

FACULTY OF COMPUTER SCIENCE & IT

SYLLABUS

of

Additional / Optional paper for specialization in Data Science

for

Bachelor of Computer Applications

(Semester I-II)

(Under Continuous Evaluation System)

(12+3 System of Education)

Session: 2022-23



**The Heritage Institution
KANYA MAHA VIDYALAYA
JALANDHAR
(Autonomous)**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Computer Applications

Session 2022-23

Additional / Optional paper for Specialization in Data Science

Bachelor of Computer Applications Semester – I							
Course Code	Course Name	Course Type	Marks				Examination Time (in Hours)
			Total	Ext.		CA	
				L	P		
BCAL-1116	*Computational Data Science	O	75	60	-	15	3
	Total		75				

Bachelor of Computer Applications Semester II							
Course Code	Course Name	Course Type	Marks				Examination Time (in Hours)
			Total	Ext.		CA	
				L	P		
BCAL-2116	*Statistical Techniques for Data Science	O	75	60	-	15	3
	Total		75				

Note:

O - Optional

*One additional/optional paper will be studied by the candidate if she opts for Specialization in Data Science

Bachelor of Computer Applications Semester I
(Session 2022-23)
COURSE CODE: BCAL-1116
COMPUTATIONAL DATA SCIENCE

Course Outcomes:

After the completion of this course, the student will be able to:

CO1: Comprehend terminology associated with data and its processing.

CO2: Comprehend various types of functions in set theory.

CO3: Apply Algorithms of polynomial algebra to solve problems.

CO4: Apply various counting principles, permutations, combinations and averages to solve basic set of problems.

Bachelor of Computer Applications Semester- I
(Session 2022-23)
COURSE CODE: BCAL-1116
COMPUTATIONAL DATA SCIENCE

Examination Time: 3 Hrs

Max. Marks: 75

Theory: 60

CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT I

Data Processing: Basic Terminology of Data, Types of Data, Information and Knowledge, Preprocessing the Data, Data cleaning, Data transformation, Data reduction.

Introduction to Data Science, Evolution of Data science, Need of Data Science, Components of Data Science, Application Areas.

UNIT II

Functions: Functions and their types, Quadratic Functions and Equations, Inverse Function, Logarithmic Functions and Equations.

UNIT III

Algebra of Polynomials: Addition, Subtraction, Multiplication and Division Algorithms

Graphs of Polynomials: X-intercepts, multiplicities, end behavior and turning points, Graphing & Polynomial Creation.

UNIT IV

Basic Principles of Counting and Factorial Concepts: Addition rule of counting, Multiplication rule of counting, Factorials.

Permutation and Combination.

Measures of Central Tendency: Mean, Median and Mode

References/Textbooks:

1. Patricia Pulliam Phillips, Cathy A. Stawarski, "Data Collection: Planning for and Collecting All Types of Data", Wiley Publisher, First Edition, 2008.
2. Roger Sapsford, Victor Jupp, "Data Collection-and Analysis", Second Edition, Sage

Publishing, 2006.

3. Kenneth Rosen, “Discrete Mathematics and Its Applications”, Tata McGraw Hill, 7th Edition
4. Anshuman Sharma, Fundamentals of Numerical Methods and Statistical techniques, Lakhanpal Publications (2016)

Bachelor of Computer Applications Semester II
(Session 2022-23)
COURSE CODE: BCAL-2116
STATISTICAL TECHNIQUES FOR DATA SCIENCE

Course Outcomes:

After the completion of this course, the student will be able to:

CO1: Comprehend the key terminology of descriptive statistics and frequency distribution

CO2: Comprehend the basic Probability terms and their usage.

CO3: Formulate hypothesis for basic problems and perform testing.

CO4: Implement statistical techniques like Chi Square test and Analysis of variance.

Bachelor of Computer Applications Semester- II
(Session 2022-23)
COURSE CODE: BCAL–2116
STATISTICAL TECHNIQUES FOR DATA SCIENCE

Examination Time: 3 Hrs

Max. Marks: 75
Theory: 60
CA: 15

Instructions for Paper Setter -

Eight questions of equal marks (12 mark each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT - I

Introduction to Statistics: Basic terminology, variables: discrete and continuous.

Introduction to descriptive Statistics: Types of data, levels of measurement, categorical variables and numerical variables. Introduction to Frequency distribution.

Probability: Meaning, Basic concepts, Events, Properties of Probability.

UNIT – II

Probability: Conditional Probability, Addition Theorem, Multiplication Theorem and Bayes' Theorem.

Introduction to Inferential statistics: Concept of a sample and a population, need of sampling, Hypothesis Testing: Type 1 and type 2 errors.

UNIT - III

Introduction to Asymmetry: Moments, Kurtosis and Skewness

Testing of Hypothesis: Null and Alternate hypothesis, confidence intervals. Chi square test.

UNIT - IV

ANOVA - one way and two way.

Data Analysis Tools in Spreadsheets: Regression Analysis, Correlation Analysis, Covariance Analysis, ANOVA Analysis.

References/Textbooks:

1. S.P Gupta, Statistical Methods, Sultan Chand & Sons (2012)
2. B. L. Agarwal, Statistics For Professional Courses, CBS Professional (2011)
3. Anshuman Sharma, Fundamentals of Numerical Methods and Statistical techniques, Lakhanpal Publications (2016)
4. Stephen L. Nelson, Excel Data Analysis for Dummies, Wiley Publications (2013)