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M.Sc. (I.T.) [Five Year Integrated Course]
M.Sc. (Information Technology)
Semester IX

Paper No : 901 **L: 4, T:0, P:0 Hrs**
Paper Title : Mobile Computing

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1. **Introduction to Mobile Computing and Personal Communications Services**
   Mobility, Nomadic, Mobile and Ubiquitous computing,
   Mobile Computing Architecture, Mobile Devices,
   Mobile Computing Technology (H/W, S/W, Communication),
   PCS Architecture, Mobility Management, Networks signaling,
2. **Global System for Mobile Communication (GSM) system overview:**
   GSM Architecture, Mobility Management, Network Signaling
3. **General Packet Radio Service (GPRS)**
   GPRS Architecture, GPRS Network Nodes
4. **Wireless Application Protocol (WAP)**
   The Mobile Internet Standards, WAP Gateway and Protocols,
   Wireless Markup Language (WML)
5. **Third Generation (3G) Mobile Services**
   Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision, Wideband Code Division Multiple Access (W-CDMA)
   CDMA 2000, Quality of Services in 3G
6. **Wireless Local Loop (WLL)**
   Introduction to WLL Architecture, WLL Technologies
7. **Global Mobile Satellite Systems**
   Case studies of the IRIDIUM and GLOBALSTAR systems
8. **Wireless Enterprise Networks**
   Introduction to virtual Networks, Blue tooth Technology, IR,
   Blue tooth Protocols

Main Reading:

1. "Wireless and Mobile Networks Architectures", by Yi-Bing Lin & Imrich Chlamtac, John Wiely & Sons, 2001
2. "Mobile and Personal Communication systems and services", by Raj Pandya, PHI 2001
3. "Guide to Designing and Implementing wireless LANs", by Mark Ciampa, Thomson learning, Vikas Publishing house, 2001
4. "Wireless Web Development" Ray Rischapter, Springinger Publishing, 2000
5. "The Wireless Application protocol" by Sandeep Singhal , Pearson Education Asia 2000
6. "Third Generation Mobile Telecommunication systems, by P.Stavronlakis, Springer Publishers, 2001
7. "Code Division Multiple Access" by Vinay K. Garg
1. "Data Communication and Networking", 3rd Edition by Behrouz A. Forouzan, Tata McGrawhill

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Paper No : 902 **L: 4, T:0, P:0 Hrs**
Paper Title : Artificial Intelligence

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1. Prolog

Facts, Objects, Predicates and Rules, Prolog variable and its type, Arithmetic & relational operators, I/O predicates, String operations, fail & ! predicates,
Recursion & repeat predicates, List and various operation on lists, File operations predicates, Dynamic & Static database, Type conversions, Screens & Window predicates, Graphics predicates

2. Introduction to AI

Overview of AI application area
Automated reasoning & Theorem proving, Expert systems, Natural Language, Understanding & Semantic modeling, Modeling Human performance
Planning & Robotics
AI problem characteristics

3. Calculus

Prepositional, Predicate , Produce predicate calculus expressions from Inference rules

4. State Space Search

Structures for State Space Search, State Space representation of Problem,
Strategies for State Space Search, Represent reasoning with predicate calculus using state space, Recursive & Pattern-Directed search, Production system

5. Heuristic Search

6. Knowledge representation

Approaches & issues in knowledge representation, Network representation Structures
Semantic nets, Frames, Scripts, Fuzzy Logic

7. Natural Language Understanding

Level & Stages of Natural language analysis, Specification & Parsing using Context-Free grammars, Transition Network Parsers, Chomsky Hierarchy & Context-Sensitive Grammars, Combining Syntax & Semantics

8. Expert Systems

Representing & Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition

9. Handling Uncertainty

Non-Monotonic Reasoning, Probalistic Reasoning, Use of certainty factors, Fuzzy Logic

10. Learning

Concept of Learning, Learning Automation, Genetic Algorithms, Learning by Inductions, Neural nets

Reference Books:

1. Charniak, E. - Introduction of Artificial Intelligence, - Narosa Publishing House.
2. Marcellus, - Expert Systems Programming in TURBO PROLOG, - Prentice-Hall Inc.
3. Elaime R. - Artificial Intelligence - Prentice-Hall Inc.
4. Hunt, E. B. - Artificial Intelligence - Academic Press.
5. Lloyd, J. - Foundation of Logic Programming - Springer-Verlag
6. Clockskin, W. F. and Mellish, C. S. - Programming in Prolog - Narosa Publ. House.
7. Carl Townsend - Introduction to Turbo Prolog - B. P. B. Publication

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Paper No : 903 **L: 4, T:0, P:0 Hrs**
Paper Title : Elective–I WADT – III (Web Application Development Techniques)

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1 Introduction to LINUX

2 The GNU Projects, free software foundation and Linux distribution

3. LINUX Architecture

4. Introduction to PHP

5. Language features

Language constructs, Variables, declarations and types, Constants, Use of Operators, Control Structures, Functions

6. Object Oriented Features of PHP

Classes and Objects, Use Of constructors, Serialization

7. PHP inbuilt Functions

String Functions, Array Functions, Mathematical Functions, Graphics Library (GD support), File System Functions, Date and Time Functions, Misc. Functions

8. Database concepts with PHP

9. Perl Basic

Introduction, Data types, Operators, Control statements, Arrays

10. Functions

String Functions, Array Functions, Mathematical Functions, Time/Date Functions, File Handling, Understanding files & Directories, Opening & Closing files, Working with Directory

11. Database Connectivity

Database access using perl, ODBC object method

12. MySQL Database Server

Configuring the MySQL Server, Starting MySQL Server, MySQL Tables, Displaying MySQL Database, Adding and removing user access, Checking and fixing database

13. Red Hat Linux Network and Server Setup

14. Setting up a Local Area Network

15. Print Server

Choosing CUPS or LPRng Print Services, Setting up printer, Working with CUPS printing, Managing printers, Using printing commands, Configuring print servers

16. File Server

NFS , Samba, Netware

17. Mail Server

Introduction to SMTP and sendmail, Installing and running sendmail, Configuring sendmail, Introducing Postfix, Getting mail from the server (POP), Administering a mailing list

18. FTP Server

Understanding FTP server, Secure FTP server (vsFTPd)

19. Web Server

Introduction to web server, Configuring Apache web server, Starting and stopping web server, Monitoring server activities

References:

1. Red Hat Linux Bible – Nigus – Wiley
2. Linux in NutShell – Ellen Siever
3. Linux Application Development – Michal K Jhonson
4. Linux Complete – Grant Tatlor
5. Integrating Linux & Windows – Mike
6. Installing Red Hat Linux – William Van Hagen
7. Red Hat Linux System Administration Unleashed – Thomas

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Paper No : 903 **L: 4, T:0, P:0 Hrs**
Paper Title : Elective- I (Advance Computer Networking)

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1. TCP/IP Protocol Suit

TCP/IP Architecture, TCP Protocol, UDP Protocol, The IP Protocol , ARP, RARP, ICMP, IGMP

2. Applications

Client – Server Model – Concepts, BOOTSTRAP (BOOTP), DHCP, Domain Name Systems (DNS), Network virtual Terminal (TELNET), File Transfer Protocol (FTP), Trivial FTP, Mail Transfer Protocols SMTP, MIME, POP, IMAP

3 Interposes Communication

File and record locking, Pipes, FIFO's, Stream and Messages, Message Queues Semaphores

4. Sockets

Socket System Cells, Reserved Parts, Stream and Stream Pipes, Asynchronous I/O, I/O Multiplexing

5. Remote Procedure Cells

Reference:

1. A.S. Tanenbaum – Computer Networks – PHI New Delhi 1997
2. Bahrouz Forouzon – TCP/IP Protocol Suit , Tata Mcgraw-Hill Edition 1998
3. A.Stevens, "TCP/IP Illustrated", Vol. 1-3, Addison Wesley, 1998
4. R.Stevens, "Unix networking Programming", PHI 1998
5. J.Martin, "TCP/IP Networking – Architecture, Administration and Programming", Pentic Hall , 1994
6. D.E. Comer,"Internetworking with TCP/IP, Vol. 1, Principles, Protocols and Architecture, PHI 2000

1. W. Stallings – Data and Computer Communications, 3rd Edition, Macmillan Pub. Co., New York 1991

8. Matthew MacDonald – Microsoft .NET DISTRIBUTED APPLICATIONS – Tata Mcgraw-Hill Edition 2003

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Paper No : 903 **L: 4, T:0, P:0 Hrs**
Paper Title : Elective -I (Information Technology and Cyber Law)

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1. Information Technology And Legal Response

Introduction, Objective, Cyberspace and Our Lives, The Nature of the Net
Features of the Net, Geographical Indeterminacy, Information technological revolution and societal impact

2. Sources of the Law

Introduction, Objective, Sources of law, The Significance of Legislation,
The common law or uncodified law, Precedent as a Source of law
Branches of law

3. The Judicial System

Introduction, Objective, Institutions of the Judicial System, Courts
Tribunals, Procedure in Civil Cases, Procedure in Criminal Cases
Officers of Court

4. Structure of Government

Introduction, Objective, Framing of the Constitution, Government Functions
Processing of Bills, Legislation: Subject to judicial review, Public interest litigation

5. Information Technology and the Attempted Legal Response

Introduction, Objective, Primary assumptions of a legal system, Sovereignty
Territorial Enforcement, Notion of Property, Real Relationships
Paper Based Transactions, Role of the Judiciary in the evolving legal framework

6. Cyber Crimes

Introduction, Objective, Cyber Crime – A perspective, The Problem: Current Forms of Computer Crime, Infringements of Privacy, Economic offences, Computer Hacking, Computer Espionage, Software Piracy and other forms of Product Piracy, Computer Sabotage and Computer Extortion, Computer Fraud, Illegal and harmful contents, Other offences, Attacks on Life, Organized Crime, Electronic Warfare, Classification of Cyber Crimes in I.T. Act, 2000

7. Cyber Contracts

Introduction, Objective, Cyber Contract, Essentials of a contract, Intention to be bound, Offer and Acceptance, Concept of offer, Offer by and to whom, Statements which are not offers, Termination of offer, Quality of acceptance, Consideration, Capacity of the parties, Consent, Unlawful agreements, Persons bound by contract, Performance and frustration, Subsequent Events and Frustration, Remedies for Breach of Contract, Damages, Specific performance, Injunctions

8. Cyber Privacy

Introduction, Objective, Cyber Privacy – A perspective, Policy approaches to privacy concerns, Market approach, Human rights approach, Contract approach, Platform for Privacy Preferences Project (P3P):

9. Cyber Intellectual Property Rights1

Introduction, Objective, Concept of Intellectual Property Rights, Role of Intellectual Property in Developing Countries, The Impact of Electronic Commerce on Intellectual Property, The Protection Of Copyright And Related Rights In The Digital Environment, Overview of the Issues, Technological protection measures, Future Work in the protection of Copyright and related rights, PATENTS, Patentable Subject Matter, Prior Art Effect, Enforcement of Rights, TRADEMARKS AND UNFAIR COMPETITION, Trademarks, Establishment and Maintenance of Trademark Rights, Infringement of Trademark Rights Through Use of a Sign on the Internet, Global Effect of Injunctions

Well-Known Marks, Unfair Competition, DOMAIN NAMES, Background

WIPO Internet Domain Name Process, Uniform Administrative Procedure Concerning Abusive Domain Name Registrations. , Exclusions for Famous and Well-known Marks, Outstanding Issues in Domain Name Process

10. Information Technology Act, 2000 (I.T. Act, 2000)

Introduction, Objective, The Information Technology Act, 2000: An overview, Transmission of electronic documents, Evidentiary presumptions of a secured electronic document, Certifying Authority (CA) , Controller of Certifying , Authorities. , Suspension of Certifying Authority, Digital Signature, Digital Signatures: Power of Central Government to make rules, Digital Signature Certificate, Revocation of Digital Signature Certificate

11. Penalties and adjudication

Introduction, Objective, Penalties and adjudication: A brief overview, Penalty for damage to computer, computer system, etc, Penalty for failure to furnish , information, return, etc. , Residuary penalty(Section 45) , Power to adjudicate, Cyber Regulations Appellate Tribunal, Composition of the Cyber Appellate , Tribunal, Right of Appeal to Cyber Regulations Appellate Tribunal, Procedures and powers of the Cyber Appellate Tribunal, Compounding of Contravention

Jurisdiction of Civil Courts, Appeal to High Court on order of Tribunal

12. Amendments to current legal provisions

Introduction, Objective, Amendments to the Indian Penal Code, Amendments to the Indian Evidence Act , 1872, Amendment to the Bankers Books Evidence Act, 189, Amendment to the Reserve Bank of India Act, 1934

References:

1. Cyber Laws. Krishna Kumar Dominant Publishers

Project preferably in Industry

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Paper No : 904 **L: 4, T:0, P:0 Hrs**
Paper Title : Elective–II (Data Warehousing)

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1. Introduction

Data Warehouse, Objectives, Difference between OLTP and Data Warehouse, Critical success factors, Data mining and its advantages , META data, Issues related to Data Warehouse

2. Project Planning and Management

Scope, Role and Responsibilities, Life Cycle approach

3. Data Warehouse Architecture- System Process

Introduction, Process flow within an data warehouse, Extract and Load Process, Clean and Transform data, Backup and Archive Process, Query Management Process

4. Data Warehouse Architecture- Process Architecture

Introduction, Load and Warehouse Manager, Query Manager, Detailed and Summary Information, Metadata, Data Marting

5. Database Design – Logical

Database Schema – Starflake, Partitioning strategy, Aggregations, Data Marting Metadata, System and Data Warehouse Process Manager

6. Database Design – H/W and Operational

H/W Architecture, Physical Layout, Security, Backup and Recovery, Service ,Level Agreement, Operating Data Warehouse

References:

1. S. Anahory & D. Murray: Data Warehousing in the real world – Addison Wesley
2. R. Kinball: Data Warehouse Toolkit – John Wiley & Sons
3. R. Kinball, L.Reeves : The Data Warehouse Lifecycle Toolkit – John Wiley & Sons
4. Efrem G. Mallach : Decision Support and Data Warehouse Systems – TMH
5. Paulraj Pulliah : Data Warehousing Fundamentals – Wiley

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Paper No : 904 **L: 4, T:0, P:0 Hrs**
Paper Title : Elective – II (Language Processor)

1. Introduction to System software, utility Software, systems programming.

2. Assemblers:

Introduction, Cross assembler, Micro Assembler , Meta Assemble, Single pass Assembler, Two Pass Assembler , Design of Operation code table , Symbol table , Literal table.

3. Macro processor

Introduction of Macros, macro processor design, Forward reference, Backward reference, positional parameters, keyword parameters, conditional assembly, Macro calls within Macros, Implementation of macros within Assemblers. Designing Macro name table, Macro Definition table, Kew word parameter table, Actual parameter table, Expansion time variable storage etc.

4. Compilers

Introduction, Analysis of the programme, Lexical Analysis, syntax analysis, phase of a compiler, Scanning, Parsing, Type checking and conversion, Storage organization and allocation strategies, Symbol tables, parameter passing, local and non local variables, Intermediate code generation of declaration, Assignment statement. Boolean Expression, Conditional Statement etc., Code generation, Code optimization, Compiler writing tools e.g. (Lex , Yacc) , Incremental Compiler , Interpreter.

5. Loader and Linkage Editor

Absolute Loader , Relocation - Relocating loader , Dynamic loader , Bootstrap loader , Linking loader , Program relocatibility , design of Absolute Loader , Design of direct - linking editor , other loader scheme e.g. (Binders , Linking Loaders , Overlays , Dynamic Binders etc .)

References:

1. D.M. Dhamdhere : systems Programming & Operating System , TMH Edition , 2 nd edition , 1996.
2. John J . Donovan : Systems Programming , McGraw-Hill International Edition , 1993 Reprint.
3. Houlb : Compiler Design in C , PHI , EEE , 1995.

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Paper No : 904 **L: 4, T:0, P:0 Hrs**
Paper Title : Elective–II (Algorithm analysis and design)

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1 **Introduction:** Concept of an algorithm, program, problem; Review of elementary data structures; symptotic Complexity, Notation - Priori, Posteori analysis

2 **Divide & Conquer :** General method - Control abstraction - MAxMin recurring relations; Sorting; erge Sort, Quick Sort, Selection sort; Computing time

3 **Greedy method:** General details, Optional Storage on tapes; Knapsack problem - Job Sequencing - Merge patterns - Minimum Spanning trees - Shortest path.

4 **Dynamic Programming:** General details, Multistage graphs; All pair shortest paths, Optimal bin; each trees; 0/1 knapsack, Traveling Salesman Problem

5 **Backtracking:** General details, Eight Queens problem, Sum of subsets - Graph coloring, Hamiltonian Cycles; Knapsack

6 **Branch & Bound :** Method; 0/1 Knapsack problem – TSP

7 **NP-Hard and NP-Complete Theory :** Basic concepts; Nondeterministic algorithms - 0(n) Sorting - P-complete & NP-Hard theory - Example problems

8 **Advanced topics.**

References :

1. Horowitz E & Sahni S - Fundamentals of Computer Algorithms, Galgotia Publications, Reprint 1994
2. Brassard & Bratley - Fundamentals of Algorithmics, PHI EEE. 1994

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Paper No : 906
Paper Title : Project

The students are required to carry out project work for part time during the semester base upon the Theoretical subjects.

Effective from July 2004

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Teaching and Evaluation Scheme

Paper Sr. No.	Paper Title	Teaching Schedule (Hours/Week)			University Exam Theory / Practical Duration |		Internal Exam Theory / Practical Duration |		Total Theory / Practical
		Lect	Tut	Prac	Hrs.	Marks	Hrs.	Marks	
901	Mobile Computing	3	1	-	3	70	2	30	100
902	Artificial Intelligence	3	1	-	3	70	2	30	100
903	EL – I (i) Web Application Development Techniques - III (ii) Advanced Computer Networks (iii) IT & Cyber Low	3	1	-	3	70	2	30	100
904	EL – II (i) Data Warehousing (ii) Language Processors (iii) Algorithm Design and Analysis	3	1	-	3	70	2	30	100
906	Project	-	-	14	-	140	-	60	200
Total		30				420		180	600