

SCHEME OF EXAMINATION FOR M.TECH. INFORMATION TECHNOLOGY							
Paper Code	Nomenclature	Time (hrs)	External marks		Internal marks		Total
			Max.	Pass	Max.	Pass	
First Semester							
MT-IT-110	Engineering Research Methodology	3	100	40	50	20	150
MT-IT-120	Advances in Databases	3	100	40	50	20	150
MT-IT-130	Object Oriented Analysis & Design	3	100	40	50	20	150
MT-IT-140	Grid Computing	3	100	40	50	20	150
MT-IT-150	S/W Lab – I (Based on paper MT-IT-120)	3	100	40			100
MT-IT-160	S/W Lab – II (Based on paper MT-IT-130)	3	100	40			100
MT-IT-170	Seminar	½			50	20	50
					Total Marks		850
Second Semester							
MT-IT-210	Web Engineering	3	100	40	50	20	150
MT-IT-220	Advanced Java Programming	3	100	40	50	20	150
MT-IT-230	Multimedia Systems Design And Development	3	100	40	50	20	150
MT-IT-240	Distributed Operating System	3	100	40	50	20	150
MT-IT-250	S/W Lab – I (Based on paper MT-IT-210)	3	100	40			100
MT-IT-260	S/W Lab – II (Based on paper MT-IT-220)	3	100	40			100
MT-IT-270	Seminar	½			50	20	50
					Total Marks		850
Third Semester							
MT-IT-310	Mobile Computing	3	100	40	50	20	150
MT-IT-320	Ethical Hacking	3	100	40	50	20	150
MT-IT-330	Elective-I	3	100	40	50	20	150
MT-IT-340	Elective-II	3	100	40	50	20	150
MT-IT-350	S/W Lab – I (Based on Paper MT-IT-320)	3	100	40			100
MT-IT-360	S/W Lab – II (Network Simulator)	3	100	40			100
MT-CSE-370	Seminar	½			50	20	50
					Total Marks		850
Elective Papers							
MT-IT-330(i)	Cloud Computing			MT-IT-340(i)	Cyber Crimes		
MT-IT-330(ii)	Distributed Systems Security			MT-IT-340(ii)	E-Commerce		
Fourth Semester							
MT-IT-410	Dissertation	Evaluation		200	80		200
		Presentation and Viva-Voce		150	60		150
		Internal Assessment				100	40
					Total Marks		450

MT-IT-110 ENGINEERING RESEARCH METHODOLOGY

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Basic research methodology: Objectives and Motivation in Research - Types of Research - Approaches and Significance of Research - Research Methodology versus Research Methods - Research Process- Finding a Research Advisor/Guide, Qualities in a Potential Research Advisor/Guide, The Advisor-Advisee Relationship; Finding a Topic and Beginning Research, Getting Research Ideas, How to be an Active Reader and Listener, Getting Exposed to Research, Directed Study; Formulating the Research Problem: Develop the Nucleus of an Idea, Extensive Literature Survey: A Trap to Avoid, Choosing an Idea, Stay Active - Measure of Good Research - Common Problems for Researchers.

UNIT – II

Overview of the Theory of Science and history of scientific research - Overview of Research Methodology for Engineering Research - Science versus Engineering - Distinct perspectives of goals, Formulating the Research Problem - Research Design - Evolution of Computing Research

UNIT – III

Research Methods for Engineering Research - History of ideas in computing – Measurements based research methods in computer engineering - Measurements based research methods in Signal and Image Processing, Graphics, Vision and Pattern Recognition - Deductive Methods in Computing Science - Deductive Methods in Signal and Image Processing, Graphics, Vision and Pattern Recognition - Inductive Methods in Computing Science - Inductive Methods in Signal and Image Processing, Graphics, Vision and Pattern Recognition - Building Models – Simulation

UNIT – IV

Searching for scientific papers - Writing and presentation of a research paper for a conference or journal - Review and opposition of engineering/scientific research papers - Writing a good thesis: Research report writing - Converting your research thesis into a monograph – Research education, the research society and research policy

REFERECE BOOKS

1. Kothari, C.R., Research Methodology –Methods and techniques, New Age Publications, New Delhi, 2009.

Maximum marks: 150 (**External:** 100, **Internal:** 50)

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UNIT – I

Introduction: Database system concepts, Three-level Schema Model, Data Independence, Relational model concepts, Relational Database Design: Dependencies, Normalization

UNIT – II

The Enhanced Entity-Relationship Model and Object-Oriented Database: The ER model revisited, EER model: Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization; Object Model: Overview of Object-Oriented concepts, Object identity, Object structure, Type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Complex objects

UNIT – III

Parallel and Distributed Databases and Client-Server Architecture: Architecture for parallel database; Distributed database concepts, Data fragmentation, Replication, and allocation techniques, Overview of Client-Server Architecture

UNIT – IV

Enhanced Data Models for Advanced Applications: Active database concepts, Temporal database concepts, Spatial databases, Deductive databases; Emerging Database Technologies: Mobile databases, Multimedia Databases, Geographic information systems (GIS); XML and Internet Databases: Structured, Semi-structured and Unstructured Data, Introduction to web databases and XML, Structure of XML data.

REFERENCE BOOKS

1. Elmasri and Navathe, Fundamentals of Database Systems [5e], Pearson Education.
2. Korth, Silberchatz, Sudarshan, Database System Concepts[5e], McGraw-Hill.
3. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, McGraw-Hill
4. Peter Rob and Coronel, Database Systems, Design, Implementation and Management, Thomson Learning.
5. C.J.Date, Longman, Introduction to Database Systems, Pearson Education
6. Thomas Connolly,Carolyn Begg, Database Systems, [3e], Pearson Education

MT-IT-130 OBJECT ORIENTED ANALYSIS & DESIGN

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Object Orientation: class, object, instance variable, methods, polymorphism, organizing classes into hierarchies, effect of hierarchies on polymorphism and variable declarations, difficulties and risks in programming language choice.

Introduction to UML: Importance of modeling, principles of modeling, object oriented modelling, conceptual model of the UML, Architecture

UNIT – II

Software Development on Reusable Technology: Incorporating re-usability and reuse into software engineering, frameworks – reusable subsystems, client-server architectures, technology needed to build client-server systems, object client server framework, difficulties and risks when considering reusable technology.

Developing Requirements: Domain analysis, starting point for software projects, defining problem and scope, types of requirements, techniques for gathering and analyzing requirements reviewing requirements, managing changing requirements.

UNIT – III

Modeling With Classes: Essentials of UML class diagrams, associations, multiplicity, generalization, instance diagram, advanced features of class diagrams, process of developing class diagrams

Using design Patterns: abstraction-occurrence pattern, general hierarchy pattern, player-role pattern, singleton pattern, observer pattern, delegation pattern, adapter pattern and proxy pattern

UNIT – IV

Modeling Interaction and Behaviour: interaction diagram, state diagram, activity diagram, implementing classes based on interaction and state diagrams

Architecting and Designing Software: process and principles of good design, techniques for design decisions, software architectures & patterns, design document

REFERENCE BOOKS

1. Timothy C. Lethbridge, Robert Laganieri: Object Oriented Software Engineering, Tata McGraw Hill, 2007
2. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
3. Bernd Bruegge and Allen H. Dutoit: Object-Oriented Software Engineering: Using UML, Patterns and Java, Second Edition Prentice Hall; 2 edition (September 5, 2003)
4. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education. Pascal
5. Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
6. Mark Priestley: Practical Object-Oriented Design with UML, TATA McGrawHill.
7. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

MT-IT- 140 GRID COMPUTING

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

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UNIT – I

CONCEPTS AND ARCHITECTURE: Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing, Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

GRID MONITORING: Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems-GridI, CE – JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems-Ganglia and GridMon

UNIT – II

GRID SECURITY AND RESOURCE MANAGEMENT: Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

UNIT – III

DATA MANAGEMENT AND GRID PORTALS: Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals.

UNIT – IV

GRID MIDDLEWARE: List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and GLite - Architecture, Components and Features.

REFERENCE BOOKS

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005.
2. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure Morgan Kaufman – 2004.
3. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education 2004.
4. Fran Berman, Geoffrey Fox, Anthony J.G.Hey, “Grid Computing: Making the Global Infrastructure a reality”, John Wiley and sons, 2003.

MT-IT-210 WEB ENGINEERING

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

An Introduction to Web Engineering : Motivation, Categories of Web Applications, Characteristics of Web Applications, Product-related Characteristics, Usage- related Characteristics, Development-related Characteristic, Evolution of web engineering .

Requirements Engineering (RE) for Web Application: Introduction, Fundamentals, Requirements Engineering Activities, RE Specifics in Web Engineering, Principles for RE of Web Applications, Adapting RE Methods to Web Application Development, Requirement Types, Notations, Tools.

Technologies for Web Applications: Client-side Technologies, ActiveX Controls, Document-specific Technologies, HTML- Hypertext Markup Language, DHTML, SMIL Synchronized Multimedia Integration Language, XML-eXtensible Markup Language, XSL-eXtensible Stylesheet Language, Java Script, Server-side Technologies, Servlet, URI Handlers, Web Service, Middleware Technologies

UNIT – II

Web Application Architectures: Introduction, Fundamentals, Developing Architectures Categorizing Architectures, Specifics of Web Application Architectures, Components of a Generic Web Application Architecture, Layered Architectures, 2-Layer Architectures, N- Layer Architectures Data-aspect Architectures, Database-centric Architectures, Architectures for Web Document Management, Architectures for Multimedia Data

Modeling Web Applications: Introduction, Fundamental, Modeling Specifics in Web Engineering, Levels, Aspects, Phases Customization, Modeling Requirements, Hypertext Modeling, Hypertext Structure Modeling Concepts, Access Modeling Concepts, Relation to Content Modeling, Presentation Modeling, Relation to Hypertext Modeling, Customization Modeling, Relation to Content, Hypertext, and Presentation Modeling

UNIT – III

Web Application Design : Introduction, Web Design from an Evolutionary Perspective, Information Design, Software Design: A Programming Activity, Merging Information Design and Software Design, Problems and Restrictions in Integrated Web Design, A Proposed Structural Approach, Presentation Design, Presentation of Nodes and Meshes, Device-independent Development, Approaches, Inter action Design, User Interaction User Interface Organization, Navigation Design,

Designing a Link Representation, Designing Link Internals, Navigation and Orientation, Structured Dialog for Complex Activities, Interplay with Technology and Architecture, Functional Design.

UNIT – IV

Testing Web Applications : Introduction, Fundamentals, Terminology, Quality Characteristics, Test Objectives, Test Levels, Role of the Tester, Test Specifics in Web Engineering, Test Approaches, Conventional Approaches, Agile Approaches, Test Scheme, Three Test Dimensions, Applying the Scheme to Web Applications, Test Methods and Techniques, Link Testing, Browser Testing, Usability Testing, Load, Stress, and Continuous Testing, Testing Security, Test-driven Development, Test Automation, Benefits and Drawbacks of Automated Test, Test Tools.

Web Project Management : Understanding Scope, Refining Framework Activities, Building a WebE Team, Managing Risk, Developing a Schedule, Managing Quality, Managing Change, Tracking the Project.

REFERENCE BOOKS

1. Gerti Kappel, Birgit Proll, “Web Engineering”, John Wiley and Sons Ltd, 2006
2. Roger S.Pressman, David Lowe, “Web Engineering”, Tata McGraw Hill Publication, 2007
3. Guy W. Lecky-Thompson, “Web Programming”, Cengage Learning, 2008
4. Moller, “An Introduction to XML and Web Technologies”, Pearson Education New Delhi, 2009
5. Chris Bates, “Web Programming: Building Internet Applications”, Third Edition, Wiley India Edition, 2007
6. John Paul Mueller, “Web Development with Microsoft Visual Studio 2005”, Wiley Dreamtech, 2006.

Maximum marks: 150 (**External:** 100, **Internal:** 50)**Time:** 3 hours

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UNIT – I

Inheritance: Member access, super class, creating multilevel Hierarchy, Method over loading & overriding, Abstract class, method, Using final to prevent overriding & overloading, the object class Packages and Interfaces: Defining packages, Access protection, importing packages, defining interfaces
Exception handling: Exception types, uncaught exceptions, multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions, creating your own exception subclasses

UNIT – II

Multithreaded programming: Creating threads, run() method, new thread, thread class, stopping & blocking threads, life cycle of thread- newborn, runnable, running, blocked, dead, waiting sleeping, suspended, blocked, using thread methods, thread exceptions, thread priority, synchronization, implementing the Runnable interface

Applet: Applet life-cycle, applet class, applet context class, passing parameters to applet, use of java .awt graphics class and its various methods in an applet

Event Handling: Event delegation model or event class hierarchy, all classes and interfaces of event delegation model, programs related to event handling covering all types of events

UNIT – III

I/O files in java: Concept of streams, difference between characterstreams and bytestreams

Graphical user interface: Layout managers (FlowLayout, BorderLayout, CardLayout, GridBagLayout, GridLayout),

AWT controls: (labels, buttons, canvases, checkboxes, checkboxgroup, choices, textfields, textareas, lists, scrollbars, panels, windows, frames, menus, menubars)

UNIT – IV

Java Swing: Working with JFrame, JApplet, JPanel, JTextField, JPasswordField, JButton, JCheckBox, JRadioButton, JList, JScrollPane, JComboBox, JMenu, JMenuBar, JMenuItem, JPopupMenu, JTree, JTable

Introduction to Servlets: Need for Servlets, Introduction to Servlets , The javax.servlet Package, Life Cycle of a Servlet, Accessing a Servlet using an HTML page Exploring Deployment Descriptor (web.xml), Handling Request and Response, Initializing a Servlet, Accessing Database, Servlet Chaining, Session Tracking & Management, Dealing with cookies,

REFERENCE BOOKS

1. Herbert Schildt, Java The Complete Reference, Eighth Edition, Tata McGraw-Hill, 2012
2. James Goslin, The Java Language Specification, Third Edition,
3. Bruce Eckel, Thinking in Java, 3rd Edition
4. Marty Hall and Larry Brown, Core Servlets and JavaServer Pages, Second Edition

MT-IT-230 MULTIMEDIA SYSTEMS DESIGN AND DEVELOPMENT

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

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UNIT – I

INTRODUCTION - Definition of Multimedia - Emergence of Multimedia Systems - From Bush's Memx to Multimedia Systems - Hypertext and Hypermedia systems - Interactive Multimedia Systems - Multimedia on-line. Multimedia Hardware : Hardware peripherals - CD - ROM Drives, and DVD's - Video Graphics & Video Capture Utilities - Audio Cards - Digital Cameras & Camcorders - Mobile Multimedia - Multimedia Software - Multimedia development tools - Programming vs. Authoring - Multimedia authoring tools (Director, Authorware, ToolBook, Visual Basic etc.) - Animation and Image manipulation tools (PhotoShop, 3D Studio, Flash, Bryce etc.) - Audio and Video editing tools (SoundForge, Adobe - Premier etc.)

UNIT – II

Media Integration and Production Issues : Multimedia Elements - Text/Graphic/Audio manipulation and Integration issues; Working with different graphic files; From MIDI to Digital Sound production. Issues in "sampling" digital sound and producing CD quality audio for IMS - Video manipulation and Integration issues; An overview of AVI, QuickTime -MPEG; video capturing and integration, synchronization issues, etc. - Managing IMS Production - Audio Asset management, Video asset management and Graphic asset production - The authoring tree for integration and production.

UNIT – III

Designing for Usability - Human Factors in the Design of Interactive-Multimedia Systems - Human Computer Interaction: General overview - User Interface design: theories, principles and guidelines - Interactive Design & Prototyping - Techniques for Prototyping; - Rapid Prototyping, Storyboards techniques, etc - Models of the User in design – User requirement modeling - Soft systems methodology - Participatory design - Cognitive models - Issues on Usability - Testing for Usability.

UNIT – IV

Issues in Design & Developments of Interactive Multimedia Systems (IMS) – An overview of design models for IMS - Review of Hypermedia design models: from Hyper-G, AHM and CMIFed to RMM - Key Issues in the Design of Interactive Multimedia Systems - "Navigate" or "Getting Lost in Hyperspace" looking at navigational - requirements in the design process - Importance of the use of appropriate metaphors in the design of IMS - Detailing task requirements and planning Media preparation - The IMS "Design and Development process model" - Applying the DDPM to two different case studies – Case studies.

REFERENCE BOOKS

1. Design and Development of Interactive Multimedia Systems – Mohamed DASTBAZ - Tata McGraw Hill Publications, New Delhi, 2002.
2. Multimedia, Make it work, Tay Vaughan, Tata McGraw Hill Publications, New Delhi.
3. Multimedia System, John F.Koegal Buford, Pearson Education Asia
4. Multimedia Literacy, Fred T.Hofstetter, McGraw Hill, 2001.

MT-IT-240 DISTRIBUTED OPERATING SYSTEM

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Distributed Systems: Goals – Hardware Concepts – Software Concepts – Design Issues – Communication in Distributed Systems: Layered Protocols - Asynchronous Transfer Mode Networks – The Client – Server Model – Remote Procedure Call – Group Communication.

Synchronization in Distributed Systems: Clock Synchronization Systems: Clock Synchronization - Mutual Exclusion - Election Algorithms - Atomic Transaction – Deadlocks in Distributed Systems - Processes and Processors in Distributed Systems: Threads – System Models - Processor Allocation - Scheduling in Distributed Systems - Fault Tolerance – Real- Time Distributed Systems.

UNIT – II

Distributed File Systems: Distributed File System Implementation - Trends in Distributed File Systems - Consistency Models - Page-Based Distributed Shared-Memory Distributed Shared Memory - Object-Based Distributed Shared Memory - comparison.

UNIT – III

Amoeba: Introduction to Amoeba - Objects and Capabilities in Amoeba – Process Management in Amoeba - Communication in Amoeba - The Amoeba Servers – Mach: Introduction to Mach - Process Management in Mach - Memory Management in Mach - Communication in Mach - Unix Emulation in Mach.

UNIT – IV

Chorus: Introduction to Chorus - Process Management in Chorus – Memory Management in Chorus - Communication in Chorus - Unix Emulation in Chorus - Cool: An Object-Oriented Subsystem - Comparison of Amoeba, Mach, and Chorus – DCE: Introduction to DCE - Threads - Remote Procedure Call - Time Series - Directory Service - Security Service - Distributed File System.

REFERENCE BOOKS

1. Andrew S. Tanenbaum, Distributed Operating System, Pearson Education Asia, 2001
2. Pradeep K. Sinha, Distributed Operating Systems: Concepts and Design : Concepts and Design, PHI Learning (2009), 1st Edition
3. Shubhra Garg, Fundamentals Of Distributed Operating System, S. K. Kataria & Sons (2010)
4. Doreen L. Galli, Distributed operating systems: concepts and practice, Prentice Hall, 2000
5. Randy Chow, Theodore Johnson, Distributed Operating Systems and Algorithm Analysis, Addison-Wesley

MT-IT-310 MOBILE COMPUTING

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Mobile Computing and Wireless Networking; Mobile Computing Applications; Wireless transmission, Multiplexing, Modulation, Spread Spectrum, Mobile Computing Architecture; Mobile System Networks; Emerging Technologies: RFID, WIMAX, Wireless Application Protocol(WAP); ZigBee; Introduction to Cellular networks: Components, Architecture, Call set-up, Frequency Reuse and Co-channel cell, Cell Design, Interference, Channel assignment, Hand Off; Mobility Management;

UNIT – II

Cellular Network Standards; Media Access Control : SDMA, FDMA, TDMA, CDMA & 3G; GSM: System Architecture, Mobile services & features, Protocols, Radio interface, Handover, GSM Channels, Localization and calling, User validation; DECT; TETRA; UMTS; General Packet Radio Service (GPRS); Introduction to CDMA based systems; Spread spectrum in CDMA systems; coding methods in CDMA; IS-95;

UNIT – III

Wireless LAN: Infra red vs radio transmission; Wireless LAN (IEEE 802.11) Architecture and protocol layers; HIPERLAN; Bluetooth Architecture: Layers, Security in Bluetooth; Mobile Ad-hoc and Sensor Networks and their applications; Vehicular Ad Hoc Networks;

UNIT – IV

Mobile Network Layer: Routing in MANET's ; Popular MANET routing protocols; Mobile Devices: Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems; Mobile IP: Architecture, Packet delivery and Hand over Management, Location Management, Registration, Tunneling and Encapsulation, Route optimization, DHCP. Mobile Transport Layer: Conventional TCP/IP transport protocols, Indirect TCP, Snooping TCP, Mobile TCP

REFERENCE BOOKS

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2004.
2. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, "Mobile Computing- Technology, Applications and Service Creation", Second Edition, Tata McGraw Hill, 2010.
3. Sipra DasBit, Biplab K. Sikdar, "Mobile Computing", PHI, 2009.
4. William C.Y.Lee, "Mobile Cellular Telecommunications", Second Edition, (Tata McGraw-Hill), 2006.
5. Theodore S. Rappaport, "Wireless Communications- Principles and Practice", Second Edition, Pearson Education, 2002.
6. Stomenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002.
7. W. Stallings, "Wireless Communications and Networks", Pearson Education, 2002.
8. Uwe Hansmann, Lothar Merk, Martin S. Nicklons, Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.
9. Hazysztof Wesolowski, "Mobile Communication Systems", John Wiley and Sons, 2002.
10. Raj Kamal, "Mobile Computing", Oxford Higher Education, 2008.
11. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI, 2012.
12. C.K.Toh, " Ad Hoc Wireless Mobile Wireless Networks- Protocols and Systems", Pearson Education, 2009.

MT-IT-320 ETHICAL HACKING

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Casing the Establishment - What is footprinting- Internet Footprinting. -Scanning-Enumeration - basic banner grabbing, Enumerating Common Network services. Case study- Network Security Monitoring
Securing permission - Securing file and folder permission. Using the encrypting file system. Securing registry permissions. Securing service- Managing service permission. Default services in windows 2000 and windows XP. Unix - The Quest for Root. Remote Access vs Local access. Remote access. Local access. After hacking root.

UNIT – II

Dial-up ,PBX, Voicemail, and VPN hacking - Preparing to dial up. War-Dialing. Brute-Force Scripting PBX hacking. Voice mail hacking . VPN hacking. Network Devices – Discovery, Autonomous System Lookup. Public Newsgroups. Service Detection. Network Vulnerability. Detecting Layer 2 Media.

UNIT – III

Wireless Hacking - Wireless Footprinting. Wireless Scanning and Enumeration. Gaining Access. Tools that exploiting WEP Weakness. Denial of Services Attacks. Firewalls- Firewalls landscape- Firewall Identification-Scanning Through firewalls- packet Filtering- Application Proxy Vulnerabilities . Denial of Service Attacks - Motivation of Dos Attackers. Types of DoS attacks. Generic DoS Attacks. Unix and Windows DoS

UNIT – IV

Remote Control Insecurities - Discovering Remote Control Software. Connection. Weakness.VNC . Microsoft Terminal Server and Citrix ICA .Advanced Techniques Session Hijacking. Back Doors. Trojans. Cryptography . Subverting the systems Environment. Social Engineering. Web Hacking. Web server hacking web application hacking. Hacking the internet User - Malicious Mobile code, SSL fraud, E-mail Hacking, IRC hacking, Global countermeasures to Internet User Hacking.

REFERENCE BOOKS

1. Stuart McClure, Joel Scambray and Goerge Kurtz, “Hacking Exposed Network Security Secrets & Solutions”, Tata Mcgrawhill Publishers, 2010.
2. Bensmith, and Brian Komer, “Microsoft Windows Security Resource Kit”, Prentice Hall of India, 2010.

MT-IT-330(i) CLOUD COMPUTING

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

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UNIT – 1

Cloud Computing Basics: Cloud Computing definition, cloud types, characteristics, laws of cloudonomics, cloud computing drawbacks, cloud adoption, measuring cost.

Cloud Architecture – cloud computing stack, connecting to cloud

Cloud Services & Applications – Infrastructure as a service, platform as a service, software as a service, defining identity as a service, defining compliance as a service

UNIT – II

Abstraction and Virtualization – virtualization technologies, load balancing, hypervisors, machine imaging, porting applications

PaaS application frameworks – Drupal, Eccentex AppBase, LongJump, Squarespace, WaveMaker Wolf Framework

Google Web Services – Google application portfolio, google toolkit, Google application engine

Amazon Web Services – Elastic Compute Cloud, Amazon Storage System, Amazon Database Services

Microsoft Cloud Services – Windows Azure Platform, Windows Live

UNIT – III

Managing Cloud – administrating the cloud, cloud management products, cloud management standards

Cloud Security – securing cloud, securing data, establishing identity and presence

Service Oriented Architecture – event driven SOA, Enterprise Service Bus, Service catalogs, SOA communications, managing and monitoring SOA

UNIT – IV

Moving Applications to Cloud - functionality mapping, application attributes, cloud service attributes, system abstraction, cloud bursting.

Cloud based Storage – measuring digital universe, provisioning cloud storage, cloud back solution, cloud storage interoperability

REFERENCE BOOKS

1. Barrie Sosinsky, “Cloud Computing Bible”, Wiley Publishing Inc., 2011
2. Christian Baun, Marcel Kunze, Jens Nimis, Stefen Tai, “Cloud Computing, Web-Based Dynamic IT Services”, Springer 2011.
3. Rajkumar Buyya, James Broberg, Andrzej Goscinski, “Cloud Computing: Principles and Paradigms”, John Wiley & Sons, Inc.

MT-IT-330(ii) DISTRIBUTED SYSTEMS SECURITY

Maximum marks: 150 (**External:** 100, **Internal:** 50)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction – Distributed Systems, Distributed Systems Security. Security in Engineering: Secure Development Life-cycle Processes - A Typical Security Engineering Process – Security Engineering Guidelines and Resources. Common Security Issues and Technologies: Security Issues, Common Security Techniques.

Host-level Threats and Vulnerabilities: Transient code Vulnerabilities - Resident Code Vulnerabilities - Mal-ware: Trojan Horse – Spyware - Worms/Viruses – Eavesdropping – Job Faults. Infrastructure-Level Threats and Vulnerabilities: Network-Level Threats and Vulnerabilities - Grid Computing Threats and Vulnerabilities – Storage Threats and Vulnerabilities – Overview of Infrastructure Threats and Vulnerabilities.

UNIT – II

Application-Level Threats and Vulnerabilities: Application-Layer Vulnerabilities -Injection Vulnerabilities - Cross-Site Scripting (XSS) - Improper Session Management - Improper Error Handling - Improper Use of Cryptography - Insecure Configuration Issues - Denial of Service - Canonical Representation Flaws - Overflow Issues. Service-Level Threats and Vulnerabilities: SOA and Role of Standards - Service-Level Security Requirements - Service-Level Threats and Vulnerabilities - Service-Level Attacks - Services Threat Profile.

UNIT – III

Host-Level Solutions: Sandboxing – Virtualization - Resource Management – Proof-Carrying Code - Memory Firewall – Antimalware. Infrastructure-Level Solutions: Network-Level Solutions - Grid-Level Solutions - Storage-Level Solutions. Application-Level Solutions: Application-Level Security Solutions.

UNIT – IV

Service-Level Solutions: Services Security Policy - SOA Security Standards Stack – Standards in Dept - Deployment Architectures for SOA Security - Managing Service-Level Threats - Compliance in Financial Services - SOX Compliance - SOX Security Solutions – Multilevel Policy-Driven Solution Architecture - Case Study: Grid - The Financial Application – Security Requirements Analysis. Future Directions - Cloud Computing Security – Security Appliances - User-centric Identity Management - Identity-Based Encryption (IBE) - Virtualization in Host Security.

REFERENCE BOOKS

1. Abhijit Belapurkar, Anirban Chakrabarti and et al., “Distributed Systems Security: Issues. Processes and solutions”, Wiley, Ltd., Publication, 2009.
2. Abhijit Belapurkar, Anirban Chakrabarti, Harigopal Ponnappalli, Niranjan Varadarajan, Srinivas Padmanabhuni and Srikanth Sundarrajan, “Distributed Systems Security: Issues, Processes and Solutions”, Wiley publications, 2009.
3. Rachid Guerraoui and Franck Petit, “Stabilization, Safety, and Security of Distributed Systems”, Springer, 2010.

MT-IT-340(i)**CYBER CRIMES****Maximum marks:** 150 (**External:** 100, **Internal:** 50)**Time:** 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Computer Hardware & Networks: The BIOS and Boot Process - Computer Memory - Hard Disks, Floppy Disks, CD ROMs and DVDs - Networks and Communications - Understanding the Internet: How the Domain Name System works - Email Concepts -World Wide Web concepts - Website Creation Concepts Forms, Interactivity, and Database-Driven Web Sites - Web Commerce

UNIT – II

Cyber crime: Definition – History and evolution Types and forms of cyber crimes -Malicious Code - Computer Viruses ,Computer Worms ,Computer Trojans, Web Hacking Foot printing, Port Scanning, E-Shoplifting Web Defacement, Denial of Service Attacks, Manipulating Cookies - Email Hacking: Email Hacking using Packet Sniffers, Email Hacking & Phishing, Email Frauds & Phishing, Email Bombing Email Hijacking - Social Engineering .

UNIT – III

Best Practices for Cyber Crime Investigation: Initializing a Search and Seizure Operation Tracking & Tracing Emails, Recovery of Digital Evidence, Setting up a Cyber Crime Investigation Cell Cyber Forensics: Basic Forensic Principles, Forensic Imaging & Verification, Data Recovery and Analysis

UNIT – IV

Cyber terrorism Prevention and detection of cyber crime – Cyber Policing Current statutes in India: Penalties & Offences under the Information Technology Act, 2000, Offences under the Indian Penal Code, 1860, Issues relating to investigation and adjudication of cyber crimes in India Digital evidence IT act 2000 and other legal provisions.

Intellectual Property Issues and Cyberspace – The Indian Perspective: Overview of Intellectual Property related Legislation in India, Copyright law & Cyberspace Trademark law & Cyberspace. Digital Delivery of Intellectual Property Services

REFERENCE BOOKS

1. Cyber Crime by Bernadette Hlubik Schell, Clemens Martin, ABC – CLIO.

MT-IT-340(ii)**E-COMMERCE****Maximum marks:** 150 (**External:** 100, **Internal:** 50)**Time:** 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will be compulsory & will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. Student will be required to attempt FIVE questions in all. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to E-Commerce: The scope of E-Commerce - Definition – Internet commerce - Electronic Markets - Electronic Data Exchange. Business Strategy in an Electronic Age: The value chain - supply chains - Porter's value chain Model – Inter organizational value chains - Competitive Advantage using e-commerce.

UNIT – II

Strategic implications of IT - Business capability - Strategy formulation and Implementation Planning - e-commerce implementation - e-commerce evaluation. Case Studies : Airline Booking Systems - Web Booking Systems - Competitive outcomes.

Business to Business Electronic Commerce: Inter-organizational Transactions - Electronic Markets - Advantages and Disadvantages of Electronic Markets and its future. Electronic Data Interchange (EDI): Definitions, Examples - EDI Technology – EDI Communications - Implementation - EDI Agreements – Security. Purchasing On-line.

Business to Consumer Electronic Commerce: The e-shop - e-commerce technologies - consumer e-commerce advantages and disadvantages.

UNIT – III

E-marketing E-advertising Internet Marketing Trends Target Markets E-branding Marketing Strategies E-security Security on the Internet E-business Risk Management Issues E-payment Systems Digital Payment Requirements Digital Token based E-payment Systems Classification of New Payment Systems Properties of Electronic Cash (E-cash) Cheque Payment Systems on the Internet Risk and E-payment Systems Designing E-payment Systems Digital Signature Online Financial Services in India

UNIT – IV

E-Customer Relationship Management Customer Relationship Management Typical Business Touch-points Orbitz ESupply Chain Management Supply Chain E-strategy Information and Strategy The Virtual Value Chain Seven Dimensions of E-commerce Strategy Value Chain and E-strategy Planning the E-commerce Project E-Commerce Strategy and Knowledge Management E-Business Strategy and Data Warehousing and Data Mining Mobile Commerce Growth of Mobile Commerce Success Stories of Mobile Commerce Wireless Applications Technologies for Mobile Commerce Origins of WAP, WAP Programming Model Wireless Technologies Customer-effective Web Design Requirements of Intelligent Websites Setting Website Goals and Objectives Strategies for Website Development Legal and Ethical Issues

REFERENCE BOOKS

1. E-Commerce : Strategy, Technologies and Applications - David Whiteley – Tata McGraw Hill Publishing Company, 2000.
2. E-Commerce Logistics and Fulfillment - Deborah L.Bayles - Pearson Education Asia - Addison Wesley Longman (Singapore) Pte. Ltd.
3. Managing your e-commerce business - Brenda Kienan - 2nd edition - Prentice Hall of India, New Delhi, 2001.
4. Cases in E-Commerce – Jeffrey F.Rayport – McGraw-Hill 2002.