Faculty of Computers and Information Technology

Mathematics -3

Information :

Course Code :	MT103	**Level**	:	Undergraduate	**Course Hours :** 3.00- Hours

Department :   Faculty of Computers and Information Technology

Instructor Information :

Title	Name	Office hours
Lecturer	Wael Mahmoud Mohamed Mohamed Ali	2
Teaching Assistant	Ahmed Mahmoud Ahmed Mahmoud	
Teaching Assistant	Ashrakt Shaban Abobakr AbdElhakim	

Area Of Study :

Apply the basic concepts and theories of ordinary differential equations.
Combine and evaluate different applications of differential equations.
Use basic mathematics to learn the principles of double and triple integral.
Analyze the analytical requirements of Taylor and Maclaurin series.
Carry out a self-learning and research in partial derivatives.

Description :

Functions of several variables: limits, continuity and partial derivatives, Chain rule, Tangent planes and normal lines, Extrema and constrained extrema, Ordinary differential equations: equations of first order (separable, homogenous, exact, linear and Bernoulli), Orthogonal trajectories, Equations reducible to first order, High order linear equations, The variation of parameters and operation method, Euler's equation, System of linear differential equations, Series and tests of convergence, Taylor and Maclaurin expansion, Multiple integrals: double integral in Cartesian and Polar coordinates, Triple integrals and Jacobians, Line integral, Green's theorem.

Course outcomes :

a.Knowledge and Understanding: :

1 -	Discuss the fundamental concepts and theories of integration, and that this can be developed for regulated functions by approximating the area under the graph by rectangles.
2 -	Identify the methodologies to gain the basic skills and general methods to solve differential equations
3 -	Explain functional requirements and constrains to understand uniform and point wise convergence of functions together with properties of the limit function

b.Intellectual Skills: :

1 -	Analyze and design method to distinguish a coherent argument from a fallacious one
2 -	Determine measurement criteria to derive general principles from examples
3 -	Evaluate and apply solution methods for system of differential equations.

c.Professional and Practical Skills: :

1 -	Analyze and design different solutions for double and triple integrals
2 -	Use different mathematical techniques to solve problems arising in other disciplines

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3 -	Realize the techniques of ordinary differential equations related to some computer science problems	

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 -	Demonstrate adequate understanding of the theory, concepts of Functions of several variables and Ordinary differential equations.
2 -	Demonstrate adequate understanding of, Continuity, and partial derivatives, Chain rule. Tangent planes and normal lines, Extrema and Constrained Extrema.
3 -	Demonstrate adequate understanding of multiple integrals: Double integral in Cartesian and Polar coordinates, Triple integrals, Surface integral of scalar functions, Jacobians, Cylindrical and spherical coordinates.
4 -	Demonstrate adequate understanding of Scalar and vector fields, Gradient, Divergence, Curl and Directional derivative. Line integral, Green's theorem.
5 -	Demonstrate adequate understanding of Ordinary differential equations: Equations of the first order: Separable, Homogenous, nearly Homogenous, Exact, Linear, Bernoulli. And Develop skills related to how to distinguish between them and determine the convenient method.
6 -	Demonstrate adequate understanding of higher order linear equations. Equations of the second order. Complementary and particular solutions. Undetermined coefficients, variation of parameters. Euler's equation, Equations reducible to the first order.
7 -	Apply solution methods for system of differential equations.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Functions of several variables: limits, continuity	4	2	2
partial derivatives, Chain rule	4	2	2
Tangent planes and normal lines	4	2	2
Extrema and constrained extrema	4	2	2
Ordinary differential equations: equations of first order (separable, homogenous)	4	2	2
Ordinary differential equations: exact, linear and Bernoulli	4	2	2
Orthogonal trajectories	4	2	2
Equations reducible to first order, High order linear equations	4	2	2
Mid-Term Exam	2		
The variation of parameters and operation method	4	2	2
Euler's equation, System of linear differential equations	4	2	2
Series and tests of convergence, Taylor and Maclaurin expansion	4	2	2
Multiple integrals: double integral in Cartesian and Polar coordinates, Triple integrals and Jacobians, Line integral, Green's theorem	4	2	2
Final Exam	2		

Teaching And Learning Methodologies :

Interactive Lectures including Discussions

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

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)