Math1012-L1 Calculus IA
Course Outline-Fall 2023

1. **Instructor(s)**

   Name: Dr. LAM, Tsz Kin

   Contact Details:

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2. **Teaching Assistant(s)**

   Name: Mr. Tommy Wing Cheong CHENG

   Contact Details:

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3. **Meeting Time and Venue**

   Lectures:

    Date/Time/Venue:

    L1: Mon, Wed 12:00-13:20, LTB; Mon 14:00-14:50 LTD

   Tutorials:

    Date/Time/Venue:

    T1A: Mon 18:00-10:50, LTH   T1B: Fri 18:00-18:50, Rm 2464

    T1C: Wed 14:00-14:50, Rm 4620   T1D: Fri 12:00-12:50. Rm 2503

4. **Course Description**

   Credit Points: 3

   Exclusion: Level 3 or above in HKDSE Mathematics Extended Module M1/M2, AL Pure Mathematics, AL Applied Mathematics; Math1003, Math1013, Math1014, Math1018, Math1020, Math1023, Math1024.

   Brief Information/synopsis:

   This is an introductory course in one-variable calculus. Topics include functions and graphs, limits of functions and continuity, derivatives and their applications, basic indefinite and definite integrals.

5. **Intended Learning Outcomes**

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

No.	ILOs
1	Develop basic computational skills in calculus.
2	Express quantitative relationships using the language of functions.
3	Apply the concepts and methods of calculus in modeling and problem solving.

6. **Assessment Scheme**
   a. Examination duration: Midterm exam 1.5 hrs;   final exam 3 hrs
   b. Percentage of coursework, examination, etc.:

Assessment	Assessing Course ILOs
10% by homework	1, 2, 3
35% by midterm exam	1, 2, 3
55% by final exam	1, 2, 3

c. The grading is based on students' performance in assessment tasks.

7. Student Learning Resources

Recommended Reading:

Text(s):

J. Stewart, "Calculus Early Transcendentals", 9th ed., CENGAGE.

8. Teaching and Learning Activities

Scheduled activities: 4 hrs (lecture + tutorial)

9. Course Schedule

Week	Topics
1	Number and intervals, inequalities and absolutes, functions and graphs.
2	Operations on functions, polynomial and rational functions.
3	Inverse functions, exponential functions, logarithmic functions.
4	Trigonometric functions and inverse trigonometric functions.
5	Tangent and velocity, the limit of a function, limit laws.
6	Continuity, limits at infinity and horizontal asymptotes, derivatives and rates of change.
7	Basic derivatives and differential rules.
8	Chain rule, implicit differentiation, derivatives of inverse functions.
9	Rates of change problems, maximum and minimum values, derivatives and graphs,
10	L'Hôpital's rule, Curve sketching, optimization problems.
11	Antiderivatives, areas and distances.
12	Definite integrals, the Fundamental Theorem of Calculus.
13	Indefinite integrals and net change, the substitution rule.