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	Ahmed Mahsoup Mohamed ElHadidi	2
Lecturer	Soliman Abdulkarim Alkhatib	15
Lecturer	Hany Abd El Ghaffar Abd El Aty El Deeb	
Assistant Lecturer	TAREK ALI ABDALLAH TEAMA	12
Assistant Lecturer	TAREK ALI ABDALLAH TEAMA	12
Assistant Lecturer	Reham Milad Kamel Samaan	
Assistant Lecturer	Doaa Nabil Sayed Mohamed Elsayed Khodair	8
Teaching Assistant	Ahmed Elsayed Abdellatif Ibrahim Bedeir	
Teaching Assistant	Ahmed Elsayed Abdellatif Ibrahim Bedeir	

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 :