MATH 18.03: Differential Equations

Instructor: Tristan Collins, 2-273 (but only Online for Fall 2020).

Lectures: Monday and Wednesday, 1pm-2pm, online.

Recitations: Tuesday and Thursday, 9am-10am/ 10am-11am/ 11am-12pm/ 12pm-1pm/ 1pm-2pm/ 2pm-3pm/ 3pm-4pm/ 4pm-5pm/ 7pm-8pm.

Office Hours: TBA

Textbooks:

- None

Course Outline:

- First Order Ordinary Differential Equations (ODEs)

- Complex Numbers and Linear Algebra

- Systems of ODEs

- Qualitative methods, phase portraits, stability, applications to modelling

- Boundary Value Problems

- Partial Differential Equations and Fourier Series

- Nonlinear ODEs and numerical methods.

Co-requisites: 18.02

How the course will function: This course will function as a flipped classroom. Each week you will be assigned readings on MITx, and asked to watch several short videos explaining concepts from the course– all of these activities will be asynchronous. There will be two weekly synchronous meetings of the course, on Monday and Wednesday at the scheduled time. During these meetings we will briefly discuss concepts from the course, work through example problems and have problem solving sessions. Attendance is not mandatory, but strongly encouraged. Portions of lecture which are not small group work will be recorded and available asynchronously. There will be recitations twice a week, on Tuesdays and Thursdays, which will be held online.

There will be a daily virtual study hall, hosted on Slack, where you can discuss course content with your peers or TAs and collaborate on homework problems. See the Class Guide, and the Guide to Virtual Study Hall for more information.

Policy on iPads and Tablets: For academic year 2020-2021 MIT is providing a loaner iPad and Apple Pencil to any undergraduate student who requests one. I very strongly encourage you to take advantage of this program if you do not otherwise have a tablet with a compatible writing device. Collaboration and small group work will be done using shared whiteboards.

Grading:

- There will be 12 weekly reading quizzes. You will have many attempts on each quiz problem. You must get at least 70% to pass the quiz, and you must pass 11 of the 12 quizzes to pass the course. Each quiz you pass will be worth 1% toward your final grade, for a total of 12% of your final grade. These quizzes are intended to help you check your understanding of the material each week.

- There will be 12 weekly problem sets accounting for 70% of your final grade. Each problem sets will consist of a part A and part B. Part A will be online, while Part B will be written, to be turned in on Gradescope. Typically, problem sets will be assigned on a Monday and due the following Monday. **Late homework will not be accepted**.

- There will be a Cumulative Assignment assigned on December 5 and due on December 9th. This will be worth 18% of your final grade.

Collaboration: Collaboration and the sharing of ideas is an essential component of learning. The same is true for independent study and reflection. Therefore, I encourage you to collaborate on your homework. However, it is absolutely essential that you write up your own solutions. Collaboration on quizzes and the Cumulative Assignment is strictly prohibited.

Student Support Services: This year, more than most, is going to be difficult. If you have a difficult learning environment at home, responsibilities beyond schooling, difficulty accessing online resources or any other stressors beyond school work, please contact Student Support Services (S^3), and ask them to make me aware of the situation. You can also contact me directly, if you choose, but S^3 is better equipped to find ways to help you through the semester. More generally, if you are dealing with a personal or medical issue that is impacting your ability to attend class, complete work, or take an exam, please discuss this with Student Support Services. The deans in S^3 will verify your situation, and then discuss with you how to address the missed work. Students will not be excused from coursework without verification from S^3. You may consult with Student Support Services remotely by emailing s3-support@mit.edu , or calling (617) 253-4861.

Policy on Accommodation: We value an inclusive environment. If you need disability accommodations to access this class, please communicate with us early in the semester. If you have an accommodation letter, please forward a PDF copy to myself, the Course Admin (name – email), as well as Theresa Cummings (tcumming@mit.edu) so that we can understand your needs and implement your approved accommodations. If you have not yet been approved for accommodations, please contact Disability and Access Services at das-student@mit.edu to learn about their procedures. We encourage you to do so early in the term to allow sufficient time for implementation of services/accommodations that you may need.

Important Dates: