Math1014- Calculus II

Course Outline - Fall 2023

1. **Instructor(s)**

   Name: Maosheng Xiong

   Contact Details:

   Office: Room 3476 Phone: 2358-7456 Email: tklam@ust.hk

2. **Teaching Assistant(s)**

   Name: LAU Hing Sang

   Contact Details:

   Office: Room 3011 (Math Support Center) Email: mahslau@ust.hk

3. **Meeting Time and Venue:**

   Lecture:

   Date/Time/Venue:

   - Tu/Thu 10:30 - 11:50, CYT-LTL

   Tutorial:

   Date/Time/Venue:

TA: LAU Hing Sang	TA:
T1A: Fri 11:30am – 12:20pm, Rm 4504 T1B: Tue 18:00pm – 18:50pm, Rm 1410 T1C: Mon 14:00pm – 14:50pm, LSK 1034	T1D: Thu 15:00pm – 15:50pm, LSK 1010 T1E: Fri 18:00pm – 18:50pm, CYTG009A

4. **Course Description**

   Credit Points: 3

   Pre-requisite: Math1012, or Math1013, or Math1023, or grade A- or above in Math1003

   Exclusion: AL Pure Mathematics, AL Applied Mathematics, Math1020, Math1024.

   Brief Information/synopsis:

   This course is a sequel to Math1012 or Math1013. Topics include applications of definite integrals, integration techniques, improper integrals, infinite sequences and infinite series, power series and Taylor series, and vectors.

5. **Intended Learning Outcomes**

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

No.	ILOs
1	apply basic integration skills;
2	apply the method of integration on formulating and solving problems;
3	solve convergence problems of infinite sequences and series;

4	apply various vector operations in dimension 2 and 3.

6. Assessment Scheme

a. Examination duration: final exam 3 hrs

b. Percentage of coursework, examination, etc.:

Assessment	Assessing Course ILOs
10% by online WeBWork homework (https://webwork.math.ust.hk)	1, 2, 3, 4
35% by midterm exam	1, 2, 3, 4
55% by final exam	1, 2, 3, 4

c. The grading is assigned based on performance in assessment tasks.

7. Student Learning Resources

Recommended Reading:

Text/Reference:

J. Hu, W.-P. Li, Y. Wu, “Calculus for scientists and engineers with matlab”.

J. Stewart, “Calculus–Early Transcendentals”. Brooks/Cole.

8. Teaching and Learning Activities

Scheduled activities: 4 hrs (lecture + tutorial)

9. Course Schedule

Keyword Syllabus:

- Review of definite integrals and the Fundamental Theorem of Calculus.
- Integration by parts, trigonometric integrals, trigonometric substitutions, polar coordinates and calculus, partial fractions.
- Numerical integration
- Improper integrals.
- Area of a region between curves
- Volume by the methods of slicing and cylindrical shells.
- Length of curves, surface area, work, average value of a function.
- Sequences and infinite series, divergence and integral, ratio, root, and comparison tests, alternating series.
- Taylor polynomials, power series and Taylor series.
- Vectors in two and three dimensions, dot products, cross products.