



MATHEMATICS 23
Elementary Analysis III
COURSE GUIDE
Midyear 2026

COURSE DESCRIPTION

This course deals with limits and continuity of functions of several variables, partial derivatives and the total differential, directional derivatives, relative and absolute extrema of functions of several variables, double and triple integrals, applications of multiple integrals, vector fields, line integrals, and surface integrals.

Prerequisite: Math 22/equivalent

Credit: 4 units

COURSE LEARNING OUTCOMES

At the end of the course, the student should be able to:

1. evaluate limits and analyze the continuity of functions of several variables;
2. find partial derivatives and directional derivatives of functions of several variables;
3. solve problems involving total differential;
4. find relative and absolute extrema of functions of several variables;
5. evaluate double and triple integrals;
6. solve problems involving applications of double and triple integrals
7. evaluate line integrals and surface integrals; and
8. solve problems involving applications of line and surface integrals.

COURSE MATERIALS

The course materials include

- lecture and discussion videos for Math 23,
- Math 23 course module, and
- Math 23 lecture slides.

These materials are available via the Math 23 course page below.

UVLê Course Name: Math 23 (Elementary Analysis III)

Enrolment Key: Math23

Other suggested references are

- Anton, H., Bivens, I., & Davis, S. (2002). *Calculus: Early Transcendentals* (7th ed). John Wiley & Sons.
- Leithold, L. (1995). *The Calculus* 7. Harper Collins College Div.
- Stewart, J. (2008). *The Calculus: Early Transcendentals* (6th ed). Thomson Brooks/Cole.

DELIVERY MODE

The course is a combination of face-to-face class meetings and online review and consultation days. Students are expected to have a reliable internet connection for online learning. Students may consult or ask questions regarding the lecture during the class period or the teacher's consultation hours.

Policy on Attendance

Attendance in face-to-face class meetings is required. As per university rule, a student must not absent themselves more than 20% of the total number of face-to-face class meetings. If most of their absences are excused, then the student must drop the course officially. Otherwise, they shall be given a grade of 5.0. Failure to submit an excuse letter with valid proof within one week after the absence will make the absence unexcused.

COURSE REQUIREMENTS

(a) Short Assessments

Teachers may give seatworks, homeworks, assignments, quizzes, or other types of short assessments to students. There shall be no make-up for these requirements in case of an absence.

(b) Four Long Exams

Each long exam will be administered face-to-face during a lecture class meeting. The tentative schedule of each long exam can be found in the course paced syllabus.

(c) Final Exam

The final exam is answerable in two hours and will be administered face-to-face during the finals week. The schedule of the final exam will be announced later in the semester.

On Missed Exams

A student who will not be able to take an exam due to a valid reason (e.g., medical) must explain in writing the reason for missing the exam and provide proof not later than one week after the exam. If the reason is deemed valid by the teacher, the percentage score on the final exam will be used for that particular exam. If the student misses another examination, they will automatically be given a zero score in that exam. A student who fails to communicate within a week after the missed exam or whose reason is not valid as deemed by the teacher shall automatically be given a score of zero for that exam.

If a student misses a long exam and again misses the final exam, then the score for the final exam will be zero. Consequently, the score of the missed long exam will also be zero.

In the event that a student misses only the final exam with valid excuse, a grade of INC shall be given provided that the class standing of the student is passing (at least 60%). Otherwise, the student shall be given a score of zero for the final exam.

GRADING SYSTEM

The final grade of a student will be based on the following computation:

Short Assessments	10%
First Long Exam	15%
Second Long Exam	15%
Third Long Exam	15%
Fourth Long Exam	15%
Final Exam	30%
Total	100%

Students shall be given a final grade according to the transmutation table below.

1.00	[93,100]	2.50	[70,75)
1.25	[90,93)	2.75	[65,70)
1.50	[87,90)	3.00	[60,65)
1.75	[84,87)	4.00	[55,60)
2.00	[80,84)	5.00	[0,55)
2.25	[75,80)		

Dropping, INC, and 4.0

A student is officially dropped from the course if they complete the dropping process via CRS.

A student who gets a grade of INC may take a completion exam within the prescribed completion period.

A student who gets a grade of 4.0 may take a removal exam within the prescribed removal period.

ACADEMIC INTEGRITY

By enrolling in this course, students are expected to adhere to the highest standards of honor and academic integrity and be bound by the following pledge.

As a student of the University of the Philippines, I pledge to act ethically and uphold the value of honor and excellence. I understand that suspected misconduct on given short assessments, long exams, and final exam will be reported to the appropriate office and if established, will result in disciplinary action in accordance with university rules, policies, and procedure.

IMPORTANT DATES

- Deadline of change for matriculation: 25 June 2026 (Thursday)
- Deadline of dropping: 13 July 2026 (Monday)
- Deadline for filing leave of absence (LOA): 21 July 2026 (Tuesday)
- Finals week: 24 July 2026 (Friday) – 27 July 2026 (Monday)

DATE	DAY	MODE	TOPIC / ACTIVITY
18 JUN	Th	face-to-face	Orientation; Review of Relevant Math 22 Topics 1.1 Functions of Several Variables, Level Curves and Level Surfaces
19 JUN	F	face-to-face	1.2 Limits and Continuity of Functions of Several Variables; 1.3 Partial Derivatives, Higher Order Derivatives
22 JUN	M	face-to-face	1.4 Differentiability, Differentials, Local Linear Approximation;
23 JUN	T	face-to-face	1.5 Chain Rule; Implicit Differentiation 1.6 Directional Derivatives, Gradients, Tangent Planes
24 JUN	W	online	Review and consultation day
25 JUN	Th	face-to-face	First Long Exam (Coverage: 1.1 – 1.6)
		online	2.1 Relative Extrema and Second Derivatives Test
26 JUN	F	face-to-face	Continuation of Topic 2.1; 2.2 Absolute Extrema and Lagrange Multipliers
29 JUN	M	face-to-face	2.3 Parametric Surfaces and Surfaces of Revolution
30 JUN	T	face-to-face	2.4 Volumes as Double Integral in Rectangular Coordinates
01 JUL	W	face-to-face	2.5 Double Integrals over General Regions; 2.6 Double Integrals in Polar Coordinates
02 JUL	Th	face-to-face	2.7 Applications of Double Integrals;
03 JUL	F	online	Review and consultation day
06 JUL	M	face-to-face	Second Long Exam (Coverage: 2.1 – 2.7)
		online	3.1 Mass as Triple Integrals in Rectangular Coordinates
07 JUL	T	face-to-face	Continuation of Topic 3.1; 3.2 More on Triple Integrals
08 JUL	W	face-to-face	3.3 Triple Integrals in Cylindrical Coordinates, Center of Mass; 3.4 Triple Integrals in Spherical Coordinates
09 JUL	Th	face-to-face	3.5 Vector Fields, Curl and Divergence; 3.6 Conservative Vector Fields
10 JUL	F	face-to-face	3.7 Line Integrals of Scalar Fields and Applications
13 JUL	M	online	Review and consultation day
14 JUL	T	face-to-face	Third Long Exam (Coverage: 3.1 – 3.7)
		online	4.1 Line Integrals of Vector Fields, Work
15 JUL	W	face-to-face	Continuation of Topic 4.1 4.2 Fundamental Theorem of Line Integrals, Independence of Path
16 JUL	Th	face-to-face	4.3 Green's Theorem
17 JUL	F	face-to-face	4.4 Surface Integrals of Scalar Fields; 4.5 Surface Integrals of Vector Fields
20 JUL	M	face-to-face	4.6 Stokes' Theorem; 4.7 Gauss's Divergence Theorem
21 JUL	T	online	Review and consultation day
22 JUL	W	face-to-face	Fourth Long Exam (Coverage: 4.1 – 4.7)
TBA		face-to-face	Final Exam

Schedules may be adjusted due to declared holidays or class suspensions.