

Math 3043 Honor Analysis  
Course outline – Fall 2023-2024

1. Instructor: Min Yan

Room: 3487, Phone: 23587442, e-mail: mamyan@ust.hk

2. Teaching Assistant: Min Yan

3. Meeting Time and Venue

Lecture: Tue/Thu 13:30-14:50, Room 5508

Tutorial: Wed 19:00-19:50, Room 3598

4. Course Description

Duration: one semester

Credit: 4 units

Exclusion: MATH 3033

Prerequisite: Grade A in AL Pure Mathematics; or grade A- or above in MATH 2043

Synopsis: This course is the continuation of Math 2043. It teaches multivariable analysis and measure theory for advanced undergraduates who study mathematics, physics, economics, and engineering.

5. Intended Learning Outcomes

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

\* Explain and apply the rigorous formulation of calculus;

\* Develop a solid foundation for future study in pure mathematics, applied mathematics, and other physical sciences.

6. Assessment Scheme

20% homework, 30% midterm, 50% final

7. Student Learning Resources

Lecture notes written by the instructor.

8. Teaching and Learning Activities

Lectures: focus on illustrating the concepts of the course content.

Tutorials: focus on examples and problem solving skills.

## 9. Course Schedule

### 1) Multivariable Function (3 weeks)

norm in vector space, multivariable limit, continuity, multivariable algebra

### 2) Multivariable Differentiation (3 weeks)

differentiation, Taylor expansion, maximum and minimum, inverse function theorem, implicit function theorem

### 3) Measure Theory (7 weeks)

measure space, measurable function, Lebesgue integral, convergence theorem, product measure, multivariable Riemann integral, Radon-Nykodym theorem, fundamental theorem of Lebesgue differentiation, change of variable for multivariable integration