



## 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	7	MAT 102	3 <sup>1</sup>	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, 4<sup>th</sup> Edition, McGraw-Hill, 2012.

#### Other references:

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

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

### D. Topics Outline

1. **Vectors and Geometry of Space:** Vectors in Space, Dot and Cross Products, Lines and Planes in Space, Surfaces in Space, Cylindrical and Spherical Coordinates.
2. **Vector-Valued Functions:** Vector-Valued Functions of One Variable, Calculus of Vector Functions, Motion in Space, Curves and Parametrization, Tangent and Normal Vectors.

<sup>1</sup> B.Sc. in Applied Mathematics and B.Sc. in Physics (Level 4).



3. **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.
4. **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.
5. **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:** 6<sup>th</sup> or 7<sup>th</sup> week.
- **Midterm 2:** 11<sup>th</sup> or 12<sup>th</sup> week.
- **Quizzes & Homework:** During the semester.
- **Final Exam:** 16<sup>th</sup> week.

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

<b>Midterm 1:</b> 20 %	<b>Midterm 2:</b> 20 %	<b>Final Exam:</b> 40 %
<b>4 Quizzes, 4 Homeworks, Attendance &amp; Participation:</b> 20 %		

The grading distribution:

A <sup>+</sup>	A	B <sup>+</sup>	B	C <sup>+</sup>	C	D <sup>+</sup>	D	F
[95, 100]	[90, 95]	[85, 90]	[80, 85]	[75, 80]	[70, 75]	[65, 70]	[60, 65]	[0, 60]



## G. Student Workload:

#	Teaching/learning activities	Contact Hours	Frequency	Total Contact hours	Self-study hours	Total self-study hours	Student Learning Time
1	Lecture	3	15	45	1	15	60
2	Tutorial	2	15	30	3	45	75
3	Lab\Practical	0	0	0	0	0	0
4	Homework	0	4	0	1	15	15
5	Quiz	0.25	4	1	1	4	5
6	Test (Midterm)	1.5	2	3	6	12	15
7	Final Exam	2	1	2	12	12	14
Total				<b>81</b>		<b>103</b>	<b>184</b>

Independent self-study =  $103/15 \cong 7$  hrs per week

## H. 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](http://goo.gl/ykm7t3)

