MATH1013 Calculus I
L01, L02 (Spring 2026) Course Outline

1. Instructor

Name: Dr. QUAN Xueyang
Office: Room 3469 (L25–26)
Email: xyquan@ust.hk
Office hours: by appointment or math support center

2. Teaching assistants

(T01A)	Ms. LIU, Ziyun	zliueq@connect.ust.hk
(T01B)	Mr. ZHOU, Rijiang	rzhouau@connect.ust.hk
(T01C)	Mr. LU, Zetian	zluba@connect.ust.hk
(T02A,B,C)	Mr. CHENG, Kei Tsi Daniel	madcheng@ust.hk

3. Meeting time and venue

Lectures:	(L01)	Tue & Thu 09:00 – 10:20	Rm 2306 (L17–18)	
	(L02)	Tue & Thu 12:00 – 13:20	CYT - G002	
Tutorials:	(T01A)	Wed 16:30 – 17:20	1409 (L25–26)	(Starting on **Feb 11**)
	(T01B)	Fri 09:30 – 10:20	CYT - G002	(Starting on **Feb 13**)
	(T01C)	Mon 11:00 – 11:50	5583 (L29–30)	(Starting on **Feb 9**)
	(T02A)	Wed 09:30 – 10:20	2504 (L25–26)	(Starting on **Feb 11**)
	(T02B)	Tue 16:00 – 16:50	4504 (L25–26)	(Starting on **Feb 10**)
	(T02C)	Fri 11:00 – 11:50	2406 (L17–18)	(Starting on **Feb 13**)

Course website: https://canvas.ust.hk/courses/69216

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/.

- **Extra problem sets (0%)**: Assessing ILOs 1, 2 and 3
  Although extra problem sets are not counted towards the final grade, you are highly encouraged to work out the solutions to the problems. WeBWorK assignments are often too easy compared with the mid-term test and the final exam, while the problem sets will provide sufficient practice exercise.

- **Midterm Test (35%)**: Assessing ILOs 1, 2 and 3
  The mid-term test will be announced later (duration is 1.5 hours). It will tentatively cover all materials from Chapter 1 to Chapter 3.

- **Final Exam (55%)**: Assessing ILOs 1, 2 and 3
  The final exam will take three hours and will be scheduled by the Academic Registry in due course (duration is 3 hours). 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.

Use of generative AI tools:
The use of ChatGPT or other generative AI tools in assignments are not strictly prohibited, but are not encouraged either. While AI tools can be useful in exploring data sets, identifying patterns and improving flows and grammar in writing, **you are warned against solely relying on AI to analyze data and solve problems without truly grasping the underlying concepts**. The use of AI tools are prohibited in the mid-term test and the final exam.

Letter grades:

The assignment of letter grades is **criterion-referenced** according to the grade descriptors below. 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 the subject, but some concepts were not clearly understood.
D	Marginal pass	The student is only able to recall some fragments of topics 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.

7. Student learning resources

- Lecture note by the instructor
  (Accessible via our course website https://canvas.ust.hk/courses/69216)

- Reference texts:
  J. Stewart, D. Clegg and S. Watson, *Calculus: Early Transcendentals* (Metric version, 9th edition), Cengage.
  J. Hu, W. Li and Y. Wu, *Calculus for scientists and engineers with Matlab*.

8. Tentative course schedule

Week	Lecture dates	Topics
1	Feb 3, Feb 5	Basic set theory, numbers and intervals Inequalities and absolute values
2	Feb 10, Feb 12	Functions and graphs Elementary functions
3	Feb 24, Feb 26	Limits of a function Rules of limits
4	Mar 3, Mar 5	Infinite limits and limit at infinity Continuity
5	Mar 10, Mar 12	Derivatives Rules of differentiation, chain rule
6	Mar 17, Mar 19	Techniques of differentiation Rates of change
7	Mar 24, Mar 26	Linear approximations, differentials Newton's method
8	Mar 31, Apr 2	Maximum and minimum of functions Mean value theorem
9	Apr 9	l'Hôpital's rule
10	Apr 14, Apr 16	Curve sketching Optimization
11	Apr 21, Apr 23	Areas and integrals Newton-Leibniz formula, antiderivatives
12	Apr 28, Apr 30	Substitution rule Integration by parts
13	May 5, May 7	Final review