DIPLOMA IN STATISTICAL ANALYSIS AND RESEARCH METHODOLOGY

SEMESTER I

SARM-3: RESEARCH METHODOLOGY

Max. Marks: 100

External: 70

Internal: 30

Pass: 40%

Credits: 6

Course Outcomes (COs)

After completing this course, students will be able to:

CO1. Explain the fundamental concepts, objectives, and types of research along with various research designs.
CO2. Conduct literature reviews, identify research problems, and apply appropriate measurement and scaling techniques.
CO3. Understand ethical principles in research, including moral philosophy, research integrity, and intellectual honesty.
CO4. Identify and prevent scientific misconduct such as fabrication, falsification, plagiarism, and redundant publication.
CO5. Apply publication ethics, recognize unethical practices in publishing, and conduct hypothesis testing using appropriate statistical tools.

Course Specific Outcomes (CSOs)

By the end of the course, students will specifically be able to:

CSO1. Design a systematic research framework using suitable research methods and design approaches.
CSO2. Evaluate and synthesize literature to frame clear research objectives and hypotheses.
CSO3. Demonstrate awareness of research and publication ethics as per international guidelines such as COPE and WAME.
CSO4. Detect and avoid plagiarism and other unethical research practices using standard plagiarism detection software (e.g., Turnitin, Urkund).

CSO5. Formulate and test hypotheses using parametric and non-parametric methods while maintaining scientific integrity and ethical conduct.

INSTRUCTIONS FOR THE PAPER SETTER/ EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The Question Paper will have 70 Multiple Choice questions (MCQs) and four choices of answers will be there, covering the entire syllabus. Each question will carry 1 mark. All questions will be compulsory; hence, candidates will attempt all the questions.
3. Paper-setters/Examiners are requested to distribute the questions from Section A and Section B of the syllabus equally, i.e., 35 questions from Section A and 35 questions from Section B.
4. The examiner shall give clear instructions to the candidates to attempt questions.
5. The duration of each paper will be two hours. of each paper will be two hours.

INSTRUCTIONS FOR THE STUDENTS

The question paper shall consist of 70 multiple-choice questions. All questions will be compulsory and each question will carry 1 mark. There will be no negative marking. Students are required to answer using OMR (Optimal Mark Recognition) sheets.

SECTION-A

Unit 1: Introduction to Research Methodology: Characteristics, Objectives and Types, Research Design

Unit 2: Literature review, Research problems, Measurement and Scaling Techniques

Unit 3: Ethics – Definition, Moral Philosophy, Nature of Moral Judgements and Reaction, Ethics with respect to Science and Research. Intellectual Honesty and Research Integrity

Unit 4: Scientific Misconduct: Falsification, Fabrication and Plagiarism. Redundant Publications: Duplicate and Overlapping Publication, Salami Slicing. Selective reporting and misrepresentation of data.

SECTION B

Unit 5: Publication Ethics- Definition, Introduction and Importance. Best Practices/Standard Settings initiatives andguidelines: COPE, WAME etc. Conflict of Interest Software to identify predatory publications developed bySPPU

Unit 6: Publication Misconduct – Definition, Concept, Problems that lead to unethical behaviour and vice versa. Violation of Publication ethics and authorship and contributor ship, Identification of Publication Misconduct, Complaints and Appeal- Examples and Fraud from India and Abroad, Predatory Publishers and Journals. Use ofPlagiarism Software like Turnitin, Urkund and other open-source software tools.

Unit 7: Meaning of Hypothesis, Characteristics of Hypothesis, Basic Concepts: Null Hypothesis and Alternative Hypothesis, One-tailed and Two-tailed, Type-I and Type-II errors, Level of Significance. Power of a test.

Unit 8: Critical Region and Acceptance Region, Hypothesis Testing Procedures (Steps), Introduction to parametric and non-parametric tests.

Note: Statistical analysis should also be taught with the help of MS Excel, SPSS or any other related software tool.

Suggested Readings

Anderson, D.R.; Sweeney, D.J. and Williams, T.A., "Statistics for Business andEconomics", 2nd edition (2011), Thompson, New Delhi.

- Cooper, D. R., and Schindler, P.S., "Business Research Methods", 9th Edition,Tata McGraw-Hill, New Delhi.
- Kothari, C. R., "Research Methodology", 2nd Edition (2008), New Age International.
- Levine, D.M., Krehbiel T.C., and Berenson M.L., "Business Statistics", 12thEdition (2012), Pearson Education, New Delhi.
- Zacks, S. (1971): Theory of Statistical Inference, John Wiley and Sons. New York