SABANCI UNIVERSITY
MATH 202 DIFFERENTIAL EQUATIONS
SPRING 2021-2022
This syllabus may be subject to update and change.

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Office Hours: Wednesdays 10.40-11.30. Otherwise, make an appointment by e-mail. In both cases will be held online via Zoom.

Lecture and Classroom:

Day / Time	Classroom
Monday 08.40-09.30	**Online**
Wednesday 14.40-16.30	**FENS G077 and online**

You can find the Zoom links for lectures on SUcourse+. In order to have access to them, you must be logged in with your Sabancı account.

Recitation (all are held online):

Day / Time	Section
Wednesday 17.40-18.30	**A1-A3**
Wednesday 18.40-19.30	**B1-B3**

You can find the Zoom links for recitations on SUcourse+. In order to have access to them, you must be logged in with your Sabancı account. Students must attend the online recitation classes to which they are registered.

Attendance: Students are expected to attend all class meetings on time. Even though attendance is not compulsory keep in mind that you will not be able to learn the lecture entirely and have a high grade unless you attend the classes properly. A certain number of pop-up questions will also be presented to the students, via TopHat (Join Code: 123635)

You are responsible for every announcement made in class or in SUCourse+. Not attending the class or not following SUCourse+ regularly is not an excuse, in case you miss something.

Textbook: Boyce, William E.; DiPrima, Richard C., Meade, Douglas B., *Elementary Differential Equations and Boundary Value Problems*, 12th Edition, Wiley-Blackwell, 2021. **https://www.homerbooks.com/urun/elementary-differential-equations-and-boundary-value-problems**
Recommended Textbook:
All "Elementary Differential Equations" books in the library.

Condensed guideline of the present syllabus:

- Read this syllabus from top to bottom.
- Check that you have a Zoom account and a TopHat account, both using your sabanciuniv.edu address.
- Follow the announcements on SUCourse+.
- Attend the lectures via Zoom or in the auditorium, and answer the questions presented at the same time via TopHat.
- Attend the recitations via Zoom.
- Keep your webcam on, for better interaction.
- Prepare for the Midterm and the Final exams.
- Take advantage of the Office Hours, to ask your questions, and check out the suggested problems, again on SUCourse.

Course Objective: Students who completed this course are expected to know mainly the concepts ordinary differential equations, their solution methods, and their applications in modeling and simulating engineering systems.

Course Description:

This course covers the following subjects which can be found in chapters 1, 2, 3, 4, 5, 6, 7 of the textbook:

i. Introduction to ordinary differential equations;
ii. First order differential equations;
iii. Second order linear equations;
iv. Higher order linear equations;
v. Series solutions of second order linear equations;
vi. The Laplace transform;
vii. Systems of first order linear equations.

Learning Outcomes

- Apply mathematical modelling in areas such as physics, engineering, biology or economics.
- Solve first-order separable and linear differential equations.
- Find the fundamental solution and the general solution of certain second order linear differential equations.
- Use the Laplace transform method to solve linear ordinary differential equations.
- Find the particular solution to a nonhomogeneous linear system of ordinary differential equations.
- Solve higher-order certain linear differential equations and systems of differential equations.

Exams:

- There will be **two** midterm exams and **one** final exam. Exam subjects will be announced for each during the class hours before the exam. These are tests performed in person on campus.
- During the exams, the use of books, notes, electronic devices (including cell phones, smart watches, calculators, computers etc.), or any other kind of supporting learning material is NOT allowed. A student violating this rule will receive 0 points for that exam.
- However weeks of the midterm exams are announced in the tentative schedule, it may change according to special situations. The university will later announce the final exam date. The final may be given on any day between 11/06/2022 and 23/06/2022. Student Resources will determine the dates and times for all final exams, and instructors cannot change it. So, do not plan to leave Istanbul before 23/06/2022.
- Unless you have a serious excuse, such as health problem, it is not allowed to make up any exam. In such a case, you must contact the instructor Nilay Duruk Mutlubaş **as soon as possible** and explain your situation. If it is a health problem you need to bring a medical report, that must be given or checked by SU Health Center within 3 days of the date of the report. Make-up for the midterm or the final will be at the end of the semester (after the finals period). Only students that had contacted the instructor with a valid excuse will be informed about the time and format. The make-up exam will contain all topics and counted for only one of the missed exams. If a student miss both (Final and Midterm) exams even with a valid excuse, then (s)he will be allowed to take make-up for Final exam only and receive 0 (zero) point for Midterm exams.

Grading:

- Midterm Exam 1: %30
- Midterm Exam 2: %30
- Final Exam: %40

NA Policy:
Students missing both the midterm and the final exams, without a valid excuse, will receive NA if they also miss the make-up. In general, if you will have serious issues preventing you from regularly following the course, you are required to contact Nilay Duruk Mutlubaş. Please see also Class Discipline below.

Academic Integrity:

All university policies on academic integrity apply to our course, and they will be enforced. (more information on http://www.sabanciuniv.edu/en/academic-integrity-statement). In general, to ensure Academic Integrity, any student might be asked to validate any activity contributing to their grade in an interview via Zoom (recorded, with audio and video). A student failing to explain the submitted work, or refusing/missing the interview, will receive zero from that work. In particular, no form of cheating is welcome in the exams such as copying whole or part of each other's answers, using cheat-sheets etc. The action against such violations could range from getting a zero on the particular assignment to explaining the case in front of the Disciplinary Committee.

Class Discipline:

It is our responsibility to provide students with excellent teaching and learning environments. We are therefore asking you to respect both our responsibility to teach and the right of other students to learn. Any action that disturbs your classmates or disrupts the online activities is unacceptable. Repeated violations of the above rules may cause a student to be counted as absent for a lecture or a recitation. Attention must be taken regarding COVID-19 spread prevention. Students attending classes must comply with the rules listed at https://mysu.sabanciuniv.edu/en/covid-19-rules, especially those regarding "OPEN AND CLOSED AREAS". The maximum capacity of the classrooms will always be respected and students are required to correctly wear a mask and sit only in the designated seats at all time. The class will not start, or will be suspended, otherwise. For the physical attendance, students will be admitted in the auditorium on a "first come first served" basis.

General Suggestions:

• Feel free to ask us and your Assistants questions in and out of class, especially during office hours.
• Remember that you do not have to be a math genius to be successful in this course (although it wouldn't hurt!). Regular study habits are sufficient to get a decent grade.
• Attend the classes and recitation hours regularly. Make sure you attend your own (registered) recitation section.
• Studying out of class for this course should become a routine. Key to success in mathematics is practice.

Registration Overrides
Time conflict requests will be accepted if you do not exceed one hour. However, any and all negative outcomes that may result are solely the student's responsibility.

GOOD LUCK ☺

Tentative Weekly Schedule

Week	Topic
1	Introduction, classification of differential equations.
2	**First order differential equations:** linear equations, method of integrating factors, separable equations, difference between linear and nonlinear equations.
3	Exact equations and integrating factors. Existence and uniqueness theorem.
4	**Second Order Linear Equations:** Homogeneous equations with constant coefficients. Fundamental solutions of linear homogeneous equations. Linear Independence, Wronskian.
5	Complex roots, repeated roots; reduction of order.
6	Nonhomogeneous equations: Method of undetermined coefficients. Variation of parameters.
7	**MIDTERM I (13.04.2022)** **Higher order linear equations:** General theory, homogeneous equations with constant coefficients, method of undetermined coefficients, variation of parameters.
8	**The Laplace transform:** Definitions, Solution of initial value problems.
9	Step functions. Solution of differential equations with discontinuous forcing functions, Impulse functions. The convolution integral.
10	**Systems of first order linear equations:** Introduction; linear independence, eigenvalues, eigenvectors.
11	Homogeneous linear systems with constant coefficients. Real eigenvalues.
12	**MIDTERM II (25.05.2022)** Complex eigenvalues. Fundamental matrices. Repeated eigenvalues. Nonhomogeneous linear systems.
13	**Series Solutions:** Power series. Series Solutions near an ordinary point. Part I
14	REVIEW