FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

M.Sc. (IT)

(Semester I-IV)

EXAMINATIONS: 2012-13

GURU NANAK DEV UNIVERSITY AMRITSAR

M.Sc. (IT) (Semester System)

Eligibility :

Graduate with Computer Science / IT Computer Applications / Computer Maintenance as one of the elective subjects with 50% marks in aggregate.

OR

BCA/B.Sc. (IT)/ BIT or equivalent there to with atleast 50% marks in aggregate.

OR

Graduate with mathematics as an elective subject and Post-Graduate Diploma in Computer Applications / PG Diploma in Information Tech. / PG Diploma in E-Commerce & Internet Application or equivalent with 50% marks in the aggregate

Scheme for M.Sc. (Information Technology) - 1st Semester

Paper	**Subject**	**Marks**
MIT-101	Analysis & Design of Embedded Systems	100
MIT-102	Distributed Computing	100
MIT-103	Advanced Computer Organization and Architecture	100
MIT-104	Network Operating Systems	100
MIT-105	Symbolic Logic and Logic Programming	100
MIT-106P	Programming Laboratory –I (Network Operating Systems)	100
	Total Marks	**600**

Scheme for M.Sc. (Information Technology) – 2nd Semester

Paper	**Subject**	**Marks**
MIT-201	Mobile Computing	100
MIT-202	Distributed Databases	100
MIT-203	Image Processing	100
MIT-204	Fuzzy Systems	100
MIT-205	Network Design and Performance Analysis	100
MIT-206P	Programming Laboratory –II (Distributed Databases)	100
	Total Marks	**600**

Scheme for M.Sc. (Information Technology) – 3rd Semester

Paper	Subject	Marks
MIT-301	Network Protocols	100
MIT-302	Advanced Web Technologies using ASP.NET	100
MIT-303	Linux Administration	100
MIT-304	System Simulation	100
MIT-305	Microprocessor and Its Applications	100
MIT-306P	Programming Laboratory –III (Based on Advanced Web Technologies using ASP.NET)	100
	Total Marks	**600**

Scheme for M.Sc. (Information Technology) – 4th Semester

Paper	Subject	Marks
MIT-401	Advanced Java Technology	100
MIT-402	Network Security	100
MIT-403	Artificial Neural Network	100
MIT-404P	Programming Laboratory –IV (Based on Advanced Java Technology)	100
MIT-405P	Project Work	200
	Total Marks	**600**

M.Sc. (IT) (Semester-I)

MIT-101

Analysis and Design of Embedded Systems

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Embedded systems and their characteristics, challenges and issues in embedded software development, Hardware and electronics fundamentals for software engineers, categories of different processor, microprocessor and micro controller,

Study of embedded processors and systems like PIC, AVR, micro controller, 68000-series computer, DSP based controller.

Operating system services: different categories of operating system, kernel architecture, and root file system contents, storage device manipulations, setting up boot loader

Development tools, preliminary programming, determining the requirement, design the system architecture, system integration, commissioning the system, Hardware software co-design, and case studies in different embedded systems.

References:

Ken Arnold, “Embedded Controller Hardware Design”, Newnes, 2001.

Arnold S. Berger, “Embedded Systems Design: An Introduction to Processes, Tools and Techniques”, CMP books, 2001.

Fran Vahid, Tony D. Givargis, “Embedded Systems Design – A Unified Hardware /Software Introduction, Wiley, 2001

MIT-102
Distributed Computing

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction: Motivation, objectives, characterization & classification of distributed systems. Distributed system architecture. Hardware & software issues.

Communication: Layered protocols, Client server protocols, RPC, group communication.

Coordination, synchronization & consistency: Logical clocks, Physical clocks, mutual exclusion, election algorithms, atomic broadcast, sequential consistency transaction distributed consensus, Threads: Thread synchronization, implementation issues, and threads vs. RPC.

Models of distributed computing: Client server and RPC, RPC architecture, exceptions, underlying protocols, IDL, marshalling etc.

Group models and peer to peer: Groups for service replication/ reliability, groups for parallelism / performance, client/ server vs. peer-to-peer, multicast, atomic broadcast.

Distributed file system: Security, Naming/ location transparency, R/W semantics, cache coherence, replication. Distributed shared memory: DSM architecture, consistency models and relation to caching, release consistency, comparison with message passing and RPC.

Security: Introduction, security techniques, cryptographic algorithms, authentication and access control.

Case study: CORBA, MACH

References:

Distributed systems, concepts and design, 3rd Edition, Addison Wesley by George Colouris, Jean Dollimore and Tim Kinder berg, 2006.
Distributed system, 2nd Edition, Addison Wesley by Sape Mull ender, 2006.

MIT-103
Advanced Computer Organization and Architecture

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Paradigms of Computing: Synchronous – Vector/Array, SIMD, Systolic

Asynchronous – MIMD, reduction Paradigm, Hardware taxanomy: Flynn's classification, Software taxanomy: Kung's taxanomy, SPMD.

Abstract Parallel Computational Models: Combinational circuits, Sorting Network, PRAM Models, Interconnection RAMs.

Parallelism in Uniprocessor Systems: Trends in parallel processing, Basic Uniprocessor Architecture, Parallel Processing Mechanism.

Parallel Computer Structures: Pipeline Computers, Array Computers, Multiprocessor Systems

Architectural Classification Schemes: Multiplicity of Instruction-Data Streams, Serial versus Parallel Processing, Parallelism versus Pipelining

Pipelining : An overlapped Parallelism, Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables

Principles of Designing Pipelined Processors: Instruction Prefetch and Branch Handling, Data Buffering and Busing Structures, Internal Forwarding and Register Tagging, Hazard Detection and Resolution

Superscalar and Superpipeline Design: Superscalar Pipeline Design, Superpipelined Design

Structures and Algorithms for Array Processors: SIMD Array Processors, SIMD Computer Organizations, Masking and Data Routing Mechanisms, Inter-PE Communications

References:

Computer Architecture and Parallel Processing, Faye A. Briggs, McGraw-Hill International Editions, 2003
Computer Systems Organization & Architecture, John d. Carpinelli, Addison Wesley, 2002

MIT-104: Network Operating Systems

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction of various Network Operating Systems: Windows 2000/2003/XP, Unix/Linux.

Overview of Network Operating System: Introduction, Architecture, Shell, Kernel, File System, Hardware requirements, Active Directory, Clustering & Load Balancing, Storage Management, Editors, Networking and Communication features, Licensing

Disk Management: Terminology and Concepts, Managing Disks, Managing Basic and Dynamic Disks, Disk Quotas, Disk Fragmentation, Remote Storage, RAID and Mirroring.

Servers: Managing DHCP, IIS, WINS, DNS and Proxy servers.

User, Group and Computer Accounts: Creating and Managing user, Group and Computer Accounts, Managing Access Controls, Troubleshooting Accounts.

Performance Monitoring and Security: Task Management, System Monitoring, Performance Logs and Alerts, Monitoring Memory, Network and Process Objects, Auditing Security Events, Audit Policy and Event Viewer.

Telnet and FTP, Distributed Systems.

Case and Comparative Studies of Windows 2003 server and Unix/Linux.

References:

1. MCSA/MCSE; Exam 70-291, Implementing, Managing and Maintaining a Windows Server 2003 Network Infrastructure by Shinder Deborah Littlejohn, Shroff Publishers, 7th Reprint, 2005.
2. Networking: The Complete Reference by Craig Zacker, Tata McGraw-Hill, Seventh Reprint, 2004.
3. Unix Concepts and Applications, Sumitabha Das,Third Edition, Tata McGraw Hill, First Reprint, 2003.
4. Unix and Shell Programming: A Text Book, Behrouz A. Forouzen, Second Reprint, 2005.
5. Linux: A Practical Approach, B.Mohamad Ibrahim, Second Reprint, 2006.
6. Linux Security, Hontanon Ramon J., 2001.
7. The Internet: Douglas E. Comer, 3rd Edition, 2003.

M.Sc. (IT) (Semester-I)

MIT-105: Symbolic Logic and Logic Programming

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Prepositional Logic: Syntax and Semantics: Validity and consequence. Normal forms. Representing world knowledge using prepositional logic.

First Order Logic: World knowledge representation and the need for quantifiers. Syntax, semantics validity consequence clause normal form.

Introduction to Prolog: Syntax of Prolog, Structured data representation. Execution model Introduction to Programming in Prolog, Illustrative examples.

The connection between logic and logic programming: Interpreting logic programs in terms of Horn clauses Deduction from clause form formulas resolution for prepositional logic Ground resolution. Unification and first order resolution SLD resolution; the computation and search rules. SLD trees and interpretation of non-declarative features of Prolog.

Advanced Prolog features: Programming techniques: Structural Induction and Recursion, Extra Logical features: Cut and Negation Case Studies.

References:

1. Gries, The Science of Programming, Narosa Publishers, 1985.
2. Stoll, set Theory and Logic, Dover Publishers, New York, 1963.
3. Clocksin, W.F. and Mellish, C.S., Programming in Prolog 2nd edition, Springer - Verlag, 1984.
4. O'Keefe, R., The Craft of Prolog. The MIT Press, 1991.
5. Lloyd, J. W., Foundation of Logic Programming, Springer, 1984.
6. R.P.Suri, Introduction to Prolog, Narosa Publications, 2007.

MIT-106 P
Programming Laboratory – I

Time: 3 Hrs. **M. Marks : 100**

Programming laboratory based on Network Operating System

MIT-201

Mobile Computing

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction :
Current Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth.

Modern Wireless Communication Systems

2G/2.5G/3G/4G Wireless Networks and Standards, Wireless in Local loop & LMDS

Cellular Concepts
Frequency spectrum, frequency reuse, channel assignment strategies, handoff strategies, interference and system capacity, fundamentals of antennas, Equivalent circuit for antenna, Antennas as cell site, Mobile antennas, Analog Vs Digital, Spectrum regulation, Licensing methods.

Cellular Networks
Mobile Radio Propagation, A basic cellular system, Performance criterion, Operations of Cellular Networks, Concept of frequency reuse Channels, Co channel Interference and it's reduction factor, types of non co channel Interference, Desired C/I from normal case on omni directional antenna systems, Digital Modulation

Multi Access Technique & Wireless Standards

TDD, FDD, Rake receiver, CDD, Spread spectrum, (direct and frequency hopping) FDMA, TDMA, CDMA, Wireless Standards GSM, CDMA, DECT, UMTS & IMT-2000,

WAP Model and architecture, Gateway, Protocol stack, Wireless Application environment

Wireless LAN
IEEE 802.11 Concepts, MAC Layer, Spread Spectrum Wireless LAN, Infrared Wireless LANs, Other Physical Layer Protocol (IEEE 802.11b, IEEE 802.11a), Wireless PAN (Bluetooth), HIPERLAN, Mobile Network Layer (Mobile IP), Mobile Transport Layer (Mobile TCP), Mobile Data network (GPRS),

GSM Systems Overview
Architecture, Location tracking, and call setup. Security, Data Services N/W Signaling, GSM mobility management, Operations, Administration and maintenance. GSM bearer Services. SMS architecture-Protocol Hierarchy, DTE-DCE interface, Mobile prepaid phone services.

References:

Wireless communication, T. S. Rappaport, PHI, 2005
Wireless and Mobile Network Architecture : Yi-Bing Lin, Wiley, 2007
Mobile Communications, J. Schiller, Pearson Education, 2006

MIT-202

Distributed Databases

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction

Concepts, Advantages and Disadvantages of Distributed Database Management System (DDBMS), Homogenous and Heterogeneous DDBMS. Functions of a DDBMS.

Distributed Database Management System Architecture

Architectural Models for DDBMS (Distributed Database Management System): Autonomy, Distribution, Heterogeneity factors; Client Server Systems, Peer-to-Peer Distributed Systems, Global Directory Issues.

Distributed Relational Database Design

Fragmentation: Reasons, Alternatives, Degree, Information requirement. Horizontal, Vertical, Hybrid Fragmentation.

Allocation: Allocation Problem, Information Requirements for allocation.

Distributed Relational Database Query Processing & Optimization

Query Decomposition, Localization of Distributed Data, Query Optimization, Introduction to Distributed Query Optimization Algorithms

Distributed Concurrency Control, Objectives, Distributed Serializability, Centralized two-phase locking, Distributed two-phase locking.

References:

1. M.Tamer Ozsu, Patrick Valdureiz, *'Principles of Distributed Database Systems'* Second Edition, Prentice Hall, 2002.
2. Romez Elmasri, Shamkant B.Navathe, *'Fundamentals of Database Systems'* Pearson Education, 2005.
3. Silberschatz, Korth, Sudershan "Database System Concepts" 4th Ed. McGraw Hill, 2006.
4. Connolly & Begg "Database Systems – A practical approach to design, Implementation and Management, 3rd Ed. Pearson Education, 2005.

M.Sc. (IT) (Semester-II)

MIT-203: Image Processing

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction to Image Processing Systems, Digital Image Fundamentals:- Image model, Relationship between Pixels, Imaging geometry, Camera model.
Manipulation on Images:- Images transformation : Introduction to FT, DFT and FFT. Walsh transformation, Hadamard transformation, Hotelling transformation, Histogram.
Image Smoothing: - Neighborhood Averaging, Median Filtering, Low Pass Filters, Average of Multiple Images, Image Sharpening by Differentiation Technique, High Pass filtering.
Image Restoration: - Degradation models for continuous function, effect of diagonalization, on-degradation, algebraic approach to restoration, interactive restoration, Gray level interpolation.
Image Encoding and Segmentation: - Encoding, Mapping, Quantizer and Coder.
Segmentation: - Detection of discontinuation by point detection, line detection, edge detection.
Edge linking and boundary detection:- Local analysis, global by graph, theoretic techniques. Thresh-holding: - definition, global thresh-holding.
Filtering**:-** median, gradient, simple method of representation signatures, boundary segments, skeleton of region.

Mathematical Preliminaries: Random signals, Discrete Random fields , Spectral density function, Review of Estimation theory ,Review of information theory , Image Representation by Stochastic models : One dimensional Causal models , Levinson Algorithm.

Noncausal representation, Linear prediction in two-dimensions, two-dimensional spectral factorization & estimation, Image decomposition, Fast KL transforms, Stochastic decoupling.

Image observation models, Inverse & Weiner fittening, FIR Weiner fitters, Fittening using Image transforms, Least square fitters, Generalized inverse, SVD & iterative methods.

Spatial feature Extraction, Transform feature, Edge detection, Boundary extraction, Boundary Representation, Region representation, Moment representation.

Structures Shape features, Texture, Seene matching & detection, Image Segmentation, Classification techniques, Image understanding.

References :

Digital Image Processing by Gonzalez & Wood, Addison Wesley, 2000.
Digital Image Processing by A.K.Jain, Pearson Education India, 2005.

MIT-204
Fuzzy Systems

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction to fuzzy logic and fuzzy sets.

Fuzzy relations, fuzzy graphs, fuzzy arithmetic, fuzzy if-then rules.

Fuzzy implications and approximate reasoning, fuzzy logic and probability theory.

Fuzzy model identification, use of fuzzy logic in database and information systems.

Use of fuzzy logic in the area of artificial intelligence and Pattern recognition.

Neuro-fuzzy systems, genetic algorithm and fuzzy logic.

References

Fuzzy logic intelligence, Control and Information by John Yen and Reza Langari, Pearson Education, 2003.

Uncertain Rule-based Fuzzy Logic System: Introduction and New Directions by Jerry M. Mendel, Prentice Hall.

Fuzzy Sets, Fuzzy Logic and Fuzzy System – edited by George J. Keir & Bo Yuan 1996. World Scientific Press.

Fuzzy Set Theory: Foundations and Applications by George J. Klir, Ute. St. Clair, Bo Yuan, Prentice Hall, 1997.

MIT-205
Network Design and Performance Analysis

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Requirements, planning, & choosing technology: Business requirements, technical requirement user requirements, traffic sizing characteristics time & delay consideration.

Traffic engineering and capacity planning: Throughput calculation traffic characteristics & source models, traditional traffic engineering, queued data & packet switched traffic modeling, designing for peaks, delay or latency

Network performance modeling- creating traffic matrix, design tools, components of design tools, types of design projects.

Technology Comparisons- Generic packet switching networks characteristics, private vs. public networking, Business aspects of packet, frame and cell switching services, High speed LAN protocols comparison, Application performance needs, Throughput, burstiness, response time and delay tolerance, selecting service provider, vendor, service levels etc.

Access Network Design- N/W design layers, Access N/W design, access n/w capacity, Backbone n/w design, Backbone segments, backbone capacity, topologies, Tuning the network, securing the network,

Design for network security.

Network Optimization: Network optimization theory: Goals of network optimization, measurements for network optimization, optimization tools, optimization techniques.

Reference:

1. James D McCabe, Network Analysis, Architecture and Design, 2nd Edition, Morgan Kaufman Series in Networking, 2007.
2. Youeu Zheng, Shakil Akhtar, Network for Computer Scientists and Engineers, Oxford University Press, 2007.
3. Foruzan, Data Communications & Networking, Tata –Mcgraw Gill, 2006.

MIT-206 P
Programming Laboratory-II (Distributed Databases)

Time: 3 Hrs. **M. Marks : 100**

Programming Laboratory based on Distributed Databases

M.Sc. (IT) (Semester-III)

MIT-301: Network Protocols

Time: 3 Hrs. **M. Marks : 100**

Note:
(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.
(ii) The student can use only Non-programmable & Non-storage type calculator.

Review of networking Technologies & Internetworking Concepts and Architectural Model : Application level and Network level Interconnection, Properties of the Internet, Internet Architecture, Interconnection through IP Routers

Internet Addresses, Mapping internet addresses to Physical addresses (ARP) & Determining an internet addresses at Startup (RARP) : Universal identifiers, three Primary classes of IP addresses, network and Broadcast Addresses, Limited Broadcast, Dotted decimal Notation, weakness in Internet addressing, Loopback addresses. Address resolution problem, two types of Physical addresses, resolution through Direct Mapping, Resolution Through Dynamic Binding. address Resolution Cache , ARP to other Protocols. Reverse address resolution protocol, timing RARP transaction, Primary and backup RARP severs.

Internet Protocol Connectionless Data Gram Delivery & Internet Protocol : Routing IP Datagrams: The concepts of unreliable delivery, connectionless delivery system, purpose of the internet protocol. the internet datagram. Routing in an internet, direct and indirect delivery, table driven IP routing, next Hop Routing, default routes, host specific routes, The IP routing Algorithm, handling incoming datagrams, Establishing routing tables

Internet Protocol : Error and Control Message(ICMP) & Subnet and Supernet Address Extension: The internet ,control message protocols, Error reporting versus error detection. ICMP message format. Detecting and reporting various network problems through ICMP. Transparent Router, Proxy ARP, subset addressing, implementation of subnets with masks representation, Routing in the presence of subsets, a unified algorithm.

User Datagram Peotocol(UDP) : Format of UDP message UDP pseudo header UDP encapsulation and Protocols layering and the UDP checksum computation. UDP multiplexing, De-multiplexing and Ports.

Reliable Stream Transport service (TCP) : The Transmission control Protocol, pots, Connections and Endpoint , passive and active opens the TCP segment format . TCP implementation issues.

References:
1. Douglas E.Comer, Internetworking with TCP/IP: Principles, Protocols
2. Forouzan, TCP-IP, Protocol Suit, TMH.
3. Comer, Internetworking with TCP-IP, Vol. 3.
4. Unix Network Programming, W. Richard Stevens.
5. SNMP, Stallings, Pearson.
6. TCP-IP Network Administration, Hunt Craig.

MIT-302: Advanced Web Technologies using ASP.NET

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Standard Controls : Display information, Accepting user input, Submitting form data, Displaying images, Using the panel control, Using the hyperlink control.

Validation Controls : Using the required field validator control, Using the range validator controlusing the compare validator control, Using the regular expression validator control, Using the custom validator control, Using the validation summary controls.

Rich Controls : Accepting file uploads ,Displaying a calendar, Displaying advertisement, Displaying different page views, Displaying a wizard.

Designing Website With Master Pages : Creating master pages, Modifying master page content, Loading master page dynamically.

SQL Data Source Control: Creating database connections, Executing database commands, Using ASP.NET parameters with the SQL data source controls, Programmatically executing SQL data source commands, Cashing database data with the SQL data Source controls.

List Controls : Dropdown list control, Radio button list controls, list box controls, bulleted list controls, custom list controls.

Grid View Controls : Grid view control fundamentals, Using field with the grid view control, Working with grid view control events extending the grid view control.

Building Data Access Components With ADO.NET : Connected the data access, Disconnected data access, Executing a synchronous database commands, Building data base objects with the .NET framework.

Maintaining Application State : Using browser cookies, Using session state, Using profiles.

Caching Application Pages And Data : page output caching, partial page caching, data source caching, data caching, SQL cache dependences.

Reference :

ASP.NET 3.5: Stephen Walther, Pearson Education, 2005

MIT-303: Linux Administration

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction : Introduction to LINUX, Installing LINUX, Partitions, LILO, Installing software packages. Updating with Gnome, Updating with KDE, Command line installing.

File Structure : LINUX files, File structure, File & Directory permission, Operations on a file.

Administering Linux : Creating a user A/C, modifying a user A/C, Deleting a user A/C, Checking Disk Quotas, System Initialization, System start-up & shutdown, Installing & managing H/W devices.

Setting Up A LAN : Understanding LAN, Setting up Wireless LAN, Understanding IP address, Troubleshooting LAN.

Setting Up Print Server : Choosing CUPS, Working with CUPS Pointing, Managing Pointing, Configuring Point Server.

Setting Up File Server : Setting up an NFS, SAMBA, Installing & Running send mail.

Setting Up Web Server : Configuring the Apache Server, Starting & stopping the server, Monitoring Server Activities.

Setting Up DHCP & NIS : Setting up DHCP Server, Setting up DHCP Client, Setting up Network Information Service.

Troubleshooting : Troubleshooting LINUX in GRUB mode.

References :

1. Redhat Linux(10) Bible : Christopher Negus, 2003
2. Linux Unleashed : Tim Parker, 2006
3. Linux Administration Tools : Charles Fisher, 2007

MIT-304: System Simulation

Time: 3 Hrs. **M. Marks : 100**

Note:
(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction : Concept of a system, stochastic activities, continue and discrete system, system modeling, mathematical modeling, principle used in modeling.

Simulation of Systems : Concepts of simulation of continuous systems with the help of two examples; use of integration formulas; concepts of discrete system simulation with the help of two examples, Generation of random numbers, Generation of non- uniformly distributed numbers.

Simulation of Queuing Systems : Rudiments of queuing theory, Simulation of Single-Server queue, two-server queue, general queues.

Simulation in Inventory Control and Forecasting : Elements of inventory theory, inventory models, Generation of Poisson and Erlang variats, forecasting and regression analysis.

Design and Evaluation of Simulation Experiments : Experimental layout and validation.

Simulation Languages : Continuous and discrete simulation languages, Block-Structured continuous simulation languages, expression based languages, discrete system simulation languages, simscript, GPSS, SIMULA, Simpack, GASP IV, CSIM, factors in selection of a discrete system simulation languages.

Case Studies : Analytic Vs Simulation Models, Applications to Operating Systems, Databases, Computer Networks Architectures.

References :
Narsingh Deo, “System Simulation with Digital Computer”, Prentice-Hall of India Pvt. Ltd. - 1993.
Gordon, “System Simulation”, Prentice Hall of India Pvt. Ltd. - 1993

MIT-305: Microprocessor and its Applications

Time: 3 Hrs. **M. Marks : 100**

Note:

(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.

(ii) The student can use only Non-programmable & Non-storage type calculator.

Introduction : Introduction to Microprocessor, General Architecture of Microcomputer System. Microprocessor Units, Input unit, Output unit, Memory unit and auxiliary storage unit.

Architecture of 8086/8088 Microprocessor : Description of various pins, configuring the 8086/8088 microprocessor for minimum and maximum mode systems, Internal architecture of the 8086/8088 microprocessor, system clock, Bus cycle, Instruction execution sequence.

Memory Interface of 8086/8088 Microprocessor : Address space and data organization, generating memory addresses hardware organization of memory address space, memory bus status code, memory control signals, read/write bus cycles, program and data storage memory, dynamic RAM system.

Input/Output Interface of the 8086/8088 Microprocessor : I/O interface, I/O address space and data transfer, I/O instructions, I/O bus cycles, Output ports, 8255A Programmable Peripheral Interface (PPI), Serial communication interface (USART and UART) – the RS- 232 C interface.

Interrupt Interface of 8086/8088 Microprocessor, Types of Interrupt, Interrupt Vector Table (IVT).

References :

Walter Triebel : The 8086 Microprocessor – Architecture, Software and Interfacing Techniques, PHI, Delhi.
Walter Triebel : The 8088 Microprocessor – Architecture, Software and Interfacing Techniques, PHI, Delhi.
Douglas V. Hall : Microprocessors and Interfacing – Programming and Hardware, Tata McGraw Hill Publishing Company Ltd. , New Delhi.
Peter Abel : IBM PC Assembly Language and Programming, PHI, Delhi.

MIT-306P: Programming Laboratory-III

Time: 3 Hrs. **M. Marks : 100**

Programming Laboratory based on Advanced Web Technologies using ASP.NET

MIT-401
Advanced Java Technology

Time: 3 Hrs. **M. Marks : 100**

Note:
(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.
(ii) The student can use only Non-programmable & Non-storage type calculator.

Java I/O: I/O Basics, Streams, reading Console input and writing console output, Print Writer Class, Reading & Writing Files, Byte Streams, Character Streams & Serialization.

Multithreaded Programming: The Java Thread Model, Thread Priorities, Synchronization, Interthread communication, Suspending Resuming and Stopping Threads.

Applets: Applet Basics, Applet Architecture, Applet: Display, Repaint, Parameter Passing.

Event Handling: The Delegation Event Model, Event Classes, Event Listener Interfaces

AWT: Window Fundamentals, Working with Frame Windows, Graphics, Color and Fonts.

Servlets: Life Cycle of a Servlet, The Servlet API, Reading Servlet Parameters, Handling HTTP Requests and Responses, Cookies & Session Tracking.

References:

1. The Complete Reference – JAVA 2 by Ptrick Naughton & Herbert Schildt TMH Publications,
2. 2007.
3. The Java Tutorial Continued by Compione, Walrath, Huml SUN JAVA Tutorial Team, Addison Wessley, 2007.
4. Java2 Black Book Steven Holzner OT Dreamtech Press, www.idgbooksindia.com, 2007.

MIT-402: Network Security

Time: 3 Hrs. **M. Marks: 100**

Note:
(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.
(ii) The student can use only Non-programmable & Non-storage type calculator.

Essential of Network Perimeter Security : Terms. Defense in depth

Packet Filtering: TCP/IP Primer, How Packet filtering Works, TCP
And UDP Ports, TCP's Tree-way handshake, The Cisco Router as a packets filter, An Alternative packet filter: IP Chains, The Cisco ACL, Effective Users of Packets-filtering devices, Tracking Rejected Traffic, Problem with Packets Filters, Dynamic packet Filtering and be Reflexive.

Stateful Firewalls : How a Stateful Firewall works, The concept of state , Stateful Filtering and stateful Inspection.

Proxy Firewalls : Fundamentals of Proxying, Pros And Cons of Proxy Firewalls, Types of Proxies, Tools of Proxying.

Security Policy : Firewalls Are Policy, How to develop Policy, Perimeter Consideration.

Network Instruction Detection : Network instruction detection basics, The roles of Network IDS in a parameter defense, IDS Sensor placement, Using an IDS Management Networks.

The Need for Host Hardening : Removing or Disabling of Unnecessary Programs. Limiting access to data And Configuration Files, Controlling User and Privileges, Maintaining Host Security Logs, Applying Patches, additional Hardening Guidelines.

Host Defenses : Hosts and the perimeter, Antivirus Software, Host-Based Firewalls, Host – based Instruction detection, Challenges Of host defenses components.

Instruction Prevention System : What is IPS, IPS Limitation, NIPS, Host-Based instruction Prevention System, Monitoring file Integrity, Monitoring Application Behavior.
Fundamentals of Secure Premier Design : Gathering Design Requirements, Design Elements for Premier Security.

Separation Resources : Security Zones, Common Design Elements, VLAN-Based Sepration.

M.Sc. (IT) (Semester-IV)

MIT-403: Artificial Neural Networks

Time: 3 Hrs. **M. Marks : 100**

Note:
(i) The paper setter is required to set eight questions in all and the candidates will be required to attempt any five questions out of these eight questions. All questions will carry equal marks.
(ii) The student can use only Non-programmable & Non-storage type calculator.

Neural Network Technology : Evolution of ANN, Architecture of ANN, Knowledge representation.

Neural Network Learning : Basic learning rules, supervised by unsupervised learning, Method of steepest Descent, LMS Algorithm.

Single Layer Perceptrons-I : Preceptron Model, Preceptron learning algorithms : Simple learning algorithm, pocket algorithm without and with Ratches, Linear Machines, Kessler's construction, Linear Machines Learning algorithm, Representing Boolean functions.

Single Layer Perceptrons-II : Anderson's BSB Model, Hopfied's Model, K-Means Clustering, Topology-Preserving Maps, ART1 and ART2.

Multilayer Preceptrons : Back-Propagation, Applications of Back-propagaion : NETtalk, Handwritten Character Recognition, Pattern Recognition.

References :
[SG] Gallant S.L., Neural Networks Learning & Expert Systems, MIT Press, 1993.
[SH] Haykin S., Neural Networks : A Comprehensive Foundation, Pearson Education Inc., Second Edition, 2003.
[FS] Freeman J.A., Skapura D.M., Neural Network Algorithms, Applications and Programming Techniques, Addison-Wesley Publications, 1992.

MIT-404P: Programming Laboratory-IV

Time: 3 Hrs. **M. Marks : 100**

Programming Laboratory based on Advanced Java Technology.

MIT–405P
Project Work

Time: 3 Hrs. **Max. Marks: 200**

The Project is to be prepared based on sum current problems from industry / business / academic domain using some currently available technology / platform.

Note:

1. The end semester project work evaluation is to be conducted by following panel of examiners:-
    a. Internal Examiner
    b. External Examiner (to be appointed by GND University, Amritsar)
    c. Head/Head's nominee (where Head means Head, DCSE, GND University, Amritsar.)

2. The Project are to be submitted before the start of theory examination.