### NIRWAN UNIVERSITY

**Syllabus of Coursework**

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Research Methodology

Part-A

UNIT 1: Research: Meaning, Definition & Purpose
UNIT 2: Scientific Method
UNIT 3: Research Objectives
UNIT 4: Variables and Hypotheses
UNIT 5: Literature Review
UNIT 6: Research Problem
UNIT 7: Research Proposal
UNIT 8: Research Design:
   i. Methods of Data Collection: Primary & Secondary
   ii. Methods of Research: Basic Research, Applied, Exploratory, Explanatory, Experimental, Descriptive & Historical
   iii. Sampling Techniques: Probability & Non-Probability
   iv. Tools and Techniques:
      (i) Check lists, Schedule, Observation, Interview, Questionnaire,
      Rating scales, Attitude scales, Measurement Scales: Nominal, Ordinal, Interval, and Ratio
      (ii) Characteristics of a Good Tool: Validity, Reliability, discriminating Power & Objectivity
      (iii) Research Methods vs Research Methodology
UNIT 10: Measurement: Development of a Questionnaire
UNIT 12: References, Bibliography and Appendices

Part-B

UNIT 1: Descriptive Statistics:
   i. Data Processing: Organization, Tabulation and Graphical Representation of Data
   ii. Measures of Central Tendencies: Mean, Median, Mode
   iii. Measures of Variability: Range, Quartile Deviation, Standard Deviation, and Coefficient of variation.
   iv. Measures of Relative Position: Percentiles Ranks; Standard Scores, and T Scores

UNIT 2: Correlation Techniques
   i. Karl Pearson’s Product Moment Correlation Coefficient (r)
   ii. Spearman’s Rank-order Correlation Coefficient (rho)
   iii. Regression and Prediction

UNIT 3: Statistical Inference
   i. Concept of Standard Error and its uses
UNIT 4: Analysis of Data

i. Chi-Square Test
ii. Median Test
iii. Multivariate Analysis
iv. Factor Analysis
v. Cluster Analysis
vi. Discriminate Analysis
vii. Conjoint Analysis
viii. Clustering
ix. Multidimensional Scaling
x. Logit and Probit Analysis

REFERENCES:


Computer Application

Computer and Internet basics: Introduction and need of Computers, Operating system and basics of Windows, User Interface, File management, File Transfer (ftp, WSftp), DOS, UNIX, Difference between presentation and document, introduction to Notepad, MS-Office word, MS-Excel, Power Point, Opening Documents and Closing documents, introduction to Paint and Photoshop. Computer Communication and Internet, Electronic mails, Communication on Internet, Surfing the Internet.

SCIENTIFIC COMMUNICATION
1) Types of Scientific Communications.
2) Importance of publishing research papers
3) Publishing Research paper:
   a. Preliminaries, Format, Choosing Journal
   b. Title, Running Title
   c. Authors: Single and Multi authorship
   d. Writing Abstract
   e. Introduction section
   f. Materials and Methods Section
   g. Result Section
   h. Figures: Design Principles, Legends, Table components, Graphs: Types, Style, Tables vs Graph
   i. Discussion Section: Format, Grammar Style, Content.
   j. Acknowledgements
   k. References: Different Styles
   l. Selecting Keywords
   m. Communication with the Editor, Handling Referees’ Comments, Galey Proofs
4) Writing Review Articles
5) Preparing and Delivering of Oral and Poster Presentations
6) Avoiding Plagiarism
7) Preparing documents for MoUs, Confidentiality Agreements.

Suggested Books:
1) P.K Sinha `Computer Fundamentals `, BPB Publications, 1992
4) Write and Publish a Scientific Paper by Robert A. Day Oryx Press
5) Scientific Easy when you know how by Jennifer Peat BMJ Books
Research and Publication Ethics

PHILOSOPHY AND ETHICS
1. Introduction to philosophy: definition, nature and scope, concept, branches
2. Ethics: definition, moral philosophy, nature of moral judgments and reactions

SCIENTIFIC CONDUCT
1. Ethics with respect to science and research
2. Intellectual honesty and research integrity
3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
4. Redundant publications: duplicate and overlapping publications, salami slicing
5. Selective reporting and misrepresentation of data

PUBLICATION ETHICS
1. Publication ethics: definition, introduction and importance
2. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
3. Conflicts of interest
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
OPEN ACCESS PUBLISHING
1. Open access publications and initiatives
2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
3. Software tool to identify predatory publications developed by SPPU

PUBLICATION MISCONDUCT
A. Group Discussions
1. Subject specific ethical issues, FFP, authorship
2. Conflicts of interest
3. Complaints and appeals: examples and fraud from India and abroad

B. Software tools

Use of plagiarism software like Turnitin, Urkund and other open source software tools

DATABASES AND RESEARCH METRICS
A. Databases
1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics
1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics

References
Assignments, PPT & Class Lectures

**Assignment I** - Critical Review of Literature – Minimum 10 Articles from referred journals with ISSN Number on the topic of his/her research work.


**Assignment III** – Assignment of Research Methodology, Computer Application and Research and Publication Ethics from given topic.