MATH 1024
Honors Calculus II
2023-24 Spring

https://canvas.ust.hk/courses/55299

INSTRUCTOR

Instructor	**Prof. Frederick Tsz-Ho FONG**
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TEACHING ASSISTANTS

Session	T1A	T1B	T1C
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COURSE DESCRIPTION

Course outline: This is a very challenging course for most, but not all, students in HKUST. It is the second part of the one-year honors course on single-variable calculus, with strong emphasis on mathematical concepts and logical reasoning skills. It is the continuation of MATH 1023, and will focus on integral calculus and infinite series.

Credits: 3

Prerequisites: MATH 1023 (strongly preferred)

INTENDED LEARNING OUTCOMES (ILOS)

Upon completion of this course, students are expected to:

(1) build a strong mathematical background, in both conceptual and computational aspects, for future studies in mathematically oriented majors, including mathematics, physics, engineering;
(2) be equipped with workable knowledge of single-variable calculus well beyond the level of HKDSE M2;
(3) get familiar with the rigorous approach of single-variable calculus, and mathematics in general;
(4) develop logical reasoning and critical thinking skills.

COURSE WEBSITE

Canvas will be used as the course website. The link can be found on top of the page. Lecture notes, homework, solutions, and sample exams will be posted there. Students should visit the course website regularly to check up new announcements and new materials.

STUDENT LEARNING RESOURCES

Major Reference: Instructor's Lecture Notes, and Prof. YAN Min's Lecture Notes.

Recommended References (for complementary or additional readings):

(1) *Introduction to Calculus and Analysis* by Richard Courant, Fritz John
(2) *Elementary Analysis: The Theory of Calculus* by Kenneth A. Ross
(3) Any former HKALE Pure Math (Calculus) textbook

GRADING

Homework: There will be about 7-8 problem sets. No late homework will be accepted. Each homework can be individual or collaborative: students can form a group of 1 to 3 people to discuss with each other on the homework problems, and submit one copy of the problem set as a team.

Every student in the same team will receive the same score for that problem set. To avoid "free-riders", students are allowed to form different groups in different problem sets.

Examinations: There will be one 3-hour midterm exam, and one 3-hour final exam.

	Percentage	Assessing Course ILOs
Homework	20%	1, 2, 3
Midterm	40%	1, 2, 3
Final	40%	1, 2, 3
Total	100%	

Extra points will be added for those who performed in the final exam much better than they did in the midterm, according to the following formula:

Grading Scheme:

Total score
$= \max\{\lambda\,\text{homework} + \mu\,\text{midterm} + \nu\,\text{final} : \lambda \in [0, 0.2], \mu \in [0, 0.4], \nu \in [0.4, 0.7], \lambda + \mu + \nu = 1\}$

Letter Grades: Try to aim at getting a total of 75% or above for A-/A/A+, about 45% or above for B-/B/B+, and about 25% or above for C-/C/C+. The course will not be graded on a curve.

TENTATIVE SCHEDULE

Week #	Topics
1	Jordan measure
2	Darboux sum, Riemann integral
3	Numerical methods
4	Fundamental Theorem of Calculus
5	Integration by parts, reduction formulae
6	More techniques of integrations
7	Improper integrals
8	Infinite series
9	Comparison tests
10	Conditional and absolute convergences
11	Power series
12	Fourier series
13	Fourier series, con't