

BHARATHIAR UNIVERSITY, COIMBATORE- 641046

M.PHIL. COMPUTER SCIENCE FT/PT 2006-2007 & ONWARDS

PAPER –I RESEARCH METHODOLOGY

UNIT –I RESEARCH METHODS

Meaning of Research – Objectives of Research – Motivation in Research – Types of Research - Research Approaches - Significance of Research – research Methods versus Methodology - Research and Scientific Method - Importance of Knowing How Research is done - Research Process – Criteria of good Research - Problem Encountered by Researchers in India – What is Research Problem ? Selecting the Problem – Necessity of Defining the Problem - Technique involved in Defining the Problem – Meaning of Research Design - Need for Research Design - Features of a Good Design - Important Concepts Relating to Research Design – Different Research Design – Basic Principles of Experimental Designs – Significance of Report Writing – Different Steps in writing Report – Layout of the Research Report - Types of Reports – Oral Presentation – Mechanics of Writing a Research Report – Precautions for Writing Research Reports.

UNIT - II ALGORITHMS AND ANALYSIS

Elementary data Structures, Greedy method: Knapsack problem- job sequencing with deadlines – Optimal merge patterns, Dynamic Programming : Multistage graphs – Optimal binary search trees – 0/1 knapsack – Reliability design – The traveling salesperson problem – Flow shop scheduling , Basic search and traversal techniques : The techniques – Code Optimization – Biconnected components and depth –first search . Backtracking : The 8-Queer s problem – Sum of subsets – Hamiltonian cycles – Knapsack problem .

UNIT – III COMPILER DESIGN

Introduction to compiling – The Phases of a Compiler – Lexical Analysis – The role of the lexical analyser – Specification & Recognition of tokens – Finite Automata- Conversion of Regular Expression to NFA - Syntax Analysis – The Role of the Parser – Context Free Grammar – Top- Down Parsing : Predictive Parser – Bottom –Up Parsing :SLR Parser – Syntax – Directed Translation – Construction of Syntax trees – Bottom – Up evaluation of S- attributed definition and inherited attributes – L-attributed definition – Type Checking – Specification of a simple type checker – Type Conversion – An algorithm for Unification – Symbol tables – Intermediate Code Generation – Code Generation – Issues in the design of code generator – Basic Blocks and Flow Graphs – A simple code generator – Register allocation and assignment – Dynamic programming code generation algorithm – Code Optimisation – The Principal sources of optimization – optimization of basic blocks- Loops in flow graphs.

UNIT – IV OBJECT ORIENTED METHODOLOGY & ORDBMS

Identifying subjects : Definitions - How to determine the subjects - examples . Defining attributes : Definitions - How to determine attributes - instance connections - examples. Defining services: message connections - specifying services final class and object specifications - examples.

What is third manifesto? Guiding principles - Object Center Relations - Third Manifesto - A New Relational Algebra - Sub typing and inheritance – preliminaries - Formal specifications - Multiple inheritance - Tuple and Relation types.

UNIT – V SOFTWARE ENGINEERING AND TOOLS

Requirements Analysis – Fundamentals – Software Design Fundamentals – Software – Software Testing Techniques - Maintenance Tasks and Side Effects.

REFERENCE BOOKS

UNIT I

1. C.R. Kothari – Research Methodology Methods & Techniques Wishwa Prakashan Publishers – Second Edition .
2. Dr.Rajammal P.Devadas – A Handbook on Methodology of Research – Sri Ramakrishna Mission Vidyalaya College of Rural Higher Education.

UNIT II

1. Alfre V. Aho & John E. Hopcroft & Jeffrey D. Ullman, “Data structures and Algorithms”, Addison – Wesley Publishing Company, 1987.
2. Ellis Harowitz & Sartaj Sal ini, “Computer Algorithms”, Galgotier Publications (P) Ltd., 1993.

UNIT III

1. Alfre V. Aho, Ravi Sethi and Jeffrey D. Ullman, “Compiler Principles, Techniques and Tools”, Addison Wesley Publishing Co. 1986.
2. Jean Paul, Tremblay and Paul G. Sorenson, “ The Theory and Practices of Compiler Writing” Mc. GrawHill Inc, International Student Edition, 1985.

UNIT IV

1. Peter Coad and Edward Yourdon, “ Object Oriented Analysis” , 2nd Edition Prentice Hall, 1991
2. Robert Lafore “ Object Oriented Programming and C++ “, Galgotia 1991
3. C.J.Date and Hugh Darwen, “Foundations for Object/ Relational Databases- The Third Manifesto”, 1998, Addtion – Wesley Inc. ISBN 0-201-30978-5

UNIT V

1. Roger S. Pressman ,” Software Engineering – A Practitioners Approach “, Mc Graw Hill Book Company , 1987.
2. Richard E. Fairley , “ Software Engineering Concepts “ , Mc Graw Hill Book Company ,1985.

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M.FHIL./PH.D. - COMPUTER SCIENCE

PART I –SYLLABUS (effective from the academic year 2006-2007 onwards)

PAPER II – ADVANCED TECHNOLOGIES IN COMPUTER SCIENCE

UNIT I: MULTIMEDIA & ITS APPLICATIONS

Introduction to Multimedia – The stages of a Project – What you need-Hardware-Software-Creativity-Organization-Basic tools- Text Editing and Word Processor tools- Painting and Drawing tools- 3D Modeling and Animation tools- Image Editing Tools- Sound Editing Tools-Animation, Video and Digital movie tools- Multimedia Authoring tools-Types of Authoring tools-Card and page based Authoring tools- Icon Based Authoring tools-Time based Authoring tools- Object oriented Authoring tools- Text-Using Text in Multimedia- Sound-MIDI versus Digital Audio.

UNIT II: NETWORK ADMINISTRATION

Overview of TCP/IP- TCP/IP and the Internet- A data communications model- TCP/IP protocol Architecture- Network Access Layer- Internet Layer- Transport Layer- Application Layer- Network Services- Names and Addresses-The Host table- Domain Name Service- Mail Services-Configuration Servers-Bootstrap protocol-File and Print Servers-Getting Started-Connected and non-connected Networks-Basic Information – Planning Routing-Planning Naming Service-Other Services-Informing the Users.

UNIT III: CLIENT/SERVER TECHNOLOGY

Welcome to Client/Server Computing-What is Client/Server-Types of Servers-SQL Database server-The fundamentals of SQL and relational databases-What does a database server do-Stored Procedures, Triggers and rules- SQL Middleware and federated databases-SQL middleware-Will the real SQL API Please stand up? Open SQL gateways-data warehouses-Distributed Objects and components-From Distributed Objects to components-3 Tier Client Server, Object Style-CORBA-Distributed Objects, CORBA style-OMG's object management architecture-CORBA 2.0-CORBA Object Services-CORBA common facilities-CORBA business objects.

UNIT IV: ADAPTIVE WEB TECHNOLOGY

J2EE: Overview-Multi-tier Architecture-The Enterprise Application-Clients-Sessions management-Web Tier- EJB Tier-J2EE Web Services

.NET Framework – Common Language Runtime – Base Class Libraries – Interoperability-Networking – Remoting - Security. Building Web applications – Web Services. Overview of XML.

UNIT V : GRID COMPUTING

Introduction: Early Grid Activities, Current grid activities, overview of grid business areas. Grid infrastructure and its relationship with other distributed architectures. Open grid service architecture (OGSA), Data management services, Overview of Globus GT3 Toolkit. Grid applications: Schedulers, Resource broker, load balancing, grid portals.

TEXT BOOKS:

UNIT I:

Tay Vaughan, "Multimedia: Making it work", Tata McGraw Hill Publishing Company Ltd, IV Edition.

UNIT II:

TCP/IP Network Administration, O'Reilly, II Edition

UNIT III:

Robert Orfali, Dan Harkey, Jerry Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications.

UNIT IV:

1. Jim Keogh, "The Complete Reference J2EE", Tata McGraw-Hill Edition, 2002.
2. James McGovern et al., "J2EE 1.4 Bible", Wiley Publishing Inc, 2003.
3. Visual Studio .Net Walkthroughs – Microsoft Manual.
4. www.msdn.microsoft.com/netframework

UNIT V:

1. Joshy Joseph, Craig Fellenstein, "Grid Computing", IBM Press, 2004
2. Fran Berman, Anthony J.C. Hey, Geoffrey Fox, "Grid computing: Making the global infrastructure a reality", Wiley, ISBN: 0470853190 (www.grid2002.org)
3. www.gridbus.org, www.globus.org, www.gridcomputing.com,
www.gridforum.org, www.grid.org