

**Analysis II (Math 131B), Fall 2021, San José State University**  
**Sweeney Hall 413, MW 10:30–11:45 (Sec. 03, code 50896)**

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

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

**Office hours:** TuTh 12:30–1:45pm.

**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*

**Semster 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 (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 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.

**Homework.** Homework will be due roughly once a week, with problem set 01 due **Mon Aug 30**. 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 **12:15–2:30pm**. 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](http://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](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 Safety:** All students registered for this class must view the CoS (College of Science) COVID-19 Training slides and the SJSU Phased Adapt Plan website and e-sign the associated CoS Acknowledgement form before the second class meeting. Failure to comply with the safety requirements outlined in the CoS COVID-19 Training slides, the SJSU Phased Adapt Plan, and outlined by instructors and TAs for in-person classes will be grounds for dismissal from class. Please review this material as needed throughout the semester, as updates will be implemented as changes occur. Links to everything listed above will be provided to you electronically.

Date	Reading	Date	Reading
		Mon Oct 18	7.2–7.3
		Wed Oct 20	<b>Exam 2</b>
Mon Aug 23	1.1–1.2, 2.1	Mon Oct 25	7.3–7.4
Wed Aug 25	2.2–2.4	Wed Oct 27	7.4–7.5
Mon Aug 30	2.4–2.5, 3.1	Mon Nov 01	7.5–7.6
Wed Sep 01	3.1–3.2	Wed Nov 03	8.1–8.2
Mon Sep 06	<b>Labor Day</b>	Mon Nov 08	8.3
Wed Sep 08	3.3	Wed Nov 10	8.4
Mon Sep 13	3.4	Mon Nov 15	12.1
Wed Sep 15	3.5	Wed Nov 17	12.2
Mon Sep 20	<b>Exam 1</b>	Mon Nov 22	<b>Exam 3</b>
Wed Sep 22	4.1–4.2	Wed Nov 24	<b>Thanksgiving Break</b>
Mon Sep 27	4.3–4.4	Mon Nov 29	12.3
Wed Sep 29	4.5–4.6	Wed Dec 01	12.4
Mon Oct 04	4.6, 5.1–5.2	Mon Dec 06	Semester review
Wed Oct 06	5.3, 6.1–6.2		
Mon Oct 11	6.4, 7.1	<b>Mon Dec 14</b>	<b>FINAL EXAM</b>
Wed Oct 13	7.1–7.2		<b>12:15–2:30pm</b>