

COMPUTER SCIENCE & INFORMATION TECHNOLOGY

SINGLE SEMESTER

PRE- Ph.D. COURSE SYLLABUS, 2021-22



MAHARAJA SRIRAM CHANDRA BHANJO DEO UNIVERSITY
SRIRAMCHANDRA VIHAR, TAKATPUR, BARIPADA, MAYURBHANJ-757003



(SYLLABUS, 2021-22) PRE- PH.D COURSE WORK
COMPUTER SCIENCE & INFORMATION TECHNOLOGY

Paper	Subject	Contact Hours	Credits	Full Marks
CSIT-801	Research Methodology	3 - 1 -1	5	50
CSIT-802	Advanced General Theory	3 - 1 -1	5	50
CSIT-803	Seminar & Dissertation	10 - 0 -0	10	100
	Total		20	200

Mission

The Pre-Ph.D. Programme is envisaged to contribute to the growth and development of the Computer Applications sector of the country. The course will create opportunities to share and disseminate computer science & IT researches and innovations by bringing about debates and discussions of topical importance to address critical computer applications issues. Pre-Ph.D. is entirely based on research activities which are done in a specific direction to achieve great results. The degree stands as a pre requisite for enrolling Ph.D. degree and is associated to advanced research activities.

Objectives

1. Appreciate that research would help to enhance efficiency, effectiveness, quality and excellence in the system of teacher computer applications.
2. Develop an understanding about problems of computer applications and methodology to explore alternative solutions.
3. Develop a rational conceptualization of the computer applications research.

[CSIT-801] Research Methodology

Course Objectives:

The objective of this course is to:

1. Concept of the different methods and techniques of research
2. Familiarity in the use of data organization and representation skills
3. Understanding trends of research in Computer Science & IT

Unit 1:

Introduction to Research Methodology : Meaning of Research, Objectives of Research, Motivations in Research, Types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research.

Unit 2:

Sample Design: Implication, Steps. Criteria for selecting a sample procedure, Characteristics of Good sampling Procedure, Types of Sample Design, Selecting Random Samples, Complex random sampling Design.

Unit 3:

Methods of Data Collection: Collection of Primary Data, Observation Method, Interview method, Collection of Data through questionnaire and Schedules, Collection of Secondary Data, Selection of appropriate method for data collection, Case Study Method.

Unit 4:

Processing and Analysis of Data: Measures of Central Tendency, Dispersion, correlation and Regression, Chi- square test : Applications, Steps, characteristics, limitations, Analysis of Variance and Co-variance.

Unit 5:

Testing of Hypothesis: Meaning, Basic concepts, Flow diagram, Power of a hypothesis test, Important parametric tests, Hypothesis Testing of Means, hypothesis testing of Correlation coefficients, Limitations of Tests of hypothesis.

Course Outcomes:

After successful completion of the course, student shall be able to:

1. Undertake better research and conceivably become successful career researchers
2. Apply critical thinking and analytical mind for addressing an issue in the domain and accepting the challenge of filling the gap in the domain.
3. Make students employable in R & D sector

Reference Books:

1. Kothari, C.R., Research Methodology (Methods and Techniques), New Age Publisher
2. Research Methods by Francis C. Dane, Brooks/ Cole Publishing Company, California.
3. The Nature of Research : Inquiry in Academic Context by Angela Brew, Routledge Falmer (2001).
4. Research Methods by Ram Ahuja, Rawat Publications (2001).

[CSIT-802] Advanced General Theory

Course Objectives:

The objective of this course is to:

1. Handling large amounts of data
2. Logical and concise thinking
3. Objectifying problems
4. Fundamental knowledge of the latest technology and development.

Unit-1: Soft Computing

Searching Techniques: Breadth first search, depth first search, uniform cost search, hill climbing, A* algorithm, Minmax and game trees, refining minmax, Alpha – Beta pruning,. Theoretical foundation of ANN: Models of ANN: Single layer perception, ANN Architecture, Feedback Networks, Back Propagation Network (BPN)

Unit-2: Ubiquitous Computing

Wireless and Cellular Communication: Wireless Transmission – Medium Access Control – Telecommunication Systems (GSM) – Mobile IP. Routing Protocols (DSDB, DSR)

Unit-3: Data Security

Data Encryption Techniques: Algorithms for block and stream ciphers, private key encryption – DES, Algorithms for public key encryption – RSA, Euclidean Algorithms, Fermat's theorem, Digital Signatures.

Unit-4: Data Mining

Association rules: Introduction – Methods to discover association rule – Apriori algorithm Partition Algorithm, Dynamic Item set algorithm . Classification: Decision Tree classification – Bayesian Classification. Clustering Techniques - Partitioning methods, Hierarchical, Agglomerative, Divisive.

Unit 5: Data Science

Recommendation Engines: Introduction, Issues with Nearest Neighbors, The Dimensionality Problem, Singular Value Decomposition (SVD), Principal Component Analysis (PCA).

Course Outcomes:

After successful completion of the course, student shall be able to:

1. Apply logical skills and mathematical concepts to analyze, design and implement computer algorithms and programs.
2. Demonstrate proficiency in a high level programming language.
3. Demonstrate proficiency in current design techniques, i.e. Object Oriented Design.
4. Make students employable in R & D, Academics and IT sector

REFERENCES:

1. S. N. Sivanandam, S. Sumathi, S.N. Deepa, "Introduction to Neural Networks using MATLAB 6.0 ", Tata McGraw-Hill, New Delhi, 2006.
2. S. N. Sivanandam, S.N. Deepa, "Principles of Soft Computing", Wiley-India, 2008.

3. D.E. Goldberg,” Genetic algorithms, optimization and machine learning”, Addison Wesley 2000.
4. Arun K Pujari , “Data Mining Techniques”, University press , Edition 2001.
5. Jaiwei Han, Michelinne Kamber , “Data Mining : Concepts and Techniques”
6. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, “Introduction to Data Mining”, 2007.
7. T.Sushmita mitra, Tir ku Acharaya , “Data Mining Multimedia,Softcomputing & Bioinformatics”, Wiley Interscience publications , 2004.
8. 8.Jochen Schiller, Mobile Communication, Pearson, 2nd Edition, 2009.
9. C.Siva Ram Murthy, B.S. Manoj, “Adhoc Wireless Networks”, Pearson, 2005.
10. Radia Perlman, “Interconnections”, Pearsons, 2000.
11. William Stallings, “High Speed Networks and Internets”, Pearson, 2010.
12. W. Stallings, Cryptography and Network Security Principles and Practices (4th ed.), Prentice-Hall of India, 2006
13. C. Pfleeger and S.L. Pfleeger, Security in Computing (3rd ed.), Prentice-Hall of India, 2007

[CSIT-803] Seminar & Dissertation

Course Objectives:

The objective of this course is to:

1. Learn the process of reviewing research paper and paper writing and research through group activities.

Seminar on proposed research work/topic, by taking Critical Review of 10 (ten) research papers (preferably from reputed journals) and Dissertation will be submitted by reviewing those research papers.

Grand presentation and viva-voce.

Course Outcomes:

After successful completion of the course, student shall be able to:

1. Make students ready for research presentations.
2. Make student able to create research writing.