Course Specifications

General Information

Course name	Calculus (3)
Course number	MATH2303
Faculty	
Department	
Course type	Major Needs
Course level	2
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Students are expected to have a clear understanding of the ideas of Calculus

2 - The primary aims of the course are to help students develop new problem solving

3 - prepare the students for further study in mathematics

4 - providing the students experience with methods and applications of calculus

5 - This course will focus on understanding calculus concepts, analytical reasoning in three dimensions .

6 - This course provide students knowledge and the ability to work with the concepts of derivatives and integration is essential for further studies of mathematical subjects, as well as for applications of mathematical techniques in other sciences.

Intended Learning Outcomes

Knowledge and Understanding	* sketch and analyze curves of conic sections: parabola, ellipse, hyperbola * sketch and analyze curves given parametrically * graph curves in polar coordinates * compute areas and arc lengths using polar coordinates * recognize and apply algebraic and geometric properties of vectors in two and three dimensions * compute dot products and cross products and recognize their geometric meaning * visualize and sketch surfaces in three-dimensional space * compute and interpret partial derivatives of functions of several variables * set up and evaluate double and triple integrals using a variety of coordinate systems, including rectangular, polar
Intellectual Skills	* explain the mathematical concepts for each topic in this subject using specialist vocabulary; follow, and explain simple proofs from the lecture notes * apply relevant Theorems to problems in calculus iii * Calculate and understand iterated integrals, double integrals, triple integrals * solve extreme value problems by applying various techniques
Professional Skills	* Work effectively with others to complete homework and class assignments * Apply gained math skills in other scientific branches as physics and chemistry * Solve application problems * Use mathematical skills for solving problems in different topics in science
General Skill	* understand advanced topics in calculus * understand double and triple integrals * understand vector functions * understand polar coordinates

Course Contents

1 - Conic sections , parabola, ellipse, hyperabola

2 - Plane Curves and Polar Coordinates . Plane Curves, Tangent Lines, Arc Length ,Polar Coordinates , Polar Equations of Conics

3 - Vectors and Surfaces. Vectors in Two and Three Dimensions . Scalar Product . Vector Product . Lines and Planes . Surfaces

4 - Functions of several variables, limits, continuity, partial derivatives, differentials chain rules, directional derivatives gradients, tangent planes, normal lines and extrema of functions of two variables

5 - iterated integrals, double integrals, triple integrals, triple integrals in polar coordinates, and change of variables in multiple integrals

Teaching and Learning Methods

1 - Lectures

2 - Discussions

Students Assessment

Assessment Method	TIME	MARKS
Quizes		30%
Midterm Exam		30%
Final Exam		40%

Books and References

Essential books	Calculus; Earl W. Swokowski, fifth edition
Recommended books	Calculus by R. COURANT
	Calculus, 7th edition by James Stewart