

**व्यावहारिक सांख्यिकी एवं कम्प्यूटर में डिप्लोमा (डी.ए.एस.सी.)**  
**Diploma in Applied Statistics and Computer (DASC)**

कार्यक्रम कोड/ Programme Code	: 905	कार्यक्रम अवधि (वर्षों में) Programme Duration (in yrs.)	: न्यूनतम : 1 अधिकतम : 3 Minimum : 1 Maximum : 3
कार्यक्रम माध्यम/ Medium of Instruction	: अंग्रेजी/ English	कार्यक्रम शुल्क/ Programme Fee	: 4000/-
प्रवेश हेतु न्यूनतम अर्हता/ Minimum Qualification for Admission	: 10+2	अधिन्यास कार्य/ Assignment Work	: आवश्यक नहीं/ Not Essential

**पाठ्यक्रम कोड एवं विवरण**

Year	Paper No.	Course Code	Title of the Course/ पाठ्यक्रम का शीर्षक	Credits
One Year Course	1649	DASC-01	Statistical Methods	4
	1650	DASC-02	Probability and Probability Distribution	4
	1651	DASC-03	Correlation, Regression and Statistical Inference	4
	1652	DASC-04	Sampling Theory and Design of Experiments	4
	1653	DASC-05	Numerical Methods and Basic Computer	4
	1654	DASC-06	Applied Statistics	4
	1655	DASC-07	Fundamental of Computer and IT	8
	1656	DASC-08	Practical and Viva-voice	8
<b>Total Credits</b>				<b>40</b>

**DASC-01**  
**Statistical Methods**

**BLOCK – I .            Data Collection and Its Representation**

**Unit-I-                    Data Collection and Tabulation :**

Meanings, Definitions and Applications of Statistics, Measurements and Scale, Measurements of qualitative data, Methods of data collection, Types of data.

**Unit-II-            Representation of Data- I (Diagrammatical representation):**

Frequency distribution, Tabulation of data, Diagrammatical Representation of data, Bar diagram, Multiple bar diagram, Divided bar diagram, Percentage bar diagram, Pie chart, Pictogram, leaf chart,

**Unit-II-            Representation of Data- I (Graphical representation):**

Graphical representation of frequency distribution, Histogram, Frequency polygon, Frequency curve, Ogive.

**BLOCK – II .            Measures of Central Tendency and Dispersion**

**Unit-I-            Measures of Central Tendency :**

Types of measures of central tendency, Arithmetic mean, Fundamental Theorems on Arithmetic mean, Geometric mean, Harmonic mean, Median, Mode, Percentiles, Deciles, and Quartiles.

**Unit-II-            Measures of Dispersion :**

Types of measures of Dispersion, Range, Mean Deviation, Variance and Standard deviation, Effect of change of origin and scale, Relationship between measures of central tendency and measures of dispersion, Coefficient of variation.

**BLOCK – II .            Moments, Skewness and Kurtosis**

**Unit-I-                    Moments, Raw Moments and Central Moments :**

Definition of moments, raw moments for ungrouped data, raw moments for grouped data, Central moments, Factorial moments, Interrelationship between various moments, effect of change of origin and scale on moments, Charlier's checks, Sheppard's correction for moments.

**Unit-II-            Skewness and Kurtosis :**

Definition of skewness, Measures of skewness, Pearson's coefficient, Bowley's coefficients, Kurtosis, Measures of Kurtosis, effect of change of origin and scale.

## **DASC-02**

### **Probability and Distribution**

#### **BLOCK – I. Probability Theory**

##### **Unit-I- Random experiments and Probability:**

Deterministic and random experiments, Sample space, Events, Algebra of Events, Axiomatic definition of Probability, Classical definition of Probability, Statistical definition of probability, Addition Theorem of Probability .

##### **Unit-II- Conditional Probability:**

Conditional probability, Multiplicative theorem of Probability, Independent events, Partition of sample space, Baye's Theorem.

#### **BLOCK – II. Probability Distributions and Expectations**

##### **Unit-I- Random Variables and Probability Distributions:**

Definition and types of random variable, Cumulative distribution function and its properties, Probability Mass Function, Probability Density Function..

##### **Unit-II- Expectation:**

Definition and types of Mathematical Expectation, Moments in terms of expectation, Mathematical and Multiplication theorems of Expectation, other theorems on expectation.

##### **Unit-III- Inequalities for Moments:**

Cauchy-Schwartz Inequality, Markov's inequality, Chebyshev's inequality.

#### **BLOCK – III. Concept of Probability Distributions**

##### **Unit-I- Univariate Distributions:**

Bernoulli Distribution, Binomial Distribution, mean and variance of binomial distribution, Moments, Moments Generating Function, Additive and Multiplicative property, Recurrence relation for moments, Fitting of Binomial Distribution, Poisson Distribution, Poisson Distribution as a limiting case of Binomial Distribution, mean and variance of Poisson distribution, Moments, Moment Generating Function, Additive and Reproductive property, Recurrence relation for moments, fitting of Poisson Distribution.

**Unit-II- Discreet Distribution:**

Geometric Distribution, mean and variance, moment generating function of geometric distribution, Negative Binomial Distribution, Moment Generating Function, Mean and Variance, Recurrence formulae for negative Binomial Distribution, Poisson Distribution as a limiting case of Negative Binomial Distribution, Hyper Geometric Distribution, Mean and Variance, Recurrence relation for Hyper Geometric distribution..

**Unit-III- Normal Distribution:**

Normal Distribution and its parameters, Standard Normal Distribution, Moments, Moments Generating Function, Area Property, properties of normal curve, Standard Scores, Advantages and Characteristics of Z Scores.

**Unit-IV- Continuous Distribution:**

Uniform Distribution, Moment Generating Function, Distribution Function, Moments of Uniform Distribution, Exponential Distribution, Moments, Moment Generating Function, Lack of Memory Property.

**DASC-03****Correlation, Regression and Statistical Inference****BLOCK – I. Correlation and Regression****Unit-I- Bivariate Data and Correlation:**

Scatter Diagram, Karl Pearson's coefficient of correlation, Properties of correlation coefficient, limits of correlation coefficient, Effect of change of origin and scale on correlation coefficient.

**Unit-II- Regression:**

Regressions, linear regression model, principal of least square, Regression lines, Regression coefficient, Properties of Regression coefficients.

**Unit-III- Correlation and Intra Class Correlation:**

Rank correlation coefficient, Spearman's rank correlation coefficients, rank correlation coefficient for tied ranks, Intra-class correlation, some remarks on Intra-class correlation.

**Unit-IV- Theory of Attributes:**

Combinations, Classes and Class frequencies of Attributes, Dichotomous Classification, Consistency of data, joint distribution of attributes, Contingency tables, Independence and Association of Attributes, Measures of Association, Yates Correction.

## **BLOCK – II . Basic Principles of Statistical Inference**

### **Unit-I- Estimation :**

Point Estimation, properties of a good estimators, Consistency, Unbiased ness, Efficiency, Sufficiency, Confidence Interval Estimation .

### **Unit-II- Method of Estimation:**

Procedures of Estimation, Method of Moments, method of Maximum Likelihood, Method of Scoring, Properties of Estimators.

### **Unit-III- Testing of Hypothesis :**

Statistical Hypothesis, Simple and Composite Hypothesis, Critical Region, Two kinds of Error, One-tailed and Two-tailed tests, Test of Significance, Most Powerful Test, Uniformly Most Powerful Test .

## **BLOCK – III . Test of Significance**

### **Unit-I- Exact Tests and Fisher's transformations :**

Tests of Significance based on Chi-Square Distribution, Tests of Significance based on t – Distribution, Tests of Significance based on F – Distribution, Tests of Significance based on Fisher's Z - Distribution.

### **Unit-II- Large Sample Tests :**

Testing Significance of Mean, Testing Equality of Means, Testing Significance of Proportion, Testing Equality of Proportions, Testing Significance of Standard Deviation, Testing Equality of Standard Deviation.

### **Unit-III- Non-Parametric Tests :**

Non Parametric Tests, Sign Test, Wilcoxon Signed- Rank Test, Mann- Whitney U-Test, Run Test.

## **DASC-04**

## **Sampling Theory and Design of Experiments**

### **BLOCK – I . Samplings Theory - I**

### **Unit-I- Simple Random Sampling:**

Advantages of Sampling over Complete Enumeration, Sampling and Non Sampling Errors, Probability or Random Sampling, Bias of an Estimator, Measures of Sampling Error, Simple Random Sampling Without Replacement (SRSWOR) .

**Unit-II- Stratified Random Sampling:**

Introduction, Reasons & Advantages of Stratification, Some theorems .

**Unit-III- Allocation of Sample Size and Systematic Sampling:**

Introduction, Equal Allocation, Proportional Allocation, Variance of Stratified Mean under Proportional Allocation, Optimum Allocation, Variance of Stratified Mean under Neyman Allocation, Relationship Among Three Variances, Impact of Arbitrary Allocation, Practical difficulties in Implementing Neyman Allocation, Systematic Random Sampling.

**BLOCK – II . Sampling Theory - II**

**Unit-I- Ratio and Regression Methods of Estimation:**

Introduction, Ratio and Regression Estimators, Approximate Variances of the Ratio Estimators

**Unit-II- Cluster and Two Stage Sampling:**

Cluster Sampling (Equal Cluster- Size), Estimation of Mean with SRS at both Stages, Relative Efficiency of Cluster Sampling, Two Stage Sampling, Estimation of Mean, Optimum Allocation when Cost Fixed and when Variance Fixed, Two- Phase (Double) Sampling for Stratification, Estimation of Mean, Difference between Multistage Sampling and Two Phase Sampling.

**Unit-III- Non- Sampling Errors: Response Error and Non Response Errors:**

Introduction, Errors in Sampling, Sampling Errors, Non Sampling Errors, Response Errors, Sources of Non Sampling Errors, Method of Minimizing Non- Response Errors.

**BLOCK – III . Design and Analysis of Experiments**

**Unit-I- Analysis of Variance, Design of Experiment and Completely Block Design :**

Analysis of Variance, Linear Models and Analysis of Variance, Design of Experiment, Basic Principles of Design of Experiments, Completely Randomized Design.

**Unit-II- Randomized Block Design and Latin square Design:**

Randomised Block Design, Efficiency of RBD, Missing Plot Technique, Latin Square Design, Efficiency of LSD.

**DASC-05**

**Numerical Methods & Basic Computer Knowledge**

**BLOCK – I.            Finite Differences**

**Unit-I-                Finite Differences:**

Forward Difference Operator, Difference Table, The Operator E, The Operator D, Backward Differences, Factorial Polynomial, Central Differences, Mean Operator.

**Unit-II-            Interpolation With Equal Intervals:**

Introduction, Missing Values, Newton- Gregory Forward & Backward Interpolation Formula,

**Unit-III-          Interpolation With Un-Equal Intervals:**

Introduction, Missing Values, Properties of Divided Differences, Newton's Divided Difference Interpolating Polynomial, Error of the interpolation Polynomial Divided Differences and Derivatives.

**Unit-IV-          Lagrange's Interpolation :**

Introduction, Lagrange's Interpolating Polynomial, General Error term or Reminder Term, Linear Interpolation, error in Linear Interpolation.

**BLOCK – II.           Central Differences**

**Unit-I-                Central Difference Interpolation Formulae:**

Introduction, Gauss Forward & Backward Formulae, Stirling's Formula, Bessel's Formula, Bessel's Formula for halves.

**Unit-II-            Inverse Interpolation:**

Inverse Interpolation by Lagrange's method, method of Successive Approximation, Method of Reversion of Series.

**Unit-III-          Numerical Differentiation:**

Introduction, Numerical Differential for Equal Intervals, Numerical Differential for Un-Equal Intervals, Approximation Formulae for the Derivative of a Function.

**Unit-IV-          Numerical Integration:**

Introduction, Trapezoidal Rule, Simpson's One-Third Rule, Simpson's Three-Eighth Rule, Waddle's Rule, Euler-Maculerian Formula.

### **BLOCK – III . Computer**

#### **Unit-I- Introduction to Computer :**

Introduction, Characteristics of computer, Historical Evaluation of Computer, Generation of Computers, Classification of computers.

#### **Unit-II- Hardware:**

Introduction, CPU, Memory Organization, Input-Output Devices.

#### **Unit-III- System Software:**

Introduction, System Software, File Commands, Editing, Commands, Disk Management Commands, Number System

### **BLOCK – IV . Basics of Computer Programming**

#### **Unit-I- Algorithm & Flow Charts :**

Introduction, Algorithm, Flow Charts.

#### **Unit-II- Programming Language:**

Introduction, Machine Language, Assembly Language & Assembler, High Level Language, Object Oriented Programming, Programming Language Generation..

## **DASC-06 Applied Statistics**

### **BLOCK – I. Index Numbers:**

#### **Unit-I- Index Number: General Theory:**

Definition & Construction of an Index number, Price Relatives, Quantity or Volume Relatives, Value Relatives, Link & Chain Relatives, Problem involved in computation of an Index Number .

#### **Unit-II- Index Numbers: Important Formulae:**

Introduction, Calculation of Index Number, Laspeyre's, Paasche's, Marshall- Edgeworth's, Fisher's formulae, other indices, Quantity Index, Criteria of good Index Number

#### **Unit-III- Consumer Price Index Number:**



Introduction, Construction & Computation of Consumer Price Index Number (CPI), Steps in construction of CPI, Use & Limitations of CPI, Base Shifting of Index Numbers, Splicing of Index Number Series, Deflating the Index Number, Index of Industrial Production.

**BLOCK – II . Time Series Analysis:**

**Unit-I- Time Series:**

Introduction, Utility of Time Series Analysis, Component of Time Series, Mathematical Models For Time Series Analysis.

**Unit-II- Determination of Trends:**

Introduction, Graphic Method, Method of Semi Averages, Method of Curve Fitting by the Principle of Least Squares, Method of Moving Averages (when Period is Even & Odd).

**Unit-III- Determination of Seasonal Indices:**

Introduction, Measurement of Seasonal Indices, Method of Simple Averages, Ratio to Trend Method, Ratio to Moving Average Method, Method of Link Relatives.

**BLOCK – III . Demography:**

**Unit-I- Sources of Demographic Data :**

Introduction, Demography & Vital Statistics, Sources of Demographic Data, Errors in Data Collection, Evaluation & its Adjustments, Rates & Ratios.

**Unit-II- Measures of Mortality:**

Introduction, Measures of Mortality, CDR, SDR, StDR, MMR, IMR.

**Unit-III- Measures of Fertility :**

Introduction, Measures of Fertility, CBR, GFR, ASFR, TFR.

**Unit-IV- Life Tables:**

Introduction, Description & Construction of Complete Life Table, Uses of a Life Table.

**Unit-IV- Measures of Reproductivity:**

Introduction, GRR, NRR.

**BLOCK – III . Statistical Quality Control:**

**Unit-I- Introduction of Statistical Quality Control :**

Introduction, Advantages of Quality Control, Quality Characteristics, Basic Principles & Operating Characteristics of Control Charts, Choice of Control Limits, Sample Size & Sample

Frequency, Rational Subgroups, Analysis of Pattern on Control Charts, Rate of Detection of Change in Average Level.

**Unit-II- Control Charts for Variables:**

Introduction, Control Charts for Mean, Control Charts for Range, Control Charts for Standard Deviation.

**Unit-III- Control Charts for Attributes :**

Introduction, Control Charts for Fraction Defectives, Control Charts for Number of Defectives, Control Charts for Number of Defects .

**Unit-IV- Principles of Acceptance Sampling:**

Introduction, AQL, LTPD, Producer's Risk, Consumer's Risk, OC Function, AOQ, Average Total Inspection, Average Sample Number, Single Sampling Plan, Double Sampling Plan, Sampling Inspection by Variables.

**DASC-07**

**Fundamental of Computer & IT**

**Introduction to Computer:**

Computer Basics: Characteristics of Computer, Application of Computer.

**Basic Components of Computer:** Components of Computer, CPU, Memory, Keyboard, Mouse, VDU, Printers, RAM, ROM, CD-ROM, Hardware and Software.

**Classification of Computer:** Analog, Digital Hybrid Computer, General purpose, Special Computer, Micro, Mini, Mainframe Computer, Super Computers, Desktop, Laptop, Palmtop. Representation of Data/information: Information Technology, Data, information, Data processing, Characteristics of information, Scope of information, Basic data types.

**Basics of Digital Electronics:**

**Digital Number System :** Number System, Decimal System, Binary System, Octal System, Hexadecimal System, Code Conversion, Binary Codes, 8421 Code/BCD Code, 2421 Code, 5211 Code, Reflective Code, Sequential Codes, Non weighted codes, Gray Code, Error Detecting and Correction Codes, ASCII Code, EBCDIC Code, Floating point Numbers.

**Digital Logic Gates:** Gate. AND, OR, NOT, BUF, NAND, NOR, XOR, XNOR, Universal Gates. Simplification of Boolean Functions: Karnaugh Maps, Minimization Technique upto 5- variable K-map, Inverse function. Digital Combinational Circuit: Decoders, Encoders, Priority Encoder, Multiplexer, De- Multiplexer, Boolean Function, Implementation, Mux-Demux Application Example. Sequential Circuits: Concept of

Sequential logic, Asynchronous sequential circuit, Synchronous sequential circuits, Latches and Flip-Flops, RS, JK Latch, JK Master Slave Flip-Flop, Sequential circuits Design.

### **Memory System:**

**Introduction of Memory System:** Memory Cell, Block diagram of Memory Cell, Memory locations and address, Memory operations, Memory hierarchy.

**Main Memories:** Semi-conductor RAM Memories, Static Memories, Dynamic RAM, Performance Measure, SDRAM, ROM, Flash Memory, Speed, size and cost of memory.

**Secondary Storage Memories:** Magnetic Disk Memory, Floppy Disk Memory, RAID Disk Arrays Optical Disk.

**High Speed and Virtual Memories:** Cache Memories, Performance Consideration, Virtual Memories, Demand Paging.

### **Microprocessor:**

Introduction to Microprocessor: Evolution, Introduction and Characteristics of Microprocessor Systems, Microprocessors Register Structure, ALU, Timing and Control Unit, CPU, Memory, Input/Output, Hardware, Software and firmware, Machine Language, Assembly language, High level language.

**Microprocessor :** Architecture, Software Model, Functions and operations, Instruction and Data format, Opcode format, Data transfer Instructions, Arithmetic instructions, Addressing Mode of 8085. 16-Bit Microprocessor: Architecture, Bus interface unit, Execution Unit, Register Organisation, Memory Segmentation, Software Model of 8086, 8088 Microprocessor.

**Advanced Microprocessors and Micro Controllers:** Introduction to 32 bit and 64 bit Microprocessors, The 80386. Microprocessor, The 80486 Microprocessor, Pentium Processor, Motorola 68XXX Processors, Microcontrollers.

## **DASC-06**

### **Practical & Viva-voice**