Math1014-L3 Calculus II
Course Outline - Spring 2023-2024

1. **Instructor(s)**

   Name: Dr. LAM, Tsz Kin

   Contact Details:

   Office: Room 3419   Phone: 2358-7457   Email: tklam@ust.hk

2. **Teaching Assistant(s)**

   Name: Zi WANG (zwanghk@connect.ust.hk), Junwei MA (jmass@connect.ust.hk),

        Jiayi WEN (jwenap@connect.ust.hk)

3. **Meeting Time and Venue:**

   Lecture:

   Date/Time/Venue:

      L3: TuTh 12:00 - 13:20, LTE

   Tutorial:

   Date/Time/Venue:

   - T03A: Mon: 18:00pm – 18:50, Rm 1007 LSK   (Zi Wang)

   - T03B: Thu 16:00pm – 16:50pm, G009B, CYT   (Junwei Ma)

   - T03C: Wed 18:00pm – 18:50pm, Rm 1011 LSK   (Jiayi Wen)

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**

   Text/Reference:

   J. Stewart, "Calculus–Early Transcendentals". Cengage.

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

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.