course wares site:

<http://ocw.mit.edu/courses/mathematics/>

- **Assessment:** The differential equations module is one part of MAM2000, and you will write a final exam for it in November (exact details to be announced). You will sit for two class tests (see below), each of which is worth 50% of your class record.

	date	venue	% of cr
class test	August 17, 18:00-20:00	Menzies 9 & 10	45 %
class test	September 28, 18:00-20:00	James A & Zoo 1	45 %
webwork assignments	ongoing	venue of your choosing	10 %

The final exam will be a two hour exam, and the class tests will be one hour tests. Please observe that the dates of the class tests are very unlikely to change, so you're advised to put them in your diary now. If you cannot sit for a class test because of illness, please bring me a medical certificate as soon as possible. Also, please sit for the final exam when it is scheduled, unless there is a true emergency. I will thoroughly investigate medical certificates (or other notes) I receive for the exam.

- **Words of advice:** Most importantly, you must remember that **mathematics is not a spectator sport**. In order to succeed in this course, you must attend lectures and tutorials, and work through the assignments and tutorial problems every week. You should read ahead of the lectures. We will cover the material in the lecture notes, in that order, so you should never be completely surprised by the lecture material. Next, you need to work through as many problems as possible, including the webwork assignments and the tutorial problems, and begin working on these problems as soon as possible.

I have found that it will often help to form study groups of four (or so), and work through problems together. You can also use your study group to take notes in class as a group (*i.e.* one person takes notes while the other three listen); this way you get to just listen and think for 3/4 of the lectures, and you still get complete notes.

I will have consultation hours listed, and I also have an open door policy. This means that if I'm in my office you can ask me questions (without a prior appointment), so long as I don't have other visitors. Of course, you can also make an appointment for a specific time if you want to guarantee that I'll be available to answer questions. Please take advantage of my open door policy and ask me questions as soon as you have them. It makes both my job as a lecturer and your job as a student much easier.

I would recommend that you use consultation times to ask me about examples and problems we do not cover in lecture. Please do not ask me to repeat lectures, especially because I post lecture videos online.

At the beginning of the semester the class will decide on a class representative. If you have any issues at all regarding the 2DE module that you'd rather not discuss with me, you should bring them to the class representative. Please do this sooner rather than later, so that we can resolve problems before they become big.