



MANGALORE UNIVERSITY



DIRECTORATE OF CORRESPONDENCE COURSES,

MANGALAGANGOTHRI - 574 199

PROSPECTUS

POST GRADUATE PROGRAM

MASTER OF SCIENCE IN

INFORMATION TECHNOLOGY

STUDY CENTER

**Rastreyya Sikshna Samithi Trust
R.V.Center For Cognitive Technologies,
R.V. Teachers College Building, 2nd Block, Jayanagar,
Bangalore – 560 011.India
Phone: +91-80-26578577 / 67178105**

OFFICERS OF THE UNIVERSITY

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MANGALORE UNIVERSITY

CORRESPONDENCE EDUCATION PROGRAMS

Objectives

Mangalore University has launched correspondence education programs as per the National Education Policy in order to reach higher education to all sections of the society. The objectives of these programs are:

- a) Promote higher education through non-formal means, specifically through correspondence mode.
- b) Promote the concept of correct intelligence among students and teachers.
- c) Establish networking of learners and knowledge practitioners by means of Information and Communication Technology
- d) Offer both conventional and innovative courses for knowledge proliferation.
- e) Take such courses to the doors of socially and economically disadvantaged sections of the society.
- f) Collaborate with national and international educational organizations to promote excellence in non-formal education.
- g) Export quality higher education through communication networks.
- h) Encourage disadvantaged and weaker sections to acquire essential skills, information and knowledge to cope with the demands of emerging new professions in a fast changing global society.
- i) Perform such other functions as and when specified/prescribed by university.

**REGULATIONS GOVERNING THE POST-GRADUATE DEGREE PROGRAMS
THROUGH CORRESPONDENCE COURSE**

(Framed under section 44(1) read with para 4(i) of the KSU act 2000)

1. TITLE AND COMMENCENT:

- i) These regulations shall be called “the regulations governing the post graduate degree programs through correspondence course of **Mangalore University**
- ii) These regulations shall come into effect from the date of assent of the Chancellor.

2. PROGRAMS:

The following post graduate degree programs shall be introduced through correspondence course.

- A) Master of Science in ASIC Design.*
- B) Master of Science in Mobile Communication & Internet*
- C) Master of Science in Information Technology*

Any other post graduate degree programs in the faculties of Science, Technology and Management introduced from time to time under correspondence course shall become part of this regulation.

3. ELIGIBILITY:

(a) **Master of Science in Application Specific Integrated Circuit Design (ASIC)**

&

(b) **Master of Science in Mobile Communication and Internet Technologies**

Candidates who have passed bachelors degree in Engineering / AMIE/ AMIETE (Electrical / Computer Science Streams) / Equivalent

OR

Bachelor of Science Degree with the following Optional subjects: Electronics / Physics / Computer Science / Information Technology / Computer Applications or Bachelor of Computer applications of Mangalore University or any other University considered as equivalent thereto by Mangalore University with one year Industrial Experience in relevant area.

(c) **Master of Science in Information Technology**

Candidates who have passed Bachelors degree in Engineering / AMIE / AMIETE (Electrical / Computer Science Streams) / Equivalent

OR

Bachelor of Science Degree with the following Optional subjects: Electronics / Physics / Computer Science / Information Technology / Computer Applications or Bachelor of Computer Applications of Mangalore University or any other University considered as equivalent thereto by Mangalore University with one year Industrial Experience in relevant area.

OR

Bachelors degree of any recognized University with one year PGDCA / PGDIT from any recognized University or DOEACC`A' Certificate or GNIIT or DAC from C-DAC / MOSE / PGDST from CIST or PGDEDPCM from Bharatiya Vidya Bhavan or Graduation + 3 years Professional IT Experience / IT Teaching Experience. Candidates with Master degree in Geo Informatics/ Bio Informatics are also eligible.

4. DURATION:

The Post graduate degree programs shall be of 2 academic years

5. MEDIUM OF INSTRUCTION:

The Medium of Instruction and examination shall be English

6. MAXIMUM PERIOD FOR COMPLETION OF THE MASTERS PROGRAM

The candidate shall complete the masters degree programs within the period as prescribed in the regulations governing maximum period for completing various degree or diploma programs offered by Mangalore University under regular scheme. No candidate shall be permitted to appear the examination after prescribed period for completing the program

A candidate who fails in any subject (1st – 2nd) year may be permitted to take the examinations again at a subsequent appearance as per the syllabus and scheme of examination in vogue at the time the candidate took the examination for the first time. This facility shall be limited to the following four years.

7. CONTACT PROGRAM

There shall be 2 contact programs of 15 days duration each in a year. Seminars, discussions and lab-sessions will be part and parcel of the contact programs.

8. SCHEME OF EXAMINATION for Master of Science in Information Technology

PREVIOUS

PAPER	NAME OF THE SUBJECT	DURATION OF EXAM IN HOURS	MARKS FOR		
			IA	EXAM	TOTAL
PAPER 1	PRINCIPLES OF PROGRAMMING LANGUAGES	3	20	80	100
PAPER 2	OPERATING SYSTEM	3	20	80	100
PAPER 3	SOFTWARE ENGINEERING	3	20	80	100
PAPER 4	ELECTIVE I	3	20	80	100
PAPER 5	ELECTIVE II	3	20	80	100
TOTAL:		15	100	400	500

Elective – I	Elective - II
1. SYSTEM SIMULATION AND MODELING	1. OBJECT ORIENTED ANALYSIS AND DESIGN USING UML
2. MULTIMEDIA SYSTEMS	2. COMPILER DESIGN

FINAL

PAPER	NAME OF THE SUBJECT	DURATION OF EXAM IN HOURS	MARKS FOR IA	EXAM	TOTAL
PAPER 6	DATABASE MANAGEMENT AND COMPUTER NETWORKS	3	20	80	100
PAPER 7	ELECTIVE III	3	20	80	100
PAPER 8	PROJECT WORK AND VIVA	-	100	300	400
				100	100
TOTAL:		6	140	560	700

Elective – III
1.CLIENT SERVER COMPUTING
2.MOBILE COMPUTING

9. INTERNAL ASSESSMENT

Marks for internal assessment shall be awarded on the basis of assignments. Students shall submit two assignments of 10 marks each in paper of study which shall be evaluated by the faculty concerned. The assignment marks should be forwarded to the registrar (Evaluation) at least 15 days before the commencement of annual examinations.

10. REGISTRATION FOR EXAMINATION

A candidate shall register for all the papers of the current year, when he/she appears for the examination for the first time.

11. CARRY OVER PROVISION:

Candidates who fail in the first year can go to final year and take the examinations at the end of the second year.

12. MINIMUM FOR PASS

No candidate shall be declared to have passed in a examination unless he/she obtains not less than 35% marks in each paper and 40% marks in the aggregate of theory and internal marks put together.

13. CLASSIFICATION OF SUCCESSFUL CANDIDATES:

- i) The results of successful candidates at the end of the final year shall be classified on the basis of aggregate marks obtained in the previous and the final year.
- ii) The candidates who pass all the examinations in the first attempt are eligible for rank provided they secure 60% and above marks.
- iii) The results of the candidates who have passed the final year but not passed previous year examinations shall be declared as NCL (not completed lower examinations).such candidates shall be eligible for the degree only after completion of the previous year examinations.

Percentage of marks for declaring class:

Distinction	70% and above
First Class	60% and above but less than 70%
High Second Class	55% and above but less than 60%
Second Class	50% and above but less than 55%
Pass Class	40% and above but less than 50%

14. REJECTION OF RESULTS:

- i. A candidate who fails in one or more papers of a year (previous / final) may be permitted to reject the result of the whole examination of that year. Rejection of result paper wise shall not be permitted. A candidate who rejects the results shall appear for the examination of that year in the subsequent examination.
- ii. Rejection shall be exercised only once in each examination and the rejection once exercised cannot be revoked.
- iii. Application for rejection along with payment of the prescribed fee shall be submitted to the Director of Distance Education together with the original statement of marks within 30 days from the date of publication of the result.
- iv. A candidate who rejects the result is eligible for only class and not for ranking.

15. IMPROVEMENT OF RESULTS

- i. A candidate who has passed in all the papers of a year (previous / final) may be permitted to improve the result by reappearing for the whole examination of that year.
- ii. The reappearance shall be permitted only once in each year (previous / final).
- iii. The reappearance for the examination of any year is permitted during the subsequent examination of that year.
- iv. Application for improvement along with payment of the prescribed fee shall be submitted to the Director of Correspondence Education together with the original statement of marks within 30 days from the date of publication of the result.
- v. If the candidate passes in all the subjects in the reappearance, higher of the two aggregate marks secured by the candidate shall be awarded to the candidate for that year (previous / final). In case the candidate fails in the reappearance, candidate shall retain the first appearance result.
- vi. A candidate who has appeared for improvement is eligible for only class and not for ranking.

16. INTERNAL ASSESSMENT MARKS

Internal assessment marks shall be shown separately in the marks card. A candidate who has rejected the result or who, having failed, takes the examination again or who has appeared for improvement shall retain the internal assessment marks already obtained.

17. Fee Structure

Tuition Fee	40,000.00
Laboratory Fee	8,000.00
Library Fee	2,000.00
Total	50,000.00

Per Annum

18. Conditions governing the program

1. Candidate admitted to a degree course in the university shall not be permitted to study simultaneously any other program leading to a degree in this or any other university.
2. If a candidate gets admitted to more than one post graduate or degree course , the Director of Correspondence Courses shall cancel his/her admission to both the courses
3. Candidates shall abide by the Rules and Regulations in force and those to be issued by the Mangalore University from time to time.
4. False declaration of age, qualification etc. by the candidate will disqualify his/her admission to the course.
5. This prospectus provides all necessary information to the candidates. Hence candidates are advised to keep the prospectus till the completion of the program. Unnecessary correspondence about the details already available in this prospectus shall be avoided.
6. Provisional pass certificate will be issued by the Registrar (Evaluation), Mangalore University on request and on payment of prescribed fee, after the declaration of the result by the university.

7. After the admission is approved by the university, Identity cards will be issued. If original card is lost, duplicate card may be obtained from the office of the Director, RVCCT, on payment of Rs.500/- through bank challan at ING-Vysya Bank or through DD drawn in favor of R.V. Centre For Cognitive Technologies.
8. Any change of address should be intimated to the Director of Correspondence Courses or Director, RVCCT. However it may be noted that any change of address in the middle of the academic year will cause unavoidable delay.
9. The study materials, circulars, letters, examination notifications and such other correspondences shall be sent by ordinary post only. The same may be collected in person from Office of the Director, R.V. Centre For Cognitive Technologies, R.V. Teachers College Building, 2nd Block, Jayanagar, Bangalore – 560 011.

**SYLLABUS FOR
INFORMATION TECHNOLOGY**

PAPER 1

PRINCIPLES OF PROGRAMMING LANGUAGES (ITCS11)

1. Introduction:

Brief history of Programming Language, Characteristics of programming language.

2. Programming Language Processors:

The structure and operation of a computer, Hardware and firmware computers, Translator and simulator computers, Syntax, semantics and virtual computers, hierarchies of computers, binding and binding time

3. Elementary Data Types:

Data object, variable and constants, data types, specification of elementary data types, declarations, type checking and type conversion, assignment and initialization, numeric data types, enumerations, Boolean, characters

4. Structured Data Types:

Structured data object and data types, specification of data structure types, implementation of data structure types, declarations and type checking for data structures, vector and arrays, record, character strings, variable sized data structures, pointers and programmer-constructed data objects, sets, file and input/output

5. Subprogram And Programmer-Defined Data Types:

Evolution of the data type concept, Abstraction, encapsulation, and information hiding, subprogram, type definitions, abstract data types

6. Sequence Control:

Implicit and explicit sequence control, sequence control within expression, sequence control between statements, subprogram sequence control, recursive subprogram, exceptions and exception handlers, Co-routines, scheduled subprograms, tasks and concurrent execution, data structures and sequence control.

7. Data Control:

Names and referencing environments, static and dynamic scope, block structure, local data and local referencing environments, shared data, task and shared data.

8. Storage Management:

Major Runtime elements requiring storage, programmer and system controlled storage management, storage management phases, static storage management, stack based storage management, heap storage management

9. Operating And Programming Environment:

Batch processing environment, interactive environments, embedded system environments, programming environments Theoretical Models: Problem in syntax and translation, problem in semantics

References Books:

1. Programming Languages, design and implementation second edition by Terrence W. Pratt Prentice Hall of India pvt.ltd. New Delhi
2. Programming Languages. Kenneth Loudness, Principles and Practice 2nd Edition
3. Principles of Programming Languages: Design, Evaluation and Implementation: Books: Bruce J. MacLennan by Bruce J. MacLennan.
4. Principles of Programming Languages, Sriram Krishnamurthi Addison-Wesley
5. Principles of Programming Languages, M.L Scott, Pragmatics publisher

PAPER 2

OPERATING SYSTEM (ITCS12)

1 Introduction

Computers and Software, Operating System Strategies.

2 Using the operating system

The Programmer's Abstract Machine, Resources, Processes and Threads, Writing Concurrent Programs, Objects.

3. Operating system organization

Basic Functions, General Implementation Considerations, Contemporary OS Kernels.

4. Device management and memory management

The I/O System, I/O Strategies, Device Manager Design, Buffering, Device Class Characteristics. The Basics, The Address Space Abstraction, Memory Allocation, Dynamic Address Space Binding, Modern Memory Manager Strategies. VIRTUAL MEMORY, The Task at Hand, Address Translation, Paging, Static Paging, Algorithms, Dynamic Paging Algorithms, Segmentation, Memory-mapped Files,

5. File Management:

The Task at Hand, Files, Low-level File Implementations, Supporting High-level File Abstractions, Directories, Implementing Directories, File Systems, Implementing processes, threads, and resources, The Task at Hand, The Hardware Process, The Abstract Machine Interface, The Process Abstraction.

6. Scheduling

Overview, Scheduling Mechanisms, Strategy Selection, Non-preemptive Strategies, Preemptive Strategies, Implementing the Scheduler.

7. Basic synchronization principles

Cooperating Processes, Evolving from the Classic Solution, Semaphores, Synchronization in Shared Memory Multiprocessors.

8. High-level synchronization and interprocess communication

Alternative Synchronization Primitives, Monitors, Interprocess Communication.

9. Deadlock

Background, Prevention, Avoidance, Detection and Recovery.

References Books:

1. Operating Systems: Gary Nutt, 3rd Edition, Pearson Education, 2005.
2. Operating Systems: Deitel, Deitel and Choffnes, 3rd Edition, Pearson Education, 2004.
3. Operating System Concepts: Silberschatz, 6th Edition, John Wiley and Sons, 2003.
4. Modern Operating Systems (2nd Edition): Andrew Tanenbaum, Pearson publications
5. Operating Systems: Design and Implementation, Third Edition with Albert S. Woodhull

PAPER 3

SOFTWARE ENGINEERING (ITCS 13)

1. Introduction:

FAQs about software engineering - professional and ethical responsibility - system modeling - system engineering process - the software process - life cycle models - iteration - specification - design and implementation - validation - evolution - automated process support - software requirements - functional and non-functional requirements - user requirements - system requirements - SRS – 2.

2. Requirements engineering processes:

Feasibility studies - elicitation and analysis - validation - management - *system models* - context models - behavior models - data models - object models - CASE workbenches

3. Software prototyping:

prototyping in the software process - rapid prototyping techniques - formal specification - formal specification in the software process - interface specification - behavior specification - architectural design - system structuring - control models - modular decomposition - domain-specific architectures - distributed systems architecture.

4. Notation:

Formatting data, regular expressions, programmable tools, interpreters, compilers, and virtual machines, programs that write programs, using macros to generate code.

5. Object-oriented design

objects and classes - an object oriented design process case study - design evolution - real-time software design - system design - real time executives - design with reuse - component-based development - application families - design patterns - user interface design - design principles - user interaction - information presentation - user support - interface evaluation

6. Dependability:

Critical systems - availability and reliability - safety - security - critical systems specifications - critical system development - verification and validation - planning - software inspection - automated static analysis - clean room software development - software testing - defect testing - integration testing - object-oriented testing - testing workbenches - critical system validation

7. Software evolution

Legacy systems - software change - software maintenance - architectural evolution - software re-engineering - data re-engineering

8. Software project management –

Project planning - scheduling - risk management - managing people - group working - choosing and keeping people - the people capability maturity model - software cost estimation - productivity estimation techniques - algorithmic cost modeling, project duration and staffing

9. Quality management

Quality assurance and standards - quality planning - quality control - software measurement and metrics - process improvement - process and product quality - process analysis and modeling - process measurement - process 9. CMM - configuration management - planning - change management - version and release management - system building – CASE tools for configuration management

Reference Books

1. Ian Sommerville, Software Engineering, Pearson Education Asia
2. Pressman R.S., Software Engineering, McGraw Hill
3. Mall R., Fundamentals of Software Engineering, Prentice Hall of India
4. Behferooz A. & Hudson F.J., Software Engineering Fundamentals, Oxford University Press
5. Jalote P., An Integrated Approach to Software Engineering, Narosa.
6. William perry : Effective methods for software testing (Second edition) John wiely 1999.
7. Bezier B : Software testomg tecjmoqies II edition, Van Nostrand Reinuold, 1990.
8. Myers G.J : The Art of Software testing, Wiley – Dreamtech India Pvt Ltd.,2004.
9. Loise Tamres : Introducing software Testing Pearson Education, 2003

PAPER 4 - ELECTIVE –I
SYSTEM SIMULATION AND MODELING (ITCS111)

1. Introduction To Simulation:

When Simulation is the Appropriate Tool; When Simulation Is Not Appropriate; Advantages and Disadvantages of Simulation; Areas of Application; Systems and System Environment; Components of a System; Discrete and Continuous Systems; Model of a System; Types of Models; Discrete-Event System Simulation; Steps in a Simulation Study.

2. Simulation Examples:

Characteristics of Queueing Systems; Queueing Notation; Simulation of Queueing Systems; Simulation of Inventory Systems.

3. General Principles:

Concepts in Discrete-Event Simulation: The Event-Scheduling / Time-Advance Algorithm, World Views, Manual simulation Using Event Scheduling.

4. Random-Number Generation:

Properties of Random Numbers; Generation of Pseudo-Random Numbers; Techniques for Generating Random Numbers; Tests for Random Numbers.

5. Random-Variate Generation:

Inverse Transform technique: Exponential Distribution, Uniform Distribution, Discrete Distributions; Acceptance-Rejection Technique: Poisson Distribution.

6. Input Modeling:

Data Collection; Identifying the distribution with Data; Parameter Estimation; Goodness of Fit Tests; Selecting Input Models without Data; Multivariate and Time-Series Input Models.

7. Verification and Validation of Simulation Models:

Model Building, Verification and Validation; Verification of Simulation Models; Calibration and Validation of Models.

8. Output Analysis for a Single Model:

Types of Simulations with Respect to Output Analysis; Stochastic Nature of Output Data; Measures of Performance and Their Estimation; Output Analysis for Terminating Simulations; Output Analysis for Steady-State Simulations.

9. Simulation of Computer Systems:

Introduction; Simulation Tools; Model Input; High-Level Computer-System Simulation; CPU Simulation; Memory Simulation.

Reference Books

1. Jerry Banks, John S. Carson, Barry L. Nelson, David M. Nicol, “Discrete-Event System Simulation”, Third Edition, Prentice-Hall India
2. Averill M. Law, W. David Kelton, “Simulation Modeling and Analysis” ,Third Edition, McGraw Hill.
3. Geoffrey Gordon, “System Simulation”, Second Edition, Prentice-Hall India.
4. Jerry Banks,John S. Carson,Barry L. Nelson,David M. Nicol-Event System Simulation (3rd Edition)
5. An Introduction to System Simulation: Books: Howard T. Odum, Elisabeth C. Odum

PAPER 4 - ELECTIVE-I
MULTIMEDIA SYSTEMS (ITCS112)

1. Media and Data Streams:

Media: Perception Media, Representation Media, Presentation Media, Storage Media, Transmission Media, Information Exchange Media, Presentation Spaces & Values, and Presentation Dimensions; Key Properties of a

2. Multimedia System:

Discrete & Continuous Media, Independence Media, Computer Controlled Systems, Integration; Characterizing Data Streams: Asynchronous Transmission Mode, Synchronous Transmission Mode, Isochronous Transmission Mode; Characterizing Continuous Media Data Streams.

3. Audio Technology :

Sound : Frequency , Amplitude, Sound Perception and Psychoacoustics; Audio Representation on Computers ; Three Dimensional Sound Projection;

4. Music and MIDI Standards:

Speech Signals; Speech Output; Speech Input; Speech Transmission.

5. Graphics and Images :

Capturing Graphics and Images Computer Assisted Graphics and Image Processing; Reconstructing Images; Graphics and Image Output Options.

6. Video Technology :

Basics, visual representation, signal formats, color encoding, composite signal, computer video format; Television Systems, conventional systems, high-definition television; Digitalization of Video Signals, composite coding, component coding; Digital Television;

7. Computer-Based Animation:

Basic Concepts; Specification of Animations; Methods of Controlling Animation; Display of Animation; Transmission of Animation; Virtual Reality Modeling Language.

8. Data Compression :

Storage Space; Coding Requirements; Source, Entropy, and Hybrid Coding; Basic Compression Techniques; JPEG : Image Preparation, Lossy Sequential DCT-based Mode, Expanded Lossy DCT-based Mode, Lossless Mode, Hierarchical Mode; H.261 (Px64) and H.263: Image Preparation, Coding Algorithms, Data Stream, H.263+ and H.263L; MPEG :

Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG-4, MPEG-7; Fractal Compression.

9. Multimedia Application Design:

Multimedia Application Classes; Types of Multimedia Systems; Virtual Reality Design; Components of Multimedia Systems; Organizing Multimedia Databases; Application Workflow Design Issues.

Reference Book:

1. Ralf Steinmetz, Klara Narstedt, "Multimedia Fundamentals: Vol 1-Media Coding and Content Processing", Pearson Education, 2004.
2. Prabhat K. Andleigh, Kiran Thakrar, "Multimedia Systems Design", PHI, 2004.
3. Fred Halsall, "Multimedia Communications, applications, networks, protocols, and standards", Pearson Education, 2002.
4. Multimedia Systems (X.media.publishing): Ralf Steinmetz, Klara Nahrstedt by Ralf Steinmetz, Klara Nahrstedt.
5. Multimedia Communication Systems: Techniques, Standards, and Networks by D. A. Milovanovic, Zoran S. Bojkovic Dragorad A. Milovanovic, Kamisetty Ramamohan Rao (Prentice Hall, 2002)

PAPER- 5 - ELECTIVE - II

OBJECT ORIENTED ANALYSIS AND DESIGN USING UML (ITCS121)

1. Object Oriented Design and Modeling:

Object Oriented Fundamentals, Objects and object classes, object oriented design process, importance of modeling, principles of modeling, object oriented modeling.

2. Introduction to UML:

Conceptual model of UML, building blocks of UML, Mechanisms in UML, architecture, software development life cycle.

3. Classes and Objects:

Basic Structural Modeling Classes, relationships, common mechanisms, class and object diagrams.

4. Advanced structural Modeling:

Advanced classes, advanced relationships, Interfaces types and roles, packages, instances and object diagrams.

5. Sequence Diagrams:

Terms and concepts in sequence diagrams

6. Collaboration Diagrams

Terms, concepts and depicting a message in collaboration diagrams.. Difference between collaboration and sequence. diagram. Depicting synchronous messages with/without priority call back mechanism.

7. Basic behavioral modeling Interactions:

Use cases, Use Case Diagrams, Interaction Diagrams and activity diagrams.

8. Advanced behavioral modeling:

Events and signals, state machines, process and threads, time and space, state chart diagrams.

9. Architectural Modeling:

Terms, Concepts, examples, Modeling techniques for component diagrams and deployment diagrams.

References Books:

1. Grandy Booch, James Rumbough, Ivar Jacobson. ' The Unified Modelling Language User Guide.
2. Pearson Edutaion 2002.
3. Ian Sommerville, ' Software Engineering Sixth Edition' 2003.
4. Meilir Page Jones, ' Fundamentals of Object Oriented Design in UML' , Addison Wesley, 2000
5. James J. Odell by James J. Odell.Object-Oriented Analysis and Design Using UML
6. Agile Software Development, Principles, Patterns, and Practices by Robert C. Martin

PAPER 5 - ELECTIVE II
COMPILER DESIGN (ITCS122)

1. Introduction to Compilers:

Overview of Compilers, Why Compilers? A Brief History, Program Related to Compilers, The Translation Process, Major data structures in a Compiler, Other issues in compiler structure, Bootstrapping & Porting, Compiler Construction Tools.

2. Lexical Analysis:

The role of the Lexical analyzer, The scanning process, Regular expressions, finite Automata, From Regular expressions to DFA's , Design of a Lexical Analyzer generator, Use of Lex to generate a Scanner Automatically

3. Syntax Analysis:

The role of the parser, The parsing process, Context- free grammars, Parse Tree & Abstract Syntax Trees, Ambiguity, External Notations, EBNF & Syntax diagrams, Formal properties of Context-free Languages, The Parser Generator

4. Top- Down Parsing:

Top –Down parsing by Recursive – Descent, LL(1) parsing, First & Follow sets, Error – Recovery in Top-Down Parsers

5. Bottom – Up Parsing:

Overview of Bottom – Up parsing, Finite Automata of LR(0) Items & LR(0) Parsing, SLR(1) Parsing, General LR(1) and LALR(1) Parsing, YACC: An LALR(1) Parser Generator, Error Recovery in Bottom-Up Parser

6. Semantic Analysis:

Attributes and Attribute Grammars, Algorithms for Attribute Computation, The Symbol Table, Data Types checking

7. Intermediate Code Generation:

Intermediate Languages, Intermediate Code & Data Structures for code generation, Basic code generation techniques, code generation of data structure references, code generation of control statements & logical expressions, code generation of procedures & function calls

8. Run Time Environment:

Memory organization During Program Execution, Fully Static Run Time Environments, Stack-Based Runtime Environments, Dynamic memory, Parameter Passing Mechanisms

9. Code Optimization:

Introduction, The Principal sources of optimization, Optimization of basic blocks, code improving Transformations

Reference Books:

1. Compiler Construction Principles & Practice By Kenneth C. Louden, International Student Edition, 2003, Vikas Publishing.
2. Compilers Principles Techniques & Tools By A. V. Aho, Ravi Sethi & J. D. Ullman Addison Wesley 4th Edition, 2000
3. Engineering a compiler by Keith, D. Cooper & Linda Torezon, Morgan Kaufmann publishers, first Indian reprint 2004.
4. The essence of compilers by Robin Hunter, Pearson education, First Indian reprint 2004.
5. The Art of Compiler Design: Theory and Practice by Thomas Pittman and James Peters

FINAL

PAPER 6

DATABASE MANAGEMENT SYSTEM AND COMPUTER NETWORKS (ITCS21)

1. Introduction To Database Systems:

Managing Data; A Historical Perspective; File Systems versus a DBMS; Advantages of a DBMS; Describing and Storing Data in a DBMS; Queries in a DBMS; Transaction Management; Structure of a DBMS; People Who work with Databases.

2. Entity-Relationship Model:

Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design for the COMPANY Database; ER Diagrams, Naming Conventions and Design Issues.

3. Relational Model And Relational Algebra:

Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations and Dealing with Constraint Violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations : JOIN and DIVISION ;Additional Relational Operations;

4. SQL-The Relational Database Standard:

SQL Data Definition and Data Types, Specifying Basic Constraints in SQL, Schema Change Statements in SQL; Basic Queries in SQL; More Complex SQL Queries; Insert, Delete and Update Statements in SQL; Additional Features of SQL; Specifying General Constraints as Assertion; Views (Virtual Tables) in SQL;

5. Database Design:

Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form; Properties of Relational Decompositions; Algorithms for Relational Database Schema Design; Multivalued Dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form;

6. Introduction to Computer Networks

Uses of computer networks : Business Applications, Home Application, Mobile Users, Social Issues; Network hardware: Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Wireless Networks, Design Issues for the Layers, Connection-Oriented and Connectionless Services, Service Primitive; Example Networks: The Internet, Connection-oriented Networks: X.25, Frame Relay & ATM;

7. Network layer:

Network layer design issues: Store and Forward packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection-Oriented Service, Comparison of Virtual Circuit and Datagram Subnets; Routing algorithms: The Optimality Principal , Shortest Path Routing, Flooding, Load Shedding, Jitter Control; Quality Of Service: Requirements, Techniques for Achieving Good Quality of Service; The Network Layer in the Internet : The IP Protocol, IP Addresses, Internet Control Protocols, Mobile IP, Ipv6;

8. The Transport Layer

The Transport Service: Services Provided to the Upper Layers, Transport Service Primitives, Berkley Sockets; Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery; The Internet Transport Protocols(UDP):Introduction to UDP, Remote Procedure Call, The Real-Time Transport Protocol ; The Internet Transport Protocols(TCP): Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header,

9. The Application Layer

DNS-The Domain Name System: The DNS Name Space, Resource Records, Name Servers ; Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery; The World Wide Web: Architectural Overview, Static Web Documents, Dynamic Web Documents, HTTP, Performance Enhancements, The Wireless Web;

Reference Books:

1. Raghu Ramakrishnan and Johannes Gehrke : Database Management Systems (Third Edition), McGraw-Hill, 2003
2. Elmasri and Navathe: Fundamentals of Database Systems (Fourth Edition), Pearson Education, 2003
3. Silberschatz, Korth and Sudharshan: Data base System Concepts, Fourth Edition, McGrawHill, 2002
4. Andrew S. Tanenbaum , Computer Networks, Fourth edition, PHI / Pearson Publication, 2002.
5. Alberto Leon – Garcia and Indra Widjaja , Communication Networks – Fundamental Concepts and Key architectures, Tata McGraw-Hill 2nd edition .

PAPER 7 - ELECTIVE - III
CLIENT SERVER COMPUTING(ITCS 231)

1. Introduction

Client / Server computing, advantages of Client / Server computing , advantages of client server

2. Architecture

Data access architecture, Execution architecture - Vertical slice - Two-tiered client / server, stored procedure, Three-tiered architecture.

3. Role of the Client and Client Service

Remote Procedure Call, Print services, Remote services, Utility Services, Message Services, Network Services, Application services

4. Database Services:

Dynamic Data Exchange(DDE), Object Linking and Embedding, Common Object Request Broker Architecture, Client tools - Non GUI, GUI, Object Oriented User Interface(OOUI).

5. Remote Procedure Calls

The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Case Studies: Sun RPC.

6. Server functionality:

Request processing, file services, database services, Communication services, security services, Network Operating system, Platforms, Server Operating system.

7. Connectivity

Open systems interconnect, communication Interface technology, interprocess communication, Wide Area Network technologies, Network management

8. Application development management issues:

Platform and productivity, environment definition, productivity measures, performance, support, organization and management, task allocation server and client side.

9. Distributed objects and components

CORBA, compound documents, Opendoc component model, OLE/DCOM.

Reference Books:

1. Patrick Smith and Steve Guengerich, Client / Server computing, 2nd Edition, Prentice Hall
2. Robert Orfali, Dan Harkey, Jeri Edwards, The Essential Client/ Server Survival Guide, 2nd Edition, Galgotia Publications.
3. Larry T Vaughn, Client/Server System Design and implementation, McGraw-Hill International edition.
4. Alan Pope, The CORBA Reference Guide, Addison Wesley publication.
5. The Complete Guide to Client / Server Computing by Eric J. Johnson

PAPER 7 - ELECTIVE –III
MOBILE COMPUTING (ITCS232)

1. Introduction:

Applications: A short history of wireless communication

2. Wireless Transmission:

Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems.

3. Medium Access Control:

Motivation for a specialized MAC: Hidden and Exposed terminals. Near and Far terminals; SOMA, FOMA, TOMA: Fixed TOM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, PRMA packet reservation multiple access, reservation TOMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access; CDMA: Spread Aloha multiple access

4. Telecommunication Systems and Satellite System:

GSM: Mobile Services, System Architecture, radio interface, Protocols, Localization and Calling, Handover, Security, New Data Services; DECT; Systems Architecture; Protocol Architecture: TETRA, I UMTS and IMT-2000; UMTS Basic Architecture, UTRA FDD mode, UTRA TDD mode. History of Satellite system, Applications, Basics: GEO, LEO, MEO, Routing, Localization. Handover, Examples.

5. Broadcast Systems:

Overview, Cyclic Repetition, Digital Audio; broadcasting: Multimedia object transfer Protocol; Digital Video broadcasting.

6. Wireless LAN:

Infrared vs. Radio Transmission, Infrastructure and Ad Hoc networks, IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, Medium Access Control Layer, MAC management, Future development; HIPERLAN: Protocol architecture, Physical Layer Channel access control. Sublayer, Medium Access control sublayer, Information bases and networking; Bluetooth: User Scenarios, Physical Layer, MAC layer, Networking, Security, Link management.

7. Wireless ATM:

Motivation for WATM, Wireless ATM working group, WATM services, Reference model: Example configurations, Generic reference model; Functions: Wireless mobile terminal side, Mobility supporting network side; Radio access layer: Requirements, BRAN; Handover: Handover reference model, Handover requirements, Types of handover, Handover scenarios, Backward handover, Forward handover; Location management: Requirements for location management, Procedures and Entities; Addressing, Mobile quality of service, Access point control protocol.

8. Mobile Network Layer:

Mobile IP: Goals, assumptions and requirements, Entities and Terminology, IP packet delivery, Agent advertisement and discovery, Registration, Tunneling and Encapsulation, Optimizations, Reverse tunneling, Ipv6; Dynamic host configuration protocol, Ad hoc networks: Routing, Destination sequence distance vector, Dynamic source routing, Hierarchical algorithms, Alternative metrics.

9. Mobile Transport Layer:

Traditional TCP: Congestion control, Slow start, Fast retransmit/fast recovery, Implications on mobility; Indirect TCP, Snooping TCP, Mobile tcp, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP. Support for Mobility: File systems: Consistency, Examples; World Wide Web: Hypertext transfer protocol, Hypertext markup language, Some approaches that might help wireless access, System architectures; Wireless application protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language; WML script, Wireless telephony application, Examples "Stacks with WAP, Mobile databases, Mobile agents

Reference Books :

1. Jochen Schiller, "Mobile Communications ",2nd Edition, Addison Wesley, Pearson Education
2. William Stallings, "Wireless Communications and Networks' , Prentice Hall-2005
3. Rappaport, "Wireless Communications Principals and Practices' , 2nd Edition, Prentice Hall
4. YI Bing Un , "Wireless and Mobile Network Architectures', John Wiley
5. P. Nicopqlitidis, "Wireless Networks', John Wiley
