Mathematics forB.C.A

Seme ster	Title of the paper	Number of hours per week	Total Credits	Total hours/ semeste	University Exam Duration	Marks	
						Internal	External
1	Discrete Mathematics (I)	4	4	72	3 hrs	20	80
2	Discrete Mathematics (II)	4	4	72	3 hrs	20	80
4	Operations Research	4	4	72	3 hrs	20	80

Mathematics for B.Sc ComputerScience

Sem ester	Title of the paper	Number of hours	Total Credits	Total hours/ semester	University Exam Duration	Marks	
						Internal	External
1	Discrete Mathematics (I)	4	4	72	3 hrs	20	80
2	Discrete Mathematics (II)	4	4	72	3 hrs	20	80

B.Sc. DEGREE PROGRAMME (UGCBCS 2017)
MATHEMATICS
(COMPLEMENTARY COURSE TO B.Sc COMPUTER SCIENCE/ BCA)
FIRST SEMESTER
DISCRETE MATHEMATICS (I)

4 hrs/week (Total Hrs:72)   **4Credits**

Syllabus

Text Books

Kenneth H Rosen ; Discrete Mathematics And Its Applications ; 6th Edition ;

Tata Mc Graw-Hill Publishing Company Limited

Module 1: Logic   **(18 hrs)**

Propositional Logic, Propositional Equivalence, Predicates and Quantifiers and Rules of Inference

Chapter 1 (Sections 1.1, 1.2, 1.3 and 1.5only)

Module II: Basic Structures   **(15 hrs)**

Sets, Set Operations, Functions, Sequences and Summations

Chapter 2 (Sections 2.1, 2.2, 2.3 and 2.4)

Module III: Number Theory and Cryptosystem   **(20 hrs)**

The Integers and Division, Primes and Greatest Common Divisors, Applications of Number Theory.

Chapter 3 (Sections 3.4, 3.5 and 3.7 Only)

Module IV: Relations   **(19 hrs)**

Relations and Their Properties, Representing Relations, Equivalence Relations, Partial Orderings.

Chapter 7 (Sections 7.1, 7.3, 7.5 and 7.6)

References

1. Clifford Stien, Robert L Drysdale, KennethBogart ; Discrete Mathematics for Computer Scientists; Pearson Education; Dorling Kindersley India Pvt. Ltd

2. Kenneth A Ross; Charles R.B. Wright ; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd

3. Ralph P. Grimaldi, B.V.Ramana; Discrete And Combinatorial Mathematics ; Pearson Education; Dorling Kindersley India Pvt. Ltd

4. Richard Johnsonbaugh; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd

5. Winfried Karl Grassman, Jean-Paul Tremblay; Logic And Discrete Mathematics A Computer Science Perspective ; Pearson Education; Dorling Kindersley India Pvt. Ltd

QUESTON PAPER PATTERN

Module	Part A 2 Mark	Part B 5 Marks	Part C 15Marks	Total
I	3	3	1	7
II	3	2	1	6
III	3	2	1	6
IV	3	2	1	6
Total No. of Questions	12	9	4	25
No. Questions to be answered	10	6	2	18
Total Marks	20	30	30	80

4 hrs/week (Total Hrs:72)   **4credits**

Syllabus

Text Books

1. **Kenneth H Rosen ; Discrete Mathematics And Its Applications ; 6th Edition ; Tata**

   Mc Graw-Hill Publishing Company Limited

2. **Frank Ayres Jr : Matrices , Schaum's Outline Series , TMH Edition.**

Module I: Graphs   **(18 hrs)**

Graphs and Graph Models, Graph Terminology and Special types of Graphs,Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths.

Text 1 Chapter 8 (Sections 8.1, 8.2, 8.3, 8.4 and 8.5 only)

Module II: Trees   **(17 hrs)**

Introduction to Trees, Application of Trees, Tree Traversal, and Spanning Trees.

Text 1 Chapter 9 (Sections 9.1, 9.2, 9.3 and 9.4 only)

Module III: Boolean Algebra   **(17 hrs)**

Boolean Function, Representing Boolean Functions and Logic Gates

Text 1 Chapter 10 (Sections 10.1, 10.2 and 10.3 only)

Module IV: Matrices   **(20 hrs)**
Definitions and examples of Symmetric, Skew-symmetric, Conjugate, Hermitian, Skew-hermitian matrices. Rank of Matrix , Determination of rank by Row Canonical form and Normal form , Linear Equations, Solution of non homogenous equations using Augmented matrix and by Cramers Rule , Homogenous Equations, Characteristic Equation, Characteristic roots and Characteristic vectors of matix , Cayley Hamilton theorem and applications.

Text 2. Relevant Sections of Chapters 2, 5 , 10 , 19 and 23 (Proofs of all Theorems in Module IV are Excluded)

References

1. Clifford Stien, Robert L Drysdale, KennethBogart ; Discrete Mathematics for Computer Scientists; Pearson Education; Dorling Kindersley India Pvt. Ltd

2. Kenneth A Ross; Charles R.B. Wright ; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd

3. Ralph P. Grimaldi, B.V.Ramana; Discrete And Combinatorial Mathematics ; Pearson Education; Dorling Kindersley India Pvt. Ltd

4. Richard Johnsonbaugh; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt.Ltd

5. Winfried Karl Grassman, Jean-Paul Tremblay; Logic And Discrete Mathematics A Computer Science Perspective ; Pearson Education; Dorling Kindersley India Pvt. Ltd

QUESTON PAPER PATTERN

Module	Part A 2 Mark	Part B 5 Marks	Part C 15Marks	Total
I	3	3	1	7
II	3	2	1	6
III	3	2	1	6
IV	3	2	1	6
Total No. of Questions	12	9	4	25
No. Questions to be answered	10	6	2	18
Total Marks	20	30	30	80

B.Sc. DEGREE PROGRAMME (UGCBCS 2017)
MATHEMATICS
(COMPLEMENTARY COURSE TO BCA) FOURTH
SEMESTER

OPERATIONS RESEARCH

4hrs/week   **4credits**

Syllabus

Text Book:

Belly E Gillet – Introduction to Operations Research (A Computer Oriented Arithmetic Approach) (Tata Mc. GrawHill)

MODULE I: Basics of O.R.   **(10hrs)**

The nature and uses of O.R- math concepts and approaches of O.R- models in O.R.

MODULE II: Linear programming problems   **(25 hrs)**

Mathematical formulation of a L.P.P., General linear programming problems, solution of a L.P.P, graphical method for solving a L.P.P.

Simplex Method: Stack and surplus variables- reduction of any feasible solution to a basic feasible solution. Unbounded solution. Optimality conditions- artificial variable techniques- Big M method.

MODULE III: Transportation & assignment Problems   **(20 hrs)**

Transportation model- solution by simplex method- north west corner rule, lowest cost entry method, vogel method, MODI method, degeneracy, assignment problems.

MODULE IV: Game Theory   **(17 hrs)**

Two persons zero sum games, pure and mixed strategy with saddle point, solution of pure strategy games, solution of mixed strategy problems by arithmetic method. Principle of dominance.

Reference Books:

1.   V.K Kapoor – OperationsResearch

2.   Kanti Swarup , P.K Gupta and Man Mohan – Operations Research, Sultan Chand &Sons

3.   K.V Mital and C. Mohan – Optimization Methods in Operations Research and SystemAnalysis

4.   J. K Sharma – Operations Research Theory and Applications , Macmillan

5.   B. N. Mishra, B. K. Mishra – OptimizationLinear Programming Ane Books

QUESTON PAPER PATTERN

Module	Part A 2 Mark	Part B 5 Marks	Part C 15Marks	Total
I	3	3	1	7
II	3	2	1	6
III	3	2	1	6
IV	3	2	1	6
Total No. of Questions	12	9	4	25
No. Questions to be answered	10	6	2	18
Total Marks	20	30	30	80

Mathematics for B.A Economics

Semesters	Title of the paper	Number of hours per week	Total Credits	Total hours/ semester	University Exam Duration	Marks	
						Internal	External
1	Graphing functions, Equations and Differential Calculus	6	4	108	3 hrs	20	80
2	Matrix, Exponential- Logarithmic Functions And Integral Calculus	6	4	108	3 hrs	20	80

MATHEMATICS

(COMPLEMENTARY COURSE TO B.A. ECONOMICS)

FIRST SEMESTER

GRAPHING FUNCTIONS, EQUATIONS AND DIFFERENTIAL CALCULUS

6 hrs/week (TotalHrs:108)   4Credits

Syllabus

Text Book

Edward T Dowling : Theory and Problems of Mathematical Methods for Business and Economics, Schaum's Outline Series ,McGraw Hill (1993)

Module I: Equations and Graphs Equations   (20 hrs)

Review - (Exponents, polynomials, factoring, fractions, radicals, order of mathematical operations.) Cartesian Co-ordinate system, linear equations and graphs slopes intercepts. The slope intercept form. Determining the equation of a straight line. Applications of line equations in business and   economics.

Module II: Functions Concepts   (23 hrs)

Functions Concepts and definitions- graphing functions. The algebra of functions. Applications of linear functions for business and economics. Solving quadratic equations Facilitating non linear graphing. Application of non linear functions in business and economics. System of equations Introduction, graphical solutions. Supply-demand analysis. Break-even analysis. Elimination andsubstitution methods. IS-LM analysis. Economic and mathematical modeling. Implicit functions and inverse functions.

Module III: Differential calculus   (40 hrs)

Limits and continuity. Evaluation of limit of a function. Algebraic limit. The derivative and the rules of differentiation: The slope of curvilinear function. Derivative notation. Rules of differentiation. Higher order derivatives. Derivative of Implicit functions. Applications of derivatives. Increasing and decreasing functions. Concavity and convexity. Relative extrema.

Inflection points. Curve sketching. Optimisation of functions. The successive derivative test. Marginal concepts in economics. Optimising economic functions of business. Relation among total, marginal and average functions.

Module IV: Exponential and logarithmic functions   **(25 hrs)**

Exponential functions. Logarithmic functions properties of exponents and logarithms. Natural exponential and logarithmic functions. Solving natural exponential and logarithmic functions. Logarithmic transformation of non linear functions. Derivatives of natural exponential and logarithmic functions. Interest compounding. Estimating growth rates from data points.

Reference Book :

1. Taro Yaman : Mathematical Economics

QUESTON PAPER PATTERN

Module	Part A 2 Mark	Part B 5 Marks	Part C 15Marks	Total
I	3	2	1	6
II	3	2	1	6
III	3	3	1	7
IV	3	2	1	6
Total No. of Questions	12	9	4	25
No. Questions to be answered	10	6	2	18
Total Marks	20	30	30	80