Math2033 Mathematical Analysis L1

Course Outline-Spring 2026

1. Instructor

Name: Prof. Hai Zhang

Office: Room 3449 Email: haizhang@ust.hk

Office hour: Tue Thu 10AM-11AM or by appointment.

2. Teaching Assistants

T1A: YU, Yingzhe, Email: yyucc@connect.ust.hk

T1B: ZHANG, Weihong, Email: wzhangde@connect.ust.hk

T1C: TANG, Ning, Email: ntangad@connect.ust.hk

3. Meeting Time and Venue

Lectures: Tue Thu 3PM-4:20PM, Rm 4620

Tutorials:

T1A: Tue 11:00AM – 11:50AM, CYTG009A

T1B: Fri 12PM - 12:50PM, Rm 4579.

T1B: Thu 5:30PM - 6:20PM, Rm 5402.

4. Course Description

Credit Points: 4

Pre-requisite: MATH 1014 or MATH 1018 or MATH 1020 or MATH 1024

Exclusions: MATH 2031, MATH 2043

Brief Information/synopsis: This course will focus on the proofs of basic theorems of analysis, as appeared in one variable calculus. Along the way to establish the proofs, many new concepts will be Introduced. Understanding them and their properties are important for the development of the present and further courses. Key topics include countability, supremum/infimum, limits of sequence of numbers and functions, Cauchy condition, continuity, differentiation, Riemann integrals.

5. Intended Learning Outcomes

Upon successful completion of this course, students should be able to:

No.	ILOs
1	recognize the power of sequential and function limit in convergence problems, and apply logical reasoning to investigative mathematical work
2	apply the concept of limits to analyze and solve problems related to continuity and approximation in the math profession
3	Have a solid foundation in the basic concepts of calculus, such as differentiability and integrability, and

	be able to apply them correctly across a variety of problems.

6. Assessment Scheme

a. Homework: 5 sets of problems will be assigned with specified due date. Each student is required to submit a typed or scanned pdf of solutions to canvas before the due date. The TAs will grade the answers and marks will be given which counts to the total grade. In addition, a list of auxiliary problems will be posted on canvas, students are strongly recommended to work on them to gain better understanding of the course although the solutions are not to be submitted. Some of the solutions will be posted on canvas.

b. Midterm exam: take-home exam, to be arranged during the midterm break.

c. Final exam: 2 hours, all the materials taught in the whole semester will be tested. The exam is closed book without calculators. More information will be given prior to the exams.

d. Percentage of coursework, examination, etc.:

Assessment	Assessing Course ILOs
15% by Homework	1, 2, 3
10% by take-home midterm exam	1, 2
75% by final exam	1, 2, 3

e. Grading Scheme (Absolute grading with discretion):

Grade	Thresholds (Guaranteed score to get the grade)
A+	95% or above
A Range	85% or above
B Range	65% or above
C Range	50% or above
Passing Grade	40% or above

If your overall course percentage is more than the mentioned thresholds, you will be guaranteed to get the corresponding grade (or grade range).

f. If you score below the threshold, your case will be subjected to our discretion by considering your performance (especially your final exam scores, completion of homework, attendance and attitude) and the overall statistics of the class. Discretions may be dealt in a batch or case by case.

7. Learning Resources

1. Lecture slides/notes prepared by the instructor. Before each lecture, a preview-version of slides will be posted on canvas for students to preview. Preview is highly recommended! After each lecture, a finalized version of slides will also be posted on canvas.
2. lecture notes written by Prof. Kin Y. Li (available on canvas)
3. Understanding Analysis, by Stephen Abbott (available on canvas, strongly recommended reading).
4. Analysis I (third edition), by Terry Tao;

8. Learning Activities

Lectures: The instructor will focus on illustrating the concepts, the main theorems and the essential math ideas. Two 90 mins lectures every week.

Tutorials: TA will focus on examples and problem-solving skills. One 50 min Tutorial every week.

9. Course Schedule

Key word Syllabus

- Simple Logic. Sets and Functions.
- Countability
- Real Numbers. Supremum and Infimum.
- Limit of Sequences. Cauchy Condition. Limit of Functions.
- Continuity.
- Differentiation.
- Riemann integral. (Improper Integral)

10. Course AI Policy

Students are allowed to consult any person (including the instructor, TA, classmates, friends outside HKUST) in any homework for ideas and hints, but are required to write up the solutions by themselves. Students are required to state and list all the persons/references they have consulted in every homework.

The use of ChatGPT or other generative AI is allowed, and they are regarded as "persons" and therefore must be stated and listed in the homework. However, please be warned that at the current stage of development of AI, the response to problems in advanced courses — may not be reliable. Students should be critical of the response generated by AI and do not blindly copy the generated responses to homework.

11. Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.