MATH50004/50015/50019 Differential Equations
Spring Term 2023/24
Course Materials, Practical Arrangements and Literature

Course materials.

- *Lecture notes.* The lecture notes are very detailed and cover the material discussed in the lectures. It is recommended that you print out the notes and bring them to the lectures. The vast majority of what I explain in the lectures is written down in the notes, so there is no need to copy everything I write during the lectures. You may want to follow the notes during the lectures and add additional explanations or pictures to your notes. I give you access to the lecture notes in advance, because I want you to concentrate on what I say during the lectures, and I would like to stress that the availability of notes is not a reason to not attend the lectures.
- *Panopto lecture recordings.* The lectures are also recorded on Panopto, but it is highly recommended that you attend the lectures and look into the recording only for repetition of the lectures. Please do watch the lecture recordings actively: think of stopping the video when you need to think about something that was explained; make notes of what is unclear and ask on the Ed Discussion Board, the Problem Classes, or the Office Hours.
- *Problem sheets.* It is very important that you go through the exercises thoroughly, as these will give the required training for the exams. The exercises have different levels of difficulty: some are standard questions and some require you being very creative and persistent. The latter holds in particular for the optional last challenging question on the problem sheet. There are comments on the each problem sheet on difficulty and importance of the exercises. The problem sheets will be released at latest every Monday. Hints to the questions will be released every Thursday evening, and the solutions for the problems from the previous week will be posted after the problem classes on Tuesday. It is highly recommended to go through the solutions, even if you have solved an exercise completely.
- *Quizzes.* In contrast to the problem sheets, the quizzes are easier, and it is recommended that you start with the quizzes before looking at the problem sheet. The non-assessed quizzes will be released every Monday morning. Four of the quizzes (the ones with even numbers) will be assessed, and those quizzes will be made available on Fridays for completion within 24 hours, see below.
- *Repetition material.* This is material you have covered before, but not core course material. It is in general not examinable, apart from its relationship to the course material, and how it is applied in the lectures and the problem sheets.
- *Extra material.* This is optional material that covers some proofs of theorems that are left out due to time pressure. Please note that most results are proved in detail in this course, and the extra material only concerns two theorems.
- *Handwritten notes.* The handwritten notes from the lectures will be made available in a separate folder on blackboard, which is updated regularly.

Practical Arrangements.

- *Lectures.* The lectures take place in Clore every Monday and Friday 3pm-4pm (apart from the week of 19 February 2024), and recordings of these lectures will be made available. Any constructive feedback on how these lectures go and what could be changed is highly appreciated, please do speak to your student reps, who can get in touch with me, or communicate this via the mid-term feedback.

- *Problem classes.* The problem classes take place in Huxley 340, 341 and 342, on Tuesday 11am-12pm, starting on 23 January 2024, and there will be no problem classes in the week of the mid-term examinations. I will give further information on how the problem classes will be organised before the first problem class.
- *Ed Discussion Board.* The Ed Discussion Board will be regularly monitored and is an ideal place to get help on course material very quickly.
- *Office hours:* The office hours take place in my office 637 Huxley Building, and I am very happy to answer any question there. I will announce on Blackboard when the office hours take place.
- *Assessments.* There will be four assessed quizzes, on Fridays, 26 January, 9 February, 1 March and 15 March There will a 40-minute mid-term exam in the week of 19 February 2024). The main exam will take place in the Summer Term. The main way to revise for the exams is doing the exercises and understanding the lecture notes well. I will give further guidance on mid-term exam and main exam.

Literature. There are a lot of books on differential equations that can be used in conjunction to the module, but none of them is required. Quite a few additional exercises and lecture notes can be downloaded free of charge from the internet. Recommended books are:

- Clark Robinson, *An Introduction to Dynamical Systems, Continuous and Discrete*, Pure and Applied Undergraduate Texts, American Mathematical Society, 2012.
- Steven Krantz, *Differential Equations: Theory, Technique and Practice, Second Edition*, CRC Press, 2015.
- Morris Hirsch, Stephen Smale, and Robert Devaney, *Differential Equations, Dynamical Systems, and an Introduction to Chaos*, Academic Press, 2013.
- Gerald Teschl, *Ordinary Differential Equations and Dynamical Systems*, Graduate Studies in Mathematics, American Mathematical Society, 2012. Note that a previous version of this book can be download free of charge from `http://www.mat.univie.ac.at/~gerald/ftp/book-ode/`.