

**Analysis II (Math 131B), Fall 2022, San José State University  
MacQuarrie Hall 235, MW 10:30–11:45 (Sec. 01, code 47375)**

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

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

**Office hours:** Tue and Wed 1:30–2:30pm (by Zoom).

**E-mail:** [tim.hsu@sjsu.edu](mailto: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 problem session where you can work together and get help from me, each **Fri 10am–noon**. Zoom info will be provided separately.

**Homework.** Homework will be due roughly once a week, with problem set 01 due **Mon Aug 29**. 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 12**, 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 11).

**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 **Thu 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 (**Thu 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 **Thu Sep 15**, you can drop at [my.sjsu.edu](http://my.sjsu.edu). Nothing will appear on your transcript, but please let me know if you drop.

To drop after Thu 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](http://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.

**COVID/Monkeypox Safety:** Students registered for a College of Science (CoS) class with an in-person component should view the CoS COVID-19 and Monkeypox Training slides for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the SJSU Health Advisories website. By working together to follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links).

Date	Reading	Date	Reading
		Mon Oct 17	7.2-7.3
		Wed Oct 19	<b>Exam 2</b>
Mon Aug 22	1.1-1.2, 2.1	Mon Oct 24	7.3-7.4
Wed Aug 24	2.2-2.4	Wed Oct 26	7.4-7.5
Mon Aug 29	2.4-2.5, 3.1	Mon Oct 31	7.5-7.6
Wed Aug 31	3.1-3.2	Wed Nov 02	8.1-8.2
Mon Sep 05	<b>Labor Day</b>	Mon Nov 07	8.3
Wed Sep 07	3.3	Wed Nov 09	8.4
Mon Sep 12	3.4	Mon Nov 14	12.1
Wed Sep 14	3.5	Wed Nov 16	12.2
Mon Sep 19	<b>Exam 1</b>	Mon Nov 21	<b>Exam 3</b>
Wed Sep 21	4.1-4.2	Wed Nov 23	<b>Thanksgiving Break</b>
Mon Sep 26	4.3-4.4	Mon Nov 28	12.3
Wed Sep 28	4.5-4.6	Wed Nov 30	12.4
Mon Oct 03	4.6, 5.1-5.2	Mon Dec 05	Semester review
Wed Oct 05	5.3, 6.1-6.2		
Mon Oct 10	6.4, 7.1	<b>Mon Dec 12</b>	<b>FINAL EXAM</b>
Wed Oct 12	7.1-7.2		<b>9:45am-noon</b>