



Ministry of Higher Education and Scientific Research
Mustansiriyah University / College of Science / Department of Mathematics



(الخطة الدراسية للمساق)

Course Plan

Course No.: 54452114

Time Division: 4hr Theoretical and 1hr Practical

Course Name: Advanced Calculus **Semester & Year:** **First, 2022 / 2023**

Course Website: <https://uomustansiriyah.edu.iq/e-learn/profile.php?id=926>

Course Description:

This subject presents the Vectors, Lines, Planes, Areas and Volumes in the three dimensional spaces, Limits, Continuity, Derivatives, Partial Derivatives, Directional Derivatives, Gradients, Directional Derivatives, Tangent Planes and Normal Vectors, Directional Derivatives and Gradients, Maxima and Minima of Functions of Two Variables and Their Applications, Line Integrals, Double Integrals on rectangular regions, Double Integrals on nonrectangular regions and Areas and Volumes.

Course Intended Outcomes:

At the end of the Course, students are expected to be able to understand mathematical analysis and complex analysis properly.

Course Outline:

Week	Description depends on the Timing table(Theoretical & Practical)
1	Vectors : definitions, rules and examples
2	Vectors: theorems, examples
3	Line's equation and Plane's equation in the 3-dimensional space, examples
4	Vector-Valued Functions, Definition, Limits, Continuity, examples
5	Vector-Valued Functions, Definition, Limits, Continuity, examples
6	Vector-Valued Functions, Derivatives by definition and by theorems, examples
7	Partial Derivatives, theorems and chain's rule, examples
8	Tangent Planes and Normal Vectors, examples
9	Directional Derivatives and Gradients
10	Maxima and Minima of Functions of Two Variables and Their Applications, examples
11	Maxima and Minima of Functions of Two Variables and Their Applications, examples
12	Line Integrals, Double Integrals on rectangular regions
13	Double Integrals on nonrectangular regions
14	Double Integrals on nonrectangular regions
15	Areas and Volumes

Textbooks:

[1] Calculus by Howard.

[2] Thomas' Calculus by Pearson Education Inc., Publishing as Pearson Addison –Waselly.

[3] Wider Advanced Calculus, 2nd Edition