

PHY 277: Computation for Physics and Astronomy / Spring 2026 (rev. 1.03; 2026-01-27)

Instructor: Prof. Michael Zingale, ESS 452, michael.zingale@stonybrook.edu

Class Meeting Time/Place: Mon., Wed., Fri. 8:25 am to 9:20 am, location: Physics S-235

An introduction to computing on UNIX/Linux computers. Fundamentals of using UNIX/Linux to write computer programs for numerical algorithms to solve computational physics and astronomy problems. Assignments are carried out in a high-level compiled programming language such as modern Fortran or C++ and require extensive use of SINC site computers outside the classroom.

1 Logistics

1.1 Prerequisite

PHY 125–127 or PHY 131–2 or PHY 141–2 (and the associated labs for your sequence); AMS 151 or MAT 126 or MAT 131 or MAT 141

1.2 Course Website / Syllabus

All course material will be available at:

<https://zingale.github.io/phy277/>

1.3 Office Hours

Office hours will follow immediately after class on Monday and Friday, for 1.5 hours. It is not possible to pick office hours that can accommodate the schedule of all students in this class. You are encouraged to contact the instructor to make an appointment outside of these times.

1.4 Teaching Assistants

The TAs for this class are:

- Mackenzie Baird, mackenzie.baird@stonybrook.edu
- Alex Heindel, alex.heindel@stonybrook.edu

Office hours for the TAs will be announced in the first week of classes.

2 Homework

There will be 8–10 homework assignments throughout the course. Students will typically have 1 week to complete an assignment. While it is recognized that students sometimes work together and discuss the homeworks as part of the learning process, *what you turn in must be your own work. Copying will not be tolerated.*

For assignments where you are writing code, you must provide the machine-readable source code (uploaded to Brightspace). The code must compile without error on the class machines (GCC 15). Points will be deducted if the code does not compile.

Homeworks are due at the time/date listed on the assignment. **No late homeworks will be accepted.** Homework grades will be posted to the Brightspace gradebook approximately 1 week after the due date, with grading comments available in the Brightspace gradebook. Students should report any errors/missing grades promptly.

AI/LLM/ChatGPT policy: you may *not* use ChatGPT or similar AI / large-language models for the homeworks. This will be treated as an academic integrity violation.

3 Exams

There will be 2 midterms and one final exam. For each of the exams, students are responsible for knowing the material presented in the lectures, recitations, assigned as homework, and in the assigned chapters of the text. Midterm exams will

take place **in-class** on the days assigned by the registrar—we will not use the common exam period scheduled by the registrar for the midterms. The midterm dates are:

- Feb. 23
- Apr. 6

*Students should not expect that they will be allowed to make up an exam without advanced notice. Reasons for wanting to make-up an exam will be judged on a case-by-case basis. Students wanting to make up an exam must have a *valid* excuse (e.g. athlete in University-related sporting event, jury duty, medical emergency) and notify the instructor *before* the scheduled exam (or as soon as is safely possible afterwards). No make-ups will be allowed more than one week after the original exam date.*

3.1 Final Exam

The final exam will be given at the time and date scheduled by the registrar.

4 Class Participation

Periodically, there will be interactive, in-class activities where you will be asked to submit something (e.g., via a google form). This participation will be marked as either submitted or not-submitted. At the end of the semester, your total participation will be averaged, dropping the lowest 2 scores from throughout the semester (this accounts for occasional absences).

No make-ups for in-class participation will be permitted.

5 Course Topics

This is a preliminary list of topics we will cover in the class. Topics and dates will shift as the semester evolves. The course website will always be the authoritative source for what we cover.

- Intro / logistics (week 1)
- Unix shell (weeks 1–3)
- C++ data types (weeks 4–5)
- C++ functions (weeks 6–7)
- Software Engineering (week 8)
- Classes (week 9–10)
- The C++ standard library (week 11–12)
- Numerical algorithms (week 13)
- Crash-course on python (if time) (week 14)

6 Course Grade

The final grade will be based on the homeworks, midterm, and final exam using the following weighting:

- homework: 20%
- class participation: 5%
- midterm 1: 25%
- midterm 2: 25%
- final exam: 25%

Computed this way, the overall course grade will range from 0–100. Letter grades will be based on a standard grade scale (i.e. an overall score $> 90/100$ would be an A- or better). However, if necessary, a curve will be applied to the overall course grade, considering the overall performance of the class. Students who wish to discuss their grades or class performance should see the instructor in person. *For privacy reasons, grades will not be discussed via e-mail.*

7 Required Syllabus Statement

7.1 Student Accessibility Support Center Statement

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 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*.

7.2 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. 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/

7.3 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. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

7.4 Electronic Communication

Email to your University email account is an important way of communicating with you for this course. For most students the email address is 'firstname.lastname@stonybrook.edu'. *It is your responsibility to read your email received at this account.* For instructions about how to verify your University email address see this:

<http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo>

If you choose to forward your University email to another account, we are not responsible for undeliverable messages.

7.5 Religious Observances

See the policy statement regarding religious holidays at

http://www.stonybrook.edu/commcms/provost/faculty/handbook/employment/religious_holidays_policy.php

Students are expected to notify the course professors by email of their intention to take time out for religious observance. This should be done as soon as possible but definitely before the end of the 'add/drop' period. At that time they can discuss with the instructor(s) how they will be able to make up the work covered.