



MANGALORE UNIVERSITY



DIRECTORATE OF CORRESPONDENCE COURSES,

MANGALAGANGOTHRI - 574 199

PROSPECTUS

POST GRADUATE PROGRAM

MASTER OF SCIENCE IN

MOBILE COMMUNICATION &

INTERNET TECHNOLOGIES

STUDY CENTER

**Rastreyya Sikshana 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**

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Registrar (Evaluation)

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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 COMMENCEMENT:

- 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 (ASIC) Design**

&

(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 Mobile Communication & Internet Technologies

PREVIOUS

PAPER	NAME OF THE SUBJECT	DURATION OF EXAM IN HOURS	MARKS FOR		
			IA	EXAM	TOTAL
PAPER-1	DATA STRUCTURES AND SYSTEMS SOFTWARE	3	20	80	100
PAPER- 2	MOBILE COMPUTING	3	20	80	100
PAPER- 3	DATA COMMUNICATIONS	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. CODE DIVISION MULTIPLE ACCESS	1. JAVA AND J2ME
2. MULTIMEDIA COMPUTING	2. WIRELESS AND ATM NETWORK

FINAL

PAPER	NAME OF THE SUBJECT	DURATION OF EXAM IN HOURS	MARKS FOR		
			IA	EXAM	TOTAL
PAPER- 6	COMMUNICATION PROTOCOLS OVER WIRELESS NETWORKS	3	20	80	100
PAPER- 7	ELECTIVE -III	3	20	80	100
PAPER- 8	PROJECT WORK & SEMINAR	-	100	300	400
				100	100
Total:		6	140	560	700

ELECTIVE III
1. CRYPTOGRAPHY AND N/W SECURITY
2. N/W MANAGEMENT

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 paperwise 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) maybe 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

- 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
MOBILE COMMUNICATION &
INTERNET TECHNOLOGIES**

PAPER 1

DATA STRUCTURES AND SYSTEM SOFTWARE (MCEC11)

1. C Language features:

Structures and Unions, Pointers and functions, pointers and structures. Dynamic memory allocation: Meaning of dynamic memory allocation, malloc, calloc, free and realloc functions, pointers revisited. File management: Defining and opening a file, closing a file, I/O operations on files, error handling during file operations, random access to files, command line arguments.

2. The Stack:

Definition and examples: Primitive operation, Implementing the pop operation, testing for exceptional conditions, implementing the push operation. Evaluating a postfix expression, program to evaluate a postfix expression, Converting an expression from infix to postfix, Program to convert an expression from infix to postfix.

3. Recursion:

Recursive definition and processes: Factorial function, Multiplication of natural numbers, Fibonacci sequence, Binary search, Properties of recursive definition or algorithm. Recursion in C: Factorial of a number, generation of Fibonacci number, Binary searching, Towers of Hanoi problem.

4. Queues and lists:

The queue and its sequential representation. Linked implementation of stacks, Getnode and free node operations, Linked implementation of queues, Linked list as a data structure, Header nodes. Lists in C, Queues as lists in C, Examples of list operations in C, Non integer and non homogeneous lists. Other list structures, Circular lists, stack as a circular list, Queue as a circular list, Primitive operations on circular lists, doubly linked lists.

5. Trees:

Binary tree and its representation. Node representation of binary tree, Internal and external nodes, Implicit array representation of binary trees, Choosing a binary tree representation, Binary tree traversals in C, Threaded binary trees. Trees and their application: C representation of trees, Tree traversals, and General expressions as trees, evaluating an expression tree, constructing a tree.

6. Sorting:

Binary tree sort simple inserting sort, shell sort address calculation sort, radix sort.

7. Searching:

Sequential searching, searching an ordered table, indexed sequential search, Interpolation search. Tree Searching: Inserting into a binary search tree, Deleting from a binary search tree. Hashing: Resolving hash clashes by open addressing, choosing a hash function.

8. Machine Architecture:

Introduction, System Software and Machine Architecture, Simplified Instructional Computer (SIC) - SIC Machine Architecture, SIC/XE Machine Architecture, SIC Programming Examples, Traditional (CISC) Machines - VAX Architecture, Pentium Pro Architecture, RISC Machines - Ultra SPARC Architecture, Cray T3E Architecture.

9. Assemblers

Basic Assembler Function - A Simple SIC Assembler, Assembler Algorithm and Data Structures, Machine Dependent Assembler Features - Instruction Formats & Addressing Modes, Program Relocation, Machine Independent Assembler Features – Literals, Symbol-Definition Statements, Expression, Program Blocks, Control Sections and Programming Linking, Assembler Design Operations - One-Pass Assembler, Multi-Pass Assembler, Implementation Examples - MASM Assembler, SPARC Assembler.

Reference Books :

1. Leland.L.Beck, System Software, 3rd Edition, Addison-Wesley, 1997.
2. D.M.Dhamdhere, System Programming and Operating Systems, 2nd Edition, TMH, 1999.
3. Data structures using C and C++ by Yedidyah Langsam and Moshe J. Augenstein and Aaron M. Tenanbaum, PHI/Pearson
4. Programming in ANSI C by E. Balagurusamy, Tata McGraw Hill, Edition 2.1, 2002
5. Robert Kruse, C.L.Tondo and Bruce Leung, Data Structures & Program Design in C, II Edition, Pearson Education, Asia.

PAPER 2

MOBILE COMPUTING (MCEC12)

1. Introduction:

Applications : vehicles, Emergencies, Business, Replacement of wired networks, Infotainment and more, Location dependent services, Mobile and Wireless devices; A short history of wireless communications, A market for mobile communications, Some pen research topics; A simplified reference model.

2. Wireless transmission

Frequencies for radio transmission, Reulations; Signals, Antennas; Signal propagation, Path loss of radio signals, Additional signal propagation effects, Multipath propagation; Multiplexing: Space division multiplexing, Frequency division multiplexing, Time division multiplexing, code division multiplexing, Modulation: Amplitude sift keying, Frequency shift keying. Phase shift keying, Advanced frequency shift keying, Advanced phase shift keying, Multicarrier modulation; Spread spectrum: Direct Sequence spread spectrum, Frequency hopping spread spectrum; Cellular systems.

3. Medium Access Control

Motivation for a specilaised MAC: Hidden and exposed terminals, Near and far terminals, SDMA; FDMA;TDMA:Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access.PRMA Packet reservation multiple access, reservation TDMA, Multiple access with collision avoidance,Polling, Inhibit sense multiple access, CDMA: Spread Aloha Multiple access, comparision of S/T/F/CDMA.

4. Telecommunications Systems

GSM, Mobile services, System architecture, radio interface, Protocols, Localization and calling, handover, Security, New data services; DECT: System architecture, protocol architecture; TETRA; UMTS releases and standardization, UMTS Systems Arcitecture, UMTS radio interface,UTRAN, Core Network handover.

5. Satellite Systems

History; Applications; basics,: GEO, LEO, MEO, Routing, Localization; handover.

6. Broadcast Systems.

Overview; Cycle repetition of data; Digital audio broadcasting: Multimedia object transfer protocol; Digital video broadcasting; DVB for convergence of broadcasting and mobile communications.

7. Wireless LAN

Infrared vs Radio transmission ; Infrastructure and adhoc network; IEEE 802.11: System architecture , Protocol architecture , Physical layer, Medium access control layer, MAC management, 802.11b, 802.11a, Newer developments; HIPERLAN; Historical: HIPERLAN 1, WATM, BRAN, HiperLAN2; Bluetooth: user Scenarios, architecture, Radio Layer, baseband Layer, Link manager protocol, L2CAP, Security, SDP, Profiles, IEEE 802.15.

8. Mobile Network layer

Mobile IP: Goals, assumptions, ad requirements, Entities and terminology, IP packet delivery , Agent discovery, registration, Tunneling and encapsulation, Optimizations, Reverse tunneling, IPv6, Ip micro –mobility support; Dynamic host configuration protocol; Mobile Ad-hoc networks: Routing, Destination sequence distance vector, Dynamic source routing, Alternative metrics, Overview of Ad-Hoc routing protocols.

9. Mobile Transport layer

Traditional TCP: Congestion, Control, Slow start, fast retransmit/fast recovery, Implications on mobility; Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP; TCP over 2.5 / 3G wireless networks.

Reference Books :

1. Jochen Schiller, Mobile Communications, Pearson 2004.
2. Rajaport: Wireless communication
3. Asoke Talukder& Roopa Yavagal Mobile Computing, McGraw-Hill Communications Engineering Publications
4. Mobile Computing And Wireless Communications by Amjad Umar
5. Principles of Mobile Computing and Communications by Mazliza Othman

PAPER 3

DATA COMMUNICATIONS (MCEC13)

1. Communication Networks and Services:

Evolution of Network Architecture and Services: Telegraph Networks and Message Switching, Telephone Networks and Circuit Switching, The Internet, Computer Networks and Packet Switching

2. Applications and Layered Architectures:

Examples of Protocols, Services, and Layering : HTTP, DNS, and SMTP, TCP and UDP Transport Layer Services; The OSI Reference Model: The seven layer OSI Reference Model, Unified View of Layers, Protocols, and Services Overview of TCP/IP Architecture: TCP/IP Architecture, TCP/IP Protocol : How the layer work together, Protocol Overview; Application Layer Protocols and TCP/IP Utilities

3. Digital Transmission Fundamentals-I :

Digital Representation of Information: Block-Oriented Information, Stream Information; Basic properties of Digital Transmission Systems; Digital Representation of Analog Signals: Bandwidth of Analog Signals, Sampling of an Analog Signal, Digital Transmission of Analog Signals; Characterization of Communication Channels: Frequency Domain Characterization, Time Domain Characterization; Fundamental Limits in Digital Transmission:

4. Digital Transmission Fundamentals-II :

The Nyquist Signaling Rate, The Shannon Channel Capacity; Line Coding ;Modems and Digital Modulation: Binary Phase Modulation, QAM and Signal Constellations, Telephone Modem Standards; Properties of Media and Digital Transmission Systems: Twisted Pair, Coaxial Cable, Optical Fiber, Radio Transmission, Infrared Light; Error Detection and Correction: Error Detection, Two Dimensional Parity Checks, Internet Checksum, Polynomial Codes, Standardized Polynomial Codes, Error Detecting Capability of a Polynomial Code;

5. Circuit Switching Networks:

Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Wavelength-Division Multiplexing; SONET: SONET Multiplexing, SONET Frame Structure; Transport

Networks : SONET Networks, Optical Transport networks; Circuit Switches: Space Division Switches, Time Division Switches; The Telephone Network: Transmission Facilities, End to End Digital Services ;

6. Peer-to-Peer Protocols and Data Link Layer:

Peer-to-Peer Protocols Service Models; ARQ Protocols and Reliable Data Transfer Service: Stop-and-Wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ; Other Peer-to-Peer Protocols;

7. Data Link Controls:

Framing; Point to Point Protocol; HDLC Data link Control; Link Sharing using Packet Multiplexers: Statistical Multiplexing , Speech Interpolation and the Multiplexing of Packetized Speech;

8. Medium Access Control Protocols and Local Area Networks:

Multiple Access Communications; Random Access : ALOHA, Slotted ALOHA, CSMA, CSMA-CD; Scheduling Approaches to Medium Access Control : Reservation Systems, Polling, Token-Passing Rings; Channelization: FDMA, TDMA, CDMA;

9. High Speed Digital Access & Connecting Devices

DSL (Digital Subscriber Line): DSL Technology; Cable Modems; Connecting Devices: Repeaters, Hubs, Bridges, Two-Layer Switch , Router and three-layer Switches.

Reference Books :

1. Alberto Leon – Garcia and Indra Widjaja , Communication Networks -Fundamental Concepts and Key architectures, Tata McGraw-Hill 2nd edition.
2. Behrouz A. Forouzan , Data Communications and Networking, Tata McGraw-Hill 3rd Edition .
3. William Stallings , Data and Computer Communication, Fifth Edition, Prentice Hall India.
4. William A. Shay, Understanding Data Communications and Networks, 2nd Edition, Thomson.
5. Godbole, Data Communications and Networks, Tata McGraw-Hill 2002.

PAPER 4 (ELECTIVE – I)
CODE DIVISION MULTIPLE ACCESS (MCEC111 CDMA)

1. Introduction to Access Technologies:

Introduction. Major Attributes of CDMA Systems. Third-Generation Systems. Multiple Access Technologies. Modes of Operation in Wireless Communications.

2. Direct Sequence Spread Spectrum and Spreading Codes:

Introduction. Types of Techniques Used for Spread Spectrum. The Concept of Spread Spectrum System. The Performance of DSSS. Bit Scrambling. The Performance of a CDMA System. Pseudorandom Noise Sequences.

3. Diversity, Combining, and Antennas:

Introduction. Diversity Reception. Types of Diversity. Basic Combining Methods. BPSK Modulation and Diversity. Examples of Base Station and Mobile Antennas.

4. IS-95 CDMA : System Architecture and Air Interface:

Introduction. TR-45/TR-46 Reference Model. Functional Model Based on Reference Model. Wireless Intelligent Network.. TIA IS-95 CDMA System.

5. Physical and Logical Channels of IS-95 CDMA:

Introduction. Physical Channels. Modulation. Bit Repetition. Block Interleaving. Channel Coding. Logical Channels.

6. IS-95 CDMA Call Processing and Signaling Applications:

Introduction. CDMA Call Processing State. CDMA Registration. Authentication. Layered Structure. A-Interface, Roaming.

7. Soft Handoff and Power Control in IS-95 CDMA:

Introduction. Types of Handoff. Pilot Sets. Search Windows. Handoff Parameters. Handoff Messages. Handoff Procedures. Setup and End of Soft Handoff. Maintenance of Pilot Sets. The Need for Power Control. Reverse Link Power Control. Forward Link Power Control.

8. RF Engineering and Network Planning:

Introduction. Radio Design for a Cellular/PCS Network. Radio Network Planning. Radio Link Design. Estimation of Cell Count. Radio Coverage Planning. Dual-Mode CDMA Mobiles, Interfrequency Handoff.

9. CDMA-2000 System.

Introduction. cdma2000 Layering Structure. cdma2000 Channels. Logical Channels Used by PLICF. Physical Layer. Forward Link Physical Channels. Forward Link Features. Reverse Physical Channels. Data Services in cdma. Mapping of Logical Channels to Physical Channels. Evolution of cdmaOne (IS-95) to cdma. Major Technical Differences between cdma2000 and W-CDMA.

Reference Books :

1. W. Stallings, "Wireless Communications and Networks", Prentice Hall, 002.
2. T.S. Rappaport, "Wireless Communications: Principles & Practice", Second Edition, Prentice Hall, 2002.
3. J. Schiller, "Mobile Communications", Addison Wesley, 2000.
4. V.K. Garg, "IS-95 CDMA and cdma 2000", Prentice Hall PTR, 2000

PAPER 4 (ELECTIVE – I)
MULTIMEDIA COMPUTING (CEC112)

1.INTRODUCTION:

Multimedia Elements; Multimedia Application; Multimedia Systems Architecture; Evolving Technologies for Multimedia Systems; Defining Objects for Multimedia Systems, Multimedia data Interface standards; The need for data compression; Multimedia Databases.

2.MEDIA AND DATA STREAMS-I:

Media: Perception media, representation Media, Presentation Media, Storage Media, Transmission media, Information Exchange media, presentation exchange media, Presentation spaces and values, and presentations dimensions; key properties of a multimedia system:

3.MEDIA AND DATA STREAMS-II:

Discrete & Continuous media, Independent media, computer controlled systems, Integration, characterizing data Streams: Asynchronous transmission mode. Synchronous Transmission media, Isochronous transmission mode, characterizing continuous media data Streams.

4. AUDIO TECHNOLOGY:

Sound: frequency, Amplitude, Sound perception and psychoacoustics; Audio representation on computer; Three dimensional Sound projection, Music and MIDI Standards; Speech Signals; Speech output; 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 AND COMPUTER BASED ANIMATION:

Basics; Television systems, digitalization of video systems, Digital Television, Basic concepts, specification of animations, methods of controlling animations, display of animation, transmission of animation, virtual reality modeling language.

7. DATA COMPRESSION-I:

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

8. DATA COMPRESSION-II:

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; Distributed Application Design issues.

Reference Books :

1. Ralf Steinmetz, Klara Narstedt, ,” Multimedia Fundamentals: Vol 1- Media Coding and content Processing”, Pearson Education/PHI, 2 nd Edition, 2003.
2. Prabhat K Andeleigh, Kiran Thakrar, “Multimedia Systems Design”, PHI, 2003
3. K.R.Rao, Zoran S Bojkovic and Dragorad A.Milovanovic,”Multimedia Communication Systems: Techniques, Standards, and Networks”, Pearson, 2002.
4. Nalin K Sharad, “Multimedia information Networking”, PHI,2002.
5. Ze-Nian Li & Mark S. Drew, "Fundamentals of **Multimedia**", Pearson Education, 2004

PAPER-5 ELECTIVE -II
JAVA AND J2ME (MCEC121)

1. Java Language:

The Java Revolution- Java Applets, Revolutionary Programming Language, Rich Object Environment. Java Language Introduction- Hello World, Lexical Issues, Variables. Types- Simple Types, Arrays. Classes-Object References, The new operator, The Dot(.) Operator, Method Declaration, Constructors, Method Overloading, Inheritance, Dynamic Method Dispatch, Abstract, Packages and Interfaces- Packages, Interfaces.

2. Java Classes:

String handling- Constructors, String syntax, Character Extraction, Comparison, String Copy Modifications, Exception Handling-Exception Types, Try and catch, Multiple catch Clauses, Nested try Statements, Exception sub Classes, Threads and Synchronization- Single Threaded Event Loop, The Java Thread Model, Input/ Output- File, Input Stream, Output Stream, File Streams. Applets- HTML Applet Tag.

3. Structural:

:

The Web Explained- How It Works, Apache web Server- Introduction, Starting, Stopping and Restarting Apache, Configuration, Securing Apache, Create The Website, Apache Log Files, MySQL- Introduction, Tutorial, Database Independent Interface, Table joins, Loading and Dumping a Database.

4. Dynamic:

The Common Gateway Interface- Introduction, Apache Configuration, A First CGI Program, What Can Go Wrong?, CGI.pm Introduced, CGI.pm HTML Shortcuts, Information Received by the CGI Program, Form Widget Methods, CGI Security Considerations, A Note about *die()*, Project- CGI/MySQL/DBI

5. Embedded :

Server Side Includes- Introduction, Security Considerations. PHP – Introduction, Embedding PHP into HTML, Configuration, Quick Examples, Language Syntax, Built-In PHP Functions, PHP and MySQL, Project.

6. Java language:

Java Virtual Machine and bytecode, Classes, source, and compilers, Class files, loaders and compilers, Object orientation, Classes and instances, Object Oriented techniques, Classes and Objects, Abstract classes , Interfaces, Polymorphism, Dynamic dispatch Error handling, Using inner classes

7. Standard libraries:

Storing data in Java, Collections, Hashtable and HashMap, Vector and List, Collections in Java 2, I/O Programming, GUI Programming, AWT, Swing

8. J2ME components:

KVM, CLDC, MIDP, Personal Java, Overview of profile system Architecture, J2ME language differences, Developing Midlets, Testing code, Comparison of different ME platforms, Differences between J2ME environments,, Mobile information device profile, Creating MIDP applications, Midlet suites Midlet deployment, Graphical User Interfaces - MIDP, Display Screens, Animations, Threading and Synchronisation, Threading, Creating Threads in Java Synchronisation

9. J2ME Capabilities

Streamed IO, Socket IO (TCP/IP), J2ME IO, Networking with HTTP, Persisting data on portable devices - JSR 75 Connectivity, SMS, Bluetooth, IrDA - Infrared Data Adapter, Networking, Push Registry ,MMAPI - JSR 135, SIPAPI - JSR 180, Game API

Reference Books :

1. The Java Hand Book by Patrick Naughton, TMH, Eleventh Reprint, 2002
2. Open Source Web Development with LAMP- Using Linux, Apache, MySQL, Perl and PHP by James Lee and Brent Ware, Addison – Wesley/Person Education Inc. 2003
3. The Complete Reference Java, Herbert Schildt, TMH, Fourth Edition, 2002
4. J2ME in a Nutshell - By Kim Topley – Oreilly publications
5. J2ME: The Complete Reference – By Keogh, James- Tata McGraw Hill Edition

PAPER-5 ELECTIVE II
WIRELESS AND ATM NETWORKS (MCEC122)

1. PCS Architecture:

Cellular telephony, cordless telephony & low tier PCS, 3rd & 4th generation wireless systems.

2. Mobility management:

Handoff, roaming management for SS and CT2, handoff detection strategies for handoff detection, channel assignment, link transfer types, hard and soft handoff.

3. IS-41 signalling:

IS-41 handoff and authentication, CD PD architecture CDPD air interface RADio resource allocation, GSM architecture, location tracking,

4. Data services

HSCPD, GPRS, GSM NETWORK SIGNALLING, GSM mobility management, GSM short message services,

5. International Roaming:

GSM, VOIP for GSM networks, GPRS functional groups, architecture, network nodes, interfaces, procedures, billings, evolving from GSM to GPRS, WAP protocols,

6. WCDMA & CDMA 2000:

QOS in 3G, paging n/w architectures, wireless local loop architectures, Bluetooth core protocols.

7. ATM Adaptation:

ATM user and Control plane protocols. ATM and MPLS support for Voice and Video and data. ATM and MPLS support for connection oriented protocols.

8. Introduction to wireless LANS:

802.11 WLANs, physical & MAC layers, wireless ATM & HIPER LAN, 802.15 WPAN,

9. Advanced Wireless LANS:

Bluetooth, interface between Blue tooth & 802.11, wireless geo location system architecture, standards, performance measure, other wireless LAN standards

Reference Books :

1. Yi-Bing Lin, Imrich Chlamtac, Wireless and mobile network architectures, John Wiley, 2001
2. Kaveh Pablayan, P. Krishnamurthy, Principles of wireless networks, Pearson education, 2002
3. P. Venkataram, S. S. Manvi, B. P. Vijaykumar, WLANs: Architectures, Protocols and Applications, Pearson education (In Press), 2005
4. Marlyn Mallick, Mobile and wireless design essentials, Wiley, 2003
5. Wireless Network Security: Books: John R. Vacca by John R. Vacca.

FINAL

PAPER-6

COMMUNICATION PROTOCOLS OVER WIRELESS NETWORKS. (MCEC21)

1. Introduction to Internet

Internet in education, Next generation internet, Strategies and educational implication.

2. Computer Networks:

Circuits, Multiplexing and Switching – General Network Topologies, Data communications and Private lines, Data Transmission methods, Principles of Multiplexing and switching. Basic Protocol concepts – Protocol Layering, OSI Reference model, layered data communication Architectures, Network service paradigms.

Introduction to queuing theory

Description, characteristics, notation of queuing problem, measuring system performance, general results, bookkeeping, Poission Process and the exponential Distribution, Steady state Birth & Death Process.

TDM and Narrowband ISDN

Circuit switching, private line networks, TDM, N-ISDN.

Connection Oriented Protocols

X.25 and Frame Relay – Packet switching, Frame Relay user plane and Control plane.

Connectionless Protocols

IP and SMDS – TCP IP protocol suite, switched multi megabit data service.

LANS, bridging and Routing – LAN standards and protocol model, Bridging concepts and protocols, Routing concepts and protocols. Polling and random access in data networks.

7. ATM and MPLS:

ATM in LAN, IP over ATM, ATM and MPLS – Physical layer and Label switching functions.

8. ATM Adaptation and MPLS tunneling protocols:

ATM user and Control plane protocols. MPLS routing and signaling protocols. ATM and MPLS support for Voice and Video and data. ATM and MPLS support for connection oriented protocols.

9. ATM and MPLS support for LAN protocols:

ATM and MPLS support of IP networks.

Reference Books :

1. James F. Kurose and Keith W. Ross: Computer Networking A Top-down Approach Featuring the Internet. Pearson Education
2. Kamilo Feher, "Wireless Digital Communications: Modulation and Spread Spectrum Techniques," Prentice Hall of India, 2004.
3. Xiaodong Wang and Vincent Poor, "Wireless Communication Systems: Advanced Techniques for Signal Reception," Pearson Education (Asia) Pte. Ltd, 2004.
4. Mischa Schwartz: Telecommunication Networks Protocols, Modeling and Analysis.
5. David E McDysan and Dave Paw – Communications Networking

PAPER 7- ELECTIVE - III

CRYPTOGRAPHY & NETWORK SECURITY (MCEC231)

1. Symmetric Ciphers

Overview: Services, Mechanisms and Attacks, The OSI Security Architecture, A Model of Network Security. Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

2. Block Cipher and the Data Encryption Standard:

Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis.

3. Symmetric Ciphers: Triple DES, Blowfish. Confidentiality Using Conventional Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.

4. Public-Key Encryption:

Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality. Public-Key Cryptography and RSA Principles of Public-Key Cryptosystems, The RSA Algorithm, Key Management, Diffie Hellman Key Exchange.

5. Digital signatures and Authentication Protocols Number Theory: Message Authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes, MD5 Message Digest Algorithm. Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard.

6. Network Security

Authentication Applications: Kerberos, X.509 Directory Authentication Service. Electronic Mail Security: Pretty Good Privacy.

7. IP Security:

Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload.

8. Web Security:

Web Security Requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

9. System Security

Intruders: Intruders. Malicious Software: Viruses and Related Threats, Countermeasures.

Firewalls: Firewall Design Principles.

Reference Books :

1. William Stallings, Cryptography and Network Security, Third Edition, Pearson Education,
2. Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security: Private communication in a Public World, Second Edition, Pearsdon Education Asia, 2002.
3. Atul Kahate, Cryptography and Network Security, Tata McGrawHill, 2003
4. Eric Maiwald, "Fundamentals of Network Security," McGraw-Hill, 2003.
5. John Hershey, "Cryptography Demystified," McGraw-Hill, 2002.

PAPER 7 ELECTIVE - III
NETWORK MANAGEMENT (MCEC232)

1. Introduction :

Analogy of Telephone Network Management, Data and Telecommunication Network Distributed computing Environments, TCP/IP-Based Networks: The Internet and Intranets, Communications Protocols and Standards- Communication Architectures, Protocol Layers and Services; The Importance of topology , Filtering Does Not Reduce Load on Node, Some Common Network Problems; Goals, Organization, and Functions- Goal of Network Management, Network Provisioning, Network Operations and the NOC, Network Installation and Maintenance;

2. Basic Foundations: Standards, Models, and Language:

Network Management Standards, Network Management Model, Organization Model, Information Model – Management Information Trees, Managed Object Perspectives, Communication Model; ASN.1- Terminology, Symbols, and Conventions, Objects and Data Types, Object Names, An Example of ASN.1 from ISO 8824; Encoding Structure; Macros, Functional Model

3. Broadband Network Management: ATM Networks:

Broadband Networks and Services, ATM Technology – Virtual Path-Virtual Circuit, TM Packet Size, Integrated Service, SONET, ATM LAN Emulation, Virtual LAN; ATM Network Management –

4. SNMPv1 Network Management: Communication and Functional Models:

The SNMP Communication Model – The SNMP Architecture, Administrative Model, SNMP Specifications, SNMP Operations, SNMP MIB Group, Functional Model.

5. SNMPv1 Network Management : Organization and Information Models :

Managed Network: The History of SNMP Management, Internet Organizations and standards, Internet Documents, The SNMP Model, The Organization Model, System

Overview, The Information Model – Introduction, The Structure of Management Information, Managed Objects, Management Information Base

6. SNMP Management

Remote Monitoring, RMON SMI and MIB, RMON1- RMON1 Textual Conventions, RMON1 Groups and Functions, Relationship Between Control and Data Tables, RMON1 Common and Ethernet Groups, RMON Token Ring Extension Groups, RMON2 – The RMON2 Management Information Base, RMON2 Conformance Specifications;

7. Network Management Applications:

Configuration Management- Network Provisioning, Inventory Management, Network Topology, Fault Management- Fault Detection, Fault Location and Isolation Techniques

8. Performance Management –

Performance Metrics, Data Monitoring, Problem Isolation, Performance Statistics; Event Correlation Techniques – Rule-Based Reasoning, Model-Based Reasoning, Case-Based Reasoning, Codebook correlation Model, State Transition Graph Model, Finite State Machine Model,

9. Security Management

Policies and Procedures, Security Breaches and the Resources Needed to Prevent Them, Firewalls, Cryptography, Authentication and Authorization, Client/Server Authentication Systems, Messages Transfer Security, Protection of Networks from Virus Attacks, Accounting Management, Report Management, Policy-Based Management, Service Level Management.

Reference Books :

1. W. Stallings, “ Data and Computer Communications”
2. A S Tanenbaum, ”Computer Networks”
3. J Martin ,” Computer NetWorks & DISTRIBUTED PROCESSING
4. Network Management- Principles and Practice, Mani Subramanian, Pearson Education Publication, 2003
5. Donal Gross, Carl M Harris, Fundamentals of Queueing Theory, Willy Series
