

MAT 331: COMPUTER-ASSISTED MATHEMATICAL PROBLEM SOLVING

FALL 2024

ABOUT THE COURSE

This course is an introduction to doing mathematics with the help of a computer. We are going to use computers as a tool to gain insight into complex mathematical problems through a project-oriented approach. You will learn both the relevant mathematical concepts and ways that the computer can be used (and sometimes misused) to understand them. The course fulfills the TECH objective of the Stony Brook Curriculum.

BASIC INFORMATION

We meet Tuesday and Thursday, 3:30pm to 4:50pm, in room S-235S of the Mathematics building; this is the computer lab in the basement, right next to the Math Learning Center.

Instructor: Christian Schnell (christian.schnell@stonybrook.edu)

Office: Mathematics 4-110

Office hours: Friday, 9:30am to 12:30pm and by appointment

Grader: Ze Yun (ze.yun@stonybrook.edu)

TEXTBOOK

As our textbook, we will use a set of notes by Santiago Simanca and Scott Sutherland. There is a link to a PDF version (and an HTML version) on the course website, in **Brightspace**.

SOFTWARE

We are going to use **Maple** as our main tool. It is available on all the computers in S-235 and in every SINC site on campus (including the virtual SINC site). You can download a copy for use at home from **SoftWeb**. (Sign in with your **NetID**, then select “Maple” from the list of “University Licensed Applications”, and choose the correct version for your operating system.)

EXERCISES AND PROJECTS

Over the course of the semester, I am going to assign a number of *exercises* and two or three larger *projects*. An exercise is basically a homework assignment: something that you should be able to do in a few minutes to a few hours. About every other week, I will post a set of exercises, from which

you can choose which ones to do. Each exercise has a due date; you must submit your solution (in the form of a **Maple** workbook) in **Brightspace** by the due date in order to receive credit. You must complete at least half of these exercises over the course of the semester. They all count for the same amount of points, whether they are easy or difficult. Part of the purpose of the exercises is to help you learn how to determine what is “easy” and what is “difficult”. A project is closer to a term paper: you are expected to devote a significant amount of time to doing it, and to take care with the presentation.

Working together on the projects is encouraged, but each student is responsible for turning in his or her own write-up of the problem and solution. This should contain a detailed description of the problem, of the means used to solve it, and of the solution itself. These write-ups should be produced by each student individually, and should be detailed enough so that someone who has not taken the class can read and understand them, and will believe the solution is correct. Half of the grade for a project depends on the clarity of the exposition, and half on the correctness.

GRADING

Your grade will be based on the projects, the exercises, and in-class participation. All the exercises taken together will count as one project. There will be no exams. Both the expository and computational aspects of the project write-ups will be graded and will count equally.

LEARNING OUTCOMES

This course fulfills the “Understand Technology” (TECH) objective of the Stony Brook curriculum. There are two specific learning outcomes:

- (1) Demonstrate an ability to apply technical tools and knowledge to practical systems and problem solving.
- (2) Design, understand, build, or analyze selected aspects of the human-made world. The “human-made world” is defined for this purpose as “artifacts of our surroundings that are conceived, designed, and/or constructed using technological tools and methods.”

UNIVERSITY POLICIES

Disability Support Services. If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, Educational Communications Center Building, room 128, at (631) 632-6748. They will determine with you what accommodations, if any, 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 Disability Support Services. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/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 are required to report any suspected instances of academic dishonesty to the Academic Judiciary. 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.