Department of Studies in Computer Science
Syllabus for the course to be completed by Ph.D candidates
Title:Advanced Research Methodology
Credit Pattern :2: 2: 0 = 4 credits

Unit 1: Attributes of research, Research versus Ph.D, Meaning of Ph.D, selecting a research problem, Types of research, categories of research, Philosophy of research, Importance of research. Research process, stages, Principles of induction and deduction. Data sets, data collection, data analysis, literature survey. Documentation: Types, format of paper, publications, writing thesis, confusion in documentation, importance of language, ethics in documentation, refereed publications, conference an journal, DBLP indexing. Research gathering, seminar, symposium, workshop and conference

Unit2 : Overview of probability distributions, testing hypothesis, generating randomness, ANOVA, Multivariate analysis.

Unit 3 : Data, variety of data, assimilation of data, symbolic data, attributes of data, multidimensional data representation, vector space, reduction of data samplesthrough clustering, reduction of attributes, data indexing.

Unit 4 : Importance of algorithms in computer science and technology research, Analysis of algorithms, P and NP complexities, Two stage solution to NP problem, Problem reduction, Optimization versus decision problems, approximation algorithms, case studies (Hamiltonian cycle and TSP, Graph coloring, Boolean circuit satisfiablility problem and subset problem.

(Each unit is for 8 hours of lectures and 16 hours of tutorials)

References :

1. K. Prathapan., Research Methodology for Scientific Research., I.K.International publisher, SBN: 9789382332855
2. C R Kothari, Research Methodology: Methods and Techniques, New Age International.
3. G. S. S. Bhishma Rao, Probability and Statistics, Scitech Publications (India) Pvt Ltd ISBN-13: 978-8183713160puy online
4. Lynne Billard,and Edwin Diday., Symbolic Data Analysis: Conceptual Statistics and Data Mining., John Wiley & Sons.
5. Duda R O and Hart., Pattern Classification., Second Edition., John Wiley & Sons.
6. Anil K Jain and R C Dubes., Algorithm for Clustering data., Prentice Hall Publications.
7. Ellis Horowitz, and SartajSahni., Algorithms: Design and Analysis., Computer Science Press.
8. Thomas H Cormen et al., Introduction to Algorithms, Second edition, Mc-Grawhill Ellis Horowitz, and SartajSahni., Computer Algorithms, Computer Science Press.