

**Analysis II (Math 131B), Fall 2024, San José State University
MacQuarrie Hall 233, MW noon–1:15pm (Sec. 01, code 49232)**

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

Office and phone: MacQuarrie Hall 316, (408)924-5071.

Office hours: MW 9:30–10:20am and 1:30–2:30pm, mostly in the math help room (MH426).

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*

Semester grade: Homework 20%; Exam 1 14%; Exams 2 and 3 18% each; final exam 30%.

Goals of the course. In your first course in analysis, you learned the theory behind calculus. In this course, we build on that foundation to study *Fourier series*, i.e., infinite series of trigonometric functions. Central questions 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. If you’re worried about remembering any of the above, we will spend the first month of class reviewing all of the above in a new setting, doing series of functions essentially from scratch.

This class will be run in a flipped format. That means you’ll watch the lectures for a particular day’s topic before class and then spend class time discussing concepts and working on problems, both with my help/personal attention and working with others in the class. Perhaps most importantly, class will be spent working on our quite considerable homework assignments. See the handout on “Daily workflow” for more details.

Problem sessions. We will also hold a weekly Zoom problem session where you can work together and get help, each **Fri 12:30–2:30pm** (time subject to change), starting **Fri Aug 30**.

Homework. Homework will be due roughly once a week, with problem set 01 due **Wed Sep 04**. 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. 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 16**, 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 15).

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 one week before **Fri Sep 15**, mainly based on completeness of homework, and as long as there is room, I will continue to give out add codes until add/drop date (**Fri Sep 15**). Note, however, that graduating seniors have the highest priority, and that Open University students have the lowest priority.

How to drop this course. Until **Fri Sep 15**, you can drop at my.sjsu.edu. Nothing will appear on your transcript, but please let me know if you drop.

To drop after Fri Sep 15, 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.

Date	Reading	Date	Reading
Wed Aug 21	1.1–1.2, 2.1	Mon Oct 21	Exam 2
Mon Aug 26	2.2–2.4	Wed Oct 23	7.3–7.4
Wed Aug 28	2.4–2.5, 3.1	Mon Oct 28	7.4–7.5
Mon Sep 02	Labor Day	Wed Oct 30	7.5–7.6
Wed Sep 04	3.1–3.2	Mon Nov 04	8.1–8.2
Mon Sep 09	3.3	Wed Nov 06	8.3
Wed Sep 11	3.4	Mon Nov 11	Veteran's Day
Mon Sep 16	3.5	Wed Nov 13	8.4
Wed Sep 18	4.1–4.2	Mon Nov 18	12.1
Mon Sep 23	Exam 1	Wed Nov 20	12.2
Wed Sep 25	4.3–4.4	Mon Nov 25	Exam 3
Mon Sep 30	4.5–4.6	Wed Nov 27	Thanksgiving Break
Wed Oct 02	4.6, 5.1–5.2	Mon Dec 02	12.3
Mon Oct 07	5.3, 6.1–6.2	Wed Dec 04	12.4
Wed Oct 09	6.4, 7.1	Mon Dec 09	Semester review
Mon Oct 14	7.1–7.2	Mon Dec 16	FINAL EXAM
Wed Oct 16	7.2–7.3		9:45am–noon