

B.Sc. (Data Science)
Skill Enhancement Course (SEC)
Semester III

BSDB32304T: Mathematical Foundation for Data Science

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 40%

Objective

This course helps student understand the basic concepts Mathematics that will be helpful to them in data science.

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions each from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any 10 questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt any two questions each from the sections A, and B of the question paper, and any ten short answer questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Section A

Unit I: Basics of Data Science- Introduction, Importance of data science, statistics and optimization from a data science perspective, structured thinking for solving data science problems using mathematics

Unit II: Linear Equations- Solution of Simultaneous Linear Equations (upto two variable case), Solution of Quadratic Equations. Series: Arithmetic Progression Series, Geometric Progression Series

Unit III: Permutations and Combinations, Binomial Theorem, Determinants with simple applications for solution of linear simultaneous equations using Cramer's Rule.

Unit IV: Matrices with simple application for solution of linear simultaneous equations using matrix inversion method, Eigenvalues and eigenvectors; Matrix factorizations.

Section B

Unit V: Functions. Graphical representations of functions, limits and continuity of functions, first principle of differential calculus, derivations of simple algebraic functions

Unit VI: Applications- Applications of derivatives in Economic and Commerce. Maximum and minimum.

Unit VII: General form of linear Programming, formulating Linear Programming Problems assumptions, Graphic Method.

Unit VIII: The Standard Maximum and Minimum Problems, Simplex Method, Duality, Dual Linear Programming Problems

Suggestive Readings

1. G. Strang, Introduction to Linear Algebra, Wellesley-Cambridge Press, Fifth edition, USA, 2016
2. Bendat, J. S. and A. G. Piersol, Random Data: Analysis and Measurement Procedures. 4th Edition. John Wiley & Sons, Inc., NY, USA, 2010.
3. Cathy O'Neil and Rachel Schutt, Doing Data Science, O'Reilly Media, 2013