

# Course Syllabus

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## The Hong Kong University of Science and Technology (Guangzhou) UG Course Syllabus

**Course Title:** Honors Calculus II **Course Code:** UFUG 1106 **Number of Credits:** 3

**Pre-/co-requisites:** UFUG 1105 (Honors Calculus I)

### 1. Name and Office Hour of Instructor:

Jishan Hu: [jishanhu@hkust-gz.edu.cn](mailto:jishanhu@hkust-gz.edu.cn)

[\(mailto:jishanhu@hkust-gz.edu.cn\)](mailto:jishanhu@hkust-gz.edu.cn)

Room E3-302, TuTh 11:00-13:00, 15:00-16:00



### 2. Lecture Day, Time, and Venue:

UFUG 1106 (L01) TuTh 13:30 - 14:50 Room E1-148

UFUG 1106 (L08) TuTh 16:30 - 17:50 Room W4-102

### 3. Information of Teaching Assistants (TAs):

To be announced.

### 4. Tutorial Day, Time, and Venue:

T01: Th 20:00 - 20:50 Room E1-148

T08: Fr 19:00 - 19:50 Room E1-148

## 5. Course Description:

This course is the second in a year-long sequence of two courses in one-variable calculus, intended for first-year undergraduate students with a strong mathematical background. In addition to foundational concepts and practical skills in applying calculus, the course emphasizes rigorous reasoning about practical facts and the proofs of certain mathematical theorems. Topics include definite and indefinite integrals, numerical calculations, applications to geometry and physics, and infinite series.

## 6. Intended Learning Outcomes (ILOs):

- A – Knowledge/Content Related;
- B – Academic Skills/Competencies;
- C – Others.

Upon completion of this course, students are expected to be able to do the following.

### Nature Course ILOs

- |        |   |
|--------|---|
| 1 A    | Understand the core ideas and concepts of integration and infinite series.  |
| 2 A, B | Calculate integration symbolically and numerically and explain clearly and rigorously the concepts and reasoning in all the calculations. |
| 3 B, C | Apply integration to solve problems and explain the paradigm of the applications.   |
| 4 A, B | Determine the convergence of infinite series and understand the theoretical issues.   |
| 5 B, C | Develop core mathematical skills such as rigorous argument and coherent writing.  |
| 6 C    | Develop the appreciation of the special characteristics of mathematics, abstract and yet relevant to everyday life.                       |

## 7. Weekly Schedule and Weekly ILOs:

Week	Topics	Weekly ILOs
1, 2	Definitions of integration and integrable functions. Criteria for integrability.	Write short proofs for some key notions, understand areas and integrals.
3	Properties of integrability.	Determine whether a function is integrable.
4	Fundamental Theorem of Calculus. Newton-Leibniz formula.	Understand the relation between integration and differentiation.
5	Integration by substitution. Integration by parts.	Use the techniques learned to evaluate specific integrals.
6	Integration of rational functions. Trigonometric substitution. Numerical integration.	As above, both analytically and numerically.
7	Improper integrals. Comparison test.	Analyze integrals in the context of unbounded domains or functions.
8	Geometry applications.	Calculate specific geometry quantities.

9	Applications for physics.	Calculate specific physical quantities.
10–12	<p>Infinite series. Partial sums. Absolute convergence and conditional convergence. Series versus improper integrals. Basic tests of convergence.</p> <p>include the term test, the comparison test, and the limit comparison test.</p> <p>Advanced tests of convergence, such as the alternating series test, the ratio test, and the root test.</p>	<p>Apply the test methods learned to determine whether specific series converge or diverge.</p>
13	<p>Power series.</p> <p>Interval of convergence. Taylor series.</p>	<p>Find Taylor series for specific functions.</p>

## 8. Assessment and Grading:

### • Grading Rubrics:

This course will be assessed using criterion-referencing and grades will not be assigned using a curve.

A: [100,85]; B: (85,70]; C: (70,55]; D: (55,35]; F: (35,0].

Subgrades (e.g., A-, B+, etc.) will be assigned for every 5 points within these ranges.

Grade adjustment will not be considered when more than 60% of students achieve a B- or higher.

• **Assessment Tasks and Their Contributions:**

Assessment Task	Contribution to		Due date
	Overall	Course	
	Grade (%)		
Assignments	10%		TBA, uniform across sessions.
Midterm Exam	45%		TBA, uniform across sessions.
Final Exam	45%		TBA, uniform across sessions.

Assessment marks for individual assessed tasks will be released within two weeks of the due date.

• **Course Grade Descriptors:**

Grades	Short Description	Elaboration on the subject grading description
A	Excellent Performance	Demonstrates comprehensive analysis and application of integration in problem-solving and mathematical proofs, along with significant creativity in thinking. Exhibits a high capacity for scholarship that goes beyond core requirements to achieve learning goals.
B	Good Performance	Shows a good knowledge and understanding of the main subjects in Honors Calculus II, competence in problem-solving and mathematical proofs, and the ability to analyze and evaluate issues. Displays high motivation to succeed in this course.
C	Satisfactory Performance	Possesses adequate knowledge of the core subject matter, competence in handling familiar problems, and some capacity for analysis and critical thinking. Demonstrates satisfactory conceptual understanding of calculus, although computational skills may be adequate, weak, or inadequate.

D	Marginal Pass	<p>Possesses threshold knowledge of the core subject matter and problem-solving skills. Shows potential for further development in the discipline.</p> <p>Demonstrates a marginal level of performance, with a lack of understanding and a low level of computational skills.</p>
F	Fail	<p>Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort toward achieving learning goals. Overall, performance is unsatisfactory, showing no understanding.</p>

## 9. Course AI Policy:

- In exams, calculators cannot be allowed. The use of various tools (including, but not limited to, AI tools, the internet, mathematical software, etc.) is strictly prohibited.
- In all other parts of the course, the use of tools is not prohibited.

## 10. Communication and Feedback:

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include [specific details, e.g., strengths, areas for improvement]. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

## 11. Resubmission Policy:

[If applicable, explain the policy for resubmitting work or reassessment opportunities, including conditions and deadlines.]

## 12. Required Texts and Materials:

Honors Calculus, by Jishan Hu, Min Yan, and Ziteng Cheng


## 13. Academic Integrity:

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST(GZ)'s Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Regulations for Academic Integrity and Student Conduct for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

## 14. Additional Resources:

Calculus, Early Transcendentals, by James Stewart

## Course Summary:

Date	Details	Due
	 <a href="https://hkust-gz.instructure.com/courses/2989/assignments/22722">Midterm Exam (https://hkust-gz.instructure.com/courses/2989/assignments/22722)</a>	