

MAT 303: Calculus IV with Applications

Fall 2023

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 the course website 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: C or higher in MAT 127 or 132 or 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 and Math Learning Center (MLC) hour:

<http://www.math.stonybrook.edu/cards/ntalampekodimitrios.html>

Class Schedule: Tuesday and Thursday at 10:00-11:20am in Javits Lecture Hall 111. 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:

- Willie Rush Lim. Email, office hours and Math Learning Center (MLC) hour:
<https://www.math.stonybrook.edu/cards/limwillie-rush.html>
 - Recitation R01 on Wednesday at 10:00-10:55am in Earth & Space 079.
 - Recitation R02 on Monday at 1:00-1:55pm in Physics P127.
- Yao Xiao. Email, office hours and Math Learning Center (MLC) hour:
<https://www.math.stonybrook.edu/cards/xiaoyao.html>
 - Recitation R04 on Tuesday at 1:00-1:55pm in Chemistry 128.

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 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_fall2023/schedule_MAT303_fall2023.html

Grading Policy: Homework: 20%, Midterm I: 20%, Midterm II: 20%, Final: 40%

Homework: Weekly problem sets will be assigned. In general, assignments are **due in the recitation** of the week after next (e.g., Homework 1 is due on Week 3). Try to write legibly and explain your reasoning clearly and fully. You are encouraged to discuss the homework problems with others, but your write-up must be your own work.

- *Late homework will be accepted*, but there will be grade penalties. Score is reduced by **20%** for each delayed day. For example, if a homework assignment is due on Wednesday but you submit it on Friday, then your score is reduced by 40%. Exceptions apply to those under documented extenuating circumstances.
- *Your lowest homework grade will be dropped* at the end of the class.

Exams: There will be two Midterms as well as a Final exam. 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 Thursday, October 5, during the time of the lecture.
- **Midterm II** will be on Tuesday, November 14, during the time of the lecture.
- The **Final** exam will be on Monday, December 18, at 11:15am-1:45pm.

Basis of grade determination: A- and A 85-100%; B-, B, and B+ 65-85%; C and C+ 50-65%; D 40-50%; F 0-40% (percentages reflect weighted scores including assignments and exams). NOTE: These letter grades are threshold scores only. Actual final scores needed to earn a certain letter grade may be lowered if warranted based on the difficulty of the exams. In other words, if your final total points in the course equal a 85%, you will not earn less than an A-; however, the threshold for an A- may be lower.

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, Stony Brook Union Suite 107, (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-disabilities> and search Fire Safety and Evacuation and Disabilities.

Academic Integrity

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is 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 Student Conduct and Community Standards 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. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.