CC-1 /MCC-1

Session: 2023-24	
Part A – Introduction	
Subject	Mathematics
Semester	I
Name of the Course	Calculus
Course Code	B23-MAT-101
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC
Level of the course	100-199
Pre-requisite for the course (if any)	Mathematics as a subject at 4.0 Level (Class-XII)
Course Learning Outcomes(CLOs):	**After completing this course, the learner will be able to**: 1. Gain knowledge of the concepts and theory of limit, continuity and differentiability of functions. Attain skills of calculating the limit of functions and examining the continuity and differentiability of different types of functions, and perform successive differentiation of functions. To apply the procedural knowledge to obtain the series expansions of functions which find multidisciplinary applications. 2. Understand concepts of asymptotes and curvature, the geometrical meaning of these terms and to have procedural knowledge to solve related problems. 3. Determine singular points of a curve and classify them. Understand the concept of rectification of curves and derive the reduction formulae. 4. Have theoretical knowledge and practical skills to evaluate the area bounded by the curves, and volume and surface area of solids formed by revolution of curves.
CLO 5 is related to the practical component of the course.	5. Attain cognitive and technical skills required for solving different problems of calculus associated with

	tracing of curves, determination of curvature, and rectification of curves, volume and surface area of solids of revolution. Have technical and practical skills of solving calculus problems related to differentiation and integration of functions by using MAXIMA software.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Internal Assessment Marks	20	10	30
End Term Examination Marks	50	20	70
Examination Time	3 Hours	3 Hours	
Max. Marks:100			

Part B- Contents of the Course

Instructions for Paper- Setter

Note: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

Unit	Topics	Contact Hours
I	ε-δ definition of limit and continuity of a real valued function, Basic properties of limits, Types of discontinuities, Differentiability of functions, Application of L'Hospital rule to indeterminate forms, Successive differentiation, Leibnitz theorem, Taylor's and Maclaurin's series expansion with different forms of remainder.	12
II	Asymptotes: Horizontal, vertical and oblique asymptotes for algebraic curves, Asymptotes for polar curves, Intersection of a curve and its asymptotes, Curvature and radius of curvature of curves (cartesian, parametric, polar & intrinsic forms), Newton's method, Centre of curvature and circle of curvature.	12

III	Multiple points, Node, Cusp, Conjugate point, Tests for concavity and convexity, Points of inflexion, Tracing of curves, Reduction formulae.	12
IV	Rectification, intrinsic equation of a curve, Quadrature, Area bounded by closed curves, Volumes and surfaces of solids of revolution.	12
	Practical	
	The practical component of the course has two parts, Problem Solving and Practical's using MAXIMA software. The examiner will set 4 questions at the time of practical examination asking two questions from the part (A) and two questions from the part (B) by taking course learning outcomes (CLO) into consideration. The examinee will be required to solve one problem from the part (A) and to execute one problem successfully from the part (B). Equal weightage will be given to both the parts. The evaluation will be done on the basis of practical record, viva-voce, write up and execution of the program. **(A) Problem Solving**- Questions related to the following problems will be solved and their record will be maintained in the Practical Notebook: 1. Problems of curve tracing when equation is given in Cartesian coordinates. 2. Problems of curve tracing when equation is given in Parametric form. 3. Problems of curve tracing when equation is given in Polar coordinates. 4. Problem of determination of length of a curve expressed in Cartesian coordinates. 5. Problem of determination of length of a curve expressed in Polar coordinates.	30

	6. Problem of determination of radius of curvature expressed in Cartesian coordinates. 7. Problem of determination of radius of curvature expressed in Polar coordinates. 8. Problem of determination of radius of curvature expressed in Parametric form. 9. Problem of determination of volumes and surfaces of solids of revolution for Cartesian curve. 10. Problem of determination of volumes and surfaces of solids of revolution for Parametric curve. 11. Problem of determination of volumes and surfaces of solids of revolution for Polar curve. **(B)The following practicals will be done using MAXIMA software and their record will be maintained in the practical note book:** 1. Learn to use basic operators and functions in Maxima software. 2. Simplify algebraic expressions and expressions containing radicals, logarithms, exponentials and trigonometric functions. 3. Expand algebraic, rational, trigonometric and logarithmic expressions. 4. Find derivatives of algebraic, trigonometric, exponential and logarithmic functions. 5. Find derivatives of functions involving above mentioned functions. 6. Problems of successive differentiation. 7. Find indefinite integrals of different functions. 8. Find definite integrals of different functions. 9. To plot curves involving Cartesian, parametric and polar forms. 10. To demonstrate singular points.	
Suggested Evaluation Methods		

<table>
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Internal Assessment:

➢ **Theory 20**

- Class Participation: 5
- Seminar/presentation/assignment/quiz/class test etc.: 5
- Mid-Term Exam: 10

➢ **Practicum 10**

- Class Participation:
- Seminar/Demonstration/Viva-voce/Lab records etc.: 10
- Mid-Term Exam:

</td>
<td>

End Term Examination:

➢ **Theory 50**

Written Examination

➢ **Practicum 20**

Lab record, viva-voce, write up and execution of the program

</td>
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<tr>
<td colspan="2">

Part C-Learning Resources

</td>
</tr>
<tr>
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Recommended Books:

1. Howard Anton, I. Bivens & Stephan Davis (2021). *Calculus* (12th edition). J. Wiley & Sons.
2. Gabriel Klambauer (1986). *Aspects of Calculus* (4th edition). Springer.
3. Wieslaw Krawcewicz & Bindhyachal Rai (2003). *Calculus with Maple Labs*. Alpha Science Int'l Ltd.
4. Gorakh Prasad (2016). *Differential Calculus* (19th edition). Pothishala Pvt. Ltd.
5. George B. Thomas Jr., Joel Hass, Christopher Heil & Maurice D. Weir (2018). *Thomas' Calculus* (14th edition). Pearson Education.
6. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2002). *Calculus* (3rd edition). Dorling Kindersley (India) Pvt. Ltd.

</td>
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</table>

Session: 2023-24	
Part A – Introduction	
Subject	Mathematics
Semester	II
Name of the Course	Algebra and Number Theory
Course Code	B23-MAT-201
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC
Level of the course	100-199
Pre-requisite for the course (if any)	Mathematics as a subject at level 4.0 (Class XII)
Course Learning Outcomes(CLOs):	After completing this course, the learner will be able to: 1. Gain knowledge of the concepts of symmetric, skew-symmetric, Hermitian, skew-Hermitian, Orthogonal and Unitary matrices, Linear dependence and independence of rows and columns of a matrix. Have knowledge of procedure and cognitive skills used in calculating rank of a matrix, eigen values, characteristic equation, minimal polynomial of a matrix and technical skills used in solving problems based on Cayley- Hamilton theorem. 2. Have knowledge of the concepts used in solving problems based on relations between the roots and coefficients of general polynomial equation

	in one variable, solutions of polynomial equations having conditions on roots, common roots and multiple roots. Understand Descarte's rule of signs and learn cognitive and technical skills required in assessing nature of the roots of an equation and solving problems based on these. 3. Have deeper and procedural knowledge required for solving cubic and biquadratic equations used in Mathematics as well as many other learning fields of study. To understand the basic concepts of number theory and their applications in problem solving and life- long learning. 4. Have knowledge of concepts, facts, principles and theories of Linear Congruences, Fermat's theorem, Euler's theorem, Wilson's theorem and its converse, Chinese Remainder theorem. Attain cognitive skills used in solving linear Diophantine equations in two variables.
CLO 5 is related to the practical component of the course.	5. Attain cognitive and technical skills required to formulate and solve practical problems involving rank of a matrix, inverse of a matrix, Cardon's method, Ferrari's method, Descarte's method, Cayley-Hamilton theorem, Euler's theorem and Chinese Remainder theorem. Have technical and practical skills required for solving algebraic equations, finding inverse and eigen values of matrices by using built in functions of MAXIMA software.

Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
Internal Assessment Marks	20	10	30
End term Examination Marks	50	20	70
Examination Time	3 Hours	3 Hours	
Max. Marks:100			

Part B- Contents of the Course

<u>Instructions for Paper- Setter</u>

The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

Unit	Topics	Contact Hours
I	Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices, Elementary operations on matrices, Rank of a matrix, Inverse of a matrix, Linear dependence and independence of rows and columns of matrix, Row rank and column rank of a matrix, Eigen values, Eigen vectors and characteristic equation of a matrix, Minimal polynomial of a matrix, Cayley-Hamilton theorem and its use in finding the inverse of a matrix, Unitary and orthogonal matrices.	12
II	Relations between the roots and coefficients of general polynomial equation in one variable, Solutions of polynomial equations having conditions on roots, Common roots and multiple roots, Transformation of equations, Nature of the roots of an equation, Descarte's rule of signs.	12

III	Solutions of cubic equations (Cardon's method), Biquadratic equations and their solutions. Divisibility, Greatest common divisor (gcd), Least common multiple (lcm), Prime numbers, Fundamental theorem of arithmetic.	12
IV	Linear congruences, Fermat's theorem, Euler's theorem, Wilson's theorem and its converse, Chinese Remainder theorem, Linear Diophantine equations in two variables.	12
	Practical	
	The practical component of the course has two parts, Problem Solving and Practical's using MAXIMA software. The examiner will set 4 questions at the time of practical examination asking two questions from the part (A) and two questions from the part (B) by taking course learning outcomes (CLOs) into consideration. The examinee will be required to solve one problem from the part (A) and to execute one problem successfully from the part (B). Equal weightage will be given to both the parts. The evaluation will be done on the basis of practical record, viva-voce, write up and execution of the program. **A) Problem Solving: Questions related to the following problems will be worked out and record of those will be maintained in the Practical Notebook:** 1. Problems to find the row rank and column rank of a matrix. 2. Problems to find the eigen values and eigen vectors of a matrix. 3. Problems to find the minimal polynomial of a matrix.	30

	4. Problems of finding inverse of a matrix using Cayley-Hamilton theorem. 5. Problems of solving cubic equations by Cardon's method. 6. Problems of solving biquadratic equations by Descarte's method. 7. Problems of solving biquadratic equations by Ferrari's method. 8. Problems to find gcd and lcm of two integers. 9. Problems to find solution of linear congruence using Euler's theorem. 10. Problems to find common solution of congruences using Chinese remainder theorem. B) **The following practicals will be done using MAXIMA Software and their record will be maintained in the practical note Book:** 1. To find roots of algebraic equations using MAXIMA. 2. To find multiple roots of algebraic equations using MAXIMA 3. To find the value of a determinant using MAXIMA. 4. To compute inverse of a square matrix using MAXIMA. 5. To find Eigen values of a square matrix using MAXIMA. 6. To find Eigen vectors of a square matrix using MAXIMA. 7. To solve system of linear equations using MAXIMA. 8. Problems to find gcd and lcm of two or more	

<table>
<tr><td></td><td>integers using MAXIMA.
9. Problems of solving biquadratic equations by Ferrari's method using MAXIMA.</td><td></td></tr>
<tr><td colspan="3">Suggested Evaluation Methods</td></tr>
<tr><td colspan="2">Internal Assessment:
➢ Theory 20
• Class Participation: 5
• Seminar/presentation/assignment/quiz/class test etc.: 5
• Mid-Term Exam: 10
➢ Practicum 10
• Class Participation: -
• Seminar/Demonstration/Viva-voce/Lab records etc.: 10
• Mid-Term Exam: -</td><td>End Term Examination:
➢ Theory 50
Written Examination
➢ Practicum 20
Lab record, viva-voce, write up and execution of the program</td></tr>
<tr><td colspan="3">Part C- Learning Resources</td></tr>
<tr><td colspan="3">Recommended Books/e-resources:
1) Stephen H. Friedberg, Arnold J. Insel & Lawrence E. Spence (2022). Linear Algebra (5th edition). Prentice Hall of India Pvt. Ltd.
2) Seymour Lipschutz and Marc Lars Lipson (2013). Linear Algebra. (4th Edition) Schaum's Outline Series, McGraw-Hill.
3) K. B. Dutta (2004). Matrix and Linear Algebra. Prentice Hall of India Pvt. Ltd.
4) Vivek Sahai & Vikas Bist (2013). Linear Algebra (2nd edition). Narosa Publishing House.
5) I. Niven (1991). An Introduction to the Theory of Numbers (5th edition). John Wiley & Sons.
6) H.S. Hall and S.R. Knight (2023). Higher Algebra (7th edition). Arihant Publications.
7) Leonard Eugene Dickson (2009). First Course in the Theory of Equations. The Project Gutenberg EBook (http://www.gutenberg.org/ebooks/29785).</td></tr>
</table>

Session 2023-2024			
Part-A Introduction			
Subject	Commerce		
Semester	I		
Name of the Course	Business Mathematics-1		
Course Code	B23-COM-104		
Course Type: (CC/MCC/MDC/ CCM/ DSEC/VOC/DSE/PC/AEC/ VAC	CC-M1		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	NIL		
Course Learning Outcomes (CLO)	After completing this course, the learner will be able to: 1. understand set theory, logical statements and truth tables. 2. learn the logarithms and arithmetic and geometric progressions and their applications. 3. familiarize with the concepts of matrices and determinants. Learn to solve system of simultaneous linear equations. 4. have the conceptual knowledge of Compound interest, annuity, loan, debenture and sinking funds and attain skills to use these concepts in daily life.		
	5*.		
	Theory	**Tutorial**	**Total**
Credits	01	01	02
Internal Assessment Marks	15	-	15
End Term Exam Marks	35	-	35
Exam Time	3 Hrs.	-	3 Hrs.
Part-B Contents of the Course			

Instructions for Paper Setters		
1. The examiner will set 9 questions in all covering the course learning outcomes (CLOs). Question No. 1 will be compulsory and comprises of seven parts of 1 marks each. Question Nos. 2 to 9 will carry 7 marks each, having two questions from each unit. About 40% questions should be numerical type. 2. Students are required to attempt 5 questions in all, selecting one question from each unit and the compulsory question.		
Unit	**Topics**	**Contact Hours**
I	Set Theory: Representation of sets, equivalent sets, power set, complement of a set. Venn Diagrams: Union and intersection of	8
	sets, De-Morgan's laws; Logical statements and truth tables.	
II	Logarithms: Laws of operation, log tables; Arithmetic and geometric progression.	7
III	Matrices and Determinants: Definition of a matrix, order, equality, types of matrices; Operations on matrices: Addition, multiplication and multiplication with a scalar and their simple properties. Determinant of a square matrix (upto 3x 3 order): Properties of determinants, minors, co-factors and applications of determinants in finding the area of triangle, adjoint and inverse of a square matrix, solutions of a system of linear equations by examples.	8
IV	Compound interest and annuities: Different types of interest rates, types of annuities, present value and amount of an annuity (including the case of continuous compounding), valuation of simple loans and debentures, problems related to sinking funds.	7
V*		

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory** Class Participation Seminar/Presentation/Assignment/Quiz/Class Test etc. Mid Term Exam:	**End Term Exam**

Part-C Learning Resources
Recommended Books/E-Resources/LMS: • Allen R.G.D., Basic Mathematics, Macmillan, New Delhi • D.C. Sancheti and V.K. Kapoor, Business Mathematics, Sultan Chand and Sons. • E. Don and J. Lerner (2009). Schaum outlines of Basic Business Mathematics, McGraw Hill. • Holden, Mathematics for Business and Economics, Macmillan India, New Delhi. • S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand & Sons, Delhi.
Session 2023-2024
Part-A Introduction

Subject	Commerce
Semester	II
Name of the Course	Business Mathematics-II
Course Code	B23-COM-204
Course Type: (CC/MCC/MDC/ CCM/ DSEC/VOC/DSE/PC/AEC/ VAC	CC-M2
Level of the course (As per Annexure-I)	100-199
Pre-requisite for the course (if any)	NIL

<table>
<tr><td rowspan="2">Course Learning Outcomes (CLO)</td><td colspan="3">After completing this course, the learner will be able to:
1. gain the knowledge to find derivatives simple functions related to commerce problems, attain skills to use application of derivatives in evaluating maxima and minima.
2. learn to find integration of simple functions related to commerce and economic problems, attain skills to use application of integration in business and commerce problems.
3. apply binomial theorem, learn the concept and applications of permutations and combinations.
4. learn the concept of Linear programming and formulation of linear programming problems related to business and commerce.</td></tr>
<tr><td colspan="3">5*.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Tutorial</td><td>Total</td></tr>
<tr><td>01</td><td>01</td><td>02</td></tr>
<tr><td>Internal Assessment Marks</td><td>15</td><td>-</td><td>15</td></tr>
<tr><td>End Term Examination Marks</td><td>35</td><td>-</td><td>35</td></tr>
<tr><td>Examination Time</td><td>3Hrs</td><td>-</td><td>3 Hrs.</td></tr>
<tr><td colspan="4">Part-B Contents of the Course</td></tr>
<tr><td colspan="4">Instructions for Paper Setters
1. The examiner will set 9 questions in all covering the course learning outcomes (CLOs). Question No. 1 will be compulsory and comprises of seven parts of 1 marks each. Question Nos. 2 to 9 will carry 7 marks each, having two questions from each unit. About 40% questions should be numerical type.
2. Students are required to attempt 5 questions in all, selecting one question from each unit and the compulsory question.</td></tr>
</table>

Unit	**Topics**	**Contact Hours**

I	Differentiation; derivative of simple functions and other functions (excluding trigonometric functions) having applications in business studies; Maxima and minima of Revenue, Cost, Demand, Production, Profit functions and other functions related to business and commerce.	6
II	Integration: Definite and indefinite (simple functions excluding trigonometric functions), basic rules of integration, application of integration in commercial and business problems.	6
III	Binomial Theorem; Permutations and Combinations.	6
IV	Linear programming: Formulation of linear programming problems (LPP) and their solution by graphical and simplex methods, Applications of linear programming in solving problems related to business and commerce.	7
V*	-	
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory** Class Participation Seminar/Presentation/Assignment/Quiz/Class Test etc. Mid Term Exam		**End Term Exam**
Part-C Learning Resources		

Recommended Books/E-Resources/LMS:

- A.R. Vasishtha, Matrices, Krishna Prakashan (P) Media Ltd.
- Allen R.G.D., Basic Mathematics, Macmillan, New Delhi
- D.C. Sancheti and V.K. Kapoor, Business Mathematics, Sultan Chand and Sons.
- Dowling E.T., Mathematics for Economics, Schaum Series, McGraw Hill, London.
- E.T. Dowling, Schaum outlines of Calculus for Business, Economics and the Social Sciences. McGraw Hill.
- Holden, Mathematics for Business and Economics, Macmillan India, New Delhi.
- S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand & Sons, Delhi.

Part A – Introduction

Subject	**Business Administration**
Semester	**I**
Name of the Course	**Business Mathematics-I**
Course Code	**B23-BBA-104**
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	**CC-M1**
Level of the course (As per Annexure-I	**Foundation-Level**
Pre-requisite for the course (if any)	**None**
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Understand set theory, logical statements and truth table. Find the solution of linear equations. 2. Determine the solution of quadratic equations. Learn the concept and applications of permutations and combinations. 3. Apply binomial theorem. Understand the concepts related to functions, limit and continuity and appropriately apply the concepts of differential calculus to solve related problems. 4. Understand the matrix algebra and its application to business problems. Find the solution of system of simultaneous linear equations using determinants and matrices. 5*.

Credits	Theory	Practical	Total
	2	**0**	**2**
Contact Hours/Week	**2**	**0**	**2**

Max. Marks: **50** Internal Assessment Marks: **15** End Term Exam Marks: **35**	Time: **3 Hours**

Part B- Contents of the Course

Instructions for Paper- Setter

The Paper-Setter shall set *nine* questions in all and the question paper shall be divided into two parts. **Part 'A'** shall comprise *four* short answer type questions from the whole of the syllabus carrying 1.75 marks each, which shall be compulsory. **Part 'B'** shall comprise *eight* questions (*two* questions from each unit) carrying 7 marks each and the student will be required to attempt *four* questions selecting *one* question from each unit.

Unit	**Topics**	**Contact Hours**
I	Set Theory: Representation of sets, equivalent sets, power set, complement of a set. Venn Diagrams: Union and Intersection of sets, De-Morgan's laws.	8
II	Quadratic Equations with real roots: Relations between roots and coefficient of the quadratic equations , Methods of solving a quadratic equation	8
III	Binomial Theorem (positive index). Functions, Limits and Continuity.	7
IV	Matrix System: Matrices, Basic operations on matrices (Addition, Multiplication, Transpose), Determinant of a square matrix, Inverse of a square matrix, Cramer's rule	7
V*		

Suggested Evaluation Methods

<table>
<tr><td>Internal Assessment:
➢ Theory
● Class Participation: 4
● Seminar/presentation/assignment/quiz/class test etc.: 4
● Mid-Term Exam: 7
➢ Practicum
● Class Participation:
● Seminar/Demonstration/Viva-voce/Lab records etc.:
● Mid-Term Exam:</td><td>End Term Examination: 35</td></tr>
<tr><td colspan="2" align="center">Part C-Learning Resources</td></tr>
<tr><td colspan="2">Recommended Books/e-resources/LMS:

1. Dr. Sancheti & Kapoor: Business Mathematics and Statistics; Sultan Chand.
2. R.S. Bhardwaj: Mathematics for Economics & Business; Excel Books, India.
3. M. Raghavachari: Mathematics for Management: An Introduction; Tata McGraw Hills.
4. Azharuddin: Business Mathematics; Vikas Publishers.
5. Gorakh Prasad: Differential Calculus; Rashi Kansal (Pothishala).
6. G. Rangaraj, R. Mallieswari & V. Rema: Business Mathematics; Cengage.
7. Eugene Don, Joel Lerner: Schaum's Outline of Basic Business Mathematics (Schaum's Outlines); McGraw-Hill Education.</td></tr>
</table>

*Applicable for courses having practical component.

<table>
<tr><th colspan="4">Part A – Introduction</th></tr>
<tr><td>Subject</td><td colspan="3">Business Administration</td></tr>
<tr><td>Semester</td><td colspan="3">II</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Business Mathematics-II</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-BBA-204</td></tr>
<tr><td>Course Type:
(CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)</td><td colspan="3">CC-M2</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="3">Foundation-Level</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3">None</td></tr>
<tr><td>Course Learning Outcomes (CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. Understand the application of Average, Ratio and Proportion, Percentage, Profit and Loss, Commission, Discount, Broke in business organisation.
2. Understand simple interest and compound interest and annuities.
3. Understand indices & logarithms.
4. Understand applications of linear programming in solving business problems.
5*.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>2</td><td>0</td><td>2</td></tr>
<tr><td>Contact Hours/Week</td><td>2</td><td>0</td><td>2</td></tr>
<tr><td colspan="2">Max. Marks: 50
Internal Assessment Marks: 15
End Term Exam Marks: 35</td><td colspan="2">Time: 3 Hours</td></tr>
</table>

Part B- Contents of the Course		
Instructions for Paper- Setter The Paper-Setter shall set *nine* questions in all and the question paper shall be divided into two parts. **Part 'A'** shall comprise *four* short answer type questions from the whole of the syllabus carrying 1.75 marks each, which shall be compulsory. **Part 'B'** shall comprise *eight* questions (*two* questions from each unit) carrying 7 marks each and the student will be required to attempt *four* questions selecting *one* question from each unit.		
Unit	**Topics**	**Contact Hours**
I	Average, Ratio and Proportion, Percentage, Profit and Loss, Commission, Discount, Broke.	8
II	Simple interest and compound interest. Annuities: Types of annuities, Present value and amount of an annuity (including the case of continuous compounding), Valuation of simple loans and debentures, Problems related to sinking funds.	8
III	Indices & logarithms, arithmetic and geometric progressions and their business applications; sum of first n natural numbers, sum of squares and cubes of first n natural numbers.	7
IV	Linear Programming: Formulation of linear programming problems (LPP) and their solution by graphical and simplex methods. Applications of linear programming in solving business problems.	7
V*		

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory** ● Class Participation: **4** ● Seminar/presentation/assignment/quiz/class test etc.: **4** ● Mid-Term Exam: **7** ➢ **Practicum** ● Class Participation: ● Seminar/Demonstration/Viva-voce/Lab records etc.: ● Mid-Term Exam:	End Term Examination: **35**

Part C-Learning Resources
Recommended Books/e-resources/LMS: 8. E. Don and J. Lerner (2009). Schaum's outline of Basic Business Mathematics (2nd Edition). McGraw Hill. 9. L.N.Paul (2002). Linear Programming: an introductory analysis. Tata Mcgraw Hill. New.

SYLLABUS

K.U. (NEP)

MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE-II

Paper : B23-CAP-204

(Common with B23-CAI-204, B23-CDS-204, B23-CTS-204)

SEMESTER : II

Unit	Topics
I.	Integration of simple algebraic, trigonometric, and exponential functions. **Presentation of data :** Frequency distribution and cumulative frequency distribution, Diagrammatic and graphical presentation of data, Construction of bar, Pie diagrams, Histograms, Frequency polygon, Frequency curve, and Ogives.
II.	**Measures of central tendency :** Arithmetic mean, Median, Mode, Geometric mean, and Harmonic mean for ungrouped and grouped data. **Measures of dispersion :** Concept of dispersion, Mean deviation and its coefficient, Range, Variance and its coefficient, Standard deviation.
III.	**Correlation :** Concept and types of correlation, Methods of finding correlation: Scatter diagram, Karl Pearson's coefficients of correlation, Rank correlation.
IV.	**Linear regression :** Principle of least square, Fitting of a straight line, Two lines of regression, Regression coefficients.

Government PG College, Ambala Cantt.

Course File (Session 2023-2024)(Odd SEMESTER)

Class: B.C.A/1st semester

Name of the Course: Mathematical Foundations for Computer Science-I

Course Code: B23-CAP-104

Course Type: CC-M

Syllabus

Unit-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.

Unit-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.

Unit-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.

Unit-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

Text /Reference Books:

- C. Y. Young (2021). Algebra and Trigonometry. Wiley.

- S.L. Loney (2016). The Elements of Coordinate Geometry (Cartesian Coordinates) (2nd Edition). G.K. Publication Private Limited.
- Seymour Lipschutz and Marc Lars Lipson (2013). Linear Algebra. (4th Edition) Schaum's Outline Series, McGraw-Hill.
- C.C. Pinter (2014). A Book of Set Theory. Dover Publications.

- J. V. Dyke, J. Rogers and H. Adams (2011). Fundamentals of Mathematics (10th Edition), Brooks/Cole.
- A. Tussy, R. Gustafson and D. Koenig (2010). Basic Mathematics for College Students (4th Edition). Brooks Cole