

KU1DSCMAT111

BASIC MATHEMATICS I

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	DSC	100-199	KU1DSCMAT111	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4		1	30	70	100	2

Course Description

This foundational math course for computer applications covers essential concepts like functions, limits and continuity, differentiation, integration, and matrix basics. It's crucial as it forms the mathematical groundwork for algorithm design, data analysis, and various computational techniques used extensively in computer applications..

Course Prerequisite

Functions, matrices, basic operations of matrices, determinant of a matrix.

Course Outcomes

CO No.	Expected Outcome	Learning Domains
1	Comprehend trigonometric functions, exponential functions, inverse functions, logarithmic function and hyperbolic functions	Understand
2	Understand the notion of limit, limit laws and continuity of a function	Understand
3	Apply differentiation rules, integration techniques, and matrix operations.	Apply
4	Comprehend the notion of derivative of a function differentiation rules and partial derivatives	Understand

5	Comprehend the indefinite and definite integrals	Understand
6	Evaluate rank of matrices, and solutions using Gauss-Jordan method.	Evaluate

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2						✓	
CO 3	✓						
CO 4	✓						
CO 5	✓						
CO 6	✓						

COURSE CONTENTS

Contents for Classroom Transaction

M O D U L E	U N I T	DESCRIPTION	HOURS
		Functions and Limits	
I	1	Functions	
		a) Trigonometric functions	
		b) Exponential functions	
		c) Inverse functions and logarithms	
		d) Hyperbolic functions	
		e) Functions of Several Variables	
	2	Limits	
		a) Limit of a function and limit laws	

		b) Limits and Continuity in Higher Dimensions	
II	Continuity and Differentiation of functions		14
	1	Continuity	
	2	Differentiation	
		a) The derivative as a function	
		b) Differentiation rules	
		c) Derivatives of trigonometric functions	
		d) The Chain rule	
		e) Implicit differentiation	
		f) Derivatives of inverse functions	
		g) Derivatives of inverse trigonometric functions	
	h) Partial Derivatives and Chain Rule		
III	Integration		14
	1	Indefinite integrals	
		a) Integral of a function	
		b) The study of Integral Calculus	
		c) Indefinite integral	
		d) Indefinite integrals and the substitution method	
		e) Integration by parts	
		f) Trigonometric substitutions	
		g) Integration of rational functions by partial fractions	
	2	Definite integrals	
	a) Definite integral		
	b) Geometric interpretation of definite integral (without proof)		
IV	Matrix basics		14
	1	a) Transpose of a matrix, Adjoint of a square matrix, Inverse of a matrix.	

	b) Rank of a matrix, Elementary transformation of a matrix, Equivalent matrix, Elementary matrices, Gauss-Jordan method of finding the inverse	
V	Teacher Specific Module	5
	<i>Directions</i>	
	Graphs of functions mentioned in Unit 1 in Module I	
	Precise definition of limit, One-sided limit (Sections 2.3, 2.4)	
	Riemann sums, its geometric meaning and definite integral	
	Normal form of a matrix.	
	Any topic related to Module I, II, III & IV	

Essential Readings

1. G.B. Thomas Jr., M.D. Weir and J.R. Hass, Thomas' Calculus: Early Transcendentals (12th edition), Pearson Education
2. S. Narayan and P.K. Mittal, Integral calculus, Revised Edition, S. Chand & Company Ltd.
3. Advanced Higher Engineering Mathematics (42nd edition), B.S. Grewal, Khanna Pub.

Reference Distribution

Module	Unit	Reference No.	Sections	Remarks
I	1	1	Sections 1.3, 1.5, 1.6, 7.3, 2.2,14.1	<i>Quick review of Section 1.3 is needed. Questions should not be asked in the End Semester Examination from section 1.3. Graphs, Level Curves, and Contours of Functions of Two Variables and computer Graphing from section 14.1 excluded</i>
	2	1	Section 2.2, 14.2	<i>Proof of all theorems from section 14.2 excluded</i>

II	1	1	Section 2.5	
	2	1	Sections 3.2, 3.3, 3.5, 3.6, 3.7, 3.8, 3.9, 14.3, 14.4	<i>Proof of all theorems from sections 14.3 and 14.4 are excluded</i>
III	1	2	For 1(a), (b) & (c), Sections 1.1, 1.2, 1.3, 1.4 & 1.5	
		1	For 1(d), (e), (f) & (g), Sections 5.5, 8.1, 8.3 & 8.4	
	2	2	Sections 1.6, 1.7, 1.8	
IV	1	3	2.6	
	2	3	2.7	<i>Exclude 2.7 (7)</i>

Suggested Readings

1. H. Anton, I. Bivens and S. Davis, Calculus, 10th edition, Willey
2. Higher Engineering Mathematics, B.S. Grewal (43rd edition), Khanna Publishers
3. S Narayan and P.K Mittal, Differential calculus, Revised Edition, S. Chand & Company Ltd
4. E. Kreyszig, Advanced Engineering Mathematics (10th edition), Willey
5. Richard Bronson, Schaum's outline of Theory and Problems of Matrix Operations, Schum's outline series, The McGraw-Hill Companies

Assessment Rubrics

Evaluation Type		Marks
End Semester Evaluation		70
Continuous Evaluation		30
a)	Test Paper *	12
b)	Assignment	6
c)	Seminar, Viva-Voce	12
Total		100

* A student has to appear for at least two written tests. Average mark of best two tests is to be considered for internal mark.

** Use of Scientific Calculators below 100 functions (that is, upto fx 99) shall be permitted.