

## **Coursework: Ph.D.**

### **COMMON FOR ALL AREAS:**

Objectives: This paper will help the students to understand the relevance and role of research methodology and the significance of the research tools in all functional areas. It will also help to distinguish between the different kinds of research available, based on the purpose and nature of problem. The course will emphasize on the types of research, data collection methods, analysis and inferences and conclusions. The course is also intended to provide computer and communication skills for research work.

### **Subject 1. Research Methods and Methodology: (45 Hours)**

#### **Unit: 1**

Meaning and types of Research: Basic Research, Pure Research, Applied Research, Modern Scientific approach to Research, Research in Business, Research process, Designing a research study, Criteria of Good Research, Salient features of Research Projects, Scope of a Research Study, Delimitation, Evaluations of Research study,

#### **Unit: 2**

Research Design: Criteria for evaluation of a Research study. Factors affecting the selection of problems and problem statements-Review of literature - Elements of scientific methods, objectives, specifications, formulation of hypothesis, Model building and nature and identification of variables, Quantitative, Qualitative, Mixed and Historical research.

#### **Unit 3:**

Communication and Research Reporting: Basics of Communication skills, Types of Scientific Communication, Structure of a Research Proposal, Structure of a Research Paper, Importance of publishing research papers, Publishing papers (Title, Running Title Authors Single and Multi authorship, Writing Abstract, Selecting Keywords, Introduction section, Materials and Methods Section, Result Section, Figures: Design Principles, Legends, Table components Graphs Types style Tables v/s Graph Discussion Section Format Grammar Style, Content, Acknowledgements, References), Different Styles of Communication with the Editor, Handling Referees' Comments, Why report, Types of Report, i.e., General, Technical, etc., Structure of a Research Report, Styles of Report, Research Paper Preparation and Presentation, Structure of Synopsis.

## **Subject 2. Computer application**

(30 Hours)

Unit: 1

Basic of Computers, Use of computers and internet for the research

Unit: 2

Exposure to different statistical packages and computer skills.

Unit: 3

Exposure to different data bases and developing expertise in word processing, electronic spread sheets and data base packages, use of internet and exposure to statistical packages, its utility and interpretation

### **Subject 3. Statistical method of data analysis**

(45 Hours)

#### Unit: 1

##### Collection and Description:

Data Vs. Information, Types of Data: Primary Vs. Secondary Data, Time series Vs. Cross sectional Data, Panel Data, Sources of secondary data, Methods of Primary data collection, Developing a Questionnaire, Editing, Coding, Identifying missing observations and outliers , Classification and Tabulation of data , Concepts of a frequency distributions for a discrete and continuous random variable,

Data representation: Bar Charts, Pie Charts, Histogram and Ogives, Observation studies, Survey Method, Pilot Survey, Population Vs. Sample Study, Features of a Good sample.

#### Unit: 2

Sampling: Determination of sample size , Sampling and Non-sampling errors, Lipstein's Nine Rules for minimizing non - sampling errors, Validity, Reliability, Precision, Sampling Frame , Sampling Fraction, Probability sampling methods: SRSWR, SRSWOR, Systematic sampling, Proportionate and disproportionate stratified sampling, Cluster sampling, Area Sampling , Two stage sampling, Multistage sampling , PPS Sampling , Sequential Sampling, Non-probability sampling methods: Conveyance Sampling , Purposive sampling , Statistical judgment, Quota Sampling, Snowball sampling (Only description of the methods and their applications to practical situations)

#### Unit 3:

##### Overview of Univariate and Bivariate Analysis:

Overview of probability theory, Concept of a Frequency distribution and a probability distribution, Characterizing a frequency distribution and a probability distribution: Concept of Raw and Central Moments, Basic concepts and applications of the measures of Central Tendency, Dispersion, Skewness and Kurtosis, Bivariate correlation analysis, Rank Correlation, Probable Error of Correlation Coefficient, Simple Linear Regression, Nonlinear Regression, Growth Curves, Concept of Coefficient of Determination and its interpretation , Measures of Association for Nominal and Ordinal data, Statistics associated with Cross-Tabulations: Chi Square, Phi Coefficient, Contingency Coefficient, Cramer's V, Lambda Coefficient, Cross-Tabulation in Practice

## **Subject 4. Research and Publication Ethics (RPE)**

**(30 Hrs.)**

### **Theory**

**(15 Hrs.)**

- **RPE 01 : Philosophy and Ethics (3 Hrs)**
  1. Introduction to philosophy: Definition, nature and scope, concept, branches.
  2. Ethics: Definition, Moral Philosophy, Nature of Moral judgments and reactions.
- **RPE 02: Scientific Misconducts (5 Hrs.)**
  1. Ethics with respect to science and research.
  2. Intellectual honesty and research integrity
  3. Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP)
  4. Redundant publication: Duplicate and overlapping publications, Salami slicing
  5. Selective reporting and misrepresentation of data.
- **RPE 03: Publication Ethics (7 Hrs.)**
  1. Publication Ethics: Definition, introduction and importance
  2. Best practices/standards setting initiatives and guidelines: COPE, WAME, etc
  3. Conflicts of interests
  4. Publication misconduct: Definition, concept, problems that lead to unethical behavior and vice versa, types
  5. Violation of publication ethics, authorship and contributorship.
  6. Identification of publication misconduct, complaints and appeals.
  7. Predatory publishers and journals.

### **Practice**

**(15 Hrs.)**

- **RPE 04: Open Access Publication (4 Hrs.)**
  1. Open access publication and initiatives.
  2. SHERPA/RoMEO online resource to check publisher copyright and self-archiving policies.
  3. Software tool to identify predatory publications developed by SPPU
  4. Journal finder/Journal suggestion tool viz. JANE, Elsevier Journal Finder, Springer Journal Suggester etc.
- **RPE 05: Publication Misconduct (4 Hrs.)**
  - A. Group Discussion (2 Hrs.)**
    1. Subject specific ethical issues, FFP, authorship
    2. Conflicts of interest
    3. Complaints and appeals: example and fraud from India and abroad
  - B. Software Tools (2 Hrs.)**
    1. Use of plagiarism software like Turnitin, URKUND and other open source software tools.
- **RPE 06: Database and Research Metrics (7 Hrs.)**
  - A. Database (4 Hrs.)**
    1. Indexing databases
    2. Citation databases: Web of Science, Scopus, etc.
  - B. Research Metrics**
    1. Impact factor of journals as per Journal Citation Report, SNIP, SJR, IPP, Cite score.
    2. Metrics: h-index, g-index, i10 index, altmetrics.