

# **Syllabus of Course Work**

## **Ph.D. Programme**



# Structure of Syllabus

## Ph.D. Course Work

Name of the Paper	Paper Code	Credit
Research Methodology- I	Ph.D-101	4
Research Methodology- II	Ph.D-102	4
Recent Development In Respective Discipline	Ph.D-103	4
Review of Literature	Ph.D-104	4

# Syllabus

## Ph.D. Course Work

Paper Code: Ph.D-101

Paper Name: Research Methodology I

Credit: 4

### Unit I

Introduction to philosophy: definition, nature and scope, concept, branches. Philosophical foundations of research, scientific basis of research, purpose of research, nature and process of research, selection and formulation of a research problem. (14hrs.)

### Unit II

Research design - explanatory, experimental and descriptive studies, hypothesis building and testing - problems of measurement. (8hrs.)

### Unit III

Data collection - observational methods, questionnaires and interviews, projection and other indirect method, library data collection. (8hrs.)

### Unit IV

Use of available data as source material - qualitative and quantitative data - Scaling techniques Sampling. (10hrs.)

Unit V Orientation towards Instrumentation and Experimental Protocols (For Science Discipline)  
Theory, instrumentation, and working principle of different instruments available in the Central Instrumental Facility, like HPLC, GCMS, AAS, STA/TGA-DSC, FTIR Spectrometer, UV-VIS Spectrometer, Fluorescence Microscope, Cell Imaging System, Gel - Electrophoresis, Real Time PCR etc. (20 hrs.)

Or

### Qualitative Research Methods (Other than Science Discipline)

Research design: Qualitative Research Process; Research Questions; Entering the Field; Sampling; How to Design Qualitative Research. Verbal data: An overview; Interview; Narratives; Focus Group Discussion. Observation and mediated data; Observation and Ethnography; Visual Data: Photography, Film, and Video; Using Documents as Data; Qualitative Online Research: Using the Internet. From text to theory: Documentation of Data; Coding and Categorizing; Analysing Conversation; Using Computers in Qualitative Analysis. Writing Qualitative research Report writing - research and theory - values and objectivity in research (20hrs.)

### Texts/references:

1. Bridget Somekh and Cathy Lewin (ed), Research Methods in the Social Sciences (New Delhi; Vistaar, 2011)
2. Bird, A. (2006) Philosophy of Science. Routledge
3. B. N. Ghosh, Scientific Method and Social Research (New Delhi: Sterling, 1993)
4. Chava Frankfort-Nachmias and David Nachmias, Research Methods in the Social Sciences (London: St. Martin Press, 1994)
5. David E. McNabb, Research Methods for Political Science: Quantities and Qualitative Methods ( New Delhi: PHI Learning, 2009)

6. Gerard Gathrie, *Basic Research Methods; An Entry into Social Science Research* (New Delhi: Sage,2010)
7. Janet Buttolph Johnson and Richard A. Joslyn, *Political Science Research Methods* ( New Delhi: Princeton Hall of India, 1989)
8. Paul Oliver, *Writing Your Thesis* New Delhi; Sage, 2008
9. William J. Goode and Paul K. Hatt, *Methods in Social Research* (London: McGraw-Hill Book, 1981)
10. Frank A. Settle (1997) *Handbook of Instrumental Techniques for Analytical Chemistry*.
11. Skoog, D.A. F. James Holler, and Stanky, R.Crouch (2007) *Instrumental Methods of Analysis*. Cengage Learning.
12. Willard, Hobart, et al., *Instrumental Methods of Analysis* 7th Edition, CBS, 1986.
13. Braun, Robert D.,*Introduction to Instrumental Analysis*. Pharma Book Syndicate, 1987.
14. Ewing,G.W., *Instrumental Methods of Chemical Analysis*, 5th Edition, McGraw-Hill,1985.
15. *Undergraduate Instrumental Analysis* 7th edition by James W. Robinson, Eileen Skelly Frame, George M. Frame II Published September 2, 2014 by CRC Press
16. Sharma, B.K. (1972) *Instrumental Methods of Chemical Analysis: Analytical Chemistry* Goel Publishing House.
17. Haven, Mary C., et.al., *Laboratory Instrumentation* . 4th Edition, John Wiley, 1995.
18. Coffey, A., and Atkinson, P. (1996). *Making sense of qualitative data: Complementary research strategies* Sage Publications.
19. Denzin, N. K., and Loncoln, Y. S. (1994). *Handbook of Qualitative Research*. Thousand Oaks: Sage Publications.
20. Silverman, D. (2010). *Qualitative research: Theory, method and practice*. London: Sage Publications.
21. Feldman, M. (1995). *Strategies For Interpreting Qualitative Data*. Thousand Oaks, CA: Sage.
22. Merriam, S. B. (2002). *Qualitative Research in Practice: Examples for Discussion and Analysis*. San Francisco, CA: Jossey-Bass.

# Syllabus

## Ph.D. Course Work

Paper Code: Ph.D-102

Paper Name: Research Methodology II

Credit: 2+2=4

### Part A Research and Publication Ethics

Credit: 2

#### Unit I

Research Ethics: Definition, moral philosophy, nature of moral judgements and reactions. Ethics with respect to Science and Research. Intellectual honesty and research integrity. Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP). Redundant publication: duplicate and overlapping publications. (13hrs.)

#### Unit II

Publication Ethics: Definition, introduction and importance. Redundant publication: duplicate and overlapping publications. Guidelines on good publication practice (COPE).  
Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa. Violation of publication ethics, authorship and contributorship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals. (17hrs.)

### Part B Application of Computer and Statistical Analysis

Credit: 2

#### Unit III

Analysis and interpretation of data - coding, tabulation, Statistical analysis of qualitative and quantitative data- diagrammatic representation, computing measures of central tendency, dispersion, location; correlation and regression; constructing sample and hierarchical tables; Testing of hypothesis- t-test, F-test, chi-square test, ANOVA, use of SPSS. (10hrs.)

#### Unit IV

Computer Basics: Fundamentals of Computer. Components of Computer Systems, application and Functions, Storage Structures of Computer Systems, Data, Information and Knowledge.

Microsoft Office: MS Word, MS Excel, MS PowerPoint. Application and use. Different features, data generation, editing, types of functions, data processing and handling etc of MS Word, MS Excel, MS PowerPoint. (15hrs.)

#### Unit V

Web Search: Search Engines and their usefulness in research, How to search and download a research paper using search engines, Uploading a file, E-book and Digital Library, UGC infonet, INFLIBNET and ERNET. Plagiarism: Plagiarism checking using different software. (5hrs.)

#### Texts/references:

1. MacIntyre, Alasdair (1967) A Short History of Ethics. London.
2. P.Chaddah (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978-9387480865
3. 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.

4. Resnik, D.B. (2011) What is ethics in research and why is it important. National Institute of Environmental Health Sciences, 1-10. Retrieved from <http://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>.
5. Beall, J. (2012). Predatory publishers are corrupting open access. *Nature*, 489 (7415), 179. <http://doi.org/10.1038/489179a>
6. 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)
7. Gupta S. C. Fundamentals of Statistics, Himalaya Publication House, Bombay, India.
8. Raja Ram V. (1996), Fundamentals of Computers, Prentice Hall of India, New Delhi, India.
9. Sanders D. H. (1981), Computer Today, McGraw Hill, New York.
10. Sinha P. K. (1992), Computer Fundamentals, BPB Publications, New Delhi, India.
11. Coburn Peter et al (1982), Practical guide to Computers in education, Addison Wesley Publication Company, California.
12. Montgomery Douglas C. (2007) 5/e, Design and Analysis of Experiments (Wiley India).
13. Montgomery Douglas C. & Runger, George C. (2007) 3/e, Applied Statistics & Probability for Engineering (Wiley, India).

## Syllabus Ph.D. Course Work

Paper Code: Ph.D-103      Paper Name: Recent Development In Respective Discipline      Credit: 4

Recent advances in respective subject where scholar is pursuing his/her Ph.D.

## Syllabus Ph.D. Course Work

Paper Code: Ph.D-104      Paper Name: Review of Literature      Credit: 4

1. What is review of literature, why it is necessary and how to write literature review?
2. Scholar will be allotted a topic of Research for writing the literature review.
3. Scholar will make presentation of Review of literature in respective department in presence of external examiner and submit the report of review of literature as hard and soft copy.