

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA
(University of Technology of Madhya Pradesh)

Air Port Bypass Road
Gandhi Nagar, Bhopal-462 036

COURSE OF STUDY AND SCHEME OF EXAMINATION
MASTER OF COMPUTER APPLICATIONS (MCA)

W.E.F. 2005-2006

MCA FIFTH SEMESTER

| Course No. | Course Name | L (Hrs) | T (Hrs) | P (Hrs) | Theory Marks | | Sessional Marks | | Practical Marks | | Total Marks |
|------------|-----------------------------|------------|------------|------------|-----------------|-----|--------------------|-----|--------------------|-----|----------------|
| | | | | | Max | Min | Max | Min | Max | Min | |
| MCA-501 | Data Warehousing and Mining | 3 | 1 | - | 100 | 40 | 50 | 30 | - | - | 150 |
| MCA-502 | UNIX & Shell Programming | 3 | 1 | 4 | 100 | 40 | 50 | 30 | 50 | 25 | 200 |
| MCA-503 | Internet & Its Applications | 3 | 1 | - | 100 | 40 | 50 | 30 | - | - | 150 |
| MCA-504 | Elective-II (E-II) | 3 | 1 | - | 100 | 40 | 50 | 30 | - | - | 150 |
| MCA-505 | Elective-III (E-III) | 3 | 1 | - | 100 | 40 | 50 | 30 | - | - | 150 |
| MCA-506 | Minor Project II | - | - | 6 | - | - | 100 | 60 | 100 | 50 | 200 |
| | Total | 15 | 5 | 10 | 500 | | 350 | | 150 | | 1000 |

Elective-II

- E-II(a) : Modeling & Simulation
- E-II(b) : Organizational Behavior
- E-II(c) : Soft Computing
- E-II(d) : Networking Programming
- E-II(e) : .Net Technology

Elective-III

- E-III(a) : Distributed Systems
- E-III(b) : Computer Vision & Digital Image Processing
- E-III(c) : Bio-informatics
- E-III(d) : Embedded Systems
- E-III(e) : Network Security

MCA-501

Data Warehousing and Mining

UNIT – I

Motivation, importance, Data type for Data Mining : relation Databases, Data Warehouses, Transactional databases, advanced database system and its applications, Data mining Functionalities: Concept/Class description, Association Analysis classification & Prediction, Cluster Analysis, Outlier Analysis, Evolution Analysis, Classification of Data Mining Systems, Major Issues in Data Mining.

UNIT – II

Data Warehouse and OLAP Technology for Data Mining: Differences between Operational Database Systems and Data Warehouses, a multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology.

UNIT- III

Data Preprocessing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Languages, and System Architectures, Concept Description: Characterization and Comparison, Analytical Characterization.

UNIT – IV

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single-Dimensional Boolean Association Rules from Transactional Databases: the Apriori algorithm, Generating Association rules from Frequent items, Improving the efficiency of Apriori, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint-Based Association Mining.

UNIT – V

Classification & Prediction and Cluster Analysis: Issues regarding classification & prediction, Different Classification Methods, Prediction, Cluster Analysis, Major Clustering Methods, Applications & Trends in Data Mining: Data Mining Applications, currently available tools.

BOOKS

1. J. Han and M. Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Pub.
2. Berson “Dataware housing, Data Mining & DLAP, @004, TMH.
3. W.H. Inmon “ Building the Datawarehouse, 3ed, Wiley India.
4. Anahory, “Data Warehousing in Real World”, Pearson Education.
5. Adriaans, “Data Mining”, Pearson Education.
6. S.K. Pujari, “Data Mining Techniques”, University Press, Hyderabad.

Note : Paper is to be set unit wise with internal choice.

MCA-502

UNIX & Shell Programming

UNIT-I

General Overview of the System: System structure, user perspective, O/S services assumption about Hardware The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer, Reading and writing disk block, Advantage and disadvantage of buffer cache.

UNIT-II

Internal Representation of Files: INODES, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks.

System Calls for the System: Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES Mounting and unmounting files system, Link Unlink.

UNIT-III

Structures of Processes and process control: Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination. The user Id of a process, changing the size of a process. The SHELL

Interprocess Communication and multiprocessor system: Process tracing system V IPO network communication sockets problem of multiprocessors systems, solution with master and hare process, and solution with semaphores.

UNIT-IV

Introduction to shell scripts: shell Bourne shell, C shell, Unix commands, permissions, editors, filters sed, grep family, shell variables, scripts, metacharacters and environment, if and case statements, for while and until loops. Shell programming.

UNIT-V

Awk and perl Programming: Awk pattern scanning and processing language, BEGIN and END patterns, Awk arithmetic and variables, Awk built in variable names and operators, arrays, strings, functions, perl; the chop() function, variable and operators, \$_ and \$. , Lists, arrays, regular expression and substitution, file handling, subroutines, formatted printing.

Linux:

History & Features of Linux, Linux structure, various flavours of linux.

BOOKS

1. M.J. Bach “Design of UNIX O.S. “, Prentice Hall of India.
2. Y.Kanetkar “Unix shell programming”, BPB Pub.
3. B.W. Kernighan & R. Pike, “The UNIX Programming Environment”, Prentice Hall of India, 1995.
4. S. Prata “Advanced UNIX: A Programming's Guide”, BPB Publications, New Delhi.
5. Vikas/Thomsaon “Jack Dent Tony Gaddis “Guide to UNIX using LINUX” Pub. House Pvt. Ltd.
6. Linux complete, BPB Publications
7. Linux Kernel, Beck Pearson Education, Asia.
8. Sumitabha Das “ Unix concepts and Applications”.

Note : Paper is to be set unit wise with internal choice.

MCA-503

Internet & Its Applications

UNIT-I

Motivation for internetworking, the TCP/IP internet, internet service, internet protocol and standardization, Ethernet, FDDI, LAN, WAN, ATM, application and network level interconnection, properties of internet, internet architecture, inter connection through IP routers, Internet addresses.

UNIT-II

ARP, RARP, **internet protocol** : *connectionless datagram delivery, routing IP datagrams* ,subnet and supernet address extensions.

UNIT-III

The TCP/IP internet layering model, the protocol layering principle, boundaries in the TCP/IP model, **UDP:** *the user datagram protocol, format of UDP message, UDP pseudo-header, UDP encapsulation and protocol layering, laying and the UDP checksum computaion, UDP multiplexing, demultiplexing, and ports, reliable stream transport service: properties of the reliable delivery service, transmission control*

protocol, response to congestion, establishing and closing TCP connection, Routing: Cores, peers and algorithms, an exterior gateway protocol.

UNIT-IV

The domain name system, applications, Telnet, FTP, SMTP, POP3, IMAP-4, MIME, SNMP, internet security and firewall design,.

UNIT-V

Good web design, the process of web publishing, document overview, header elements, heading, image, forms, tables, website hosting, HTTP & URL, search engines, Javascript, ASP, servlets.

BOOKS

1. Douglas E. Comer “Internetworking with TCP/IP”, Volume-I, PHI.
2. Thomas A. Powell “The Complete reference HTML”, TMH.
3. Douglas Comer “The Internet Book - Pearson Education”, Asia
4. K.Kalata “Internet Programming Thomson learning”.
5. E.Stephen Mack & Janan Platt “HTML 4.0”, BPB Pub
6. Joel sklar “Principles of Web Design”, Vikas Pub. House.

Note : Paper is to be set unit wise with internal choice.

MCA-504

Elective-II : E-II(a) : Modeling & Simulation

UNIT-I

Systems: Models types, principles used in modelling, system studies, interacting subsystems and example, simulation definition, examples, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT-II

System Simulation : Techniques of simulation, monte carlo method, comparison of simulation and analytical methods, numerical computation techniques for continuous and discrete models, distributed leg models, cobweb models.

UNIT-III

Continuous system simulation : Continuous system models, differential equation, analog computer analog methods, digital analog simulators, CSSLS, CSMPIII language.

System Dynamics : Historical background, exponential, Growth and decay models, modified exponential growth models, logistic curves and generalization of growth models, system dynamics diagrams, dynamo language.

UNIT-IV

Probability concepts in simulation : Stochastic variables, discrete and continuous probability function, continuous uniform distributed and computer generation of random numbers, uniform random number generator, non uniform continuously distributed random numbers, rejection method.

Discrete system simulation : Discrete events, representation of time, generation of arrival patterns, simulation of telephone system, delayed calls, simulation programming tasks, gathering statistics, discrete simulation languages.

UNIT-V

Object Oriented approach in simulation, simulation in C++, Introduction to GPSS, general description, action times, choice of paths, simulation of a manufacturing shop, facilities and storage, program control statements, priorities and parameters, numerical attributes, functions, simulation of a supermarket transfer models, GPSS model applied to any application, simulation programming techniques like entry types.

BOOKS

1. G.Gordan “System Simulation” , 2nd Ed, 2002 PHI.
2. T.A. Payer “Introduction to Simulation”, McGraw Hill.
3. W.A. Spriet “Computer Oriented Modeling and Simulation”.
4. Narsingh Deo “System Simulation with Digital Computers”, PHI.
5. V. Rajaraman “Analog Simulation”, PHI
6. Law & Kelton “Simulation Modelling and Analysis” 3rd Ed., 2000, McGraw Hill.

Note : Paper is to be set unit wise with internal choice.

MCA-504

Elective – II: EII(b) Organizational Behaviour

UNIT – I

Organizational Behavior Today: What is Organizational Behavior, shifting paradigms of organizational behavior, organizational behavior and diversity.

Learning about Organizational Behavior: Organizational Behavior and learning imperative scientific foundations of organizational behavior.

UNIT – II

Challenge and Opportunities for organizational behavior: Towards improving quality & productivity, improving people skills from management control to empowerment, from statorility of flexibility, improving ethical behavior, organizational social responsibility work and quality of life.

UNIT- III

A Micro Perspective of Organizational Behavior: The perception process, personality and attitudes, motivation: motivating performance through job design and goal setting, learning: processes rewards systems and behavior management.

UNIT – IV

Micro and Macro Dynamics of Organizational Behavior: Graph dynamics and teams, interactive conflict and negotiation skills, stress: cause effects and coping strategies, leadership styles, activities and skills.

A Macro Perspective of Organizational Behavior: Communications, decision-making, Organizational Theory & Design, Organizational Culture.

UNIT – V

Horizons for Organizational Behavior: International Organizational Behavior(IOB), the impact of culture on IOB, Communication in IOB, motivation across culture, managerial leadership across cultures

Organizational Change & Development: Learning objectives, the changes facing organizations, managing change and organizational development, future of organizational Behavior.

BOOKS

1. Fred Luthans “Organizational Behavior”, McGraw Hills international Edition, Management & Organization series.
2. Schermerhorn, Hunt & Osborn “Organizational Behavior” (7th Edition), John Wiley & Sours Inc.
3. Stephen P. Robbins “Organizational Behavior: Concepts controversies applications”, PHI publications.
4. A.J.Robertson Lvan T. and Cooper, Cary.L. “Work Psychology Understanding Human Behavior in the workplace” Macmillan India Ltd. Delhi 1996.
5. M.N. Mishra “Organizational Behavior”, Vikas Pub. Co.

Note : Paper is to be set unit wise with internal choice.

MCA-504

Elective II : EII(c) : Soft Computing

UNIT-I

Introduction, Soft Computing concept explanation, brief description of separate theories.

Neural Networks and Probabilistic Reasoning; Biological and artificial neuron, neural networks and their classification. Adaline, Perceptron, Madaline and BP (Back Propagation) neural networks. Adaptive feedforward multilayer networks. Algorithms: Marchand, Upstart, Cascade correlation, Tilling. RBF and RCE neural networks. Topologic organized neural network, competitive learning, Kohonen maps.

UNIT-II

CPN , LVQ, ART, SDM and Neocognitron neural networks. Neural networks as associative memories (Hopfield, BAM). Solving optimization problems using neural networks. Stochastic neural networks, Boltzmann machine.

UNIT-III

Fundamentals of fuzzy sets and fuzzy logic theory, fuzzy inference principle. Examples of use of fuzzy logic in control of real-world systems.

UNIT-IV

Fundamentals of genetic programming, examples of its using in practice. Genetic Algorithms Applications of GA's – Class.

UNIT-V

Fundamentals of rough sets and chaos theory. Hybrid approaches (neural networks, fuzzy logic, genetic algorithms, rough sets).

BOOKS

1. Cordón, O., Herrera, F., Hoffman, F., Magdalena, L.: Genetic Fuzzy systems, World Scientific Publishing Co. Pte. Ltd., 2001, ISBN 981-02-4016-3
2. Kecman, V.: Learning and Soft Computing, The MIT Press, 2001, ISBN 0-262-11255-8
3. Mehrotra, K., Mohan, C., K., Ranka, S.: Elements of Artificial Neural Networks, The MIT Press, 1997, ISBN 0-262-13328-8
4. Munakata, T.: Fundamentals of the New Artificial Intelligence, Springer-Verlag New York, Inc., 1998. ISBN 0-387-98302-3
5. Goldberg : Introduction to Genetic Algorithms
6. Jang, “ Nero-Fuzzy & Soft Computing”, Pearsons

Note : Paper is to be set unit wise with internal choice.

MCA-504

Elective II : E-II(d) : Network Programming

UNIT-I

Communication protocol, Internet Protocols, Novell, System Network Architecture, UUCP, IPX/SPX for LANS, protocol comparisons.

UNIT-II

Berkeley sockets

Overview, unix domain protocols, socket address, socket system call, reserved ports, passing file descriptions, I/O asynchronous and multiplexing, socket implementation.

UNIT-III

Winsock programming

Using windows socket, API window socket and blocking I/O, other window extension, network dependent UNRI, DLL. sending and receiving data over connection/termination.

UNIT-IV

Novell IPX/SPX

Novell's windows drivers, netware C interface for windows, IPX/SPX procedure, datagram communication, connection oriented communication with SPX,IPX/SPX implementation of DLL.

UNIT-V

Programming Applications

Time and data routines, trivial file transfer protocol, remote login.

BOOKS

1. Davis R, Windows Network Programming, Add Wesley.
2. Steven R, Unix Network Programming, (Vol I & II) PHI.

MCA-504

Elective II : EII(e) : .Net Technology

UNIT-I

Introduction to .NET Technology, Introduction to VB.NET, Software development and Visual Basic .NET, Visual Basic .NET and .NET frame.

UNIT-II

Visual Basic fundamentals: The Visual Basic .NET Development Environment, The element of VB.NET, VB.NET operators, Software design, Conditional structure and control flow, Methods.

UNIT-III

Classes and Objects: Types, Structure and Enumeration, Classes, Interfaces, Exception handling and Classes, Collections, Arrays and other Data Structure.

UNIT-IV

Advance design concepts, Patterns, Roles and Relationships, Advanced Interface Patterns: Adapters and Delegates and Events Data Processing and I/O.

UNIT-V

Writing Software with Visual Basic .NET, Interfacing with the End User, Introduction to ASP.NET and C#.NET and their features.

BOOKS

1. Jeffrey R. Shapiro "The Complete Reference Visual Basic .NET" Tata Mcgraw Hill (2002 Edition).

2. Rox "Beginner and Professional Edition VB.NET" Tata Mcgraw Hill.
3. Steven Holzner "Visual Basic .NET Black Book" Wiley Dreamtech Publication.
4. Alex Homer, Dave Sussman "Professional ASP.NET1.1" Wiley Dreamtech
2. Bill Evzen, Bill Hollis "Professional VB.NET 2003" Wiley Dreamtech
3. Tony Gaddis "Starting Out VB.NET PROG.2nd Edition" Wiley Dreamtech
4. Chris Ullman, Kauffman "Beg. ASP.NET1.1 with VB.NET 2003" Wiley Dreamtech
5. Chris Ullman, Kauffman "Beg ASP.NET1.1 with VC#.NET 2003" Wiley Dreamtech

MCA-505

Elective-III : EIII(a) Distributed Systems

UNIT-I

Introduction to Distributed Systems : Goals of Distributed Systems, Hardware and Software concepts, the client server model, Remote procedure call, remote object invocation, message and stream oriented communications.

UNIT-II

Process and synchronization in Distributed Systems : Threads, clients, servers, code migration, clock synchronization, mutual exclusion, Bully and Ring Algorithm, Distributed transactions.

UNIT-III

Consistency, Replication, fault tolerance and security : Object replication, Data centric consistency model, client-centric consistency models, Introduction to fault tolerance, process resilience, recovery, distributed security architecture, security management, KERBEROS, secure socket layer, cryptography.

UNIT-IV

Distributed Object Based and File Systems : CORBA, Distributed COM, Goals and Design Issues of Distributed file system, types of distributed file system, sun network file system,.

UNIT-V

Distributed shared memory, DSM servers, shared memory consistency model, distributed document based systems : the world wide web, distributed co-ordination based systems: JINI

Implementation: JAVA RMI, OLE, ActiveX, Orbix, Visbroskes, Object oriented programming with SOM

BOOKS

1. Andrew S. Tanenbaum, Maarten Van Steen "Distributed Systems Principles and Paradigms" Pearson Education Inc. 2002.
2. Lui "Distributed Computing Principles and Applications".
3. Harry Singh "Progressing to Distributed Multiprocessing" Prentice-Hall Inc.
4. B.W. Lampson "Distributed Systems Architecture Design & Implementation", 1985 Springer Verlag.
5. Parker Y. Verjies J. P. "Distributed computing Systems, Synchronization, control & Communications" PHI.
6. Robert J. & Thieranf "Distributed Processing Systems" 1978, Prentice Hall.
7. George Coulios, "Distribute System: Design and Concepts", Pearson Education

Note : Paper is to be set unit wise with internal choice.

MCA-505

Elective-III : EIII(b) Computer Vision and Digital Image Processing

UNIT-I

Introduction: The role of Computer Vision, applications, successes, research issues; its relationship to natural vision, basic image properties. Digital image representation, fundamental steps in image processing, elements of digital image processing systems digitization, Display and recording devices.

UNIT-II

Digital Image fundamentals: A simple Image model. Sampling and quantization, Relationship between pixel, imaging geometry, image transformation, introduction to fourier transformation, Discrete fourier transformation, fast fourier transformation.

UNIT-III

Image Enhancement: Histogram processing, image subtraction, image averaging, smoothing filters, sharpening filters, enhancement in frequency domain, low pass filtering, high pass filtering.

UNIT-IV

Image Encoding & Segmentation: Segmentation, detection of discontinuation by point detection, line detection, edge detection. Edge linking & Boundary Detection: Local analysis, global by Hough transform & Global by graph theoretic techniques.

UNIT-V

Image Representation and Description: Chain codes, polygonal approximation, signatures, boundary segments, boundary descriptors, regional descriptors, introduction to image understanding. Motion Tracking , Image differencing, Feature matching, Optic flow

BOOKS

1. Gonzalez and Woods "Digital Image Processing", Addison Wesley
2. Gonzalez and Woods "Digital Image Processing using MATLAB", Addison Wesley
3. SchalKoff: Digital Image Processing & Computer Vision, Addison Wesley.
4. M. Sonka et.al : Image Processing and Machine Vision, Prentice Hall.
5. Ballard & Brown: Computer Vision, Prentice Hall.
6. Jain A. K. Fundamentals of Digital Image Processing, PHI
7. Boyle and Thomas, "Computer Vision - A First Course" 2nd Edition, ISBN 0-632-028-67X, Blackwell Science 1995.
8. Low, "Introductory Computer Vision and Image Processing", McGraw-Hill 1991, ISBN 0-07-707403-3

Note : Paper is to be set unit wise with internal choice.

MCA-505

Elective- III : EIII(c) Bioinformatics

UNIT-I

Fundamentals of Bioinformatics and Information Technology : Introduction to bioinformatics, experimental sources of biological data fundamentals of molecular biology available databases operating system, including windows and Unix networks-including the intranets and the Internet.

Analytical science and Bioinformatics : High throughput sequencing, experimental determination of protein structures, Gene expression monitoring, proteomics, metabiomics.

UNIT-II

Protein Information resources : Introduction, biological databases, primary sequence databases, composite protein sequence database, secondary databases, composite protein pattern databases, structure classification databases, web addresses.

Genome information resources : Introduction, DNA sequence databases, specialised genomic resources.

DNA Sequence analysis : Introduction, why analyse DNA, Gene structure and DNA sequences, features of DNA sequence analysis, issues in the interpretation of EST searches, two approaches to gene hunting, the expression profile of a cell, cDNA libraries and ESTs, different approaches to EST analysis, effects of EST data on DNA databases.

UNIT-III

Pairwise alignment techniques : Introduction, database searching, alphabets and complexity, algorithms and programs, comparing two sequences a simple case, sub-sequences, identity and similarity, the dotplot, local and global similarity, global alignment the needleman and Wunsch algorithm, local alignment the Smith Waterman algorithm, dynamic programming, pairwise database searching.

Multiple sequence alignment : Introduction, the goal of multiple sequence alignment, multiple sequence alignment a definition, the consensus, computational complexity, manual methods, simultaneous methods, progressive methods, database of multiple alignment, searching databases with multiple alignments.

Secondary database searching : Introduction, why bother with secondary database searches, what is a secondary database.

UNIT-IV

Bioinformatics tools : Visualisation of sequence data, sequence alignment, homology searching, including BLAST, gene expression informatics, introduction to gene finding.

Building a sequence search protocol : Introduction, a practical approach, when to believe a result, structural and functional interpretation.

Analysis packages : Introduction, what's in an analysis package, commercial databases, commercial software, comprehensive packages, packages specialising in DNA analysis, intranet packages, internet packages.

UNIT-V

Applications and commercial aspects of Bioinformatics : Drug discovery, genetic basis of disease, personalised medicine and gene-based diagnostics, legal, ethical and commercial ramifications of bioinformatics.

Perl Programming : Data manipulation, file maintenance, pipelining, packaging and interfacing system facilities.

Macromolecular Modelling and Chemoinformatics : Acquisition of chemical information, including molecular structure from databases visualisation of molecules simulation of molecular interaction introduction to industry standard modelling software.

BOOKS

1. Attwood TK & Parry-smith DJ
"Introduction to Bioinformatics" 2001, Pearson Education Asia.
2. Setup Joao & Meidanis Joa
"Introduction to computational Molecular Biology" PWS Publishing Company, 1997 (An international Thouson publishing company).

8. Andreas D. Baxevan's & B.F. Francis Quellet, "Bio Informatics: A Practical guide to the analysis of Genes & Proteins", Second edition 2001, A John Wiley & Sons.
 9. Martin Tompa Lechre notes on Biological sequence Analysis, Department of Computer Science & Engineering, university of Washington, Seattle USA <http://www.cs.washington.edu/education/courses/527/oowi/>
 10. Jean Michael "Bioinformatics : A beginner's Guide", Wiley India.
- Note : Paper is to be set unit wise with internal choice.

MCA-505

Elective III : EIII(d) : Embedded Systems

UNIT-I

Princeton (Von Neumann) and Harvard Architecture, CISC and RISC architecture, General-purpose processor, microcontroller, Embedded processor, Digital Signal processor, Application specific processor, Super scalar, VLIW, pipelined Architecture. Definition of Embedded System, classification of embedded system, skills required for an Embedded System Designer, Trends in embedded system various examples of an embedded system, Challenges to design embedded system, embedded system development design methodology.

UNIT-II

Hardware units required to design embedded system like power source, clock oscillator circuit, Real time clock and timer, reset circuit, watchdog timer, memories, interrupts, DAC and ADC, LCD and LED display, PWM, Keypad/keyboard, pulse dialer, modem and transceiver.

UNIT-III

Embedded Software: Development tools for embedded software, Assemblers, Compilers, Editor, Interpreter, Cross Assembler, Simulator, Emulator, Locator, Linker, Profiler, Coding strategies for obtaining optimized time and space requirements, Debugging Embedded Software, Software in high level language, coding of software in machine language, Software for Device drivers and device management.

UNIT-IV

Introduction to Real Time Operating System, comparison of RTOS with O.S., Tasks and Task States, Task and Data, Semaphores and Share data, Interrupt, Interrupt handler, Share data problem, Messages, Queue, Mailboxes and pipe. Introduction to U-COS II Real time operating system, main features of U-COS-II

UNIT-V

Embedded Communication System: Standard for Embedded Communication, USART, SPI, I2C, CAN, USB, Firewire, Ethernet, Wireless communication like IRDA, Bluetooth, 802.11, PCI Bus, SoC, IP Core, Case Study of Digital camera

BOOKS

1. Frank Vahid & Tony Givargis "Embedded System Design" John Wiley & Sons.
2. Dr. Rajkamal "Embedded System" TMH
3. David E. Simon "An Embedded Software Primer" Addison Wesley Longman Publication.
4. Prasad..K.V.K.K.: "Embedded/Real Time System Concept & Design Black Book" Wiley Dreamtech Publication.
5. Mark miller "VoIP" Wiley Dreamtech Publication

Note : Paper is to be set unit wise with internal choice.

MCA-505

Elective-III : EIII (e) Network Security

UNIT-I

Classical Encryption Techniques: Symantec Cipher model, substitution Techniques, transposition techniques, rotor machines, steganography.

Block Ciphers and the Data Encryption standards: Simplified DES, block cipher principles, the data encryption standard, the strength of DES, differential and linear cryptanalysis, block cipher design principles, block cipher modes of operation.

Advanced Encryption Standard: Evaluation Criteria for AES, the AES cipher.

Contemporary symmetric ciphers: Triple DES, blowfish.

Confidentiality using symmetric encryption: Placement of Encryption function, traffic confidentiality, key distribution, and random number generation.

UNIT-II

Public key Encryption and Hash functions : Prime numbers, Fermat's and Euler's Theorems, testing for primality, the chinese remainder theorem, discrete logarithms.

Public key cryptography and RSA: Principles of Public key cryptosystems, the RSA algorithm.

Key Management other public key cryptosystems: Key management, diffie-Hallman key exchange, elliptic curve arithmetic, and elliptic curve cryptography.

UNIT-III

Message authentication and Hash function : Authentication Requirements, Authentication functions, message authentication codes, hash functions, security of hash function and MACs.

Hash Algorithms: MD5 message digest algorithm, secure Hash algorithm, ripemd-160, HMAC.

Digital Signature and Authentication protocols: Digital signatures, Authentication protocols, and digital signature standard.

Authentication Applications: Kerberos, X.509 Authentication service.

UNIT-IV

Electronic Mail Security: Pretty Good privacy, S/MIME.

IP Security: IP Security overview, IP security architecture, authentication header, encapsulating security payload, combining security associations, key management.

Web Security: Web security considerations, Secure sockets layer and transport layer security, secure electronic transaction.

UNIT-V

Part four system security: Intruders, intrusion detection, and password management.

Malicious software: Viruses and related threats, virus countermeasures.

Firewalls: Firewall Design Principles, Trusted systems.

BOOKS

1. William Stallings "Cryptography and Network Security", 3 ed, Pearson Education.
2. W.Stallings " Network security Essential " Applications & Standards", Pearson ed.
3. Kanfren "Network Security : Private Communications in a public world 2/e
4. Eric Maiwald " Network Security : A Peginner's Guide, second ed.", Tata Mcgraw Hill.
5. Roberta Bragg " Mark Rhodes, Ousley & Keith Strassberg Network Security : The Complete Reference " Tata McGraw Hill.
6. Eric Maiwald "Fundamentals of Network Security" Wiley India.

MCA SIXTH SEMESTER

| Course No. | Course Name | L (Hrs) | T (Hrs) | P (Hrs) | Seminar | | Sessional Marks | | Practical Marks | | Total Marks |
|------------|--|------------|------------|------------|---------|-----|--------------------|-----|--------------------|-----|----------------|
| | | | | | Max | Min | Max | Min | Max | Min | |
| MCA-601 | Project work of 4 to 5 months duration* | - | - | - | 100 | 50 | 200 | 120 | 200 | 100 | 500 |

* Project work should be undertaken in an organization engaged in software/hardware development. Synopsis of project should be approved by HOD of concerned Institution within one month from the beginning of the project.
A confidential report of the student should be taken from the project guide and should be made part of sessional.