FUTURE UNIVERSITY IN EGYPT
جامعة المستقبل

Faculty of Engineering & Technology

Differentiation with Applications and Algebra (Math 1)

Information :

Course Code :	MTH 111	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Faculty of Engineering & Technology

Instructor Information :

Title	Name	Office hours
Lecturer	Soliman Abdulkarim Alkhatib	7
Lecturer	Hany Abd El Ghaffar Abd El Aty El Deeb	
Lecturer	Soliman Abdulkarim Alkhatib	7
Assistant Lecturer	Doaa Nabil Sayed Mohamed Elsayed Khodair	10
Assistant Lecturer	Basma Magdy Ahmed Mohamed	12
Assistant Lecturer	TAREK ALI ABDALLAH TEAMA	7
Assistant Lecturer	Doaa Nabil Sayed Mohamed Elsayed Khodair	10
Assistant Lecturer	Basma Magdy Ahmed Mohamed	12
Teaching Assistant	Ahmed Elsayed Abdellatif Ibrahim Bedeir	
Teaching Assistant	Mariam Mohamed Kamal Abdelaziz	

Area Of Study :

Description :

Concepts of a function, limits, continuity, and differentiation. Rules of Differentiation. Differentiation of algebraic and transcendental functions and their Inverses. Application of derivatives. Taylor and Maclaurin expansion. Extrema of a function. Asymptote lines, Curve Sketching. Higher derivatives and Leibnitz Rule. Indeterminate forms and L'Hopital's rule. Algebra of determinants and matrices, Solution of linear systems. Gauss - Jordan Method, Iterative Methods. Eigenvalues and Eigenvectors.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Explain the concepts of function, limit, properties of functions, continuity, inverse of algebraic functions, rules of differentiation, differentiation of algebraic and transcendental functions with inverses, and curve sketching.
2 -	Explain the higher derivatives of functions, Leibnitz rule, curve sketching, and Taylor and Maclaurien series & polynomials with absolute error estimation.
3 -	Identify various forms of indeterminate quantities, and L'Hopital rule application for certain types of Indeterminate forms
4 -	Recognize determinants, matrix algebra, and direct and iterative methods for the solution of algebraic linear systems.
5 -	Illustrate the eigenvalues and the corresponding eigenvectors of a matrix
b.Intellectual Skills: :	
1 -	Analyze the theorems, concepts, methods, and rules of differentiation for algebraic and transcendental functions.
2 -	Apply Taylor theorem for the approximation of functions, and L'Hopital rule for Indeterminate quantities evaluations.
3 -	Apply matrix algebra, inverse matrix, reduced matrix, to the solution of linear system of algebraic equations.
4 -	Solve linear system of equations (homogeneous and non-homogeneous) by using Gauss - Jordan method, and other direct methods, or by any convenient iterative methods.
5 -	Apply matrix algebra in finding eigenvalues and eigenvectors.
c.Professional and Practical Skills: :	
1 -	Perform curve sketching to represent different engineering systems.
d.General and Transferable Skills: :	
1 -	Communicate effectively

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Concept of a function, limits, properties, Continuity, and Differentiation.	5	1	1
Rules of Differentiation. Chain rule, Implicit Differentiation. Differentiation of parametric functions.	5	1	1
Transcendental functions and differentiation. Trigonometric and Inverse Trigonometric Functions. Exponential and Logarithmic Functions. Hyperbolic and Inverse Hyperbolic functions	5	1	1
Application of derivatives. Taylor and Maclaurin expansion, polynomial, and series. Extrema of a function. Asymptote lines. Curve Sketching.	10	2	2
Higher derivatives and Leibnitz rule. Indeterminate Forms and L 'Hopital's Rule	10	2	2
Definitions and properties of determinants and matrices, Algebra of Matrices. Inverse Matrix.	5	1	1

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Reduced matrix. Rank of a Matrix. Solution of linear systems using inverse Matrix, and Cramer's Rule	10	2	1
Gauss - Jordan Method. Homogeneous and non-homogeneous systems. Square and rectangular systems	5	1	1
Solution of linear algebraic systems by Iterative Methods. Jacobi method, Seidel Method	5	1	1
Solution of linear algebraic systems by Iterative Methods. Jacobi method,	5	1	1
Eigenvalues and Eigenvectors of a matrix.	5	1	1
Eigenvalues and Eigenvectors of a matrix.	5	1	1

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion
Problem-based Learning

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final Exam	40.00		
Mid- Exam 1I	25.00		
Mid- Exam I	25.00		
Performance	10.00		

Course Notes :

Recommended books :

Periodicals :

Web Sites :