

**DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS  
KURUKSHETRA UNIVERSITY, KURUKSHETRA**

Session: 2023-24			
Part A - Introduction			
Subject	BCA		
Semester	I		
Name of the Course	Mathematical Foundations for Computer Science-I		
Course Code	B23-CAP-104 (Common with B23-CAI-101, B23-CDS-101, B23-CTS-101)		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/ VAC)	CC-M		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)			
Course Learning Outcomes (CLO):	<p>After learning this course student will be able:</p> <ol style="list-style-type: none"> <li>1. Gain the knowledge of set theory, types of sets and operations on sets. Understand various concepts of matrices and determinants, and acquire the cognitive skills to apply different operations on matrices and determinants.</li> <li>2. Have the knowledge of the basic concepts of complex numbers and acquire skills to solve linear quadratic equations.</li> <li>3. Gain the knowledge of the concepts of Arithmetic progression, Geometric progression and Harmonic progression, and find A.M., G.M. and H.M. of given numbers.</li> <li>4. Understand the concept of differentiation</li> <li>5. * Attain the skills to make use of the learnt concepts of Introductory Mathematics in multidisciplinary learning contexts and to know their applications</li> </ol>		
Credits	Theory	Practical	Total
	1	1	2
Contact Hours	1	2	3
<b>Max. Marks:50(30(T)+20(P))</b> <b>Internal Assessment Marks:15(10(T)+5(P))</b> <b>End Term Exam Marks:35(20(T)+15(P))</b>		<b>Time: 3 Hrs.(T), 3Hrs.(P)</b>	
Part B-Contents of the Course			

<b><u>Instructions for Paper- Setter</u></b>		
<b>Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
I	Sets and their representations, Empty set, Finite and infinite sets, Subsets, Equal sets, Power sets, Universal set, Union and intersection of sets, Difference of two sets, Complement of a set, Venn diagram, De-Morgan's laws and their applications.	4
II	An introduction to matrices and their types, Operations on matrices, Symmetric and skew-symmetric matrices, Minors, Co-factors. Determinant of a square matrix, Adjoint and inverse of a square matrix, Solutions of a system of linear equations up to order 3.	4
III	Quadratic equations, Solution of quadratic equations. Arithmetic progression, Geometric progression, Harmonic progression, Arithmetic mean (A.M.), Geometric mean (G.M.), Harmonic mean (H.M.), Relation between A.M., G.M. and H.M.	4
IV	The concept of differentiation, differentiation of simple functions, Use of differentiation for solving problems related to real-life situations. Differentiation of simple algebraic, trigonometric and exponential functions.	4
V*	<p>Practicum: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems: <b>Problem Solving-</b> Questions related to the practical problems based on following topics will be worked out and record of those will be maintained in the Practical Note Book:</p> <ul style="list-style-type: none"> <li>• Problems related to union, intersection, difference and complement of sets.</li> <li>• Problems based on De Morgan's Laws.</li> <li>• Problems related to Venn diagrams.</li> <li>• Problems to find inverse of a matrix.</li> <li>• Problems to find determinant of a square matrix of order 3.</li> <li>• Problems to find nth term of A.P., G.P. and H.P.</li> <li>• Problems to find sum of n terms of A.P., G.P. and H.P.</li> <li>• Problems to find A.M., G.M. and H.M. of given numbers.</li> <li>• Problems involving formulation and solution of quadratic equations in one variable.</li> <li>• Problems to find first derivatives of functions.</li> </ul>	25
<b>Suggested Evaluation Methods</b>		
<b>Internal Assessment:</b> > <b>Theory</b> • Class Participation: 4		<b>End Term Examination:</b> <b>A three hour exam</b>

<ul style="list-style-type: none"> <li>• Seminar/presentation/assignment/quiz/class test etc.: NA</li> <li>• Mid-Term Exam: 6</li> </ul> <p>➤ <b>Practicum</b></p> <ul style="list-style-type: none"> <li>• Class Participation: NA</li> <li>• Seminar/Demonstration/Viva-voce/Lab records etc.: 5</li> <li>• Mid-Term Exam: NA</li> </ul>	<p><b>for both theory and practicum.</b></p>
<p><b>PartC-Learning Resources</b></p>	
<p><b>Text /Reference Books:</b></p> <ul style="list-style-type: none"> <li>• C. Y. Young (2021). <i>Algebra and Trigonometry</i>. Wiley.</li> <li>• S.L. Loney (2016). <i>The Elements of Coordinate Geometry (Cartesian Coordinates)</i> (2<sup>nd</sup> Edition). G.K. Publication Private Limited.</li> <li>• Seymour Lipschutz and Marc Lars Lipson (2013). <i>Linear Algebra</i>. (4<sup>th</sup> Edition) Schaum’s Outline Series, McGraw-Hill.</li> <li>• C.C. Pinter (2014). <i>A Book of Set Theory</i>. Dover Publications.</li> <li>• J. V. Dyke, J. Rogers and H. Adams (2011). <i>Fundamentals of Mathematics</i> (10<sup>th</sup> Edition), Brooks/Cole.</li> <li>• A. Tussy, R. Gustafson and D. Koenig (2010). <i>Basic Mathematics for College Students</i> (4<sup>th</sup> Edition). Brooks Cole</li> </ul>	

\*Applicable for courses having practical component.