

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
Assistant Lecturer	TAREK ALI ABDALLAH TEAMA	12
Assistant Lecturer	Reham Milad Kamel Samaan	

Area Of Study :

To familiarize students with the basic concepts of MTH 112 and to make them able to develop an understanding of mathematical concepts that provide a foundation for the mathematics encountered in Engineering. The course allows students to work at their own level thereby developing confidence in mathematics and general problem solving. On successful completion of this course the student will be able to:

1. demonstrate a sound understanding of a number of mathematical topics that are essential for studies in Computer Science;
2. interpret and solve a range of problems involving mathematical concepts relevant to this course ;
3. Effectively communicate the mathematical concepts and arguments contained in this course.

Description :

- 1) 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:
 - 1) Integration by parts,,
 - 2) Trigonometric substitutions,
 - 3) Integration by partial fractions,
 - 4) Quadratic expressions and substitutions,
 - 5) Integration by reduction.
 - C) Applications of definite integral:
 - 1) Area, 2) Volume, 3) Arc length of parametric functions.
 - 4) 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: :

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| 1 - | i. Provide a through understanding and working knowledge of mathematics relevant to this course. |
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2 -	ii. Develop techniques for solving problems that may arise in everyday life.
b. Intellectual Skills :	
1 -	i. Demonstrate knowledge of the theory, concepts, methods, and techniques of Integral calculus, analysis, and analytic Geometry at the intellectual level required of this course
2 -	Think logically.
3 -	Analyze and solve problems.
4 -	Organize tasks into a structured form.
5 -	evaluate the evolving state of knowledge in a rapidly developing area
6 -	Transfer appropriate knowledge and methods from one topic within the subject to another.
c. Professional and Practical Skills :	
1 -	Develop a professional attitude and approach to gain conceptual and practical knowledge and understanding of integration. Integration of Algebraic, Transcendental Functions and inverse functions.
2 -	Understand definite and indefinite integrals, the difference between them, and the relationship between derivatives and integrals
3 -	Acquire skills needed to integrate functions of all types.
4 -	Evaluate the area of any region bounded between two curves, volumes of solids of revolution, and surface area.
5 -	Understand analytic Geometry, Lines and planes in space, Conic sections, and Quadric Surfaces. Application of definite integration techniques to evaluate areas, surface areas, arc lengths and volumes
6 -	Plot lines and planes in space, determine if lines in space are parallel or perpendicular, and find the vector equations of lines and planes in space.
7 -	Know the properties of conic sections: parabola, ellipse, and hyperbola, and be able to sketch graphs.
8 -	Convert equations for quadric surfaces to standard form and identify the surface
9 -	Gain the principle of quality control.
10 -	Develop skills related to creative thinking, and problem solving.
d. General and Transferable Skills :	
1 -	(i) Gain the principle of quality control.
2 -	(ii) Develop skills related to creative thinking, and problem solving.

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. Fundamental Theorem of calculus.	10	6	4
Techniques of integration: Integration by parts, Trigonometric substitutions, Integration by partial fractions, Quadratic expressions and substitutions, Integration by reduction.	10	6	4
Conic Sections: Parabolas. Ellipses. Hyperbolas.	10	6	4
First-Exam			
Applications of definite integral: Area, Volume, Arc length of parametric functions. Surface area of solid revolution,	10	6	4
Lines and planes in three dimensional: Lines: the vector equation, and the scalar equation. Planes: the vector equation, and the scalar equation.	10	6	4

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Second Exam			
Cylindrical and spherical coordinates. Translation and Rotation of axes	5	3	2
Quadric Surfaces: Cone, ellipsoid, paraboloid, hyperboloid	5	3	2
Final Exam			

Teaching And Learning Methodologies :

Lectures

Tutorial

Class discussions and activities

Homework and self-study

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments and Quizzes	20.00	1	
Attendance and Participation	10.00	1	
Final-term Exam	40.00	15	To assess overall understandings, concepts, Knowledge, Problem solving, and mathematical skills delivered by the course,
First Mid Exam	15.00	7	To assess the levels of math skills needed for successful completion of the course, and to improve teaching and learning for all students.
Second Mid Exam	15.00	12	To assess comprehension, Knowledge, Problem solving, and mathematical skills delivered by the course after 9 weeks of studying.

Course Notes :

Course notes

Handouts

Recommended books :

(1) Larson, R, Edwards, B & Falvo, D 2004, Elementary linear algebra, 5th edn, Houghton Mufflin, Boston, Massachusetts.

(2) Stewart, J 2005, Calculus: concepts & contexts, 3rd edn, Thomson/Brooks/Cole, Australia.

Periodicals :

www.sosmath.com, www.math.hmc.edu,
www.tutorial.math.lamar.edu,
www.web.mit.edu

Web Sites :

www.sosmath.com, www.math.hmc.edu,
www.tutorial.math.lamar.edu,
www.web.mit.edu