ESSENTIAL READINGS:

- Biswas, S. (2007): Applied Stochastic Processes: A Biostatistical and Population Oriented Approach, Reprinted 2nd Ed., New Central Book Agency.
- Lee, E.T. and Wang, J.W. (2013): Statistical Methods for Survival data Analysis, 4th Ed., John Wiley & Sons.
- Indrayan, A. (2017): Medical Biostatistics, 4th Ed., Chapman and Hall/CRC.

SUGGESTED READINGS:

- Miller, R.G. (2011): Survival Analysis. John Wiley & Sons.
- Elandt-Johnson R.C (1971): Probability model and Statistical Methods in Medical Biostatistics, 2nd Ed., Chapman and Hall/CRC. Genetics, John Wiley & Sons.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch University of Delhi, from time to time.

DISCIPLINE SPECIFIC ELECTIVE COURSE – 5D: RESEARCH METHODOLOGY

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Research Methodology	4	3	0	1	Class XII pass with Mathematics	Nil

Learning Objectives:
The learning objectives include

- To provide scientific approaches to develop the domain of human knowledge through empirical studies.
- To enable the student researchers to understand basic concepts and aspects related to research, data collection, analyses, interpretation and report writing.

Learning Outcomes:
After completion of this course, students should be able to understand:

- Research Methods.
- Research Problems.
- Research Designs.
- Comparative study of different methods of data collection.
- Guidelines for construction of questionnaires.
- Processing and Analysis of data.
- Interpretation and Report writing.

SYLLABUS OF DSE – 5d

Theory

UNIT I (15 hours)
Introduction to Research:
Importance and need for research ethics, Objectives of research, Types of research, Research approaches, Review of literature, Mode of literature survey: Books and Monographs, Journals, Conference proceedings, Abstracting and Indexing Journals, E-Journals/Books, Formulation of a research problem, Identifying variables, Constructing hypothesis, Conceptualization of a research design.

UNIT II (15 hours)
Methods & Techniques of Data Collection:
Survey methodology and Data collection, Source of data collection- Use of secondary data, Methods of collecting primary data, Develop a questionnaire, Questions and answers in surveys, Non-response, Errors in surveys, Sample size, sampling frames and coverage error.

UNIT III (15 hours)
Data Processing & Analysis:
Data processing, Exploratory data analysis, Various techniques - Parametric and Nonparametric tests, Correlation and Regression analysis, ANOVA, Multivariate Techniques for data analysis covered in core statistics papers, Techniques of interpretation, Precautions in interpretation.
Report writing: Discussions, Conclusions, Referencing and various formats for reference writing, Bibliography, Thesis writing, Formats of publications in research journals including subject classification, Impact factor, Citation index.
Computer Application: Data Communication and networks, Website, Webpage, Search Engines, Scientific search engines. Scientific Word Processing.

PRACTICAL/LAB WORK – (30 hours)

PROJECT WORK (using a spreadsheet, Scientific Word Processing with LaTeX and MS-Word, MS Equation editor, Slides making-Power Point Features, Slide preparation, SPSS, Statistical Programming with R, Simulation.)

ESSENTIAL READINGS
- Kothari, C.R., Garg, Gaurav (2021): Research Methodology: Methods and Techniques, 3rd Edition (Reprint), New Age International Publishers.
- Kumar, R. (2019): Research Methodology: A Step-by-Step Guide for Beginners, SAGE publications.
- Anderson, J., Durston, B.H., Pooole, M. (2001): Thesis and Assignment Writing, Wiley Eastern. Ltd., New Delhi.
- Braun, J., Duncan, W. and Murdock, J. (2021): A First Course in Statistical Programming with R, Cambridge University Press, London.
- Lamport, L. (1999): LATEX: A Document Preparation System, Addison, Wesley, 2nd Edition, New York.
- Cunningham, B.J. (2013): Using SPSS: An Interactive Hands-On Approach, SAGE South Asia Edition.
- Voss, J. (2014): An Introduction to Statistical Computing: A Simulation-based Approach, Wiley series in computational statistics

SUGGESTIVE READINGS

- Pannerselvan, R. (2018): Research Methodology, Prentice-Hall of India Pvt., New Delhi.
- Landau, Sabine and Everitt, Brian S. (2004): A Handbook of Statistical Analyses using SPSS, Chapman & Hall/CRC.
- Dalgaard, P. (2011): Introductory Statistics with R, Springer Science, New York.
- Gardener, M. (2013): Beginning R: The Statistical Programming Language, Wiley Publications.
- Robert, C.P. and Casella, G. (2010): Monte Carlo Statistical Methods, Springer Science, New York.
- Rubinstein, R.Y. (2016): Simulation and the Monte Carlo Methods, Wiley.
- Venkataraman, M.K. (2003): Numerical Methods in Science and Engineering, The National Publishing Company, Chennai.

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