CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI (C.G.)

Detail Syllabus for PrePhD Course Work

Subject: **Research Methodologies & Computer Application**
Total Theory Periods: 40
Total Marks in End Semester Examination: 100
Assessment: 50
Duration of End Semester examination: Three Hours

Branch: common to all disciplines
Total Tutorial Periods: 10
Total marks in Teacher's

Section -A (Marks Allotted: 60)

Introduction: Concept, Meaning of Research, Objectives of Research, research approaches, Types of Research, significance; research methods/methodology; research & scientific methods-Inductive and deductive; Characteristics of Good Research.

Research Process: Research Plan, Steps, Research problem Identification, definition, Formulation, Research Objectives.

Research Designs: Concepts, features, Types-Exploratory, Descriptive and Causal Research Designs, and its methods, Research Budget.

Data for research: Collection and Preparation; Primary and Secondary Sources of data; methods for data collection, Data Tabulation, Editing and Coding; Survey and Observation methods; Motivation Research and Projective Techniques. Types of Data, Questionnaire Design: Techniques and Precautions; Summarizing the Data: Mean, Median, Mode and Standard Deviation -numerical for practice.

Sampling Fundamentals: Sampling Plan, Design; Sampling methods - Probability sampling methods - simple random sampling with replacement, simple random sampling without replacement, stratified sampling, cluster sampling. Non-probability sampling method - convenience sampling. Judgment sampling, quota sampling; Sample Size Determination, Reliability and Validity.

Measurement and Scaling Techniques: Rating Scale and Ranking Scales.

Concept of Hypotheses: Formulation of Hypotheses, Testing of hypotheses, Parametric and non-parametric tests. Testing of significance mean, proportion, variance and correlation - coefficients. (Numerical pertaining to applicability for practice: Chi Square, t -test, z-test, ANOVA)

Data Processing and Analysis Techniques: Univariate and Bivariate Analysis (Chi Square, t -test, z-test ANOVA, -numerical for practice)

Multivariate Analysis: Introduction to Discriminant Analysis, Cluster Analysis, Factor Analysis, Multiple Linear Regressions. Importance of statistics in research, descriptive vs inferential

Interpretation and Report Writing: Data Interpretation, Techniques of Interpretation, Steps in Writing Report, Generic layout of a Research Report

Research and Publication Ethics : Introduction to Philosophy: definition, nature and scope, concept; Ethics: definition, nature of moral judgments and reactions; Ethics with respect to science and research; Intellectual honesty and research integrity; National and International regulations/laws/ethics related to research on Human, Animals and Environments; Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP); Publication ethics: definition, introduction and importance; Best practices/standards setting initiatives and guidelines: COPE, WAME, etc.

Intellectual Property Rights: Introduction to IPRs, Basic concepts and need for Intellectual Property – Patents, Copyrights, Trademarks, Geographical Indications; IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS; Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR. Registration of IPRs-Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India

and Abroad. Digital Products and Law - Digital Innovations and Developments as Knowledge Assets – Cyber Law and Digital Content Protection.

Application of Research in engineering, sciences, social sciences, humanities, Management etc

Use of SPSS and other statistical software's for Data Analysis

Section - B (Marks Allotted: 40)

Computer Application:

Word Processing Tool: Simple typesetting. fonts, type size, Document class, page style. page numbering. formatting lengths. word count, parts of a document, dividing a document, spell check, insertion of objects in a text. Word processing tools like MS-Word, latex, Open office or similar tool.

Spreadsheet Tool: Introduction to spreadsheet application, features and functions, Using formulas and functions. Data storing. Feature for Statistical data analysis, Generating charts/ graph and other features. Tools used may be Microsoft Excel, Open office or similar tools.

Presentation Tool: Introduction to presentation tool, features and function. Creating presentation, customizing presentation, Showing presentation. Tools used may be Microsoft Power Point. Open Office or similar tools.

Web Search: Introduction to Internet, Use of Internet and WWW, Using search engine like Google, Yahoo etc, Using advanced search techniques.

Application of Internet in research: INFLIBNET, Use of Internet, sights (DOAJ), Use of E Journals, Use of E-library.

Open Access Publishing: Open access publications and initiatives; SHERPA/RoMEO 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.; Introduction to other Open-Source Software Tools

Databases and Research Metrics: Indexing databases; Citation databases: Web of Science, Scopus, etc.; Citation Style; Impact factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score; Metrics: h-index, g index, i10 index, Altmetrics

Research Communication:

Basics of Communication skill: need and features, English Grammar: Word Choice, Sentence Structure, paragraph structure, Types of Scientific Communication, Importance of publishing research paper, Publishing research paper: Preliminaries, Format (APA/Latex style), Choosing Journal, 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, Communication with the Editor. Handling Referee's comments. Writing Review Articles, Preparing Posters for Scientific Presentation, Preparing and Delivering of Oral Presentation, Writing Practical Reports. Avoiding Plagiarism.

Use of Plagiarism software like Turnitin, Urkund.

Reference Books:

- Kothari C.K. (2004), 2/e, Research Methodology - Methods and Techniques (New Age International, New Delhi)
- The complete reference Office Xp - Stephan L. Nelson, Gujulia Kelly (TMH)
- Book for Open Office.
- Hans Raj (1988) Theory and Practice in Social Research, Surjeet Publication, Kolhapur.
- Krishnaswarni 0. R. (1988) Methodology of Research in Social Science, Himalaya Pub. House.
- Kothari, C.R. (2005) Quantitative Technique, New Delhi, Vikas Publication House.
- Gautam, N. C. (2004) Development of Research tools, New Delhi, Shree Publishers.
- Gupta, Santosh (2005) Research Methodology and Statistical Techniques, Deep and Deep Publications.
- Chandera A. and Sexena T. P. (2000) Style Manual, New Delhi, Metropolitan Book Comp. Ltd.
- Bhattacharya, D. K. (2004) Research Methodology, New Delhi, Excel Books.
- The complete reference Office Xp - Stephan L. Nelson, Gujulia Kelly (TMH)
- LATEX Tutorials, A primer by Donald knuth
- First steps in Latex - George Gratzer
- 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 Edition*. 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.nih.gov/research/resources/bioethics/whatis/index.cfm
- Beall, J. (2012). Predatory publishers are corrupting open access. Nature, 489(7415), 179-179. https://doi.org/10.1038/489179a
- Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019), ISBN:978-81-939482- l-7. http://www.insaindia.res.in/pdf/Ethics_Book.pdf
- V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012
- S. V. Satakar, Intellectual Property Rights and Copy Rights, Ess Ess Publications, New Delhi, 2002
- Deborah E. Bouchoux, -Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets, Cengage Learning, Third Edition, 2012.