Math1012-L2 Calculus IA

Course Outline-Fall 2024

https://canvas.ust.hk/courses/59411

1. Instructor(s)

Name: Dr. LAM, Tsz Kin

Contact Details:

Office: Room 3419 Phone: 2358-7457 Email: tklam@ust.hk

Office Hours: Wed 16:00-18:00 (in Math Support Center, starting in Week 2)

2. Teaching Assistant(s)

Name: Ms. Phyllis LIANG (T2A-T2D), Mr. Yixin LI (T4A-T4B), Mr. Xin XU (T4C-T4D)

Contact Details:

Office: Email:

3. Meeting Time and Venue

Lectures:

Date/Time/Venue:

L2: WeFr 13:30-14:50, LTD (T.K. Lam); Tu 12:00-12:50 LTC (Phyllis Liang)

L4: TuTh 13:30-14:50, LTD (T.K. Lam); Th 12:00-12:50 LTC (Phyllis Liang)

Tutorials:

Date/Time/Venue:

Phyllis Liang	T2A: Tu 14:30-15:20, Rm 6580	T2B: Fr 10:30-11:20, Rm 6580
	T2C: We 18:00-18:50, Rm 6573	T2D: We 11:00-11:50, Rm 1104
Yixin Li	T4A: Mo 16:00-16:50, Rm 1410	T4B: Tu 18:00-18:50, LG 3009
Xin Xu	T4C: We 17:00-17:50, Rm 6580	T4D: Tu 17:00-17:50, Rm 1104

4. Course Description

Credit Points: 3

Exclusion: Level 3 or above in HKDSE Mathematics Extended Module M1/M2, 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. The provisional grade scale is

A+/A/A- > 85% > B+/B/B- > 70% > C+/C/C- >50% > D > 40% > F

d. Grade descriptors:

A+/A/A-	Excellent performance on conceptual understanding and computational tasks with completely/almost-completely/roughly-completely correct approaches and solutions to fundamental calculus problems.
B+/B/B-	Good performance on conceptual understanding of calculus, with good/satisfactory/inadequate computational skills
C+/C/C-	Satisfactory performance on conceptual understanding of calculus with adequate/weak/inadequate level of computational skills
D	Marginal level of performance, showing lack of understanding and low level of computational skills
F	Unsatisfactory level of performance, showing no understanding

7. Student Learning Resources

Recommended Reading:

Text(s):

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

8. Teaching and Learning Activities

Scheduled activities: 5 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, chain rule
8	Derivatives of inverse functions, implicit differentiation
9	Related rates and related rates, maximum and minimum values, derivatives and graphs,

10	L’Hôpital’s rule, optimization problems.
11	Antiderivatives, areas and distances.
12	Definite integrals, the Fundamental Theorem of Calculus.
13	Indefinite integrals and net change, the substitution rule.