B.Sc. INFORMATION TECHNOLOGY
Students Admitted From A.Y. 2016-2017 & Onwards

SEMESTER – I

16UITDA01	DSE Allied 1: Mathematics and Statistics -I	04 hrs/wk	04 Credits

Objectives:

To enable the students to
1. Interpolate mathematical and statistical skills and knowledge which will be beneficial to develop proficiency in analytical reasoning.
2. Demonstrate skills of solving real world problems.
3. Associate basic methods of mathematics and statistics in computing to design and analyze algorithms, computability theory and graphics.
4. Identify a problem and examine different methods to its solutions and evaluate merits and demerits of each.
5. Distinguish a logical argument from a fallacious one in mathematical reasoning as well as in everyday life.

Unit - 1 Set Theory (10 hrs)
- Introduction
- Methods of Representation of a Set, Different Types of Sets, Operations on sets & its properties (Union of sets, Intersection of sets, Complement of sets, Difference of sets) (without proof)
- Cartesian product.

Unit – 2 Matrix (10 hrs)
- Introduction
- Different Types of Matrices
- Trace of Matrix, Transpose of Matrix, Determinant, Addition & Subtraction of Matrices, Multiplication of Matrices, Adjoint of a Matrix, Inverse of a Matrix

Unit – 3 Functions (10 hrs)
- Introduction
- Domain, Co domain & Range of a Function, Classification of Functions, Different Types of Functions.

Unit – 4 Mathematical Logic (10 hrs)
- Introduction
- Simple & Compound Propositions, Connectives, Truth Values & Truth Tables of a Proposition.

Unit – 5 Correlation & Regression (10 hrs)

- Introduction
- Different Types of Correlation, Correlation and Regression Coefficients and their Properties
- Scatter Diagram Method
- Rank Correlation
- Regression Lines.

Text Books:

1. *J. P. Tremblay and R. Manohar.* 2001. **Discrete Mathematical Structures with Applications to Computer Science** [First Edition]. Mcgraw Hill Education, New York. (Unit 1, 3, 4)
2. *V. N. Vedamurthy and N Iyengar*. 1998. **Numerical Methods.** [First Edition] Vikas Publishing House Pvt Ltd, New Delhi. (Unit 2)
3. *S. C. Gupta and V. K. Kapoor*. 2001. **Fundamentals of Mathematical Statistics.** [Tenth Edition, Revised]. Sultan Chand & Sons, New Delhi. (Unit 5)

Reference Books:

1. *Olympia Nicodemi.* 1987. **Discrete Mathematics: A Bridge to Computer Science and Advanced Mathematics** [First Edition]. West Publishing Company, USA.
2. *S. C. Gupta and V. K. Kapoor*. 2001. **Elements of Mathematical Statistics.** [Third Edition, Revised]. Sultan Chand & Sons, New Delhi.

16UITDA02	DSE Allied 2: Mathematics and Statistics –II	04 hrs/wk	04 Credits

Objectives:

To enable the students to

1. Interpolate mathematical and statistical skills and knowledge which will be beneficial to develop proficiency in analytical reasoning.
2. Demonstrate skills of solving real world problems.
3. Associate basic methods of mathematics and statistics in computing to design and analyze algorithms, computability theory and graphics.
4. Identify a problem and examine different methods to its solutions and evaluate merits and demerits of each.
5. Distinguish a logical argument from a fallacious one in mathematical reasoning as well as in everyday life.

Unit - 1 Co-Ordinate Geometry (10 hrs)
- Introduction, Distance between Two Points in R_2 (without proof)
- Section Formula (without proof), Area of a Triangle (without proof)
- Equations of Different Types of Line (without proof), Parallel Lines, Perpendicular Lines

Unit - 2 Progression (10 hrs)
- Introduction, Arithmetic Progression, Harmonic Progression, Geometric Progression, n^{th} Term & Sum of First n Terms of A.P. & G.P. (without proof)
- Arithmetic Mean, Harmonic Mean, Geometric Mean.

Unit - 3 Interpolation (10 hrs)
- Introduction of Interpolation & Extrapolation
- Newton Forward Interpolation (without proof)
- Newton Backward Interpolation (without proof)
- Lagrange Interpolation (without proof).

Unit - 4 Transportation Problem (10 hrs)
- Introduction, North – West Corner Method, Least Cost Method,
- Vogel's Approximation Method.

Unit - 5 Measure of Central Tendency & Dispersion (10 hrs)
- Introduction, Mean, Median, Mode, Quartiles, Range, Standard Deviation.

Text Books:

1. *C. B. Boyer. 2004. History of Analytic Geometry* [First Edition]. Dover Publications, USA. (Unit 1)
2. *S. C. Gupta and V. K. Kapoor.* 2001. **Fundamentals of Mathematical Statistics.** [Tenth Edition, Revised]. Sultan Chand & Sons, New Delhi. (Unit 2, 5)
3. *V. N. Vedamurthy and N Iyengar*. 1998. **Numerical Methods.** [First Edition] Vikas Publishing House Pvt Ltd, New Delhi.
   (Unit 3)
4. *V. K. Kapoor.* 2014. **Operations Research – Concepts, Problems & Solutions** [Fifth Edition, Revised]. Sultan Chand & Sons, New Delhi. (Unit 4)

Reference Books:

1. *S. C. Gupta and V. K. Kapoor*. 2001. **Elements of Mathematical Statistics.** [Third Edition, Revised]. Sultan Chand & Sons, New Delhi.
2. *J. P. Tremblay and R. Manohar.* 2001. **Discrete Mathematical Structures with Applications to Computer Science** [First Edition]. Mcgraw Hill Education, New York.
3. *V. K. Kapoor*. 2001. **Operations Research.** [Sixth Edition, Revised]. Sultan Chand & Sons, New Delhi.