Faculty of Computers and Information Technology

Mathematics -2

Information :

Course Code :	MT102	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Faculty of Computers and Information Technology

Area Of Study :

Apply the basic concepts and theories of integration in different applications.
Combine and evaluate different techniques of integration.
Use basic mathematics to learn the principles of integrations and conic section.
Analyze the analytical requirements of drawing lines, planes, cylinders and spheres in three dimensions.
Carry out a self-learning and research for some applications of definite integral.

Description :

Calculus: A) Indefinite integrals. properties and evaluation of definite and indefinite integrals of algebraic and transcendental functions. Fundamental Theorem of calculus. B) Techniques of integration: Integration by parts, Trigonometric substitutions, Integration by partial fractions, Quadratic expressions and substitutions, 5) Integration by reduction. C) Applications of definite integral: Area, Volume, Arc length of parametric functions, Surface area of solid revolution,
2) Analytic Geometry: A) lines and Planes in space. vector equations. B) Definitions and properties of conic sections, parabola, hyperbola, and ellipse. C) Translation and rotation of axes. D) Quadric Surfaces. Ellipsoid, Hyperboloid, paraboloid.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Describe the fundamental concepts to recognize the difference between definite and indefinite integrals, and the relationship between derivatives and integrals.
2 -	Discuss different methodologies to explain the parabola, ellipse and hyperbola, and related properties
3 -	Explain functional requirements and constrains to distinguish between analytic geometry lines and planes in space
b.Intellectual Skills: :	
1 -	Analyze the application of definite integrals techniques to evaluate areas, surface areas, arc lengths and volumes.
2 -	Determine measurement criteria to evaluate bounded areas and volumes of linear systems of algebraic equations
3 -	Prepare appropriate analytics for lines, planes, cylinders and spheres in space
c.Professional and Practical Skills: :	
1 -	Analyze and design different cases of definite integral applications
2 -	Use different computing technologies to solve integration problems
3 -	Install and maintain different supporting tools to categorize some properties and concepts to compute basic information like (conic section, lines and planes in space).

d.General and Transferable Skills: :	
1 -	Exploit a range of learning resources of integration and conic sections
2 -	Work in a team effectively and efficiently considering time and stress management

ABET Course outcomes :	
1 -	Understand definite and indefinite integrals, the difference between them, and the relationship between derivatives and integrals.
2 -	Define the parabola, ellipse and hyperbola, and related properties.
3 -	Analyze the application of definite integrals techniques to evaluate areas, volumes, arc lengths and surface areas.
4 -	Develop a repository of experience with the evolution of bounded areas and volumes of linear systems of algebraic equations.
5 -	Understand Solid Geometry equations of lines and planes in space.
6 -	Contrast the properties of lines and planes in space.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Indefinite integrals. Properties and evaluation of definite and indefinite integrals of algebraic and transcendental functions and inverse functions.	4	2	2
Fundamental Theorem of calculus.	4	2	2
Techniques of integration: Integration by parts, Trigonometric substitutions.	4	2	2
Integration by partial fractions, Quadratic expressions and substitutions, Integration by reduction.	4	2	2
Conic Sections: Parabolas. Ellipses.	4	2	2
Hyperbolas.	4	2	2
Applications of definite integral: Area, Volume,	4	2	2
Arc length of parametric functions. Surface area of solid revolution,	4	2	2
Mid-Term Exam	2		
Lines and planes in three dimensional: Lines: the vector equation, and the scalar equation.	4	2	2
Planes: the vector equation, and the scalar equation.	4	2	2
Cylindrical and spherical coordinates. Translation and Rotation of axes	4	2	2
Quadric Surfaces: Cone, ellipsoid, paraboloid, hyperboloid	4	2	2
Final Exam	2		

Teaching And Learning Methodologies :
Interactive Lectures including Discussions
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 :

A. Neeman, Algebraic and Analytic Geometry. Cambridge university press, 2007.ISBN: 978-0521709835.