Under-Graduate Programme
Allied Mathematics Courses
(Computer Science / Computer Applications)

Courses of Study, Schemes of Examinations
& Syllabi

(Choice Based Credit System)

THE DEPARTMENT OF MATHEMATICS
(DST – FIST sponsored)

BISHOP HEBER COLLEGE (Autonomous)

(Reaccredited with 'A' Grade (CGPA – 3.58/4.0) by the NAAC &
Identified as College of Excellence by the UGC)

DST – FIST Sponsored College &
DBT Star College
TIRUCHIRAPPALLI – 620 017
TAMIL NADU, INDIA

2020 – 2021

Allied Mathematics Courses offered to students of

Under Graduate Programme in Computer Science/Computer Applications

(For the candidates admitted from the year 2020 onwards)

Sem.	Course	Code	Title	Hrs./week	Credits	Marks		
						CIA	ESA	TOTAL
I	I	U20MAZ11	Operations Research	5	4	25	75	100
II	II	U20MAZ22	Numerical Methods	4	4	25	75	100
II	III	U20MAZ23	Probability & Statistics	4	4	25	75	100

Sem. I   **Code   : U20MAZ11**

Total Hrs. 75   **Credits: 4**

General objectives:

On completion of this course, the learner will

1. Be able to understand Linear Programming Problems (LPP) and to know methods of solving them.
2. Be able to apply LPP to solve transportation and assignment problems.
3. Know the basics and the methods of solving network problems.
4. Know the basics of inventory models and to solve inventory problems.

Learning outcome:

On completion of the course, the student will be able to analyze and solve Linear Programming Problems, Transportation Problems, Assignment Problems & network problems.

Unit I

Introduction to Operations Research – Linear programming problem - Introduction – General model of the LPP – Characteristics of an LPP – Assumptions of Linear Programming – Formulation of an LPP- Standard Form of an LPP - Solution to an LPP – Types of possible solutions to an LPP – Convex set and Extreme points - Graphical solution to an LPP – Simplex methods.

Unit II

Big–M method – Two phase method.

Unit III

Transportation Problem – Introduction – Conversion of a TP into an LPP Form – Formulation of a Transportation Problem - Concepts of Basicness, and Degeneracy in the solution – Methods used to find the solution to a Transportation Problem– Description of various methods to find the Initial Basic Feasible Solution – Stepping Stone Method/ Modified Distributive Method.

Unit IV

Assignment Problem – Introduction – General Model of the Assignment Problem – Conversion into an Equivalent LPP – Solution to the Assignment Problem.

Unit V

PERT - CPM - Introduction – Method for Construction of a Network – Numbering the nodes – Critical Path Method (CPM) – Project Evaluation Review Technique (PERT).

Text book

P Mariappan, Operations Research An Introduction, Pearson New Delhi, 2013

    Unit I: Chapter 1, Chapter 2: 2.1 – 2.11
    Unit II: Chapter 2: 2.12 – 2.13
    Unit III: Chapter 4: 4.1 – 4.7
    Unit IV: Chapter 5: 5.1 – 5.4
    Unit V: Chapter 6: 6.1 -6.5

References

1.   Hamdy A.,Taha, Operations Research, Keerthi Publishing House , 1997.
2.   S. Dharani Venkatakrishnan , Operations Research , Keerthi Publishing House, 1997.
3.   S. D. Sharma Kedarnath , Operations Research, Ramnath Publishers and Co., Meerut 1997.
4.   M. P. Gupta, J. K. Sharma, Operations Research for Management, National Publishing House, 1992.

Allied Course II –Numerical Methods

Sem. II   **Code   : U20MAZ22**

Total Hrs. 60   **Credits: 4**

General objectives:

On completion of this course, the learner will

1. know and apply different numerical techniques to solve algebraic and differential equations.
2. know methods of finding approximate values for definite integrals.

Learning outcome:

On completion of the course, the student will be able to solve algebraic, differential and integral equations numerically.

Unit I

Introduction to Numerical Analysis-Solution of algebraic and transcendental equations – Bisection method – Iterative method – Regula Falsi method – Newton Raphson Method.

Unit II

Linear System of Equations - Gauss Elimination method – Iterative methods – Gauss Seidel method.

Unit III

Interpolation – Gregory Newton's forward and backward interpolation formulae – Lagrange's interpolation formula.

Unit IV

Numerical Integration – Trapezoidal rule, Simpson's one-third rule.

Unit V

Numerical solution of ordinary differential equations – Euler's method — Runge- Kutta 2nd order – Runge-Kutta 4th order (Problems only)

Text Book

Dr Perumal Mariappan, Numerical Methods for Scientific Solutions, New Century Book House, Pvt.Ltd, Chennai

Unit I: Chapter 1: 1.1, 1.2; Chapter 2: 2.1 – 2.5
Unit II: Chapter 3: 3.1, 3.3 - 3.6
Unit III: Chapter 5: 5.1 – 5.5
Unit IV: Chapter 7: 7.4, 7.4.1, 7.4.2.
Unit V: Chapter 6: 6.1, 6.4, 6.5

Reference

S. S. Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Private Limited, 2005.

Allied Course III - Probability & Statistics

Sem. II   **Code   : U20MAZ23**

Total Hrs. 60   **Credits: 4**

General objectives:

On completion of this course, the learner will

1. Know methods of calculation of measures of central tendency and measures dispersion of a data.
2. Know methods of finding correlation and regression co-efficient between two data sets and their applications.
3. Know the properties of some discrete and continuous distributions.

Learning outcomes:

On completion of the course, the student will be able

1. to analyze discrete and continuous data through measures of central tendency and measures of dispersions.
2. to find correlation and regression co-efficient between two data sets.
3. calculate the probability for any event and use it to estimate certain possibilities.

Unit I

Range-The mean deviation-The standard deviation- difference between mean and standard deviation-calculation of standard deviation of variation.

Unit II

Skewness - (without derivations) - measure of skewness based on moments- kurtosis- measures of kurtosis.

Unit III

Correlation: Karl Pearson's coefficient of correlation - Spearman's rank correlation coefficient (formula alone)- correlation coefficient-Regression -regression equations of Y on X – regression equations of X on Y.

Unit IV

Classical or a priori probability-axiomatic approach to probability- calculation of probability-Theorems of probability-conditional probability- Baye's theorem - Mathematical expectation - Random variable and probability distribution.

Unit V

Binomial distribution- Poisson Distribution-definition- relation between Binomial, Poisson and Normal distribution-properties of normal distribution- Area under the Normal curve.

Text Book:

Perumal Mariappan, Statistics for Business, 1st Edition, CRC Press Taylor & Francis Group, Boca Raton London Newyork, 2019

Unit I: Chapter 5

Unit II: Chapter 6

Unit III: Chapter 7

Unit IV: Chapter 8: 8.3 – 8.4; Chapter 9

Unit V: Chapter 10: 10.2, 10.3 Chapter 11: 11.2, 11.3 11.4

Reference

S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, fourteenth edition, (2004).