### CC-VI: SURVEY SAMPLING & INDIAN OFFICIAL STATISTICS

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| **UNIT-I** |
| Concept of population and sample, complete enumeration versus sampling, sampling and non- sampling errors. Types of sampling: non-probability and probability sampling, basic principle of sample survey, simple random sampling with and without replacement, definition and procedure of selecting a sample, estimates of: population mean, total and proportion, variancesof these estimates, estimates of their variances and sample size determination. |
| **UNIT-II** |
| Stratified random sampling: Technique, estimates of population mean and total, variances of these estimates, proportional and optimum allocations and their comparison with SRS. Practical difficulties in allocation, estimation of gain inprecision. Systematic Sampling: Technique, estimates of population mean and total, variances of these estimates (N=nxk). Comparison of systematic sampling with SRS and stratified sampling in the presence of lineartrend and corrections. |
| **UNIT-III** |
| Introduction to Ratio and regression methods of estimation, first approximation to the population mean and total (for SRS of large size), variances of these estimates and estimates of these variances, comparison with SRSWOR. Cluster sampling (equal clusters only) estimationof population mean and its variance. |
| **UNIT-IV** |
| Present official statistical system in India, methods of collection of official statistics, their reliability and limitations. Role of Ministry of Statistics & Program Implementation (MoSPI), Central Statistical Office (CSO), National Sample Survey Office (NSSO), and National Statistical Commission. Government of India’s Principal publications containing data on the topics such as population, industry and finance. |

**TEXT BOOKS:**

1. Sukhatme,P.V., Sukhatme,B.V. Sukhatme,S. Asok,C.(1984). Sampling Theories of Survey With Application, IOWA State University Press and Indian Society of Agricultural Statistics
2. Guide to current Indian Official Statistics, Central Statistical Office, GOI, New Delhi.

### SUGGESTED READINGS:

1. Cochran W.G. (1984):Sampling Techniques(3rd Ed.), Wiley Eastern.
2. Murthy M.N. (1977): Sampling Theory & Statistical Methods, Statistical Pub. Society, Calcutta.
3. Des Raj and Chandhok P. (1998): Sample Survey Theory, Narosa Publishing House.
4. Goon A.M., Gupta M.K. and Das gupta B. (2001): Fundamentals of Statistics (Vol.2), World Press.

### CC-XII: STATISTICAL COMPUTING USING C & R PROGRAMMING

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| **UNIT-I** |
| History and importance of C. Components, basic structure programming, Keywords and Identifiers and execution of a C program. Data types: Basic data types, Enumerated data types, derived data types. Constants and variables: declaration and assignment of variables, Symbolic Constants, overflow and underflow of data. Operators and Expressions: Arithmetic, relational, logical, assignment, increment/decrement, operators, precedence of operators in arithmetic, relational and logical expression. Implicit and explicit type conversions in expressions, library functions. Managing input and output operations: reading and printing formatted and unformatted data |
| **UNIT-II** |
| Decision making and branching - if…else, nesting of if…else, else if ladder, switch, conditional operator. Looping in C: for, nested for, while, do…while, jumps in and out of loops. Arrays: Declaration and initialization of one-dim and two-dim arrays. Character arrays and strings: Declaring and initializing string variables, reading and writing stringsfrom Terminal (using scanf and printf only). |
| **UNIT-III** |
| User- defined functions: A multi-function program using user-defined functions, definition of functions, return values and their types, function prototypes and calls. Category of Functions : no arguments and no return values, arguments but no return values, arguments with return values, no arguments but returns a value, functions that return multiple values. |
| **UNIT-IV** |
| Introducing R: Getting R, Running R program, Finding your way in R, Command packages, Starting Out: Reading and Getting Data into R, Viewing Named Objects, Types of Data Items, Structure of Data Items, Examining Data Structure, Saing Your Work in R, Working with objects: Manipulating objects, Viewing Objects, Constructing data objects, Different forms ofData Objects. Descriptive Statistics and Tabulation. |

**TEXT BOOKS:**

1. Kanetkar Y. P. Let us C ; BPB Publications; 15thedition.
2. Gardener, M. Beginning R: The Statistical Programming Language, WileyIndia

### SUGGESTED READINGS:

1. Balagurusamy, E. (2011): Programming in ANSI C, 6th Edition, Tata McGraw Hill.
2. Kernighan, B.W. and Ritchie, D. (1988): C Programming Language, 2ndEdition, Prentice Hall.
3. Gottfried,B.S.(1998): Schaum’s Outlines: Programming with C, 2nd Edition,Tata Mc Graw Hill

### DSE-III: DEMOGRAPHY AND VITAL STATISTICS

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| **UNIT-I** |
| Population Theories: Coverage and content errors in demographic data, use of balancing equations and Chandrasekharan-Deming formula to check completeness of registration data. Adjustment of age data, use of Myer and UN indices, Population composition, dependencyratio. |

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| **UNIT-II** |
| Introduction and sources of collecting data on vital statistics, errors in census and registration data. Measurement of population, rate and ratio of vital events. Measurements of Mortality: Crude Death Rate (CDR), Specific Death Rate (SDR), Infant Mortality Rate (IMR) andStandardized Death Rates. |
| **UNIT-III** |
| Stationary and Stable population, Central Mortality Rates and Force of Mortality. Life (Mortality)Tables: Assumption, description, construction of Life Tables and Uses of LifeTables. |
| **UNIT-IV** |
| Abridged Life Tables; Concept and construction of abridged life tables by Reed-Merrell method, Measurements of Fertility: Crude Birth Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate (SFR) and Total Fertility Rate (TFR). Measurement of Population Growth: Crude rates of natural increase, Pearl’s Vital Index, Gross Reproduction Rate (GRR)and Net Reproduction Rate (NRR). |

**TEXT BOOKS:**

1. Pathak, K.B. and Ram, F.: Techniques of Demography Analysis, Himalayan Publishers
2. Gun,A.M., Gupta,M.K. and Dasgupta, B.(2008):Fundamentals of Statistics, Vol. II, 9th Edition, World Press.

### SUGGESTED READINGS:

1. 9Mukhopadhyay P. (1999): Applied Statistics, Books and Allied (P)Ltd.
2. Biswas, S. (1988): Stochastic Processes in Demography & Application, Wiley Eastern Ltd.
3. Croxton, Fredrick E., Cowden, Dudley J. and Klein, S. (1973): Applied General Statistics, 3rd Edition. Prentice Hall of India Pvt. Ltd.
4. Keyfitz N., Beckman John A.: Demography through Problems S-Verlag Newyork.