

THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
SAYT 1134 (Summer term, 2024-25)
Towards Differential Geometry
Course Outline

1 Course Introduction

This course, combining the knowledge of calculus and geometric intuition, leads students to explore the fruitful variety of curves and surfaces beyond lines, planes, and conics. Students will use calculus up to partial differentiation to describe curves and surfaces, to calculate the tangent vector, normal vector and curvature, tangent plane, geodesic and Gaussian curvature. Other essential geometric theorems, such as Gauss-Bonnet, will be introduced.

A thorough study on the lecture notes will be sufficient for this course. Materials for optional and extra readings are for those who want to learn more. It is not intended for examination. Further references are suggested as we proceed, and they are for optional readings as well.

Once again, may I point out that we not only need to READ mathematics, we need to DO mathematics. Try to go through as many exercises as you can. They are organic components of the lecture notes. Don't just sit there and wait for the model answers.

2 Course Information

- Course Code: SAYT 1134
- Lecture and Tutorial Date: 9/8, 12/8, 14/8, 16/8, 19/8, 21/8, 23/8, 26/8, 27/8, 2024
(Reserved Date: 22/8, 28/8, 31/8, 2024)
- Time and Venue
 - **Lectures:** 10:30am-1:15pm at MMW 702 (except 9/8, 26/8, 27/8) MMW 703 (9/8, 26/8, 27/8 only)
 - **Lunch Time:** 1:30pm-2:30pm (at own expenses)
 - **Tutorial:** 2:30pm-5:15pm
 - * Group 1: MMW 705 (except 12/8, 14/8), LSB 222 (12/8, 14/8 only)
 - * Group 2: MMW 702
 - * Group 3: MMW 704
 - * Group 4: MMW 706

3 Course Instructor

- Dr. Man Chuen CHENG
- Contact information:
 - Office: Room 210, Lady Shaw Building
 - Phone: 3943 7985
 - Email: mccheng@math.cuhk.edu.hk
 - Office hours: By appointment

4 Teaching Assistants

- Group 1: ***Clive Chan**, Ryan Lam, Kai-Kwan Lau, Marco Wong
- Group 2: ***Max Shung**, James Chau, Nelson Lam
- Group 3: ***Michael Cheung**, Thomas Lam, Ming Chan
- Group 4: ***Alex Tang**, Toby Lam, Jacky Wong

The teaching assistant marked with * is the group leader of the corresponding group. Contact information of each group leader will be provided during the first tutorial lesson.

5 Assessment Scheme

- **Classwork:** 10%
You are required to attend ALL tutorials and attempt the classwork exercise.
- **Test 1:** 20%
It is scheduled on 16 August, 2024 (Friday)
- **Test 2:** 20%
It is scheduled on 23 August, 2024 (Friday)
- **Final Examination:** 50%
The final examination is centralized and scheduled on 30 August, 2024 (Friday)

6 References

- *Differential Geometry of curves and surfaces*, 2nd edition, Manfredo P. do Carmo, Dover
- *Linear Algebra*, 4th edition, Friedberg, Pearson
- *Thomas' Calculus*, 14th edition, Thomas, Weir & Hass, Pearson

7 Attendance and Absence

7.1 Attendance

Attendance will be taken at the beginning of **every** lectures and tutorials. Please arrive on time. An unsatisfactory attendance rate may lead to a grade deduction at the end of the course.

7.2 Application for Absent and Corresponding Arrangement

- **Sick Leave:** In case of illness necessitating absence, the student shall write an email to the **course instructor** (Dr. Cheng, email: mccheng@math.cuhk.edu.hk) with your medical certificate attached, within two days from the day of absence.
- **Personal Leave:** Students who wish to apply for a leave of absence for **non-medical reasons** shall apply in writing to obtain permission from the **course instructor**, with the reason and supporting documents two days before the day of absence.

8 Group Changing Arrangement

- **General Arrangement.** After each test, your teaching assistants will examine your test results and in-class performance. Only students with extraordinary performance will be considered.
- **Special Application.** Students may apply for group changing. Critical reasoning must be provided. Students are reminded that group changing is not common. Please don't expect a high chance to change your group with your own application.

For general arrangement, the group changing result will be informed in the next lecture after the test. For special applications, the result will be informed in the next lecture after the day of application. Students have to attend the changed class on the informed day.

9 Course Webpage

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

<https://www.math.cuhk.edu.hk/course/2324/sayt1134>