Ph.D. Course Work
Ph.D./A/03 – Advance Statistics & Computer Application

Unit -I

1. **Introduction**

    1.1 Types of Data: Qualitative data. Quantitative data and Assumption about data.

    1.2 Sample Size in Research Studies, Effect of Violating Assumption.

    1.3 Statistical Decision in Hypothesis Testing: Type I error and Type II error, Understanding the power of test and On-tailed and Two tailed test.

2. **Descriptive Profile and Normal Distribution**

    2.1 Variance, Standard, Error of Mean, Skewness, Kurtosis, Percentiles, Applications of Descriptive statistics, interpretation of the result.

    2.2 Problems based upon Normal Distribution and Area Distribution.

    2.3 Development of Normative Scales: Z-scale, T-Scale, 6 Sigma scale and Hull scale.

3. **Assumption of Parametric Tests.**

    3.1 Common assumption of parametric test

    3.2 Normality and its testing (with kolmogorov-Smirnov Test)

    3.3 Using transformation of Normality

    3.4 Homogeneity of Variances and its testing (with Levene'sTest)

Unit -II

4. **Non-Parametric Tests of Significance.**

    4.1 Common assumptions of Non-parametric Test

    4.2 Chi-Square Test:- One way and Two way Chi Square Test.

    4.3 Mann Whitney U-Test.

    4.4 Wilcoxon T-test (Signed-Ranked test)

    4.5 Kruskal-Wallis H-test.

    4.6 Friedmans X^2- Test

5. **Non- Parametric measures of Correlation**

    5.1 Goodman's and Kruskal's Gamma

    5.2 Correlation coefficient of nominal and arrange in a 2x2 table

    5.3 Biserial correlation

    5.4 Point biserial correlation

    5.5 Tetra choric correlation

    5.6 Lambda

Unit -III

6. **Comaring mean with t-Test and Anova.**

    6.1 One Sample t-Test

    6.2 Independent two sampled t-Test.

    6.3 Paired t-Test (Repeated measures)

7. **Analysis of variance and Covariance.**
   7.1 The theory behind ANOVA, ANOVA assumption and Logic of F-ratio
   7.2 Total sum of Square, Between sum of Square and Within sum of Square
   7.3 One way ANOVA
   7.4 Post hoc test Procedures.
   7.5 Two way ANOVA
   7.6 Post hoc test Procedures.
   7.7 Assumptions and Issues in ANCOVA
   7.8 Independence of the covariate and treatment effect.

Unit -IV

8. **Correlations**
   8.1 Product Moment correlation coeffcient
   8.2 Correlation matrix
   8.3 Partial correlation
   8.4 Multiple correlation
   8.5 Computation of partial correlation and multiple correlation
   8.6 Interpretation of partial correlation and multiple correlation
9. **Regression Analysis**
   9.1 Understanding the Regression Equations
   9.2 Methods of regression anlysis
   9.3 Simple linear regression analysis
   9.4 Assumption of regression analysis
   9.5 Computation of regression analysis
   9.6 interpretation of findings

Practicals:

Using latest version of SPSS for calculating the various statistical techniques involved in parametric and non-parametric aspects.

References:
1. Field, A (2013) Discovering Stattistics Using IBM SPSS Statistics. London : SAGE Publication Limited.
2. Verma, J. (2011). Statistical Methods for Sports and Physical Education. New Delhi: Tata McGraw-Hill.
3. Verma, J. & Salam, A. (2012). Statstics ofr Psychology, New Delhi: Tata McGraw-Hill.
4. Verma, J., & Salam, A(2019). Testing Statistical Assumption in Research. Hoboken, USA: A Wiley.
5. Wilcox, R R (2009) Basics statistics Unverstanding Convernational Methods in modern Insight. New York, USA: OXFORD Univeersity Press.
6. Winner, B.J. (1962). Statistical principles in Experimental Design. New York: McGraw Hill
7. Garrett Henry, E. (1981) Staistics in Psychology and Education, New York: McGraw Hill
8. Heiman Gary, W. (1992) Basic Statistics for the behavioral Sciences, Boston: Houghton Milfflin Company.
9. Levin. Jack & Alan Fox, James (2000) Elementary Statistics in Social Research, London: Allyn & Bacon.

Ph. D. Course Work
Ph.D./A/02 - Research & Publication Ethics

Unit I

1. **Philosophy and Ethics**
   1.1   Introduction to philosophy: definition, nature and scope, concepts
   1.2   Branches of philosophy
   1.3   Ethics: definition, moral philosophy,
   1.4   Reactions of moral judgments

Unit II

2. **Scientific conduct**
   2.1   Ethics with respect to science and research
   2.2   Intellectual honesty and research integrity
   2.3   Scientific misconducts: Falsification, Fabrication and plagiarism (FFP)
   2.4   Redundant publications: duplicate and overlapping publication, salami slicing and selective reporting and misrepresentation of data

Unit III

3. **Publication ethics**
   3.1   Publication Ethics: definition, introduction and importance
   3.2   Best practices/standards setting initiatives and guidelines: COPE, WAME, etc.
   3.3   Conflicts of interest.
   3.4   Ethical issues regarding copy right.

Unit IV

4. **Publication misconduct:**
   4.1   Definition, concept, problems that lead to unethical behavior and vice versa,
   4.2   Types of publication misconduct.
   4.3   Violation of publication ethics, authorship and contributorship
   4.4   Identification of publication misconduct, complaints and appeals and predatory publishers and journals

PRACTICAL

1. **Open Access Publishing**
   - 1.1 Open access publication and initiatives
   - 1.2 SHERPA/Ro MEO online resource to check publisher copyright & self archiving policies
   - 1.3 Software tool to identify predatory publication developed by SPPU
   - 1.4 Journal finder/journal suggestion tools viz. JANE, Elservier Journal Finder, Springer Journal Suggester, etc.

2. **Publication Misconduct**
   - 2.1 **Group Discussion**
     - 2.1.1 Subject specific ethical issues, FFP, authorship
     - 2.1.2 Conflicts of interest
     - 2.1.3 Complaints and appeals: examples and fraud from India and abroad
   - 2.2 **Software tools**
     - 2.2.1 Use of plagiarism software like Turnitin, Urkund and other open source software tools.

3. **Databases and research metrics**
   - 3.1 **Databases**
     - 3.1.1 Indexing databases
     - 3.1.2 Citation databases: Web of Science, Scopus, etc.
   - 3.2 **Research Metrics**
     - 3.2.1 Impact Factor of Journal as per Journal Citation Report, SNIP, SJR, JPP, Cite Score
     - 3.2.2 Metrics: h-index, g index, i10 index, altmetrics

REFERENCES:

- Bird, A. (2006) Philosophy of Science. Routledge. MacIntyre, Alasdair (1967) A short History of Ethics. London.
- P. Chaddah, (2018) Ethics in Competitive Research : Do not get scooped; do not get plagiarized, ISBN 978-9387480865
- National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On being a Scientist: A guide to Responsible Conduct in Research: Third Education. National Academies Press.
- Resnik, D.B. (2011). What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10. Retrieved from https://www.niehs.hih.gov/research/resources/bioethics/whatis/index.cfm
- Indian National Science Academy (INSA), Ethics in Science Education, Research and governance (2019), ISBN: 979-81-939482-1-7. http://www.insaindia.res.in/pdf/Ethics_Book.pdf

*****

Ph. D. Course Work
Ph.D./A/01 - Research Methodology

Unit I

1. **Introduction to Research**
    1.1 Nature of research
    1.2 Unscientific and scientific Methods of problem solving
    1.3 Types of research

2. **Developing and presenting the research problem**
    2.1 Identifying the Problem
    2.2 Literature review
    2.3 Hypothesis
    2.4 Limitations, Delimitation and Assumption
    2.5 Criteria of choosing a problem

Unit II

3. **Historical Research**
    3.1 Sources of historical research
    3.2 Admissibility of Historical evidences.
    3.3 Designing the research
    3.4 Working with the Evidences.

4. **Philosophical Research**
    4.1 Purpose of Philosophical Research
    4.2 Schools of Philosophy
    4.3 Critical thinking and Reasoning.

Unit III

5. **The Survey**
    5.1 Utility in sociological & Behavioral Research
    5.2 Tools of Survey; Questionnaire, Interview, Delphi Method and Case Study
    5.3 Normative survey.

6. **Experimental and Quasi-experimental research**
    6.1 Sources of Invalidity
    6.2 Threats to Internal and External Validity
    6.3 Controlling Threats
    6.4 Types of designs

Unit IV

7. **Qualitative Research**

   7.1 Contrast between quantitative and qualitative research;

   7.2 Procedures in qualitative Research

   7.3 Purpose and significance of Meta Analysis.

8. **Research Proposal and Report**

   8.1 Salient features of proposal

   8.2 The Proposal process

   8.3 Basic guidelines of Research Report

   8.4 Parts of research Reports

   8.5 Guidelines for writing abstracts.

REFERENCES:

- Baumgartner, T.A., Strong C.H., & Hensley, L.A. (2000). Conducting and reading research in health and human performance (3rd ed.) Boston: McGraw-Hill.
- Berg, K.E. & Latin, R.W. (1994). Essentials of modern research methods in health, physical education and recreation, EEnglewood Cliffs, NJ : Prentic-Hall
- Best, J.W., & Kahn, J.V. (1998). Research in education (8th ed.) Boston: Allyn & Bascon.
- Bodgan, R., & Biklen, S. (1997). Qualitative Research for education (3rd ed.) Boston: Allynh and Bacon.

*****

Ph. D. Course Work
Ph.D./A/O4- Teaching Pedagogy in Higher Education

UNIT-I
1. Introduction, Communication and ICT
1.1 Introduction, to pedagogy and relevant theories of learning

1.2 Pedagogical Learning with the use of ICT

1.3 Pedagogical Innovations and its seven Notions

1.4 Employ effective communication skills with students

1.5 Strategies for Effective Communication

1.6 Techno-Skills in Teachers of Higher Education

1.7 Digital Technologies in Classroom and Playfields

UNIT-II
2. Curriculum Design
2.1 Meaning and Characteristics

2.2 Dimensions of curriculum

2.3 Curriculum Structure

2.4 Curriculum Component

2.5 Attributes of Curriculum Design

2.6 Establishing Curriculum-Design Specifications

2.7 Developing a Curriculum

UNIT-III
3. Pedagogical Practices
3.1 Consideration of learning domains

3.2 Objectives as rationale for selection of a pedagogical model

3.3 Various Models of teaching and teaching strategies

3.4 Consideration of different 'models'

3.5 Components and dimensions of pedagogical models

3.6 Flipped Classroom

3.7 Cooperative learning Pedagogy

UNIT-IV
4. Evaluation System
4.1 Nature and types of Evaluation

4.2 Components of evaluation:

4.3 Assessment of Teacher, Assessment of students, Grading

4.4 Ways and Means for continuous Evaluation system

4.5 Strategies for effective feedback and practice

4.6 criteria for evaluating the program

4.7 Feasibility, administrabilty and accountability of program as a creditable evaluation

References:

1. Armour (2011) – Sports Pedagogy: An introduction for teaching and Coaching, paperback Prentice Hall; 1ˢᵗ addition (24 March 2011)

2. E Groves, S.C. (2017) Practice Theory Perspectives on Pedagogy and Education: Praxis, Diversity and Contestation, Springer.

3. Jarvis, P. (2002). The theory & Practice of Teaching. Psychology Press.

4. Loughran, J. (2006). Developing a pedagogy of teaching education: Understanding teaching and learning about teaching: London: Rutledge

5. Venkataiah, N. (2011) Professional Development of Teachers. Hyderabad: Neelkamal Publications Pvt. Ltd.

6. Walder, A.M. (2014). The concept of Pedagogical innovation in higher education. Education Journal, 3(3), 195-202.