Faculty of Computers and Information Technology

Mathematics -1

Information :

| **Course Code :** | MT101 | **Level** | : | Undergraduate | **Course Hours :** | 3.00- Hours |

| **Department :** | Faculty of Computers and Information Technology |

Instructor Information :

Title	Name	Office hours
Lecturer	Ahmed Lotfy Ibrahim Ibrahim El Bably	19
Lecturer	Ahmed Lotfy Ibrahim Ibrahim El Bably	19
Teaching Assistant	Manar Afify Farag Hassan abo el Soud	
Teaching Assistant	Manar Afify Farag Hassan abo el Soud	
Teaching Assistant	Ahmed Mahmoud Ahmed Mahmoud	

Area Of Study :

Apply the basic concepts and theories of differentiation in different applications.
Combine and evaluate different applications of derivatives.
Use basic mathematics to learn the principles of differentiation and linear systems.
Analyze the analytical requirements of some applications of linear systems.
Carry out a self-learning and research for more applications of derivatives.

Description :

1) Calculus: A) Concept of a function, limits, Continuity, and Differentiation. B) Rules of Differentiation. Chain rule, Implicit Differentiation. Differentiation of parametric functions. C) Transcendental functions and differentiation. Trigonometric and Inverse Trigonometric Functions. Exponential and Logarithmic Functions.. Hyperbolic and inverse hyperbolic functions. D) Indeterminate Forms and L'Hopital's Rule. E) Application of derivatives. Taylor and Maclaurin expansion, polynomial, and series. Extrema of a function. Asymptote lines, Curve Sketching.
2) Algebra: A) Definitions and properties of determinants and matrices, Algebra of Matrices. B) Reduced matrix. Rank of a Matrix. Solution of linear systems using inverse Matrix, and Cramer's Rule. C) Gauss - Jordan Method. Homogeneous and non homogeneous systems. Square and rectangular systems. D) Solution of linear algebraic systems by Iterative Methods. Jacobi method, Seidel Method. E) Eigenvalues and Eigenvectors..

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Describe the basic methods for evaluating differentiation.
2 -	Discuss practices used in the applications of derivative
3 -	Explain solution of linear systems, inverse matrix, eigenvalues and eigenvectors.
b.Intellectual Skills: :	
1 -	Analyze the local and absolute extrema, and inflection points of representative functions.
2 -	Determine measurement criteria for the analytical and geometrical methods of continuous functions.
3 -	Prepare different solutions for linear algebraic systems by different methods.

c.Professional and Practical Skills: :

1 -	Analyze and design different cases of derivatives applications.
2 -	Use different theorems of linear algebra to solve problems.
3 -	Realize some properties and concepts to compute basic information like (eigenvalues and eigen vectors).

d.General and Transferable Skills: :

| 1 - | Exploit a range of learning resources of differentiation and linear algebra. |
| 2 - | Work in a team effectively and efficiently considering time and stress management. |

ABET Course outcomes :

1 -	Recognize the basic methods for evaluating differentiation.
2 -	Describe the functions by using differentiation.
3 -	Describe solution of linear systems, inverse matrix, eigenvalues and eigenvectors.
4 -	Compute and analyze the local and absolute extrema, and inflection points of representative functions.
5 -	Analyze the analytical and geometrical concepts of continuous functions.
6 -	Analyze the solution of linear algebraic systems by Iterative Methods.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Concept of a function, limits, Continuity, and Differentiation.	4	2	2
Rules of Differentiation. Chain rule, Implicit Differentiation. Differentiation of parametric functions.	4	2	2
Transcendental functions and differentiation. Trigonometric and Inverse Trigonometric Functions. Exponential and Logarithmic Functions. Hyperbolic and inverse hyperbolic functions.	4	2	2
Application of derivatives. Taylor and Maclaurin expansion, polynomial, and series.	4	2	2
Extrema of a function. Asymptote lines, Curve Sketching.	4	2	2
Indeterminate Forms and L'Hospital's Rule	4	2	2
Definitions and properties of determinants and matrices, Algebra of Matrices.	4	2	2
Reduced matrix. Rank of a Matrix. Solution of linear systems using inverse Matrix.	4	2	2
Mid-Term Exam	2		
Cramer's Rule	4	2	2
Gauss - Jordan Method. Homogeneous and non-homogeneous systems. Square and rectangular systems	4	2	2
Solution of linear algebraic systems by Iterative Methods. Jacobi method, Seidel Method.	4	2	2
Eigenvalues and Eigenvectors of a matrix.	4	2	2
Final Exam	2		

Teaching And Learning Methodologies :

Interactive Lectures including discussion

| Tutorials |
| Self-Study (Project / Reading Materials / Online Material / Presentations) |
| Problem Solving |

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	10.00	4	
Final Exam	40.00	14	
Midterm Exam (s)	20.00	9	
Others (Participations)	10.00		
Quizzes	20.00	5	

Course Notes :

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)

Recommended books :

S. Lipschutz and M. Lipson,SCHAUM$ outlines: Linear Algebra, 4thed.McGraw . HILL, 2009.ISBN: 978-0-07-154353 -8.