



SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Teaching Language
MAT	203	Calculus(3)	4	3	0	2	6	MAT 102	3 ¹	English

A. Course Description

Creating a deep background of multivariable calculus and its applications which is essential to proceed to next courses.

B. Course Outcomes

At the end of this course the student will be able to:

- Work with different geometries in the space.
- Be familiar with functions of several variables and partial differentiation.
- Set up and compute multiple integrals in rectangular, polar, cylindrical and spherical coordinates.
- Be familiar with vector calculus.

C. References

Required Textbook

Calculus, R. T. Smith and R. B. Minton, 4th Edition, McGraw-Hill, 2012.

Other references:

- *Advanced Engineering Mathematics*, E. Kreyszig, John Wiley & Sons, INC 8th Edition, 1998.
- *Calculus*, O. Swokowski, et al, PWS Pub. Co.; 6th Edition, 1994.
- *Calculus*, F. Ayres & E. Mendelson, Schaum's Outline McGraw-Hill, 1st Edition, 1999.

Course Website: Google Classroom Webpage: <http://www.imamm.org/>

¹ B.Sc. in Applied Mathematics and B.Sc. in Physics (Level 4).



D. Topics Outline

- Vectors and Geometry of Space:** Vectors in Space, Dot and Cross Products, Lines and Planes in Space, Surfaces in Space, Cylindrical and Spherical Coordinates.
- Vector-Valued Functions:** Vector-Valued Functions of One Variable, Calculus of Vector Functions, Motion in Space, Curves and Parametrization, Tangent and Normal Vectors.
- Functions of Several Variables and Partial Differentiation:** Limits and Continuity; Partial Derivatives, Directional Derivatives, The Total Derivative, The Gradient of a Scalar Function, Tangent Plane, Chain Rule; Implicit Differentiation, Implicit and Inverse Function Theorems, Extrema, Maxima and Minima and their Tests, Constraints and Lagrange's Multipliers, Taylor's Series for Functions of Several Variables.
- Multiple Integrals:** Double Integrals in Cartesian Coordinates, Double Integrals in Polar Coordinates, Triple Integrals in Cartesian Coordinates, Triple Integrals in Cylindrical and Spherical Coordinates, Areas and Volumes, Change of Variables in Multiple Integrals, Improper Multiple Integrals.
- Vector Calculus:** Line and Surface Integrals, Curl and Divergence, Green's Theorem, Divergence Theorem, and Stokes Theorem, Applications.

E. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homework:** During the semester.
- **Final Exam:** 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 20 %	Midterm 2: 20 %	Final Exam: 40 %
Quizzes, Homework, Attendance & Participation: 20 %		

The grading distribution:

A ⁺	A	B ⁺	B	C ⁺	C	D ⁺	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)



G. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. (“Immediate family” is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

[Executive Rules for Study Regulations and Exams](http://goo.gl/ykm7t3)
goo.gl/ykm7t3

