

Analysis II (Math 131B), Fall 2020, San José State University
Zoom, MW 10:30–11:45 (Sec. 01, code 44456)

Instructor: Dr. Tim Hsu (pronounced “shoe”).

Office and phone: MacQuarrie Hall 419, (408)924-5071.

Office hours: M 2–3pm, W 1–2pm. Current schedule available at:
<http://www.timhsu.net/courses/generic/sched.pdf>

E-mail: tim.hsu@sjsu.edu. I can be reached by e-mail at many times of the day, and will try to respond within 24 hours.

Course web page: <http://www.timhsu.net/courses/131b/>

Required texts: *Fourier Series, Fourier Transforms, and Function Spaces: A Second Course in Analysis*, Hsu, MAA Press.

Optional texts: *Writing Proofs*, Hsu, downloadable from course web page.

Background references: Ross, *Elementary Analysis: The Theory of Calculus*; Rudin, *Principles of Mathematical Analysis*.

Grading: Your semester grade consists of: Homework 25%; Exam 1 14%; Exams 2 and 3 18% each; final exam 25%.

Goals of the course. In your first course in analysis, you learned the theoretical underpinnings of calculus. In this course, we will build on that foundation to study *Fourier series*, which are infinite series of trigonometric functions. Central questions in that study include:

- How do we define the “best” approximation to a given function?
- How do we find that best approximation?

In particular, those questions naturally lead to the idea of a *function space*, and specifically, a certain space of functions called a *Hilbert space*. We study the foundations of function spaces and approximations, establish the fundamental theory of Fourier series, and then go on to look at a continuous analogue known as the **Fourier transform**.

Prerequisites. A first course in analysis (Math 131A) or equivalent. As background, we assume: Supremums and infimums, completeness, sequences and limits, the Bolzano-Weierstrass theorem, series and convergence, continuity and limits, and the Extreme Value Theorem. It will also be helpful, but not as necessary, to have seen differentiation, the Mean Value Theorem, integration, the Fundamental Theorems of Calculus, and series of functions (power series, term-by-term integration and differentiation). If you’re worried about remembering any of the above, we will spend the first month of class reviewing all of the above topics in the setting of complex-valued functions; in particular, we will cover series of functions essentially from scratch.

Class is a cell-free zone. Please turn off all cellphones before you get to class.

Problem sessions. We will also hold a weekly problem session where you can work together and get help from me, **Fri 10am–noon**, Zoom info provided separately.

Homework. Homework will be due roughly once a week, with problem set 01 due **Wed Aug 26**. For more details on homework content and the process of doing homework (including outlines and revisions), see the handout on homework.

Specific homework assignments will be determined as the term progresses. For a complete list of all homework assigned to date, and downloadable versions of almost all handouts from class, you can always check the course web page.

Exams. We will discuss this topic in more detail before the first exam, but briefly, the material on exams will mostly resemble the material from the homework. All exams are closed-book.

Calculators. You will *not* be allowed to use calculators for *any* in-class exams. The numerical work on exams will be simple enough that a calculator shouldn't be necessary, and even if you make numerical mistakes, you won't lose a lot of points on them.

Exam dates. The dates of our three in-class exams and final exam are found on the syllabus below. In particular, the final exam will be held on **Mon Dec 14**, from **9:45am–noon**. Please make sure that you are still on campus at that time (e.g., don't buy a plane ticket that leaves town on Dec 13).

How to add this course. If you are not registered for this course, and you would like to add it, you must first put a full effort into completing all of the work in the course. Second, if you are a graduating senior, you need to produce documentation to verify that.

I'll make a waiting list, which you get on by filling out and turning in the information form for the course. I'll give out add codes starting **Mon Aug 31** (or possibly earlier), mainly based on completeness of homework, and as long as there is room, I will continue to give out add codes until add date (**Tue Sep 08**). Note, however, that graduating seniors have the highest priority, and that Open University students have the lowest priority.

How to drop this course. Until **Mon Aug 31**, you can drop at my.sjsu.edu. Nothing will appear on your transcript, but please let me know if you drop.

To drop after Mon Aug 31, you must go to the student services center and submit a Course Drop form to the Director of Academic Services. Dropping under these circumstances is only allowed for “serious and compelling reasons” (course catalog). A low grade is not a serious and compelling reason.

Academic integrity. Your commitment to learning (as shown by your enrollment at SJSU) and SJSU's Academic Integrity Policy require you to be honest in all of your academic course work. Faculty are required to report all infractions to the Office of Student Conduct and Ethical Development. See: www.sjsu.edu/studentconduct

Disabilities. If you need course adaptations or accommodations due to a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities register with the Accessible Education Center (formerly the Disability Resources Center) to establish a record of their disability.

Tentative Syllabus

Date	Reading	Date	Reading
Wed Aug 19	1.1–1.2, 2.1–2.2	Mon Oct 19	Exam 2
Mon Aug 24	2.3–2.4	Wed Oct 21	7.2
Wed Aug 26	2.5, 3.1	Mon Oct 26	7.3
Mon Aug 31	3.1–3.2	Wed Oct 28	7.4–7.5
Wed Sep 02	3.3	Mon Nov 02	7.6
Mon Sep 07	Labor Day	Wed Nov 04	8.1–8.2
Wed Sep 09	3.4	Mon Nov 09	8.3
Mon Sep 14	3.5	Wed Nov 11	Veteran's Day
Wed Sep 16	Exam 1	Mon Nov 16	8.4–8.5.1
Mon Sep 21	4.1	Wed Nov 18	10.1
Wed Sep 23	4.2–4.3	Mon Nov 23	Exam 3
Mon Sep 28	4.3–4.4	Wed Nov 25	Thanksgiving Break
Wed Sep 30	4.5–4.6	Mon Nov 30	12.1–12.2
Mon Oct 05	5.1–5.2	Wed Dec 02	12.3
Wed Oct 07	5.3, 6.1–6.2	Mon Dec 07	12.4
Mon Oct 14	6.4, 7.1	Mon Dec 14	FINAL EXAM
Wed Oct 16	7.1–7.2		9:45am–noon