

DEPARTMENT OF COMPUTER SCIENCE
SYLLABUS OF Ph.D. PROGRAMME



RAMA DEVI WOMEN'S UNIVERSITY
Vidya Vihar, Bhubaneswar-751022, Odisha
Website: <https://rdwu.ac.in>

Ph. D. COURSE WORK SYLLABUS

(2021)



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Bhubaneswar

**P. G. DEPARTMENT OF COMPUTER SCIENCE
RAMA DEVI WOMEN'S UNIVERSITY
VIDYA VIHAR, BHUBANESWAR-751022**

SYLLABUS FOR Ph.D. COURSE-WORK

All the scholars of Ph.D. programme of this Department have to undergo a course work of one semester duration. On successful completion of the course work, the scholars may be eligible for registration for Ph.D. subject to final recommendation of Department Research Committee (DRC). The syllabus structure for coursework is given below.

Papers	Course Title	Credits	Marks	Pass Mark	Remarks	Page No.
Paper-I	Research Methodology and Computer Application (Theory & Practical)	4	100	50%	Subject Specific	
Paper-II (Elective)	Elective: Subject Specific (Theory)	4	100	50%	Subject Specific	
Paper-III	Review of Related Literature (Practical)	4	100	50%	Common to all subjects	
Paper-IV	Research and Publication Ethics (Theory & Practical)	4	100	50%	Common to all subjects	
--	Total	16	400	50%	--	--



PAPER-I

FM-100 (Theory-75 + Practical-25)

RESEARCH METHODOLOGY AND COMPUTER APPLICATIONS

Course Code: CS-01

Credit 4

Unit-I: Philosophy and Culture of Research

Introduction to Philosophy of Knowledge: Various aspects of research methodology; Methodological Approaches; the Analytical Approach; Methodological Procedures with Integrated Approaches.

Types of Research: Introduction to Qualitative & Quantitative Research- Need for Qualitative & Quantitative Research, Grounded Theory Approach, Case Studies in Qualitative Research,

The Challenges of Reliability and Validity in Qualitative Research.

Hypothesis: Different types, Significant, Development of working hypothesis, Null hypothesis.

Unit-II: Scientific Writing and Presentation Tools

Structure of a Research Manuscript: Paper Title, Abstract, Introduction, Citations, Review of Literature, Identifying/ narrow-down to Problem Statements, Proposed Methods/Problems, Result Discussion, Conclusion and Future Directions, References Styles and Citation Credits. Structure of Dissertation Preparation. Presentation Tools (LaTeX), Open Source Tools for Figure Preparations.

Unit-III: Data Analysis in Research

Basic statistical methods through the use of linear model theory and regression. Analysis through one-end two-sample t-tests, multiple linear regression, analysis of variance, regression diagnostics, model-building techniques, random effects models, mixed models. Need of Quantitative analysis in Research Methodology, Data collection, Univariate & Bi-variate data analysis and application to various projects.

Procedure for data collection and data analysis techniques using Python.

Unit-IV: Practical on Computer Applications

Approaches to Computer Application: MS Word: Working with Text, Working with Tables, Graphics and Pages, Document Views and Formatting, and Mail-merge, and Referencing Style. MS-Office and its application, File handing in window, various versions of MSOffice, 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 Use of Internet: Fundamentals and Services – E-mail, FTP, Telnet, WWW

Text Books:

1. Research Methodology: Methods and Techniques, Second Edition, New Age International publishers by C.R. Kothari
2. Mu current presentation tools by Michel Hyatt, International Leadership Groups
3. Morgan, G. and Smircich, L., The Case for Qualitative Research, Academy of Management Review, 5(4): 491-500.
4. 'The Craft of Research' by Wyne C. Booth, Colomb, William, University of Chicago Press. <https://press.uchicago.edu/ucp/books/book/chicago/C/bo23521678.html>

Unit I: Cloud Computing and Networking

Cloud Computing: Virtual Machine Management: Configuration, Placement and Resource Allocation. Creating and Configuring Hyper-V Network Virtualization, Overview of Backup and Restore Options for Virtual Machines, Protecting Virtualization Infrastructure by Using Data Protection Manager. Power efficiency in Virtual Data centres, Fault Tolerance in Virtual Data Centres. Term Papers [as provided].

Networking: Layers and Functions, Switching techniques, Addressing, Routing Protocols, Quality of Services, Network Virtualization, Recent research trends, Term Papers [as provided].

Concept implementations using NS2/NS3.

Unit II: Soft Computing

Artificial Neural Networks: Introduction to Artificial Neural Networks (ANNs), ANN Architectures, Training techniques for ANNs. Single-Layer and multi-layer NN System, Back Propagation Network: Multi-layer feed-forward network, training using back propagation algorithm, Recurrent Neural Networks (RNNs): Elman Network, Jordan Network, The Hopfield network, Boltzmann machines, Convolutional Networks.

Implementations using Scilab/Matlab/Open Source Software.

Unit III: Advanced Algorithm

Linear Programming: Introduction, Example, Formal Structure, Standard Form, Slack Form, Simplex Algorithm, Initialise Simplex, Duality.

Flow Networks: Max Flow Problem, Min Cut Problem, Equivalence of Max Flow and Min-Cut, Residual Graph, Cut, Idea of Ford Fulkerson, Augmenting Path & Ford Fulkerson.

NP-Completeness: Meaning of P and Polynomial time, Polynomial-Time Reductions (Vertex Cover to/from Independent Set, Vertex Cover to Set Cover), Polynomial-Time Verification, NP, NP-Completeness (Example Problems: 3-SAT, Vertex Cover), Reductions (Independent Set to Vertex Cover, Vertex Cover to Set Cover).

Unit IV: Applied Cryptography

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transportation Techniques.

Introduction to Information Hiding, Steganography and Watermarking, Fragile watermarking, Reversible watermarking, Importance of digital watermarking, Applications, Properties, Evaluating watermarking systems.

Implementations using Scilab/Matlab.

Text Books:

1. Computer Networking *A Top Down Approach* by James F. Kurose and Keith W. Ross, 6th Edition, Pearson.
2. Cloud Computing: Concepts, Technology & Architecture, Thomas Erl, Ricardo Puttini, Zaigham Mahmood, Prentice Hall.
3. B Kröse, P Van Der Smagt - An Introduction to Neural Networks, University of Amsterdam, 8th ed., 1996
4. Simon Haykin, Neural Networks and Learning Machines, (3rdEdn.), PHI Learning, 2011.
5. Algorithm Design, Jon Kleinberg, Eva Tardos.
6. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest.
7. Approximation Algorithms: Vijay V.Vazirani
8. W.Stallings- Cryptography and Network Security Principles and Practice, Person Education Asia, 2000. (3rd Edition).
9. Ingemar J. Cox, Matthew L. Miller, Jeffrey A. Bloom, Jessica Fridrich, Ton Kalker, "Digital Watermarking and Steganography", Morgan Kaufmann Publishers, New York, 2008.



PAPER- III: REVIEW OF RELATED LITERATURE

Course Code: CS-03

Credit: 04

Full Marks: 100 (Practical)

Learning Outcomes:

After completion of the course the students will be able to-

- Conduct review of related literature
- Identify the research gap and write the review in a synchronized manner
- Select a research area of their interest
- Identify variables relevant to the selected research area
- Summarize the findings of different research studies
- Write a thematic paper on any contemporary issue in the subject
- Present thematic paper

CONTENTS

Each student is required to select a problem on which she has to do intensive review of related studies under the supervision of a faculty member of the Department. She has to review adequate research studies related to the problem and prepare a report.

The student is required to submit a report on the review carried out by her and need to give a power point presentation before the RAC. Assessment shall be made on the basis the following criteria:

- 1) Relevance of the reviews.
- 2) Finding the research gap.
- 3) Standard and quality of writing the review.
- 4) Style of presentation.
- 5) Answering the question

Distribution of Marks for Evaluation

1) Report writing and submission	: 50 Marks
2) Presentation	: 30 Marks
3) Viva-voce Test	: 20 Marks

Total:	100 Marks

PAPER- IV: RESEARCH AND PUBLICATION ETHICS

Course Code: CS-04

Credits: 04

Full Marks: 100 (Theory-75) + (Practical-25)

BACKGROUND

This Paper has been incorporated in the Ph.D. course work under this University as per the UGC correspondence in December 2019 vide its 543rd Meeting held on 09 August 2019. The main aim of this course is to create awareness about publication ethics and publication misconducts. It is an interdisciplinary course with 03 credits (Theory) and 1 credit (Practical). The course transaction modes shall be classroom teaching, guest lectures, group discussions and practical sessions. The evaluation of the course will be through continuous assessment processes such as tutorials, assignments quizzes, etc.. Final examination will be conducted at the end of the course.

LEARNING OUTCOMES:

On completion of the course, the scholars will be able to:

- i. Understand the basics of philosophy of science and ethics, research integrity, publication ethics.
- ii. Identify research misconduct and predatory publications.
- iii. Comprehend indexing and citations, open access publications, research metrics (citations, h-index, impact factor etc).
- iv. Use plagiarism tools for a valid and ethical research report.

COURSE STRUCTURE:

A: THEORY

Unit-I: Philosophy and Ethics

- Introduction to Philosophy: Definition, nature and scope, concept, branches.
- Ethics: definition, moral philosophy, nature of moral judgement and reactions.
- Intellectual honesty and research integrity
- Conflict interest

Unit-II: Scientific Conduct

- Ethics with respect to science and research
- Scientific misconduct: Falsification, Fabrication, and Plagiarism (FFP)
- Redundant Publications: Duplicate and overlapping publications.
- Selective reporting and misrepresentation of data.

Unit-III: Publication Ethics

- Publication ethics: Definition, introduction and importance
- Violation of publication ethics, authorship and contributorship
- Publication misconduct: Definition, concept, problems that lead to unethical behaviour, types, identification of publication misconduct, complaints and appeals
- Predatory publishers and journals

Unit-I: Open Access Publishing

- Open Access Publications and initiatives
- Online resource to check publisher copyright and self-achieving policies (SHERPA/RoMEO)
- Journal finder/ journal suggestion tools viz. Elsevier finder, Springer, Journal suggester etc.

Unit-II: Publication Misconduct

- Use of plagiarism software like Turnitin, Urkund and other open source software tools
- Software tools to identify predatory publications developed by SPPU
- Indexing databases

Unit-III: Database and Research Metrics

- Citation databases: Web of Science, Scopus. etc.
- Impact Factor of journal as per Journal Citation Report.
- Metrics: h-index, g-index, i10 index, altmetrics

Unit-IV: Group Discussion/Seminar

- Subject Specific ethical issues, FFP, authorship
- Conflict of interest
- Complaints and appeals: examples and fraud from India and abroad

REFERENCES

- Bird, A. (2006). Philosophy of Science. Rutledge.
- MacIntyre, A. (1967). A short history of ethics. London.
- P.Chaddah (2018). Ethics in competitive Research: Do not get scooped; do not get plagiarised.
- National Academy of Sciences (2009). On being a scientist: A guide to responsible conduct in Research (3rd Ed.), National Academics Press.
- Resnik, D.B. (2011). What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10.
- Beall, J. (2102). Predatory publishers are corrupting open access. Nature, 489 (7415), 179-179.
- Indian National Science Academy (INSA). Ethics in science education, research and governance (2019).

