

## SYLLABUS FOR PH.D. COURSE WORK

<b>PAPER CODE</b>	<b>PAPER NAME</b>	<b>MAX. MARKS</b>
RCW101	Research Methodology	100
RCW102-A	Computer Applications	100
RCW102-B	Advanced Computer Application	100
RCW103	Review Writing & Seminar on the Published Research Work in the Relevant Field	50+50=100
RCW104	Research and Publication Ethics	100
	<b>TOTAL MARKS</b>	<b>400</b>

# **RESEARCH METHODOLOGY**

## **(RCW-101)**

### **Unit 1: Introduction**

Meaning, Concept, Nature, Steps, Types and Characteristics of research.

Scientific Inquiry

Philosophical and Sociological foundations of research

Interdisciplinary approach and its implications in various research area.

### **Unit 2: Methods of Research**

Qualitative and quantitative methods of research like Historical, case study, ethnography, exposit facto, documentary and content analysis, survey (Normative, descriptive, evaluative etc.) field and laboratory experimental studies.

Characteristics of methods and their implications in research area.

### **Unit 3: Development of research proposal**

Research proposal and its elements

Formulation of research problem-criteria of sources and definition

Development of objectives and characteristics of objectives.

Development hypotheses and applications.

### **Unit 4: Methods of data collection**

Concept of sampling and other concepts related to sampling.

Probability and non-probability samples, their characteristics and implications.

Tools of data collections, their types, attributes and uses.

Redesigning, research tools-like questionnaire, opinionnaire, observation, interviews, scales and tests etc.

## **Unit 5: Methods of data analysis**

Analysis of qualitative data based on various tools.

Analysis of quantitative data and its presentation with tables, graphs etc.

Statistical tools and techniques of data analysis-measures of central tendency, dispersion.

Decision making with hypothesis testing through parametric and non-parametric tests. Validity and delimitations of research findings.

## **Unit 6: Report writing and evaluations**

Principles of report writing and guide lines according to style manuals.

Writing and presentation of preliminary, main body and reference section of report.

Picture and Graphs. Introduction to SPSS.

Evaluation of research report.

## **References:**

1. Wilkinson & Bhandarkar: Methodology and Techniques of Social Research.
2. Pauline Vyoung: Scientific Social Surveys and Research.
3. Panneerselvam, R., Research Methodology, Prentice Hall of India, New Delhi, 2004
4. Kothari: Research Methodology.
5. Festinger. L & D. Katz: Research Methods in Behavioral Science.
6. Sellitz, Et Al: Research Methods in Social Relations.

**(For Non Computer Background)**

**COMPUTER APPLICATION**

**(RCW102-A)**

**Unit 1: Basics of Computer**

Characteristics of Computers, Evolution of computers, computer memory, computer generations, Basic computer organization; System software, Application software, introduction to operating system, single user, multi-user, multi-tasking single tasking, application of computer for business and research, MS-windows, Linux.

**Unit 2: Data Communication and Networks**

Data communication concepts, local area network, wide area network, internet, intranet, extranet, website. E-mail, search engines-enterprise E-communication and E-collaboration

**Unit 3: Using Internet for Research**

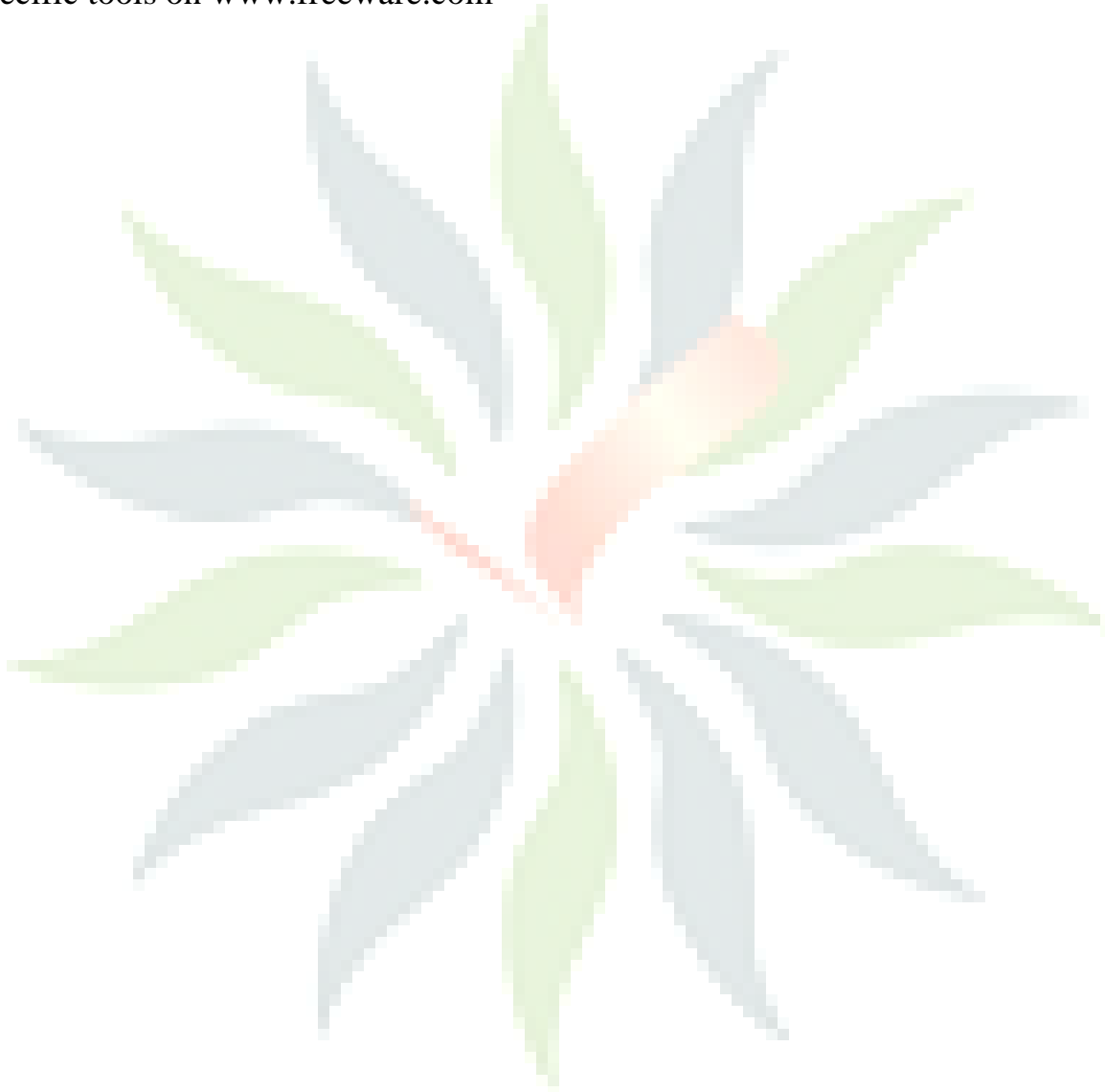
The Internet: quick look, what is internet, Use of Internet, major internet services, electronic mail, www, downloading super tools for better computing Internet and the society, Use of E-Journals, Use of E-library, searching the keyword search engines, News and multimedia, governments, archives and statistics.

**Unit 4: Introduction to Research Related Software's**

Introduction to Data analysis software-SPSS: Definition, objectives and features, data analysis using SPSS: Data entry creating variables, switching to data labels, data analysis: Frequencies, recording into different variables, cross tabulations and layers. Core calculation software, developing utility programs for research, Introduction to C programming.

## **Unit 5: Research Related Tools and Utilities**

MS-Office and its application, File handling in window, various versions of MS-Office, Research publishing tool- MS-Word, Adobe acrobat, Graphics tool- MS-Excel, MS-Power Point: Creating presentations and adding effects, Subject/field specific tools on [www.freeware.com](http://www.freeware.com)



**(For the students in Engineering & Computer background)**

# **ADVANCED COMPUTER APPLICATION (RCW102-B)**

## **Unit 1: Basics of Computer Organization**

System software compilation and interpretation, phases of compilation process, Lexical analysis, Lex packages on Linux system, Parsing Techniques, code generation and optimization.

Application software, software development models, requirement analysis and specification for software design, Programming techniques and tools, software validation and quality assurance techniques, software maintenances and advance concepts, software management.

Operating system, functions of OS. Multiprogramming, multiprocessing and multitasking, memory management, Concurrent programming. Scheduling, study of Linux operating system.

## **Unit 2: Data Communication and Networks**

Data communication concepts, local area network, wide area network, internet, intranet, extranet, website. E-mail, search engines-enterprise E-communication and E-collaboration

## **Unit 3: Working with Internet**

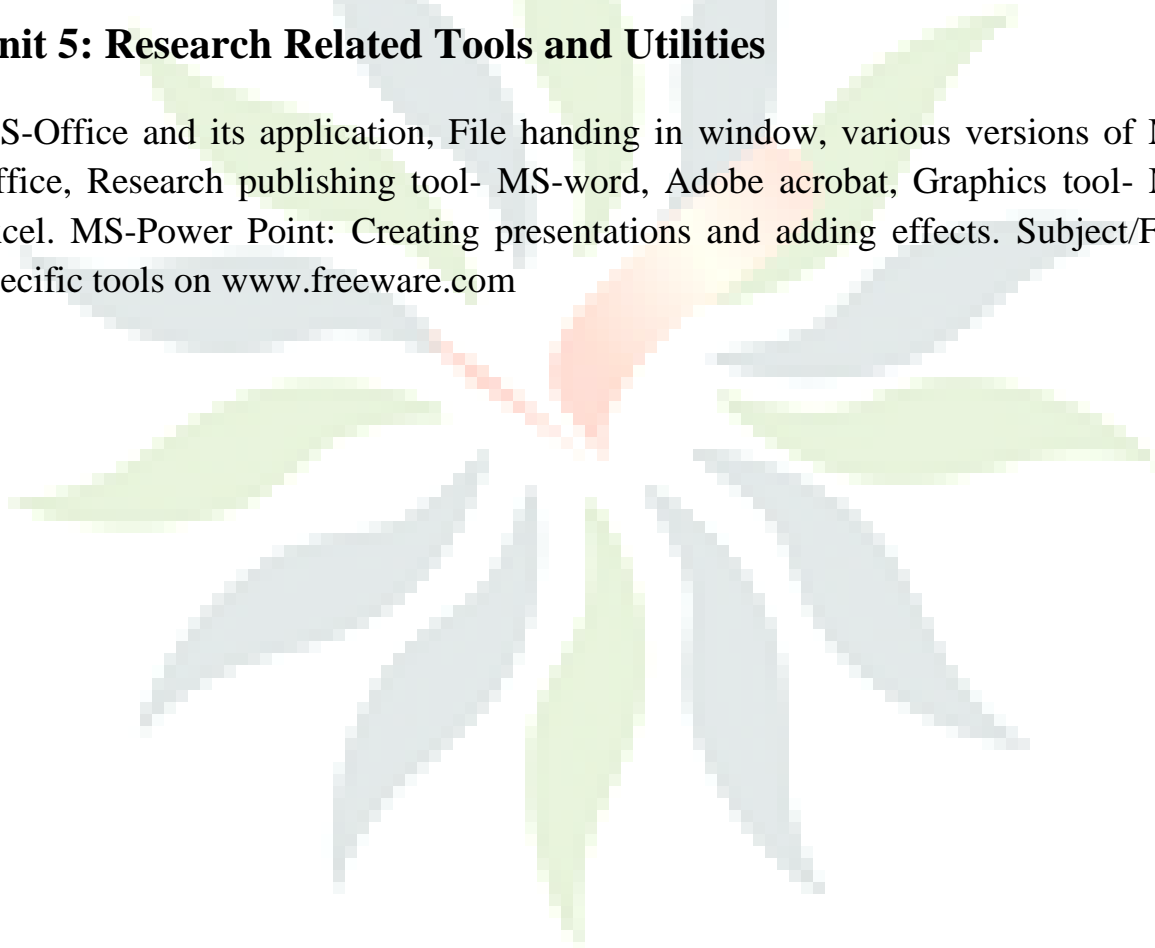
Introduction to internet, INFLIBNET, sights (DOAJ), searching on the internet, Using graphics on internet, E-mail. The use of multimedia on the internet, Security on the internet, Exploring e-mail facilities. Web design, creating web pages, themes and graphics, linking web pages, Navigation and testing, Making the website interactive, Internet and the society, study of search engines, Use of EBSCO HOST online database of Academic Libraries.

## **Unit 4: Programming Fundamentals**

Object oriented programming concepts, Classes, Objects, Installations, Inheritance, Polymorphism and Overloading, Elements of C++ tokens, identifiers, variables and constants, Data types, Operators, Control statements, Function parameter passing. Class and objects, Constructors and destructors, overloading inheritance templates, exception handling Relational database design and SQL : E-R diagrams, transformation and normalization, SQL, DDL, DML, DCL command database objects.

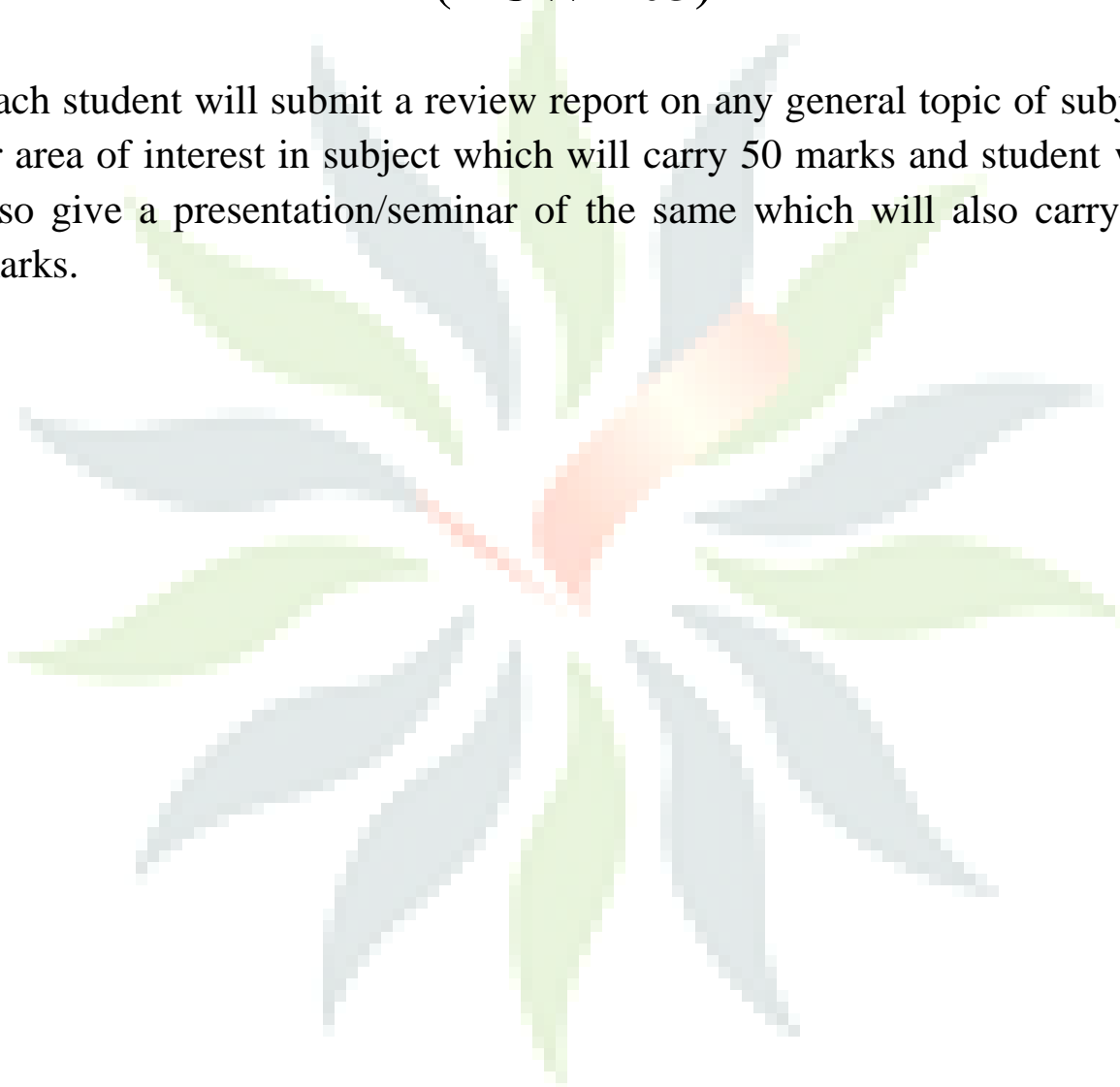
## **Unit 5: Research Related Tools and Utilities**

MS-Office and its application, File handling in window, various versions of MS-Office, Research publishing tool- MS-word, Adobe acrobat, Graphics tool- MS-excel. MS-Power Point: Creating presentations and adding effects. Subject/Field specific tools on [www.freeware.com](http://www.freeware.com)



# **REVIEW WRITING & SEMINAR ON THE PUBLISHED RESEARCH WORK IN THE RELEVANT FIELD (RCW-103)**

Each student will submit a review report on any general topic of subject or area of interest in subject which will carry 50 marks and student will also give a presentation/seminar of the same which will also carry 50 marks.





# RESEARCH AND PUBLICATION ETHICS

## (RCW-104)

### Unit 1: Philosophy and Ethics

Introduction to philosophy: definition, nature and scope, concept, branches.

Ethics: definition, moral philosophy, nature of moral judgments and reactions.

### Unit 2: Scientific Conduct

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 3: Publication Ethics

Publication ethics: 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 contributorship.

Identification of publication misconduct, complaints and appeals.

Predatory publishers and journals.

PRACTICE

### Unit 4: 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.

## **Unit 5: 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

## **Unit 6: 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:**

1. Bird, A. (2006). *Philosophy of Science*. Routledge.
2. MacIntyre, Alasdair (1967) *A Short History of Ethics*. London.
3. P. Chaddah, (2018) *Ethics in Competitive Research: Do not get scooped; 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 Conduct in 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*, -. Retrieved from <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>
6. Beall, J. (2012). Predatory publishers are corrupting open access. *Nature*, 489(7415), 179-179. <https://doi.org/10.1038/489179a>
7. Indian National Science Academy (INSA), *Ethics in Science Education, Research and Governance* (2019), ISBN: 978-81-939482-1-7. [http://www.insaindia.res.in/pdf/Ethics\\_Book.pdf](http://www.insaindia.res.in/pdf/Ethics_Book.pdf)
8. *The Ethics of Teaching and Scientific Research* by Miro Todorovich; Paul Kurtz; Sidney Hook.
9. *Research Ethics: A Psychological Approach* by Barbara H. Stanley; Joan E. Sieber; Gary B. Melton
10. *Research Methods in Applied Settings: An Integrated Approach to Design and Analysis* by Jeffrey A. Gliner; George A. Morgan Lawrence Erlbaum Associates, 2000
11. *Ethics and Values in Industrial-Organizational Psychology* by Joel Lefkowitz Lawrence Erlbaum Associates, 2003.