GE2905 Research and Publication Ethics 2 0 0 2

Unit-I PHILOSOPHY AND ETHICS (3 Hrs.)

Introduction to Philosophy: Definition, Nature and Scope, Concept, Branches

Ethics: Definition, Moral Philosophy, Nature of Moral Judgements and Reactions

Unit-II SCIENTIFIC CONDUCT (5 Hrs.)

Ethics with Respect to Science and Research-Intellectual Honesty and Research Integrity

Scientific Misconducts: Falsification, Fabrication, and Plagiarism (FFP)

Redundant Publications: Duplicate and Overlapping Publications, Salami Slicing-Selective Reporting and Misrepresentation of Data

Unit-III PUBLICATION ETHICS AND OPEN ACCESS PUBLISHING (11 Hrs.)

A. Publication Ethics (7 Hrs.)

Definition, Introduction and Importance-Best Practices/Standards Setting Initiatives and Guidelines: COPE, WAME, Etc-Conflicts of Interest

Publication Misconduct: Definition, Concept, Problems that Lead to Unethical Behavior and Vice Versa, Types

Violation of Publication Ethics, Authorship and Contributor-Ship-Identification of Publication Misconduct, Complaints and Appeals-Predatory Publishers and Journals

B. Open Access Publishing (4 Hrs.)

Open Access Publications and Initiatives

SHERPALROMEO Online Resource to Check Publisher Copyright & Self-Archiving Policies

Software Tool to Identify Predatory Publications Developed by SPPU

Journal Finder/Journal Suggestion Tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, Etc.

Unit-IV PUBLICATION MISCONDUCT (4 Hrs.)

A. Group Discussions (2 Hrs.)

Subject Specific Ethical Issues, FFP, Authorship-Conflicts of Interest-Complaints and Appeals: Examples and Fraud From India and Abroad

B. Software Tools (2 Hrs.)

Use of Plagiarism Software like TURNITIN, URKUND and Other Open Source Software Tools

Unit V DATABASES AND RESEARCH METRICS (7 Hrs.)

A. Databases (4 Hrs.)

1. Indexing Databases
2. Citation Databases: Web of Science, Scopus, Etc.

B. Research Metrics (3 Hrs.)

1. Impact Factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, CiteScore
2. Metrics: h-index, g-index, il0-index, Altmetrics

Total: 30 Hours

References

1. Bird, A, (2006), *Philosophy of Science,* Routledge.

2. MacIntyre, Alasdair,(1967), *A Short History of Ethics*, London.

3. P.Chaddah, (2018), *Ethicsin Competitive Research: Do Not Gets Cooped; Do Not Get Plagiarized*, ISBN:978-9387480865

4. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009), *On Being a Scientist: A Guide to Responsible Conductin Research: Third Edition*, National Academies Press.

5. Resnik, D. B., (2011), What is Ethics in Research & Why is It Important, *National Institute of Environmental Health Sciences*, 1-10, Retrieved From https:llwww.niehs.nih.gov/research/resourcesibioethics/whatis/index.cfm

6. Beall. J, (2012), Predatory Publishers are Corrupting Open Access, Nature, 489 (7415), 179-179. *https:lldoi.orgil0.l038/489179a*

7. Indian National Science Academy (INSA), Ethicsin Science Education, Research and Governance, (2019), ISBN: 978-81-939482-1-7. http://www.insaindia.res.inlpdf/EthicsBook.pdf

GE1901 Research Methodology in Engineering 4 1 0 5

Aim

This course is designed for students who are beginning their research projects. The aim of the course is to give students the tools to conceptualize their programme in terms of identifying the research problem, collecting relevant data pertaining to the problem, methodology of carrying out the research and analysis of the results/data and writing papers/thesis/dissertation.

Objectives

Learn to focus on a research problem using scientific methods

- Learn methods to devise and design an experimentation set-up
- Learn basic instrumentation and data collection methods
- Learn parameter estimation and related modelling methods

UNIT – I Introduction to Research Methods 15

Motivation and Objectives of Research, Types and Approaches, Methods of Research: Theoretical and Experimental Research Process, Significance of Research - Methods Vs Methodology - Research Process – Components of Research Problem, Various Steps in Scientific Research, Literature Survey – Primary Data and Secondary Data.

UNIT – II Data Collection and Sampling Design 15

Sources of Data: Primary Data, Secondary Data; Procedure Questionnaire- Survey and Experiments - Sampling Merits and Demerits, Sampling Errors, Processing and Analysis of Data - Statistics in Research - Measures of Central Tendency -Measures of Dispersion -Measures of Asymmetry (Skewness) – Error Analysis

UNIT – III Statistical Modeling and Time Series Analysis 15

Probability Distributions, Fundamentals of Statistical Analysis and Inference, Multivariate Methods, Concepts of Correlation and Regression, Fundamentals of Time Series Analysis and Spectral Analysis, Applications of Spectral Analysis. Use of Statistical Soft Ware SPSS, GRETL Etc in Research, Factorial Design of Experiments, Analysis of Variance.

UNIT – IV Optimization and Matlab 15

Introduction to Traditional and Non – Traditional Optimization Techniques, Soft Computing, Computer and Its Role in Research, Basic in Algorithms, Introduction to Evolutionary Algorithms - Fundamentals of Genetic Algorithms, Simulated Annealing, Neural Network Based Optimization, Optimization of Fuzzy and Expert Systems. Parallel Programming Models, Introduction to MATLAB, Numerical Matrix Computation, Data Fitting Techniques and Practical Case Studies, Root Finding and Practical Case Studies

UNIT - V Report Writing 15

Structure and Components of Research Report, Types of Report - Techniques of Interpretation, Precautions in Interpretation, Significance of Report Writing, Different Steps in Report Writing, Layout of Research Report, Mechanics of Writing Research Report. Research Publications - Impact Factor, Science Citation Index, Scopus Citation Database, IPR

Exposure to LaTeX - Installation – Document Class – Page Style – Parts of Document – Table of Contents – Changing Font – Centering and Intending – Theorem Like Declarations, Math Environment, Figures, Tables, Mathematical Symbols - Reference Manager, Camera Ready Preparation. **Total: 75 Hours**

Books for References

1. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan, 2006'
2. Bendat and Piersol, Random Data: Analysis and Measurement Procedures, Wiley Interscience, 2001.
3. Shumway and Stoffer, Time Series Analysis and Its Applications, Springer, 2000.
4. Jenkins, G.M., and Watts, D.G., Spectral Analysis and Its Applications, Holden Day, 1986
5. Richard I Levin Amp; David S. Rubin, Statistics for Management, 7/e. Pearson Education, 2005.
6. Timothy J. Ross, Fuzzy Logic with Engineering Applications, Wiley Publications, 2nd Edition, 2004
7. P.J. Van Laarhoven & E. H. Aarts, Simulated Annealing: Theory and Applications (Mathematics and Its Applications, 1987
8. R. Venkata Rao Advanced Modeling and Optimization of Manufacturing Processes International Research and Development, e-ISBN 978-0-85729-015-1, Springer London Dordrecht Heidelberg New York, 2011
9. David E. Goldberg, Genetic Algorithms in Search, Optimization, and Machine Learning, 1989
10. T. H. Cormen, C. E. L. Leiserson and R.L. Rivest, C. Stein, Introduction to Algorithms, Prentice Hall, 2001
11. M.J. Quinn, Parallel Computing, MCGraw Hill International Edition, 2002.
12. Leslie Lamport, LaTeX: A Document Preparation System, Addison Wesley, ISBN-13: 978-0201529838, 1994

GE1904 Research Methodology in Humanities 4 1 0 5

Unit – I Introduction 15

Meaning of Research, Objectives, Types, Research Approaches, Significance, Research Methods and Research Process

Unit – II Research Methodology 15

Nature, Types and Scope of Research in Language and Literature, Areas of Research, Areas and Problems of Research in Indian Contexts

Unit- III Form and Documentation 15

Scholarly Prose - Names of Persons, Titles of Sources, Quotations, Numbers, Dates and Times, Abbreviations

Work Cited - Names of Authors, Titles, Versions, Publisher, Locational Elements, Punctuations in the Works Cited List, Formatting and Ordering the Works Cited List

In-Text Citation - Author, Title, Number in Text Citations, Indirect Sources, Repeated Use of Sources, Punctuations

Citation in Forms Other Than Print

Unit - IV Mechanics of Writing 15

Sentences – Positioning of Words, Length of Sentence

Types - Simple, Compound, Complex and Compound Complex

Paragraphs – Orders of Sentences, Making Connections, Topic Sentences, Transitions, Unity, Order, Coherence and Completeness

Effective Writing - Plain and Unpretentious Style, Brevity and Conciseness, Consistency, Brightness

Errors to be Avoided in Sentences and Paragraphs

Redundancy, Tautology, Vague Words, Abusive Euphimisms, Slangs, Sexist Language, Ambiguities

Plagiarism

Unit - V Format of Thesis, Dissertations and Research Papers 15

Report Writing and Its Different Types, Exposure to Latex, structure and Components of a Thesis, Various Steps in Writing a Research Thesis, Layout of the Thesis, Margin, Spacing, Heading and Titles, Sub Titles, Page Numbers, Tables and Illustrations, Works Cited List, Annexures, Publications in Impact Factor and Scopus Indexed Journals

Total 75 Hours

Books for References

1. C.R. Kothari, Research Methodology, Wishwa Prakashan P.G. Triphati, Research Methodology, Sulthan Chand & Sons, New Delhi, 2006
2. R. Panneerselvam, Research Methodology, Prentice Hall of India, New Delhi, 2004.
3. Stoufferetal, Measurement and Prediction, Wiley, New York, 1950
4. J.W. Bames, Statistical Analysis for Engineers and Scientists, McGraw Hill, New York, 1994
5. Donald Cooper, Business Research Methods, Tata McGraw Hill, New Delhi, 2006
6. Bhanwar Lal Garg, Renu Kavdia, Sulochana Agarwal and Umesh Kumar Agarwal, An Introduction to Research Methodology, RBSA Publications, 2015
7. S.S. Rao, "Optimization", Wiley Eastern, New Delhi, 1995.
8. Montgometry, D.C., "Design and Analysis of Experiments", Wiley Publications, 2000
9. Kerlinger, F.N. Foundations of Behavioral Research – Lied New York Reinhart & Weinstein 1973.
10. Coley S. M. and Scheinberg C. A., , "Proposal Writing", Newbury Sage Publications, 1990
11. Leedy P D, "Practical Research: Planning and Design", 4th Edition, N W MacMilan Publishing Co, 1993
12. Day R A, "How to Write and Publish a Scientific Paper", Cambridge University Press, 1989.
13. MLA Handbook for Writers of Research Papers (8th edition), Modern Language Association of America, New York, 2016.
14. Leslie Lamport, LaTeX: A Document Preparation System, Addison Wesley, ISBN-13: 978-0201529838, 1994

GE1903 Research Methodology in Management 4 1 0 5

Aim

This course is designed for students who are beginning their research projects. The aim of the course is to give students the tools to conceptualize their programme in terms of identifying the research problem, collecting relevant data pertaining to the problem, methodology of carrying out the research and analysis of the results/data and writing papers/thesis/dissertation.

Objectives

- To formulate a viable research question
- To distinguish probabilistic from deterministic explanations
- To analyze the benefits and drawbacks of different methodologies
- To understand how to prepare and execute a feasible research project
- To identify and interpret patterns in data
- To eliminate alternative explanations

Unit – I Introduction to Research 15

Research Methodology-An Introduction -Meaning of Research -Objectives of Research-Motivation in Research -Types of Research - Research Approaches -Significance of Research -Research Methods versus -methodology -Research and Scientific Method -Importance of Knowing How Research is Done -Research Process -Criteria of Good Research -Problems Encountered by Researchers in India –Defining the Research Problem -Selecting the Problem -Necessity of Defining the Problem -Technique Involved in Defining a Problem.

Unit – II `Research Design and Sampling Design 15

Research Design -Meaning of Research Design -Need for Research Design - Research Methodology Features of a Good Design - Different Research Designs -Basic Principles of research Designs -Developing a Research Plan - Hypotheses- Definition – Types -Testing of Hypotheses - Sampling –Meaning -Important Sampling Distributions - Sampling Design -Census and Sample Survey -Implications of a Sample Design -Steps in Sampling Design -Criteria of Selecting a Sampling Procedure -Different Types of Sample Designs – Complex Random Sampling Designs - Measurement and Scaling Techniques - Scaling -Meaning of Scaling - Scale Classification Bases

Unit – III Data Collection and Processing Techniques 15

Methods of Data Collection -Collection of Primary Data -Observation Method -Interview Method - Questionnaires - Schedules - Questionnaires and Schedules - Other Methods of Data Collection –Primary and Secondary Data -Selection of Appropriate Method for Data Collection -Case Study Method -(i) Guidelines for Constructing Questionnaire/Schedule -(ii) Guidelines for Successful Interviewing–Processing and Analysis of Data - Some Problems in Processing -Elements/Types of Analysis -Statistics in Research -Measures of Central Tendency -Measures of Dispersion - Simple Regression Analysis -Multiple Correlation and Regression.

Unit – IV Statistical Tools for Analysis 15

Statistical tools – Importance - Analysis of data through SPSS - Chi-square Test - Conditions for the Application of $\chi 2$ Test -Steps Involved in Applying Chi-square Test - Analysis of Variance and Covariance -Analysis of Variance - One-way ANOVA -Coding Method -Two-way ANOVA - Analysis of Co-variance (ANOCOVA) – t test Z test - Multivariate Analysis Techniques -Growth of Multivariate Techniques - Characteristics and Applications -Classification of Multivariate Techniques -Variables in Multivariate Analysis -Important Multivariate Techniques -Important Methods of Factor Analysis

UNIT - V Report Writing 15

Structure and Components of Research Report, Types of Report - Techniques of Interpretation, Precautions in Interpretation, Significance of Report Writing, Different Steps in Report Writing, Layout of Research Report, Mechanics of Writing Research Report. Research Publications - Impact Factor, Science Citation Index, Scopus Citation Database, IPR

Exposure to LaTeX - Installation – Document Class – Page Style – Parts of Document – Table of Contents – Changing Font – Centering and Intending – Theorem Like Declarations, Math Environment, Figures, Tables, Mathematical Symbols - Reference Manager, Camera Ready Preparation. **Total: 75 Hours**

Books for References

1. C.R Kothari, Research Methodology, Wishwa Prakashan P.G Triphati, Research Methodology, Sultan Chand & Sons, New Delhi, 2006
2. Panneerselvam, R., Research Methodology, Prentice Hall of India, New Delhi, 2013.
3. Stoufferetal, Measurement and Prediction, Wiley, N. York, 1950
4. J.W Bames, Statistical Analysis for Engineers and Scientists, McGraw-Hill Companies,1994
5. Donald Cooper, Business Research Methods, Tata McGraw-Hill Education Pvt. Ltd., 2006
6. Bhanwar Lal Garg, Renu Kavdia, Sulochana Agrawal and Umesh Kumar Agrawal, An Introduction to Research Methodology. RBSA Publications, 2015
7. Rao S. S., "Optimization", Wiley Eastern, New Delhi, 2005.
8. Montgomery D.C., "Design and Analysis of Experiments", Wiley Publications, 2000
9. Kerlinger, F.N. Foundations of Behavioural Research -IIED New York Reinhart & Weinstein, 1974
10. Coley S M and Scheinberg C A, "Proposal Writing", Newbury Sage Publications, 2010
11. Leedy P D, "Practical Research: Planning and Design", 4th Edition, N W MacMillan Publishing Co, 1993
12. Day R A, "How to Write and Publish a Scientific Paper", Cambridge University Press, 1994
13. MLA Handbook for Writers of Research Papers (7th Edition), Modern Language Association of America Publishers, 2009
14. Leslie Lamport, LaTeX: A Document Preparation System, Addison Wesley, ISBN-13: 978-0201529838, 1994

GE1902 Research Methodology in Science 4 1 0 5

Aim

This course is designed for students who are beginning their research projects. The aim of the course is to give students the tools to conceptualize their programme in terms of identifying the research problem, collecting relevant data pertaining to the problem, methodology of carrying out the research and analysis of the results/data and writing papers/thesis/dissertation.

Objectives

- Learn to focus on a research problem using scientific methods
- Learn methods to devise and design an experimentation set-up
- Learn basic instrumentation and data collection methods

UNIT - I Introduction to Research Methods 15

Motivation and Objectives of Research, Types and Approaches, Methods of Research: Theoretical and Experimental Research Process, Significance of Research - Methods Vs Methodology - Research Process – Components of Research Problem, Various Steps in Scientific Research, Literature Survey – Primary Data and Secondary Data. Major Internet Services, Working of Internet, Downloading Super Tools for Better Computing Internet, Searching the Keywords.

UNIT - II Data Collection and Sampling Design 15

Sources of Data: Primary Data, Secondary Data; Procedure Questionnaire- Survey and Experiments - Sampling Merits and Demerits, Sampling Errors, Processing and Analysis of Data - Statistics in Research - Measures of Central Tendency -Measures of Dispersion -Measures of Asymmetry (Skewness) – Error Analysis

UNIT - III Statistical Modeling and Time Series Analysis 15

Fundamentals of Statistical Analysis and Inference, Probability Distributions, Binomial, Poisson and Normal Distributions, Concepts of Correlation and Regression, Fundamentals of Time Series Analysis and Spectral Analysis, Error Analysis, Applications of Spectral Analysis.

UNIT - IV Statistical Analysis and MATLAB 15

Testing of Hypothesis: t – Test (Difference of Means and Paired t Test); F Test; Goodness of Fit (χ^2 Test). Design of Experiments – Random Block Design, Completely Randomized Design ad Latin Square Design.
Use of Statistical Software: SPSS in Research, Introduction to Matlab – Application in Matrices.

UNIT - V Report Writing 15

Structure and Components of Research Report, Types of Report - Techniques of Interpretation, Precautions in Interpretation, Significance of Report Writing, Different Steps in Report Writing, Layout of Research Report, Mechanics of Writing Research Report. Research Publications - Impact Factor, Science Citation Index, Scopus Citation Database, IPR

Exposure to LaTeX - Installation – Document Class – Page Style – Parts of Document – Table of Contents – Changing Font – Centering and Intending – Theorem Like Declarations, Math Environment, Figures, Tables, Mathematical Symbols - Reference Manager, Camera Ready Preparation.

Total: 75 Hours

Books for References

1. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan, 2006
2. Bendat and Piersol, Random Data: Analysis and Measurement Procedures, Wiley Interscience, 2001.
3. Shumway and Stoffer, Time Series Analysis and Its Applications, Springer, 2000.
4. Jenkins, G.M., and Watts, D.G., Spectral Analysis and Its Applications, Holden Day, 1986
5. S.C.Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics,11th Edition-2002
6. Donald H. McBurney, Research Methods, 5th Edition, Thomson Learning, ISBN: 81-315-0047-0, 2006.
7. Helmet Kopka and Patrick.W.Daly, **"**A Guide to Latex and Electronic**",** 4th Edition – Addison- Wesly Longman Limited, 2004 (Section 3.1-3.4, 4.1,4.2,4.5,4.8, 5.1, 5.3 and 9.3)
8. Section Amos Gilat, MATLAB, An Introduction with Applications, John Wiley & Sons, 2004. (Chapters 8 and 9)
9. Leslie Lamport, LaTeX: A Document Preparation System, Addison Wesley, ISBN-13: 978-0201529838, 1994