VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY

MA003IU- CALCULUS 2 S2 2022-2023

Lecturer: Dr. Nguyễn Minh Quân. Office: O2. 610
Office Hours: Tue.: 9 AM-11 AM, and/or by appointment.
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Lectures (Group 7): Friday 8AM-11:25 AM (4 periods) at A2.307

Teaching Assistants:
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Link for the class drive:
https://drive.google.com/drive/folders/11r737ToOtPHabQXoD7AYVkDeeAGo87Ba?usp=sharing

Textbook: J. Stewart, *Calculus,* Cengage Learning, 8th edition, 2016 **(Chapters: 11-16)**.

References: J. Rogawski, *Calculus, Early Transcendentals*, W. H. Freeman, 2008.
G. James, *Modern Engineering Mathematics*, 4Ed., Pearson Education, 2011.

Course Objective: To provide the students with the main notions and techniques of calculus of **functions of several variables** concerning limits, continuity, differentiation, and integration; basic skills of computing the sum of **series**; and **vector calculus**. Many applications explain how to use these notions and techniques in practical situations.

Contents: Sequence and Series; Convergence Tests; Power Series; Taylor and Maclaurin Series; Cartesian Coordinates; Lines, Planes and Surfaces; Derivatives and Integrals of Vector Functions, Arc Length and Curvature, Parametric Surfaces; Functions of Several Variables; Limits, Continuity, Partial Derivatives, Tangent Planes; Gradient Vectors; Extrema; Lagrange Multipliers; Multiple Integrals: Double Integrals, Triple Integrals, Techniques of Integration; Vector Fields, Line Integrals, Surface Integrals.

Learning outcomes:
Upon the successful completion of this course students will be able:
1. To master the basic concepts of calculus of functions of several variables, sequences, series, vector calculus.
2. To understand how to test the convergence/divergence of a series.
3. To know how to calculate the dot product, cross product, and master the relation of vectors and the equations of lines and planes.
4. To know how to calculate the partial derivatives and applications in optimization.
5. To know how to calculate the multiple integrals, line integrals, surface integrals, and applications in engineering.
6. To utilize mathematical methods and models to explore natural phenomena.

Assessments: Your final grade will be determined by averaging your grades for exams and assignments with the following weightings:

> ➢ *Assignments/Quizzes/HW and class attendances: 20%.*
> ➢ *Midterm Test: 30%.*
> ➢ *Final Exam: 50%.*

Important Info:

- In the midterm or final exam, each student is allowed two sheets of size A4 (two cheat sheets) to take notes and summarize the method and formulas.
- Assignments and quizzes will be assigned regularly. Your grade on "**Assignments/Quizzes and class attendance**" is the average score of all in-class quizzes (40%) and all assignments on Myopenmath (60%) with bonus (if any). More than half of the quizzes are given **randomly** in class.
- **Assignments, lectures, and announcements will be posted on IU Blackboard and/or www.myopenmath.com.** The method to access the class on "myopenmath" will be announced on Blackboard later.
- **Bonus credits for active class participation:** Bonus points will be given for students who raise good questions, or answer the questions from the lecturers, or solve the problems/questions on the board when suggested/requested.

Tips for success: Attend classes regularly, active in learning and class participation, doing exercises on **myopenmath**, self-motivation, **self-study**, **read/review** the material before and after the class, do in-class quizzes and assignments seriously, **teamwork** (allowed to discuss on assignments), meet the instructor if have troubles, speak out and raise questions, improve your problem-solving skills: firstly, make appropriate series of mini-questions and secondly, find the answers to these mini-questions.

Academic Integrity: Students are expected to adhere to the university policy on academic honesty. Cheating will result in formal charges.

Workload: You are expected to work about 7 hours of work per week outside of class. Some of you will do well with less time than this, and some of you will need more.

Attendance: I expect you to attend classes regularly unless you have a valid excuse. Please remember that once you miss classes and fall behind, it is very difficult to get back on track.

Classroom Conduct!

Cell phones must be off or set to silent mode in the classroom. Leave the class to conduct your emergency conversation. Remove any headphones once class sessions begin. Use smartphones and laptops appropriately, for course-related purposes only. Surfing the Web, doing homework, checking email/Facebook, texting on smartphones, phone/PC alerts during lectures are rude and disrespectful.

INPORTANT DATES:

Week 1: April 10-15
Week 8: May 29-June 3
Midterm week: June 5-10

Week 9: June 12-17
Week 15: July 24-29 (last week of classes)
<mark>**Final exam weeks: July 31—August 12**</mark>
Holidays: Sat April 29—Wed May 03, 2023 (no classes)

THE DETAILED CONTENT:

Name of Chapter	Descriptions
Chapter 1. Sequences and Series (Chapter 11 in Stewart's book) Week 1-2-3-4	1.1 Sequences 1.2 Series 1.3 The Integral Test and Estimates Sums 1.4 The comparision Tests 1.5 Alternating Series 1.6 Absolute Convergence and the Ratio and Roots Tests 1.7 Staregy for Testing Series 1.8 Power Series 1.9 Representations of Functions as Power Series 1.10 Taylor & Maclaurin Series 1.11 Applications of Taylor Polynomials
Chapter 2. Vectors and the Geometric of Space (Chapter 12 ans Sec 13.1 in Stewart's book) Week 5-6	2.1 Vectors in 3-Spaces 2.2 The Dot Product and Applications 2.3 The Cross Product and Applications 2.4 Equations of Lines and Planes 2.5 Cylinders and Quadric Surfaces 2.6 Vector Functions and Space Curves (Section 13.1)
Chapter 3. Partial Derivatives (Chapter 14 in Stewart's book) Week 7-8-9 <mark>Midterm right after week 8</mark>	3.1 Functions of Several Variables 3.2 Limits and Continuity 3.3 Partial Derivatives 3.4 Tangent Planes and Linear Approximations 3.5 The Chain Rule 3.6 Directional Derivatives and Gradient Vectors 3.7 Maximum and Minimum Values 3.8 Lagrange Multipliers

Chapter 4. Multiple Integals (Chapter 15 in Stewart's book) Week 10-11-12	4.1 Double Integrals over Rectangular Regions 4.2 Iterated Integrals 4.3 Double Integrals over General Regions 4.4 Double Integrals in Polar Coordinates 4.5 Applications of Double Integrals 4.6 Surface Area 4.7 Triple Integrals 4.8 Triple Integrals in Cylindrical and Spherical Coordinates
Chapter 5. Vector Calculus (Chapter 16 in Stewart's book) Week 13-14-15	5.1 Vector Fields 5.2 Line Integrals 5.3 The Fundamental Theorem of Line Integrals 5.4 Green's Theorem 5.5 Curl and Divergence 5.6 Parametric Surfaces and Their Areas 5.7 Surface Integrals 5.8 Stokes' Theorem and Divergence Theorem

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