# THIRUVALLUVAR UNIVERSITY

MASTER OF PHILOSOPHY

## COMPUTER SCIENCE

**(FT/PT)**

**(with effect from 2009-2010)**

**PART I**

**CORE COURSE I**

**RESEARCH METHODOLOGY**

### UNIT-I: RESEARCH METHODOLOGY

Meaning of research - Objectives of research - motivation of research - Types, approaches and significance - Methods versus methodology - Research in scientific methods - Research process - Criteria for good research - Problem encountered by research in India - Funding agencies.

### UNIT-II: RESEARCH DESIGN

Research Problem: Selecting the problem - Necessity of defining the problem - Techniques involved in defining the problem - Research design - Needs and features of good design - Different research design - Basic principles of experimental designs.

### UNIT-III: DATA COLLECTION AND DOCUMENTATION

Data collection methods - Data types - Processing and presentation of data - Techniques of ordering data - Meaning of primary and secondary data - The uses of computers in research - The library and internet - Uses of search engines - virtual libraries - common software for documentation and presentation.

**UNIT-IV: DATA AND ERROR ANALYSIS**

Statistical analysis of data - Standard deviation - Correlation - Comparison of sets of data - Chi squared analysis for data - Characteristics of probability distribution - Binomial, Poisson and normal distribution - Principle of least square fittings - Curve fitting - Measurement of errors - Types and sources of errors - Determination and control of errors.

**UNIT-V: RESEARCH COMMUNICATION**

Meaning of research report - Logical format for writing thesis and paper - Essential of scientific report: abstract, introduction, review of literature, materials and methods and discussion - Write up steps in drafting report - Effective illustrations: tables and figures - Reference styles: Harvard and Vancouver systems.

**REFERENCE BOOKS:**


1. Research Methodology, Methods and Techniques - C.R. Kothari - Wishwa Prakasam Publications, II Edition.
2. Research: An introduction - Robert Ross - Harper and Row Publications.
3. Research methodology - P. Saravanavel - Kitlab Mahal, Sixth Edition.
4. A Hand book of Methodology of Research - Rajammal P.A. Devadass - Vidyalaya Press
5. Introduction to Computers - N. Subramanian
6. Statistical methods - G.W. Snedecor and W. Cocharan - Oxford and IBH, New Delhi.
7. Research Methodology Methods and Statistical Techniques - Santosh Gupta.
8. Statistical Methods - S.P. Gupta
9. Scientific social surveys and research - P. Young - Asia Publishers, Bombay.
10. How to write and publish a scientific paper - R.A. Day - Cambridge University Press.
11. Thesis and Assignment writing - Anderson - Wiley Eastern Ltd.

# PART I

# CORE COURSE II

# PRINCIPLES OF COMPUTER DESIGN (or)

# ARTIFICIAL NEURAL NETWORKS

## PRINCIPLES OF COMPUTER DESIGN

**UNIT-I**

**Introduction to compiling**

Compilers - Analysis of the source program - The phases of compiler - cousins of the compiler - The grouping of phases - Compiler construction tools.

**A Simple one-Pass compiler**

Overview - Syntax definition - Syntax directed translation - Parsing - A translator for simple expressions - Lexical analysis - Incorporating a symbol table - Abstract stack machines - Putting the techniques together.

**UNIT-II**

**Lexical Analysis**

The role of the lexical analyzer - Input buffering - Specification of tokens - Recognition of tokens - A language for specifying lexical analyzers - Finite automata - Form a regular expression to a NFA - Design of a lexical analyzer generator - Optimization of DFA based matchers.

**Syntax Analysis**

The role of the parser - Context free grammars - Writing a grammar - Top down parsing - Bottom up parsing - Operator precedence parsing - LR parsers - Using ambiguous grammars - Parser generators.

**UNIT-III**

**Syntax Directed Translation**

Syntax - directed definitions - Construction of syntax trees - Bottom-up evaluation of S-attributed definitions - L-attributed definitions - Top down translation - Bottom up evaluation of inherited attributes - Recursive evaluators - Space for attribute values at

compile time - Assigning space at compiler - construction time - Analysis of syntax directed definitions.

**Type checking**

Type systems - Specification of a simple type checker - Equivalence of type expressions - Type conversions - Overloading of functions and operators - Polymorphic for unification.

**UNIT-IV**

**Run-time Environments**

Source language issues - Storage organization - Storage allocation strategies - Access to nonlocal names - Parameter passing - Symbol tables - Language facilities for dynamic storage allocation - Dynamic storage allocation techniques - Storage allocation in Fortran.

**Intermediate Code Generation**

Intermediate languages - Declarations - Assignment statements - Boolean expressions - Case statements - Back patching - Procedure calls.

**UNIT-V**

**Code Generation**

Issues in the design of a code generator - The target machine - Run-time storage management - Basic blocks and flow graphs - New use information - A simple code generator - Register allocation and assignment - The dag representation of basic blocks - Peepphole optimization - Generation code from dags - Dynamic programming code generation algorithm - Code generator generators.

**Code Optimization**

Introduction - The principal sources of optimization - Optimization of basic blocks - flow graphs - Introduction to global data flow analysis - Iterative solution of equations - Code improving transformations - Dealing with aliases - Data flow and structured flow graphs - Efficient data flow algorithms - A tool for data flow analysis Estimation of types - Symbolic debugging of optimized code.

**Text Book:**

Alfred V Aho, Ravi sethi, Jeffrey D Ullman, "Compilers principles, techniques and tools, Addison Wesley, 1999.

# ARTIFICIAL NEURAL NETWORKS

**UNIT-I**

Introduction to Neutral Networks - Basic Concepts of Neutral Networks - Inference and Learning - Classification Models - Association Models - Optimization Models - Self Organization Models.

**UNIT-II**

Supervised and Unsupervised Learning - Statistical Learning - AI Learning - Neutral Network Learning - Rule Based Neural Networks - Network Training - Network Revision Issues - Theory of Revision - Decision Tree Based NN - Constraint Based NN.

**UNIT-III**

Incremental learning - Mathematical Modeling - Application of NN - Knowledge based Approaches.

**UNIT-IV**

Heuristics - Hierarchical Models - Hybrid Models - Parallel Models - Differentiation Models - Control Networks - Symbolic Methods - NN Methods.

**UNIT-V**

Structures and Sequences - Spatiotemporal NN - Learning Procedures - Knowledge based Approaches.

**Text Book:**


1. Limin Fu-Neutral Networks in Computer intelligence - Mc Graw Hill International Edition - 1994.
2. Robert J Schalkoff - Artificial Neural Networks - Mc Graw Hill - 1997.s