

**DEPARTMENT OF COMPUTER SCIENCE
CENTRAL UNIVERSITY OF SOUTH BIHAR**

course structure and syllabus for Ph.D.

There will be 12 credit courses (one semester) for a PhD student.

Course Code	Courses	Credits
CSC101DC00104	Research Methodology	4
CSC101DC00202	Research and Publication Ethics	2
CSC101DC00304	Tools and Techniques of Research	4
CSC101DC00404	Preparation and Presentation of Research Proposal	4
	Total Credits	14

CSC101DC00104 RESEARCH METHODOLOGY (4 Credits)

Part A (2 Credits)

Unit I: Research: A Conceptual Framework

- Research: meaning and concept
- Knowledge, facts, principles, theories and research as a source of knowledge
- Scientific method of inquiry and basic steps of research
- Types of research: Basis, Applied and Action Research
- Ethics in research
- Methods and methodology
- Intellectual and property right

Unit II: Computer Applications

- Word processing, Data processing, Graphical processing, Use of web tools for research, use of multimedia tools.

Part B (2 Credits)

Unit III: Sampling and Testing of Research Hypothesis

Hypothesis and testing a hypothesis, sources of data, fundamentals of data collection methods, sampling. Interpretation of results and generalization, descriptive statistics, random variable, distribution of random variable, probability distribution, Binomial, Poisson, exponential and normal distribution, correlation and regression analysis.

Unit IV: Report Writing

Structure and components of research report, types of report, layout of research report, mechanism of writing a research report, writing a paper and self-evaluating, performing research reviews.

Suggested Readings:

- C.R. Kothari, Research Methodology: Methods and Techniques, International (P) Limited Publishers, New Delhi.
- Raman, V Raja, Fundamental of computer, New Delhi: Prentice Hall India
- R. Panneerselvam, Research Methodology, PHL Learning Private Ltd. New Delhi
- Anderso J., Berry H.D., Poole M., Thesis and assignment writing, Wiley Eastern Limited, New Delhi

CSC101DC00202 RESEARCH AND PUBLICATION ETHICS (2 Credits)

Unit I: Philosophy and Ethics

Introduction to philosophy: definition, nature and scope, concept, branches. Ethics: definition, moral philosophy, nature of moral judgments and reactions.

Unit II: 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.

Unit III: 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 contributor ship

6. Identification of publication misconduct, complaints and appeals
7. Predatory publishers and journals PRACTICE

Unit IV: 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 .
4. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

Unit V: 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 VI: 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.

Suggested Readings:

- The Ethics of Teaching and Scientific Research By Miro Todorovich; Paul Kurtz; Sidney Hook.
- Research Ethics: A Psychological Approach By Barbara H. Stanley; Joan E. Sieber; Gary B. Melton
- Research Methods in Applied Settings: An Integrated Approach to Design and Analysis By Jeffrey A. Gliner; George A. Morgan Lawrence Erlbaum Associates, 2000

- Ethics and Values in Industrial-Organizational Psychology By Joel Lefkowitz
Lawrence Erlbaum Associates, 2003.

CSC101DC00304 Tools and Techniques of Research (4 Credits)

Unit I: Modelling and Simulation

System and Model, Simulation, Need and Types of Simulation, Steps of Modelling, Applications of Simulation, Simulation Language.

Unit II: Research tools

To learn different research tools (Latex, MATLAB, etc.) relevant to the respective research areas.

Unit III:

Lecture/Seminar on different recent topics in computer science.

Unit IV: Techniques involved in solving the problem

Methods of solving research problems related/relevant to the research area.

References for Units I and II:

- Jerry Banks, John S. Carson & Barry L. Nelson, Discrete Event System Simulation
PHI
- System Simulation, by G. Gordon, 2nd edition, 2011, Prentice Hall
- Stefen Kottwiz, Latex for Beginners, open sources
- Amos Gilat, MATLAB an introduction with applications.

CSC101DC00404 Preparation and Presentation of Research Proposal (4 Credits)

Course Objective: This course is designed to prepare the students for beginning the research for PhD.

1. Literature review and background study by the research scholar.
2. Presentation of research proposal by the research scholar.