FUTURE UNIVERSITY IN EGYPT
جامعة المستقبل

Faculty of Engineering & Technology

Integration with Applications and Analytical Geometry (Math 2)

Information :

Course Code :	MTH 112	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Faculty of Engineering & Technology

Instructor Information :

Title	Name	Office hours
Lecturer	Soliman Abdulkarim Alkhatib	15
Lecturer	Soliman Abdulkarim Alkhatib	15
Assistant Lecturer	Doaa Nabil Sayed Mohamed Elsayed Khodair	8
Assistant Lecturer	TAREK ALI ABDALLAH TEAMA	12
Teaching Assistant	Mariam Mohamed Kamal Abdelaziz	1
Teaching Assistant	Mariam Mohamed Kamal Abdelaziz	1

Area Of Study :

Description :

Definite and Indefinite integrals. Integration of algebraic and transcendental functions. Integration of inverse functions. Fundamental Theorem of calculus. Methods of integration. Conic Sections: Parabola, Ellipse, and Hyperbola. Applications of definite integral: Area, Arc length, Surface area, and volume of the solid of revolution. Lines and planes in three dimensions. Vector equations of lines and Planes in space. Quadric Surfaces: ellipsoid, paraboloid, and hyperboloid. Applications

Course outcomes :

a.Knowledge and Understanding: :

1 -	Describe definite and indefinite integrals of algebraic and transcendental functions, vector equations of lines and planes in three-dimensional space, conic sections, and quadric surfaces.
2 -	Recognize methods of integration, numerical integration with application to algebraic and transcendental functions and their inverses.
3 -	Identify scalar and vector equations of lines and planes in space, conic sections, Quadric Surfaces and their equations and properties.

4 -	Illustrate areas, arc lengths, surface areas, and volumes of the solid of revolution by using concepts of analytic geometry and integral calculus.
b.Intellectual Skills: :	
1 -	Apply theorems, concepts, methods, and techniques of integral calculus and analytic geometry at the intellectual level required of this course.
2 -	Analyze engineering problems solving related to integration with application, conic sections, and vector equations of lines, planes, and Quadric Surfaces.
3 -	Solve engineering problems related to vector equations of lines and planes in space, conic sections, quadric surfaces, and applications in engineering problems.
4 -	Apply numerical integration methods (left and right rectangular and trapezoidal rule) for the solutions engineering problems in case of failure of the rules and methods of integrations.
5 -	Use rules and methods of integration in finding Areas, volumes of revolution, and Arc lengths of parametric functions.
c.Professional and Practical Skills: :	
1 -	Compute definite and indefinite integrals of algebraic and Transcendental functions and their inverses.
2 -	Solve problems related to conic sections, quadric surfaces, and vector equations of lines and planes in space.
3 -	Design a software algorithm for the approximate integrals using left, and right rectangular, and trapezoidal rule with absolute error estimations.
d.General and Transferable Skills: :	
1 -	Write Essays concerning integration of algebraic, and Transcendental functions & their inverses.
2 -	Communicate effectively.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Indefinite and definite integrals. Properties and evaluation of definite and indefinite integrals of algebraic and transcendental functions and their inverses. Fundamental Theorem of calculus. numerical integration.	10	2	2
Techniques of integration: Integration by parts, Trigonometric substitutions.	10	2	2
Integration by partial fractions, Quadratic expressions and substitutions, Integration by reduction.	10	2	2
Conic Sections: Parabolas. Ellipses. Hyperbolas.	10	2	2
Applications of definite integral: Areas, Volumes, and Arc lengths of parametric functions.	10	2	2
Surface area, volume of solids of revolution,.	10	2	2

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Lines and planes in threedimensional space. Scalar and vector equations of lines and Planes in space.	10	2	2
Quadric Surfaces: Cone, ellipsoid, paraboloid, hyperboloid. Applications.	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	20.00		
Mid- Exam I	15.00		
Performance	10.00		
Reports	15.00		

Course Notes :

Recommended books :

Periodicals :

Web Sites :