

<b>Name of Faculty</b>	:	Faculty of Computer Science & Applications
<b>Name of Program</b>	:	Bachelor of Computer Applications in Cyber Security
<b>Course Code</b>	:	2BDM01
<b>Course Title</b>	:	Discreet Mathematics & Calculus
<b>Type of Course</b>	:	Basic Science
<b>Year of Introduction</b>	:	2023-24

<b>Prerequisite</b>	:	Basics of Mathematics
<b>Course Objective</b>	:	Different Techniques to solve higher order ODEs, Direction and magnitude studies, PDEs
<b>Course Outcomes</b>	:	At the end of this course, students will be able to:
	CO 1	To calculate line integral , use of grad, div and curl, green and stock's theorem
	CO 2	Apply different techniques to solve higher order ODEs
	CO 3	Understand the rate of change when more than one independent variables present, apply partial derivative equation techniques to predict the behaviour of certain phenomena.
	CO 4	To represent Fourier series and integral of periodic function
	CO 5	To solve initial-value problems for linear differential equations with constant coefficients.

### Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
L	T	P		Theory Marks		Practical Marks		Total Marks
			C	SEE	CIA	SEE	CIA	
4	0	0	4	100	50	0	0	150

*Legends: L-Lecture; T-Tutorial/Teacher Guided Theory Practice; P-Practical, C - Credit, SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

### Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	<b>Permutation and combination:</b> Introduction, rule of sum and product, combination-permutation, circular and restricted permutation, permutation with repetition of objects, principal of mathematical introduction.	15	25%	CO 1
2	<b>Functions and Relation:</b> Introduction to function, one to one function, onto function ,floor function,	15	25%	CO 2

	Ceiling function, Big-O notation ,Big-omega ,Big-Theta notation.			
3	<b>Differentiation:</b> Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, simple integration.	15	25%	CO 3
4	<b>Central values computation:</b> arithmetic mean, median, mode, dispersion, standard deviation, co-relation, regression.	15	25%	CO 4

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
<b>Weightage</b>	<b>40</b>	<b>35</b>	<b>25</b>	-	-	-

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

#### Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Linearly dependent and independent set, Basis and dimension, Gradient, divergence, and curl, Directional derivative	2
2	Line integration, Green's theorem, Gauss divergence theorem and Stoke's theorem	2
3	Homogenous Linear ODEs with constant coefficient, Euler- Cauchy equations, Wronskian	2
4	Non homogenous ODEs, Method of undetermined coefficient, solution by variation of parameter.	2
5	First order partial differential equation and it's solution Euler's theorem, Total derivatives	2
6	Jacobians', Maxima and Minima of two variables using Lagrange's multipliers.	2
7	Fourier Series of periodic function	2
8	Fourier integral of cosine and sine function.	2
9	Laplace transform of derivatives and integrals - shifting theorem - differentiation and integration of transforms	2
10	inverse transforms - application of convolution property - solution of linear differential equations with constant coefficients using Laplace transform - Laplace transform of unit step function, impulse function and periodic function	2

#### Suggested Learning Websites

Sr. No.	Name of Website
1	<a href="https://semesters.in/engineering-mathematics-for-btech-first-year/">https://semesters.in/engineering-mathematics-for-btech-first-year/</a>
2	<a href="https://www.nptel.ac.in">https://www.nptel.ac.in</a>
3	<a href="https://tutorial.math.lamar.edu/classes/calci/calci.aspx">https://tutorial.math.lamar.edu/classes/calci/calci.aspx</a>
4	<a href="https://www.khanacademy.com">https://www.khanacademy.com</a>

#### Reference Books

Sr. No.	Name of Reference Books
1	Erwin Kreyszig, Advanced Engineering mathematics, John Wiley, 10th Ed., 2015.
2	B. S Grewal, Higher Engineering Mathematics, (43rd Edition), Khanna Pub., Delhi (2014).
3	B V Ramana, Higher Engineering Mathematics; McGraw-Hill
4	R. K. Jain and S. R. K. Iyernagar, Advanced Engineering Mathematics, Alpha Science, 3rd Ed., 2007.