

MAT 303: Calculus IV with Applications

Fall 2020

Department of Mathematics
Stony Brook University

Important Note: Every effort will be made to avoid changing the course schedule, but the possibility exists that unforeseen events will make syllabus changes necessary. It is your responsibility to check Blackboard for corrections or updates to the syllabus. Any changes will be clearly noted in course announcements or through Stony Brook email.

Course Description: This course is an introduction to differential equations, with particular emphasis on scientific applications. Topics we will cover include homogeneous and non-homogeneous linear differential equations, systems of linear differential equations, non-linear systems, Laplace transforms, and series solutions to equations, as time permits. We will study standard techniques for solving ordinary differential equations, including numerical methods, and their applications to engineering, physics, biology, chemistry, economics, and social sciences.

Textbook (required): Differential Equations with Boundary Value Problems: Computing and Modeling (5th edition) by Edwards, Penney and Calvis.

Prerequisites: In order to take this course, you must have a grade of C or higher in MAT 127 or MAT 132 or MAT 142 or AMS 161 or level 9 on the mathematics placement examination.

SBC Objectives: STEM+

Instructor: Dimitrios Ntalampekos. Email: dimitrios.ntalampekos@stonybrook.edu. Office Hours: Monday at 4:30-5:30pm and Wednesday at 3:30-4:30pm. Math Learning Center (MLC) hour: Monday at 3:30-4:30pm. The office and MLC hours will be held through the Zoom platform.

Class Schedule: Synchronous lecture delivery on Monday, Wednesday and Friday at 1:00pm-1:55pm through the Zoom platform. Lectures will be recorded in case of internet disruption. Students are expected to attend class and recitation regularly and to keep up with the material presented in the lecture and the assigned reading.

Course Assistants:

- Ruijie Yang. Email: ruijie.yang@stonybrook.edu. Office Hours: TBA.
 - Online synchronous Recitation R01 on Wednesday at 10:30am-11:25am through the Zoom platform. Lectures will be recorded in case of internet disruption.
 - Jacob Mazor. Email: jacob.mazor@stonybrook.edu. Office Hours: TBA.
 - Face-to-face Recitation R03 on Tuesday at 6:30pm-7:25pm in Earth&Space 001.
 - Face-to-face Recitation R04 on Friday at 10:30am-11:25am in Engineering 143.
 - Online synchronous Recitation R05 on Friday at 10:30am-11:25am through the Zoom platform. Lectures will be recorded in case of internet disruption.
- Recitations R04 and R05 are a combined online/hybrid recitation.
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Technical Requirements:

- A device (such as computer, cell phone or tablet) that allows you to attend the lectures and office hours on the Zoom platform, and access the course material in Blackboard.
- A scanner or camera that allows you to scan your solutions to assignments and exams and upload them to Blackboard. For example, you can use a cell phone and a scan-app.
- A camera, required for proctoring the exams.
- A stable internet connection for attending classes and office hours, taking the exams and uploading solutions to Blackboard.

The university provides technology support. For laptop loans: <https://www.stonybrook.edu/commcms/studentaffairs/studentssupport/>; for IT support: <https://it.stonybrook.edu/services/itsm>.

Software Requirements: We will use *Mathematica*, which is a computational software program developed by Wolfram Research and used in many scientific, engineering, mathematical and computing fields, based on symbolic mathematics. Mathematica has a comprehensive documentation: <https://reference.wolfram.com/language>.

Stony Brook students can download the Windows/Mac/Linux version of Mathematica 12.0 from Softweb (<https://softweb.cc.stonybrook.edu>). You need your Stony Brook netID and netID password to log in to Softweb. To obtain an Activation Key for Mathematica you must visit the Wolfram User Portal by following the link in Softweb. If it is your first time visiting the Wolfram User Portal, you must create a Wolfram ID and follow the steps in there to request an Activation Key.

In addition, you can use any of the campus SINC sites, or you can access the Virtual SINC site.

Course Learning Objectives: Demonstrate ability to solve homogeneous and inhomogeneous linear differential equations, systems of linear differential equations, with methods including series solutions, Laplace transforms, and Fourier series. Implement developed techniques in problems in economics, engineering, and all sciences with emphasis on numerical and graphical solutions. Analyze differential equations and solutions with the use of computers.

Course Schedule: The course schedule is posted in the following website and is **subject to changes**.

http://www.math.stonybrook.edu/~dimitriosnt/teaching/MAT303_fall2020/schedule_MAT303_fall2020.html

Grading Policy: Homework: 30%, Midterm I: 20%, Midterm II: 20%, Final: 30%

Homework: Homework is a fundamental part of this course, and you will have to work hard on the assigned problems in order to succeed. In order to receive full credit for any problem you must show all of your work, and must provide full justification for your answer.

- Assignments will be posted on Blackboard at the beginning of each week, and will be **due on Wednesday of the following week**. You have the option to submit your written solutions to the teaching assistant of your recitation (if you are enrolled in a face-to-face recitation) or scan them and upload them to Blackboard (if you are enrolled in a face-to-face or online recitation).
- Late homework will be accepted, but there will be grade penalties.
- The lowest homework score will be dropped.

Exams: There will be **two** Midterms as well as a Final, each respectively accounting for 20%, 20%, and 30% of the total grade. By enrolling in this course, you are attesting to the fact that you will be available for the exams at the following times:

- **Midterm I** will be on Wednesday, September 30, during the time of the lecture, via Blackboard.
- **Midterm II** will be on Wednesday, November 11, during the time of the lecture, via Blackboard.

- The **Final** exam will be on Friday, December 11, at 2:15-5:00pm, via Blackboard.

The two Midterms and the Final exam will be administered synchronously through Blackboard. You will have to write clearly, take a clear photo or scan of your work, and upload it to Blackboard. Note that credit cannot be given for manuscripts that are not legible and it is your responsibility to upload a readable copy of your work in time. In order to eliminate the impact of internet disruptions, sufficient extra time will be given for uploading your work to Blackboard. The exams will be proctored through Zoom by the instructor and the teaching assistants. Every student who is taking an exam will join the Zoom session of the class with camera enabled. Minor internet disruptions during proctoring are permissible.

Face Mask Policy

Face coverings must be worn at all times while participating in the face-to-face components of this course. If a student does not comply, the student will be asked to leave the classroom. If the student does not comply or leave the classroom, the class will end and the student will be reported to the Office of Student Conduct and Community Standards at communitystandards@stonybrook.edu.

Accommodations for Students with Hearing and Communication Impairments:

Some students with hearing and communication impairments may need their instructor to wear a clear mask for lip and facial expression purposes. If the student has registered with the Student Accessibility Support Center (SASC) and has requested an accommodation for clear masks, SASC will reach out to the student's instructors and provide a clear mask for them to wear while teaching and/or interacting with the student. If you have questions, please email sasc@stonybrook.edu or call (631) 632-6748.

Face Mask Accommodations, Modifications, or Exemptions: The Student Accessibility Support Center (SASC) works with students who may require academic accommodations. If a student is unable to wear a mask for health reasons, the student should contact SASC at sasc@stonybrook.edu. SASC will work with the student to help identify arrangements to complete in-person courses in an alternate format. If, however, there is an in-person class that cannot be accommodated in an alternate format, a student may be approved by the Medical Director of Student Health Services to wear a modified face mask or no face covering. In this situation, SASC will communicate this information to the faculty member. Approved students will also be provided with a written exemption from the Medical Director of Student Health Services that indicates any modifications or exceptions, which they must carry with them to show faculty if requested. Please note that medical exemptions are rare and are based solely on medical necessity. If a student is exempt from the face mask policy, proper social distancing will be ensured within a given instructional setting. If you have questions regarding accommodations, please email sasc@stonybrook.edu. For health related concerns in the classroom, please contact Dr. Rachel Bergeson, Medical Director, at rachel.bergeson@stonybrook.edu.

Student Accessibility Support Center Statement (SASC)

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, 128 ECC Building, (631) 632-6748, or at sasc@Stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: <https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities> and search Fire Safety and Evacuation and Disabilities.

Academic Integrity

Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html.

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.