Course Outline of MAT1001: Calculus I (L07 L08)

For L07: Tuesday and Thursday, 10:30 AM – 12:20 PM, CD 101
For L08: Tuesday and Thursday, 3:30 PM – 5:20 PM, CD 102

Course Instructor

Xiaoying Tang (唐晓莹)
https://scholar.google.com/citations?hl=zh-TW&user=S1a25sEAAAAJ&view_op=list_works&sortby=pubdate
Email: tangxiaoying@cuhk.edu.cn
Office: Chengdao 401
Office Hours: Wednesday, 4 – 5:30 PM
Appointments may also be set up via emails.

Course Description

This course covers one-variable calculus. It emphasizes intuitive and conceptual understanding of the theory of Calculus, as well as computation skills; it cultivates the ability to use Calculus to solve problems within mathematics and from other scientific disciplines.

Course Material

[Textbook] *Thomas' Calculus (13th Edition in SI Units)*, George B. Thomas Jr., Maurice D. Weir, Joel R. Hass.
Publisher: Pearson.

[Reference Book] *Calculus: Early Transcendentals (8th Edition)*, James Stewart.
Publisher: Brooks Cole.

Additional supplementary notes may be posted on **Blackboard** (https://bb.cuhk.edu.cn).

Course Assessment

Assignments: 20%
Quizzes: 10%
Midterm examination: 25% (Tentative midterm date and time: 9:30 – 11:30 AM, Saturday, October 28)
Final examination: 45%

Teaching Assistants (TA) and Tutorial Sections

For L07:

Mr. Huaiyu Li(李怀宇)，223010059@link.cuhk.edu.cn
Tutorial T25, Thursday 18:00 – 19:30, TD_109

Mr. Weizhe ZHANG(张伟哲)，223010143@link.cuhk.edu.cn
Tutorial T26, Thursday 19:30 – 21:00, TD_109

Mr.Yuan GAO (高源), 223010141@link.cuhk.edu.cn
Tutorial T27, Friday 18:00 – 19:30, TD110

Mr. Siyuan Wang (王思源), 222013004@link.cuhk.edu.cn
Tutorial T28, Friday 19:30 – 21:00, TD110

For L08:

Mr. Yuansheng Lin (林源盛), 223010100@link.cuhk.edu.cn
Tutorial T29, Wednesday 18:00-19:30, TD113

Mr. Yuansheng Lin (林源盛), 223010100@link.cuhk.edu.cn
Tutorial T30, Wednesday 19:30-21:00, TD113

Mr. Guanwu Lian (连观武), 223010095@link.cuhk.edu.cn
Tutorial T31, Friday 18:00-19:30, TD111

Mr. Yucong Huang (黄於聪), 223010097@link.cuhk.edu.cn
Tutorial T32, Friday 19:30-21:00, TD111

Tutorials

In addition to lectures, each student is assigned with an 80-minute tutorial each week.

- Tutorials will start on September 11.
- Tutorials will be conducted by teaching assistants (TAs).
- During the tutorials, TAs will go over some assignment problems (additional examples may be presented if time permits).
- Quizzes will be conducted in tutorials.
- You must attend your assigned tutorial section (i.e., if you are in Tutorial T03, you CANNOT attend T01), or your quiz grades will NOT be recorded.

Quizzes

- There will be four 30-minute quizzes in total. Quiz dates are:
  - Quiz 1: Sept 18 – 22 (Week 3)
  - Quiz 2: Oct 9 – 13 (Week 5)
  - Quiz 3: Nov 13 – 17 (Week 10)
  - Quiz 4: Dec 4 – 8 (Week 13)

- There will not be any make-up quizzes **for any reason**. Instead, to compensate for special situations (including, but not limited to, sickness, injury, stress, and family emergency) while keeping logistic simplicity, **your lowest quiz score will not be counted toward the term grade** (i.e., only your best three will count).

Assignments

- Most of the time, there will be an assignment weekly (except special situations, such as holidays and the midterm exam week).
- Assignments should be submitted online to **Blackboard** (https://bb.cuhk.edu.cn).
- **No late submission will be accepted.** Instead, to compensate for special situations (including, but not limited to, sickness, injury, stress, and family emergency) while keeping logistic simplicity, **your lowest assignment score will not be counted toward the term grade.**
- To avoid internet traffic jam, you are strongly encouraged to submit your solution at least two hours before the deadline --- we will not be responsible if you are not able to submit your solution at the last minute due to slow internet speed.
- No solution will be posted for the assignments. (Use the tutorials and office hours wisely!)

Policy of Assignments/Quizzes/Exams

- You are allowed (and encouraged) to discuss the assignment problems with your classmates, but you should always write your own solution independently. Direct copying or slight changes in symbols would be considered cheating; **any cheating cases will result in a grade of zero and may be reported to the Academic Disciplinary Committee**.

- There will not be any make-up midterm. Make-up final exam is only possible if the absent student could provide a strong valid reason with formal documental proof and has his/her application submitted within five days since the examination day. (Remembering the wrong exam time, setting the alarm time incorrectly, having pressures from other exams and activities, etc., are not considered valid reasons.)

- **All quizzes and exams are close-book; notes, calculators and dictionaries will NOT be allowed.**

Grade Appeal Policy

- After the release of the grade for each assignment, you may have questions or doubt regarding the marking (e.g., why did I only get two points out of three for this question?). You may express your concern to the marker via emails and ask for a reason. If there is a marking mistake, your grade can be corrected. **However, any such appeal must be done within two weeks since the grade release date. After that, your assignment grade will not be changed even if there is a marking mistake.**
- Appeal regarding the midterm exam marking must be done within two weeks after the paper return date. **After that, your midterm grade will not be changed even if there is a marking mistake.**
- Once the official course letter grade is released on the SIS (Student Information System), all concerns regarding the final exam grade and the course grade must be raised to your instructor formally via email within two weeks since the grade release date. **Appeals that are raised after the deadline will not be handled.**

Course Contents

This course will cover most contents of Chapters 2 to 9 in the textbook, except 2.3, 6.6, 7.7, 8.1, 8.6, and 8.9 (these six sections will not be on the assignments/quizzes/exams, but your instructor may still cover them in class). The following is an outline of the course contents, which may be adjusted slightly as the term progresses.

- Rates of change, Limit of a function and limit laws, one-sided limits, continuity, infinite limits, asymptotes of graphs.
- The derivative and tangent line at a point, derivative functions, higher order derivatives, differentiation rules, derivative of trigonometric functions, chain rule, implicit differentiation, related rates.
- Linearization and differentials, extreme values of a function, mean value theorem, monotonicity, first derivative test.
- Concavity, second derivative test, curve sketching, applied optimization.
- Newton's method, area approximation by using left, right, and mid sums, limits of these sums, definite integrals.
- Fundamental theorem of calculus, antiderivatives and indefinite integrals, substitution method.
- Area between curves, volumes using cross-sections and cylindrical shells, arclength.
- Work and fluid forces, inverse functions and their derivatives, natural log, exponential functions.

- L’Hôpital’s rule, inverse trigonometric functions, relative rates of growth, integration by parts.
- Trigonometric integrals, trigonometric substitutions, partial fractions method.
- Numerical integration: by rectangle, trapezoidal and Simpson’s rules, improper integrals.
- First-order ordinary differential equations (ODE): solutions, slope fields, Euler’s method, linear equations, separable equations.
- Applications of ODE: “mixing problems”, Malthusian model, Logistic model, autonomous equations, phase-line analysis.