

THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MATH 2028 (First term, 2023-24)
Honours Advanced Calculus II
Course Outline

Course Description

This is a continuation of MATH2018. The following topics will be discussed: multiple integrals in n -dimensions: areas and n -volumes, surface areas, volumes of submanifolds and hypersurfaces in n -space, change of variables; vector analysis: line integrals, surface integrals, integration on submanifolds, Green theorem, divergence theorem and Stokes theorem in n -dimensions.

Instructor

- LI Man-chun Martin (Office: LSB 236. Email: martinli@math.cuhk.edu.hk)

Teaching Assistants

- CUI Han (Office: AB1 614, Email: hcui@math.cuhk.edu.hk)
Office Hours: please check on the course webpage
- WANG Yizi (Office: LSB 222A, Email: yzwang@math.cuhk.edu.hk)
Office Hours: please check on the course webpage

Time and Venue

- **Lectures:** Mon 10:30AM - 12:15PM at MMW 710; Wed 11:30AM - 12:15PM at WMY 301
- **Tutorials:** Wed 10:30AM - 11:15AM at WMY 301

Lectures, Tutorials and Homeworks

Tutorials form an integral part of the course and students are expected to attend all the lectures and tutorials. Although the lecture notes will be posted on the course webpage, for the benefit of the students, we **strongly suggest** you to take notes during the lectures by yourself. This is the best way to learn the materials with your own articulation in the process. Moreover, one cannot learn the subject well without working out lots of exercises. Therefore, students are expected to complete the homework assignment in detail by themselves (peer discussions are encouraged though but students are expected to do their own write-ups). Note that plagiarism is taken very seriously by the University and any related offence will lead to disciplinary action including termination of studies at the University.

Textbook and References

We will not be using just one single textbook for the course. Instead, we will roughly go through Chapters 3-5 of Spivak's book (**) in terms of content, but supplemented with more expanded details and with a more modern treatment on differential forms, see e.g. Chapter 1-3 of (*):

- (**) M. Spivak, *Calculus on Manifolds*, 5th edition, CRC press
- (*) V. Guillemin and P. Haine, *Differential Forms*, World Scientific

Other classics textbooks which provide a more theoretical treatment include

- J. Munkres, *Analysis on Manifolds*, 1st edition, CRC press
- W. Fleming, *Functions of Several Variables*, 2nd edition, Springer

You will also find useful the following more modern references which contain more computational examples and applications:

- *Thomas' Calculus, Early Transcendentals*, 13th edition
- J. Hubbard and B.B. Hubbard, *Vector Calculus, Linear Algebra, and Differential Forms: A Unified Approach*, 5th edition, Matrix Editions
- T. Shifrin, *Multivariable Mathematics: Linear Algebra, Multivariable Calculus, and Manifolds*, 1st edition, Wiley

Assessment Scheme

- **Assignments:** 10%

Assignments will be posted on the course webpage every week. Although you are asked to hand in a few selected problems only, you are supposed to do all of them. Please use the Blackboard system to submit your homework assignments.

- **In-class Midterm:** 40%

There will be one in-class midterm on October 25, 2023 (Wednesday) from 10:30AM to 12:15PM.

- **Final Examination (TBA):** 50%

The final examination will be centralized by the University and it will be within the official examination period of December 6 – 22, 2023. The exact date and time will be announced around late October to mid-November. Please do not make any travel plan until you know the examination dates. No make-ups or special arrangements can be made by the instructor or the Department.

Course Webpage

Please check regularly Blackboard and the following course webpage for course materials and announcements:

<http://www.math.cuhk.edu.hk/course/2324/math2028>

Honesty in Academic Work

The Chinese University of Hong Kong places very high importance on honesty in academic work submitted by students, and adopts a policy of zero tolerance on cheating and plagiarism. Any related offence will lead to disciplinary action including termination of studies at the University.

The Honour Code and Code of Conduct for Students has been formulated and approved by the University. It is available at the online Student Handbook via the following website:

http://rgsntl.rgs.cuhk.edu.hk/aqs_prd_aplx/Public/Handbook/document.aspx?id=1987&tv=F&lang=en