MATH1013 Calculus I B
L02 – L11 (Fall 2026) Course Outline

1. Instructor

2. Teaching assistants

3. Meeting time and venue

Lectures: Twice every week, 1.5 hours each
Tutorials: Once every week, 1 hour each
Course website: https://canvas.ust.hk/courses/73631
Please refer to the course website for the detailed information about instructor, teaching assistants and meeting time and venue for each individual lecture section.

4. Course description

This is an introductory course in **one-variable calculus**, the first in the Calculus I and II sequence, designed for students who passed HKDSE Mathematics Extended Part M1 or M2. Major topics include: functions and their limits, continuity, derivatives and rules of differentiation, applications of derivatives, basic integral calculus.

Credit points: 3
Exclusions: MATH1012/1014/1020/1023/1024
Prerequisite: Official: None; Recommended: **Pre-calculus** (MATH1003/1005/1006 or **Level 3 or above** in HKDSE Mathematics EP M1/M2)

5. Intended learning outcomes

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

1. compute limits, derivatives and simple integrals of functions in one variable;
2. express quantitative relationships using the language of functions; and
3. apply conceptual knowledge of differential calculus in modeling and problem solving for further studies in science, engineering or other mathematically related fields.

6. Assessment scheme

- **WeBWorK assignments (10%)**: Assessing ILOs 1, 2 and 3
  WeBWorK homework sets will be assigned from time to time and can be accessed via https://webwork.math.ust.hk/.

- **Midterm Test (36%)**: Assessing ILOs 1, 2 and 3
  The mid-term test will be scheduled on **Sunday, October 25 from 10:15 to 12:15**. It will tentatively cover all materials from Chapter 1 to Chapter 3 of the main reference text.

- **Final Exam (54%)**: Assessing ILOs 1, 2 and 3
  The final exam will take 3 hours, and will be centrally scheduled by the Academic Registry in due course. It will cover everything that has been taught in the course.

The mid-term test and the final exam will normally be **closed-book written tests**, and **calculators will not be allowed** during the tests. The exact exam arrangements may be modified in the event of unexpected emergencies.

Letter grades:
The assignment of letter grades is **criterion-referenced** according to the grade descriptors below. In particular, this means neither "absolute grading" nor "curve grading". Although the exact "grade boundaries" vary due to the difficulty of the assessments, students should **generally** aim at getting a course total of about 85% or above for A-/A/A+, about 70% or above for B-/B/B+, and about 40% or above for a passing grade.

Grade descriptors:

Grades	Short description	Elaboration on subject grading description
A	Excellent	The student has mastered almost all techniques of basic one-variable calculus taught in the course, and has excellent and thorough conceptual understanding on the subject content.
B	Good	The student has mastered most computational techniques of basic one-variable calculus taught in the course, yet the understanding of some challenging concepts may not be deep enough.

C	Satisfactory	The student meets the minimum expectation of the instructor, has acquired some basic computational techniques of basic one-variable calculus, but some concepts were not clearly understood.
D	Marginal pass	The student is only able to recall some fragments of topics about basic one-variable calculus and is able to complete some of the most elementary computations.
F	Fail	The student does not have sufficient understanding of even some fragments of topics, and is not even able to complete elementary computations.

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.

7. (Important) Policy on the use of AI tools

- **In assignments or in regular study**:
  You are **allowed** to consult AI tools to help with your assignments or regular study. However, you are advised to properly use these AI tools to assist your study rather than to directly ask them for answers and surrender your study opportunity. From the previous term (Spring 2026), it has been observed that the inappropriate use of AI has led to a drastic decline in students' exam performance in many different courses, which led to a decline in grades. Please visit this Canvas page (https://canvas.ust.hk/courses/73631/pages/learning-mathematics-effectively-with-ai) for some advice on properly using AI tools to assist your study. Apart from AI, you are highly recommended to **seek help from the course instructor or the TAs, especially during their office hours**.

- **In the mid-term test or the final exam**:
  The use of AI tools is **strictly prohibited** in the mid-term test and in the final exam. Students who are found wearing unauthorized electronic devices, including but not limited to **AI glasses** or **smart watches**, will be **disqualified** from the assessment.

8. Student learning resources

- **Main reference text**:
  J. Stewart, D. Clegg and S. Watson, *Calculus: Early Transcendentals* (Metric version, 9th edition), Cengage.
- **Other reference texts**:
  Lecture note by the instructor of each individual section.
  Lecture note by Dr. Henry Cheng for Fall Term 2025–26 (accessible via our course website https://canvas.ust.hk/courses/73631).
  J. Hu, W. Li and Y. Wu, *Calculus for scientists and engineers with Matlab*.

9. Tentative course schedule

Week	Lecture dates	Topics
1	Sep 1 – Sep 7	Basic set theory, numbers and intervals
		Inequalities and absolute values
2	Sep 8 – Sep 14	Functions and graphs
		Elementary functions
3	Sep 15 – Sep 21	Limits of a function, rules of limits
4	Sep 22 – Sep 28	Infinite limits and limit at infinity
		Continuity
5	Sep 29 – Oct 5	Derivatives
		Rules of differentiation, chain rule
6	Oct 6 – Oct 12	Techniques of differentiation
7	Oct 13 – Oct 19	Rates of change
		Linear approximations, differentials
8	Oct 20 – Oct 26	Newton's method
		Maximum and minimum of functions
9	Oct 27 – Nov 2	Mean value theorem
		l'Hôpital's rule
10	Nov 3 – Nov 9	Curve sketching
		Optimization
11	Nov 10 – Nov 16	Areas and integrals
		Newton-Leibniz formula, antiderivatives
12	Nov 17 – Nov 23	Substitution rule
		Integration by parts
13	Nov 24 – Nov 30	Final review