SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

FOR

MASTER OF TECHNOLOGY

[INFORMATION SECURITY MANAGEMENT]

REGULAR PROGRAMME

Offered by IT Deptt.

Indira Gandhi Delhi Technical University for Women
(Established by Govt. of Delhi vide Act 09 of 2012)
(Formerly Indira Gandhi Institute of Technology)
Kashmere Gate Delhi-110006

M.Tech(ISM)

FIRST SEMESTER

Paper Code	Paper Title	L	P	Credit
THEORY				
MIS -501	Secure Coding and Security Engineering	4	-	4
MIS -503	Advanced Data Structure	4	-	4
MIS -505	Cyber Security and Forensics	4	-	4
MMC -507	Advanced Network Technologies	4	-	4
MIS -509	Network Security and Management	4	-	4
PRACTICALS				
MIS -511	Secure Coding and Security Engineering Lab	-	2	1
MIS -513	Advanced Data Structure Lab	-	2	1
MIS -515	Cyber forensics and Incident Handling Management Lab	-	2	1
MIS-517	Technical Report Writing*	-	2	2
	TOTAL	**20**	**8**	**25**

SECOND SEMESTER

Code	Course Title	L	P	Credit
THEORY				
MIS -502	Cryptographic Protocols and Algorithms	4	-	4
MIS-504	OS Hardening	4	-	4
MIS-506	Cloud Computing Architecture	4	-	4
ELECTIVES (Choose any two) **				
MIS -508	Secure Wireless Networks	4	-	4
MIS -510	Web Application and its security management	4	-	4
MIS -512	Security Testing and Risk Management	4	-	4
MIS-514	Big Data and Business Analytics	4	-	4
MIS -516	Distributed Systems	4	-	4
MIS -518	IT Act 2000 and Cyber Laws	4	-	4
MIS -520	Digital Image Processing and Steganography	4	-	4
MIS-522	Intellectual Property Rights	4	-	4
MIS-524	Open Ended Research Topic	4	-	4
PRACTICALS				
MIS -526	Cryptographic Protocols and Algorithms Lab	-	2	1
MIS -528	OS Hardening Lab	-	2	1
MIS-530	Lab based on elective(s)	-	2	1
MIS-532	Term Paper*	-	2	2
	TOTAL	**20**	**8**	**25**

*NUES (Non University Examination System)

** Any of these subjects may be chosen in distance learning mode such as Massive Open Online Courses (MOOC's) and supervised by internal faculty-in –charge.

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THIRD SEMESTER

Code	Course Title	L	P	Credit
THEORY				
MIS-601	Information Security Audit and Security Management	4	-	4
MIS-603	Advanced Database Management and information retrieval	4		4
ELECTIVES(Choose any one) **				
MIS-605	Security Architecture for Computational Grids	4	-	4
MIS -607	Ethical Hacking	4	-	4
MIS-609	Biometric Systems	4	-	4
MIS-611	Enterprise Information Security Management	4	-	4
MIS -613	E-Commerce and M-Commerce	4	-	4
PRACTICALS				
MIS-615	Information Security Audit and Security Management Lab	-	2	1
MIS -617	Advance Database Management and information retrieval Lab	-	2	1
MIS -619	Minor Project	-	8	12
	TOTAL	**12**	**12**	**26**

FOURTH SEMESTER

Code	Paper	L	P	Credit
MIS -602	Dissertation	-	30	24
MIS -604	Seminar and Progress Report[*]	-	04	04
	TOTAL		**34**	**28**

*NUES (Non University Examination System)
** Any of these subjects may be chosen in distance learning mode such as Massive Open Online Courses (MOOC's) and supervised by internal faculty-in –charge.

1. The total number of credits of the Programme M. Tech. = 104.
2. Each student shall be required to appear for examination in all courses. However, for the award of the degree a student shall be required to earn the minimum of 100.

Paper Code: MIS-501   L   P   C
Paper Title: Secure Coding and Security Engineering   4   0   4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1

Buffer Overrun, Format String Problems, Integer Overflow, and Software Security Fundamentals, SQL Injection, Command Injection, Failure to Handle Errors, and Security Touchpoints, Cross Site Scripting, Magic URLs, Weak Passwords, Failing to Protect Data, Weak random numbers, improper use of cryptography.

(10 Hrs)

UNIT 2

Information Leakage, Race Conditions, Poor Usability, Not Updating Easily, Executing with too much privilege, Failing to protect network traffic, improper use of PKI, trusting network name resolution, Failing to protect network traffic, improper use of PKI, trusting network name resolution, bonus topics, final project time.

(10 Hrs)

UNIT 3

Technical engineering basics ô cryptography, protocols, access controls, cryptography hardware and software implementations. Types of attack ô web exploits, card fraud, hardware hacks, electronic warfare , tampering, side-channels, malicious hardware. Specialized protection mechanisms ô biometrics, seals, smartcards, RFID, alarms, and DRM, and how they fail. Security economics ô why companies build insecure systems, why it's tough to manage security projects, and how to cope.

(10 Hrs)

UNIT IV

Security psychology ô the privacy dilemma, what makes security too hard to use, and why deception will keep increasing. Ethics ô vulnerability disclosure. Policy ô why governments waste money on security, why societies are vulnerable to terrorism, and what to do about it. How to explore, read, critique, present and extend a wide variety of research literature in security engineering and related fields. How to plan, execute and report a research project Projects will probably involve one of the following: 1) simulation, 2) implementation, 3) comparison, 4) vulnerability analysis. Projects should also consider at least one multi-disciplinary aspects such as Psychology, Economics, Policy, Ethics, etc.

(10 Hrs)

References:

1. Howard, LeBlanc, and Viega, õ24 Deadly Sins of Software Securityö, 1st edition, 2005, The McGraw-Hill
2. Ross Anderson, õSecurity Engineering - A Guide to Building Dependable Distributed Systemsö, 2nd edition, 2008, Wiley Interscience.
3. Robert C. Seacord, õSecure Coding in C and C++ö, 2nd edition, 2013, SEI Series in Software Engineering .
4. Michael Howard and David LeBlanc, "Writing Secure Codeö, 2nd edition, 2003, Microsoft Press

Paper Code: MIS-503   L   P   C
Paper Title: Advanced Data Structure   4   0   4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT I
Review of Elementary data structures : Arrays, Linked list, Stacks, Queues, Binary Trees, Hashing, Sorting and Searching techniques, Sparse matrices: Properties of sparse matrices, linked list representation of sparse matrices, Analyzing algorithms.

(10 Hrs)

UNIT 2
Definition Operations on B Trees, B+ trees, B* trees, Weight Balanced Trees (HuffmanTrees), 2-3 Trees and Red-Black Trees. Augmenting Red-Black Trees to Dynamic Order Statics and Interval Tree Applications. Operations on Disjoint sets and its union find problem Implementing Sets. Dictionaries, Priority Queues and Concatenable Queues using 2-3 Trees.

(10 Hrs)

UNIT 3
Binomial heaps, Fibonacci heaps, Union Find Data Structures, Amortization, Self-adjusting and persistent data structures. Definitions for Graphs, Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph and Planarity Testing Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single source shortest path and all pair shortest path algorithms.

(10 Hrs)

UNIT 4
Greedy Method: General Method, Knapsack problem, Single source shortest path. Dynamic Programming: General method, 0/1 Knapsack problem, All pair shortest path. Backtracking: Sum of subsets, 8-queens problem, and Hamiltonian cycles.

(10 Hrs)

References:
1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, õIntroduction to Algorithmsö, 1st edition, 2005, MIT Press.
2. Ellis Horowitz, Sartaj Sahni Sanguthevar Rajasekaran, õThe Design and Analysis of Computer Algorithmsö, 2nd edition, 2007, Galgotia
3. Aho, Hopcraft & Ulman, The Design and Analysis of Computer algorithmsö, 1st edition, 1974, Addison Wesley.
4. Tannenbaum, õData Structuresö, 2nd edition, 2007, PHI
5. R.E. Tarjan, õData Structures and Network algorithmsö, 1st edition, 2005, SIAM Regional Conference series in applied mathemetics..
6. Rajeev Motwani and Prabhakar Raghavan, õRandomized Algorithmsö, 1st edition, 1995, Cambridge University Press.
7. Dexter C. Kozan, õThe Design & Analysis of Algorithmsö, 1st edition, 1991, Springer-Verlag.

Paper Code: MIS-505   L   P   C
Paper Title: Cyber Security and Forensics   4   0   4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1
Introduction to Incident Response Process Computer Security Incident, Goals of Incident response, Who is involved in Incident response, Incidence Response Methodology, Pre-incident preparation, Detection of Incidents,, Initial response, Formulate a response strategy, Investigate the incident, Reporting and Resolution.

(10 Hrs)

UNIT 2
Preparing for Incidence Response : preparing Individual Hosts, Recording of Cryptographic Checksum of critical files, enabling secure Audit Logging, Building Up your Hosts Defense, Preparing a Network : Installing Firewalls and IDS, User access control Lists, Establishing Appropriate Policies and procedures, creating a response tool Kit, Establishing an Incident Response Team, Incident handling After Detection of an Incident.

(10 Hrs)

UNIT 3
Fundamentals of Computer Forensics, Computer Forensics Technology, Live data collection from Windows systems, Live data Collection from Unix systems, Data Acquisition of digital evidence from electronic media, Evidence collection and preservation, Network Forensics, Email Investigations, Mobile device forensics, Computer Forensics Analysis and Validation, Macro Threats, Information Warfare.

(10 Hrs)

UNIT 4
Data analysis Techniques : Preparation for Forensic Analysis, Restoring a forensics Duplicate, Recovering deleted files on Windows systems, recovering Unallocated Space, Free Space and Slack space, Writing forensic Reports, Report Writing Guidelines.

(10 Hrs)

References:
1. K Mandla, C. Prosise , Matt Pepe, õ Incident Response and Computer Forensicsö, 2nd Edition, 2003, TMH
2. John R. Vacca, õComputer Forensicsö, 2nd Edition, 2004, Firewall Media,.
3. Majid Yar, õCybercrime and Societyö, 1st Edition, 2006, Sage Publications,.
4. Chad Steel, õWindows Forensicsö, 1st Edition, 2006, Wiley India,
5. R M Slade, õ Software Forensicsö, 1st Edition, 2004, TMH

Paper Code: MMC-507   L   P   C
Paper Title: Advanced Network Technologies   4   0   4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60
  1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
  2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.

UNIT 1
Protocol and Network Fundamentals: Internet Evolution, Packet Switched Networks, TCP/IP Protocol Architecture, OSI Model, Internetworking, Overview of User Datagram Protocol and Internet Protocol. **High Speed Networks:** Frame Relay, Networks, ATM, High Speed LAN

(10 Hrs)

UNIT 2
Delay Models In Data Networks: Characteristics of Queuing System, Little's Theorem, Queuing Models, Single Server Queues, Multi Server Queues, Priority Queuing, and Networks of Queues. **Multi-access Communication:** Aloha Modeling, Slotted Aloha Modeling, Carrier Sensing: CSMA/CA/CD, MACA, MACAW, 802.11 MAC Protocol.

(10 Hrs)

UNIT 3
Congestion Control and Traffic Management: Congestion Control in Data Network and Internet, Link level flow control, Link level error control, TCP traffic control, Traffic and Congestion control in ATM Networks

(10 Hrs)

UNIT 4
Internet Routing: Shortest Path Length Determination, Interior Routing Protocols: Distance Vector and Link State Protocol, Exterior Routing Protocol: BGP & IRDP, Multicasting. **Quality of Service and Resource Reservation in IP Networks:** Overview of QoS, Integrated Services, Differentiated Services, Random Early Detection (RED), Resource Reservation: RSVP, Multiprotocol Label Switching (MPLS). Real Time Transport Protocol.

(10 Hrs)

Text Books:
1. Dimitri Bersekas, Robert Gallager, "Data Networks", Second Edition, Pearson Education, 2006.
2. William Stallings, "High Speed Networks and Internets", Second Edition, Pearson Education, 2010.

Reference Books:

1. James F. Kurose,Keith W.Ross, õComputer Networking: A Top-Down Approach Featuring the Internetö, Third Edition, Pearson Education, 2007.

2. Nader F. Mir, õComputer and Communication Networksö, Second Edition, Pearson Education, 2007.

3. Behrouz A. Forouzan, õData Communications and Networkingö, Fourth Edition, Tata McGraw Hill, 2007

4. S.Keshav, õAn Engineering Approach to Computer Networkingö, First Edition, Pearson Education, 1997.

5. Andrew S. Tanenbaum, õComputer Networksö, Fourth Edition, Prentice Hall, 2003.

Paper Code: MIS-509   L   P   C
Paper Title: Network Security and Management   4   0   4

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 60**
  1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
  2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.

UNIT 1
Security Taxonomy, Domain of information security, Security goals, security attacks, threats Vulnerabilities, Malicious Softwares, Virus, Trojan, Worms, spywares, Security services and Mechanism Security Techniques: Steganography, Digital watermarking, Security Models, Introduction to DB Security. Software vulnerabilities, Buffer and Stack over flow, Phishing.

(10 Hrs)

UNIT 2
Mathematics of Cryptography, Integer Arithmetic, modular arithmetic, Linear congruences, Algebraic structures, GF(2n) Traditional Symmetric Key ciphers, Substitution, Transposition, Stream and Block Ciphers , Some Classical systems ó Statistical theory of cipher systems-Complexity theory of crypto systems ó Stream ciphers, Block ciphers.

(10 Hrs)

UNIT 3
Modern Block Ciphers ó DES and variant, modes of use of DES. Advanced Encryption Standard Transformations, Key expansion, Public Key Cryptography RSA, ECC, Web security, IP sec, Email Security

(10 Hrs)

UNIT 4
Network management Architecture & Applications, Management standards and Models, Network Management Functions- Configurations Configuration Management, Fault management, Identification and Isolation, Management Protocols SNMP v1, SNMP v3, Network management Accounting & Performance Functions: accounting Management, Performance Management, Network Usage, Metrics.

(10 Hrs)

References:
  1. William Stallings, õCryptography and Network security Principles and Practicesö, 4th edition, 2005, PHI
  2. Behrouz A. Forouzan , õCryptography and Network Securityö, 1st Edition, 2007, The McGraw-Hill
  3. J. Richard Burkle, õNetwork Management Concepts and Practice : A hands on approachö, 3rd Edition, 2000, Pearson education
  4. Gollmann, Dieter, õComputer Securityö, 2nd edition, 2005, John Wiley & Sons Ltd.
  5. Micki Krause, Harold F. Tipton, õHandbook of Information Security Managementö, 6th edition, 2011, Auerbach Publications
  6. C P Pfleeger, S L Pfleeger, õSecurity in Computingö, 4th edition, 2006, PHI
  7. Ankit Fadia, õ Network Security A Hackers Perspectiveö, 2nd edition, 2002, Mc-Millan Publishing

Paper Code:MIS-511   L   P   C
Paper Title: Secure Coding and Security Engineering Lab   -   2   1

Experiments will be based on the subject Secure Coding and Security Engineering

Paper Code: MIS-513   L   P   C
Paper Title: Advanced Data Structure Lab   -   2   1

Experiments will be based on the subject Advanced Data Structure

Paper Code: MIS-515   L   P   C
Paper Title: Cyber forensics and Incident Handling Management Lab -   2   1

Experiments will be based on the subject Cyber forensics and Incident Handling Management

Paper Code: MIS-517   L   P   C
Paper Title: Technical Report Writing   -   2   2

Technical reports describe the progress or results of scientific or technical research and development. The purpose of a technical report is to completely and clearly describe technical work, why it was done, result obtained and implications of those results. Technical report present facts and conclusions about designs and other projects. Typically, a technical report includes research about technical concepts as well as graphical depictions of designs and data. For guidelines of technical report writing, following website may be referred. www.theiet.org/students/resourees/technicalreport.com

Paper Code: MIS-502	L	P	C
Paper Title: Cryptographic Protocols and Algorithms	4	0	4

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 60
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Protocol Building Blocks, Communication Using Symmetric Cryptography, One Way Hash Functions, Communication using Public Key Cryptography , digital signatures, signature with encryption, Random and Pseudo random sequence generation.

(10 Hrs)

UNIT 2
Basic Protocols: key exchange, Authentication, Formal analysis of Authentication and Key exchange protocols, Multiple Key Public Key Cryptography, secret Splitting, Secret Sharing.

(10 Hrs)

UNIT 3
Intermediate Protocols: time stamping services, subliminal channels, Undeniable Digital signatures, Proxy signatures, group signatures, Bit Commitment, fair coin flips, metal poker, key escrow.

(10 Hrs)

UNIT 4
Advanced Protocols: Zero knowledge proofs, Zero knowledge proof for identity, blind signatures, identity based public key cryptography, Oblivious transfer, oblivious signatures, Simultaneous contact signing, Digital certified Mail, Esoteric protocols, secure elections.

(10 Hrs)

References:
1. Bruce Schneier, Applied Cryptography, 2nd edition, 1996, Wiley
2. **Dong**, Ling, **Chen**, Kefei, , Security Analysis Based on Trusted Freshness, 1st edition 2012, Springer
3. Bernard Menezes, õNetwork Security and Cryptographyö, 2nd edition, 2011, Cenege Learning
4. J A Buchman, õ Introduction to Cryptographyö, 2nd Edition, 2009, Springer

Paper Code: MIS-504   L   P   C
Paper Title: OS Hardening   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**
  1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
  2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Overview of Linux and Windows Operating system, Linux Kernel, Windows kernel, Networking , Secure booting, Boot loaders and Boot time services, Securing Virtual Terminals, Securing log in Screens, Users and Groups, Shadow Password, Groups, adding groups, Deleting Unnecessary users and Groups, Passwords, Password Aging, Process Accounting, Plugable Authentication Modules, , Hardening Kernel in Linux

(10 Hrs)

UNIT 2
Working of Linux Firewall, Tabls, Chains, Policies, Filtering Criteria, IP table Commands, Securing Connections and Remote Administrations, Public key encryptions, SSL,TLS, Open SSL, Remote administration, ssh, scp,sftp, ssh-agent, Agent forwarding, The sshd Daemon, Securing Files and File system, Access Permission, Imutable Files, Encrypting Files, Securely Mounting Files, Secring removal devices, Understanding Logging and log Monitoring, Syslog, Syslog-NG, Log anaysis and correlation, Hardening remote access to Email, Securing FTP server

(10 Hrs)

UNIT 3
Understanding Windows Kernel, Windows attacks, Automated Vs dedicated attackers, Virus, Trojan, Directory traversal, Password Cracking, Social engineering, Adware, spyware, spam, phishing and Farming, Conventional Defense mechanism, Unconventional defenses, Host based firewall, Use of Anti -virus , Anti-Spam software, and anti-spam softwares, Hardening TCP/IP stack, Securing Files and File system in Windows, NTFS permissions, Best practice recommendations.

(10 Hrs)

UNIT 4
Windows password authentication, Unicode password, Password Complexities, Strong Password, Windows password Hashes, Password Attacks, tools and techniques, Defense mechanism against password attacks, Disable LM password Hashes, Disable LM and NTLM authentication, Hardening File System, Protection of High Risk files, High risk windows files, File Defenses, Methods to prevent unauthorised execution, Securing internet explorer

(10 Hrs)

References:
  1. R A Grimes, õProfessional Windows Desktop and server Hardening ö, 1st edition, 2006, Wiley India Edition
  2. James Turnbull, õ Hardening Linuxö, 1st edition , 2005, Apress publication
  3. Scambray, Shema, and Sima, õHacking Exposed Web Applicationsö, 3rd edition , 2010, McGraw Hill.
  4. Sander Van Vugt, õ Red Hat Enterprise Linux 6 Administrationö, 1st edition, 2010, Wiley Interscience

Paper Code: MIS-506   L   P   C
Paper Title: Cloud Computing Architecture   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1

The Evolution of Cloud Computing, Why Cloud Computing Matters, Advantages and Disadvantages of Cloud Computing, How Cloud Computing Works, Understanding Services and Applications by type, IaaS, PaaS, SaaS, IDaaS, CaaS, Cloud Computing for Everyone, Collaborating on Calendars and Schedule.

(10 Hrs)

UNIT 2

A Brief Primer on Cloud Security and Cloud Architecture, Security Architecture, Cloud Computing Architecture, Control over Security in Cloud Model, Security Concerns, Accessing Risk Tolerance in Cloud Computing, Legal and Regulatory Issues

(10 Hrs)

UNIT 3

Securing the Cloud: Architecture, Security requirements for the Architecture, Security Patterns and Architectural Elements, Cloud Security Architecture, Planning Key strategies for secure operations, Overview of Data Security in Cloud Computing, Data Encryption, Cloud Data Storage, Cloud Lock-in.

(10 Hrs)

UNIT 4

Key strategies and Best Practices, Effectively Managing Risk, Overview and Limits of Security Controls, Security Monitoring, Building an Internal Cloud, Selecting an External Cloud, Evaluating Cloud Security, Operating a Cloud, Using Mobile Cloud.

(10 Hrs)

References:
1. Ronald L. Krutz, Russell Dean Vines, Cloud Security: A Comprehensive Guide to Secure Cloud Computing, 1st edition, 2010, Wiley
2. Vic (J.R.) Winkler, Securing the Cloud: Cloud Computer Security Techniques and Tactics, Syngress, 1st edition, 2011, Elseveir.
3. John W. Rittinghouse and Ames F. Ransome, ðCloud Computing Implementation, Management and Securityö, 2nd edition, 2010, CRC Press, Taylor & Francis Group, Boca Raton London New York.
4. Cloud Computing Bible, Barrie Sosinsky, 1st edition, 2011, Wiley-India
5. Miller Michael, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, 1st edition, 2008, Pearson Education India.

Paper Code: MIS-508   L   P   C
Paper Title: Secure Wireless Networks   4   0   4

INSTRUCTIONS TO PAPER SETTERS	**Maximum Marks : 60**

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1

Wireless Networks, Wireless Network Architecture, Adhoc Networks, Sensor Networks, Wireless Devices, Access Points, PDA, Smart Phones, Wireless Standards, IEEE 802.11 a/b/g/n Emerging Wireless Technologies, SSID, BSSID, MAC Address, Beacons and Broadcasts, Associating and Authenticating.

(10 Hrs)

UNIT 2

WLAN Architecture, Frequency and Data rates, WLAN components, Security feature of 802.11 Problems With the IEEE 802.11 Standard, WEP, Problems in WEP, WPA, WPA2, Security Requirements and Threats, Loss of Confidentiality, Loss of Integrity, Risk Mitigation.

(10 Hrs)

UNIT 3

Secure Design Principles for Wireless Networks, Defense In Depth, Least Privilege, Network Segmentation, Wireless Assessments, Secure the Infrastructure, Rogue AP Detection, Physical Security, Firewalls, Routers, Switches, Intrusion Detection Systems and Intrusion Prevention Systems Wireless Intrusion Detection and Intrusion Prevention Systems, Honeypots, Web Authentication Gateways

(10 Hrs)

UNIT 4

Preventing Rogue Wireless Networks, Manually Detecting Rogue Wireless Networks, Tracing Malicious Rogue Access Points, Handling Rogue Access Points, Automated Detection of Rogue Wireless Networks, Other Wireless Technologies, Next-Gen Solutions, Lightweight Wireless Solutions, Cloud-based Wireless Solutions, Dedicated Wireless IDS, Client Protection

(10 Hrs)

References:

1. Tyler Wrightson , õWireless Network Security: A Beginner∅ Guideö, 1st edition, 2012, McGraw-Hill
2. Security for mobile wireless sensor networks by Liu , Donggang, 1st edition, 2007, Springer
3. Wimax Standard & Security Ahson Syed, 1st edition, 2007, CRC Press (Taylor & Francis)
4. Wireless Security handbook Earle, Aaron E, 1st edition, 2006, Auerbac Publication (Taylor & Francis Group)
5. Yang Xiao, õ Security in Sensor Networksö, 1st edition, 2006, AuerBach Publications

Paper Code: MIS-510   L   P   C
Paper Title: Web Application and its Security Management   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1
History of web application- Introduction to web application architecture, Uniform Resource Locator (URL), HTTP- Introduction, HTTP Methods, WEBDAV methods, Request/Response analysis, Security problems with http, HTTPS- Handshake protocol, Record protocol, Proxy- Man in the middle attack, Tools: Burp proxy, Paros proxy, web scarab Encoding Techniques- URL Encoding, HTML Encoding, Unicode Encoding, Tools: Burp decoder

(10 Hrs)

UNIT II
Profiling Application - Spiders, crawlers, Search engine discovery, Banner Grabbing, Analysis of error codes, Tools: Http Print, netcraft Attacking Authentication- Authentication Types, Brute force attacks, Analyzing Auto complete options, Insecure credential transmission, Session puzzle attacks, Authentication bypass techniques, Shoulder surfing, CAPTCHA Rebinding attacks, Countermeasures, Tools: Bruter, Burp Repeater, Burp Intruder Attacking Authorization- Authorization types, Parameter tampering, Horizontal privilege escalation, Vertical privilege escalation , Referrer spoofing

(10 Hrs)

UNIT III
Cryptography weakness- Symmetric cryptography, Asymmetric cryptography, Substitution cipher, Stream cipher, Block cipher, Steganography, SSL cipher testing, Cracking hashes, Padding oracle attack, Cracking ECB encryption, Tools: SSLDigger, MD5 crack Attacking Session management- Introduction, Secure flag, HTTPOnly flag, Cookie Domain & Path, Session Token analysis, Session fixation , Cookie transmission mechanisms, Tools: Burp sequencer, Timeout issues

(10 Hrs)

UNIT IV
SQL injection- Error based SQLi, Blind SQLi, SQLi exploitation, Data extraction with UNION queries, Data extraction with inference techniques, Command execution with SQLi, Impact of SQLi, Remediation, Stored procedures Vs Parameterized queries, Tools: SQLMap, Absinthe URL Redirection attacks- Phishing attacks, Remediation HTTP Response splitting - Cache positioning , Command execution Attacking Web Server- Denial of service attacks, Buffer over flows, Remediation

(10 Hrs)

References:
1. Scambray, Shema, and Sima, "Hacking Exposed Web Applications", 2nd edition, 2006, McGraw Hill.
2. J.D. Meier, Alex Mackman, Michael Dunner, Srinath Vasireddy, Ray Escamilla and Anandha Murukan "Improving Web Application Security: Threats and Countermeasures", 1st edition, 2003, Microsoft Corporation
3. Michael Howard, David LeBlanc, "Writing Secure Code", 2nd Edition, 2003, Microsoft Corporation
4. Simson Garfinkel, "Web Security, Privacy and Commerce", 2nd Edition, 2002, O'reilly
5. Michael Cross, "Developer's Guide to Web Application Security", 1st edition, 2007, Syngress publishing

Paper Code: MIS-512   L   P
C
Paper Title: Security Testing and Risk management   4   0
4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1
Role of Testing in SDLC: Review of software development models (Waterfall Models, Spiral Model, W Model, V Model) Agile Methodology and Its Impact on testing, Test Levels (Unit, Component, Module, Integration, System, Acceptance, Generic), Approaches to Testing ó I: Dynamic Testing, Black Box Testing Equivalence Class Partitioning, Boundary Value Analysis, State Transition Test, Cause Effect Graphing and Decision Table Technique and Used Case Testing and Advanced black box techniques ,Statement Coverage, Branch Coverage, Test of Conditions, Path Coverage.

(10 Hrs)

UNIT 2
Fitting Security Testing into SDLC, Security requirements, Design vs implementation vulnerabilities, Common secure Design issues, poor use of cryptography, tracking users and their permissions, flawed input validation, weak structural security, programming language implementation isues, platform implementation issues, generic application security implementation issues

(10 Hrs)

UNIT 3
Directions for risk management development. Possibilities in six dimensions - what, when, why, which way, who, and wherewithal. Definitions of risk, threat, opportunity and uncertainty distinguished; relationship with performance objectives, implications for uncertainty management. Security Risk management, Risk leased security testing : information gathering, Run time inspection, Identfying threat paths, ranking the risks associated with vulnerabilities.

(10 Hrs)

UNIT 4
Objectives for risk management applications. Distinguishing benefits and objectives for risk management. Objectives for process, application, performance and strategic capability; links between these objectives. Planning the scope and purpose of a risk management application. Risk evaluation: The importance of risk-performance trade-offs, and risk efficiency as a key criterion in evaluating alternative course of action. Building capability in risk management. Assessing risk management capability (benchmarking, risk maturity). Nature and quality of risk management processes, Facilitators of risk management capability.

(10 Hrs)

References:

1. Elfriede Dustin, Luke Nelson and chris Wysopal, õ The art of Software Security Testingö, Addison- Wesley Professional, 1st edition, 2006
2. Wolf Halton, Alfred Basta, õ Computer security and penetration Testingö, delmer Publisher, 1st edition, 2007
3. Andreas Spillner, Tilo Linz, Hans Schaefer, õSoftware Testing Foundationsö, Shoff Publishers, 3rd edition, 2011
4. Srinivasan D and Gopalswamy R, õ Software Testing: Principles and Practicesö, Pearson Ed, 1st edition, 2006
5. Aditya P. Mathur, õ Foundations of Software Testingö, Pearson Ed, 1st edition, 2000
6. Robert V Binder, õ Testing Object Oriented Systems: models, patterns and toolsö, Addison Wesley, 1st edition, 1996
7. Roger S. Pressman , õSoftware Engineering ó A practitionerøs approachö, 5th edition, 2009, McGraw Hill
8. Jorion, Philippe, õValue at Risk: The New Benchmark for Managing Financial Riskö, 3rd edition, McGraw-Hill, 2007

Paper Code: MIS-514   L   P   C
Paper Title: Big Data and Business Analytics   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Big Data-Volume, Velocity, Variety, Varacity, types & sources of Big Data   OLAP & RTAP, Data Exploration & Dimension Reduction : Data Summaries, Data Visualization, Correlation Analysis, Reducing no of categories in Categorial variables, principal component Analysis for classification & prediction, Accuracy measures, Cutoff, Oversampling & Asymetric Costs, Multiple Linear Regression,Transforming Data into Actionable Results.

(10 Hrs)

UNIT 2
Classification of Business data :- Naïve Bayes Classifier, k-Nearest Neighbour, Classification Tree, Generating Classification Rules from Trees, Discovering Association Rules in Transaction Databases, Business Case Studies for Data Classification.

(10 Hrs)

UNIT 3
Business Decision making process: Decision, Decision Process, Types of Decision, Kepher-Tregoe Decision making method, Decision Support Systems, Types of Decision Support Systems, DSS Architecture, DSS Hardware & Operating Systems, DSS Tools. Case studies for Developing Decision support Systems.

(10 Hrs)

UNIT 4
Tools for Big Data Analytics : No SQL, Hadoop, Mapreduce, Gephi, Association Rule Mining, Cluster Analysis, Genetic Algorithms, Fuzzy Logic & Uncertain Data Management, Unstructured Data, Web Data, Web communities, Crawlers, Social Networks, Blogs & Microblogs, Sentiment Analysis & Opinion mining, Document summarization technique, CASE STUDIES for Business Intelligence.

(10 Hrs)

References:
1. Shmueli, Patel & Bruce, õData Mining for Business Intelligenceö, 2nd edition, 2010, Wiley Interscience Publications.
2. EG Mallach, õDecision Support Systems & Data warehousing Systemsö, 1st edition, 2002, Tata McGraw Hill Publications.
3. R Roiger & M Geatz, õData Mining ó A Tutorial Based Primerö, 2nd edition, Pearson Education Asia.
4. Alex Berson & S J Smith, õ Data Warehousing, Data Mining & OLAPö, 1st edition, 2004, Tata Mc Graw Hill Publishing Company.
5. J.C. Lee, õSocial Networks Analysisö, Springer Publications

Paper Code: MIS-516   L   P   C
Paper: Distributed Systems   4   0   4

INSTRUCTIONS TO PAPER SETTERS	Maximum Marks : 60

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Definition of Distributed System, Goals, Transparency, Openness Scalability, Hardware Concepts, Software Concepts : distributed operating system, Network operating System, Middle ware, The Client server model, Clients and servers, Application Layering, Client server architectures, Processes; distributed systems ó hardware and software concepts, Client-serve model; Communication ó Lower-level protocols, transport protocols

(10 Hrs)

UNIT II
higher level protocols, RMI Remote Object Invocation, Message oriented communication, Stream oriented communication Synchronization : Clock synchronization, Physical Clocks, Clock Synchronization Algorithms, Logical clocks, Lamport timestamp, Global state, Election algorithm, the Bully algorithm, A ring Algorithm

(10 Hrs)

UNIT III
Consistency and replication, Data Centric Consistency Models, Strict Consistency, Sequential Consistency, Causal consistency, FIFO consistency, Wak and release Consistency, Distribution protocols, replca placement update propagation Epidemic Protocols, Fault tolerance, Reliable Group Communication, Distributed Commit, Two phase Commit, Three phase commit

(10 Hrs)

UNIT IV
Distributed System Security : Security Threats, Policies and Mechanisms, design Issues, Secure Channel, Authentication, Secure Group Communication, Security Management, Key management, Secure Group Management Authentication Mangement, Kerberos, SESAME

(10 Hrs)

References:

1. Tenenbaum, õDistributed Systems : Principles and Paradigmsö, 2nd edition, 2006, Pearson Education

2. Coloursist, õDistributed Systems: Concepts and designö, 5th edition, 2011 Pearson Education

Paper Code: MIS-518   L   P   C
Paper Title: IT Act 2000 and Cyber Laws   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**
   1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
   2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Understanding Computers, Internet and Cyber Laws: Modern era : the Scene and problems, need for Cyber Laws, law and legal system, Jurisprudence of Indian Cyber Law, Evolution of Key Terms and Concepts, Data, System, Network etc , Security threat to cyber space and e-commerce Evolution of Cyber Crime, Ranges of cyber crime, Indian IT act, amendments, Basics of PKI, Certification, Certifying authorities, The role of Certifying authority

(10 Hrs)

UNIT 2
Issues in Electronic Transaction, Issues , Authentication, The role of Electronic Signatures in E Commerce, Basic Laws of Digital and Electronic Signature, Authentication of signatures and Electronic Records, Protection of Intellectual property rights in Cyber spaces in India, Domain names in IPR, protection of Copy Rights, protection of Patents in India and associated laws, Patent as Intellectual Property, Plagiarism Issues, Tools to detect Plagiarism, Plagiarism Tools Turnitin, Viper

(10 Hrs)

UNIT 3
Penalties and Compensation and Adjudications of Violations of Provisions of IT act, penalty and compensation for damage to computer, compensation for failure to protect data, adjudications of disputes under the IT Act, Cyber Appellate Tribunal, Its Functions and Powers under the IT act, offenses under IT act in India, Obscenity and pornography on Cyber space, hacking, punishment for violation of Privacy under It act

(10 Hrs)

UNIT 4
Indian evidence act, Examiner of Electronic evidence, amendments introduced in Indian evidence act, Indian CERT, Law regarding Electronic Cheques and truncated cheques, Ithe IT rules 2000, Ministerial Order on blocking of websites, Cyber laws in US, Cyber laws in Gobal Prospective

(10 Hrs)

References:
   1. Harish Chander, õ Cyber Laws and IT Protectionö, 1st edition, 2012, PHI
   2. Dr. Jyoti Rattan, õCyber Laws and Information Technologyö, Universal Law Publication.
   3. Prof. Vimlendu Tayal õCyber Law Cyber Crime Internet and E Commerceö. Universal Law Publication.

Paper Code: MIS-620   L   P   C
Paper Title: Digital Image Processing and Steganography   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Perspective Projection, Spatial Domain Filtering, sampling and quantization. Intensity transformations, contrast stretching, histogram equalization, Correlation and convolution, Smoothing filters, sharpening filters, gradient and Laplacian. Hotelling Transform, Fourier Transforms and properties, FFT (Decimation in Frequency and Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Discrete Cosine Transform, Frequency domain filtering.

(10 Hrs)

UNIT 2
Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions, Restoration from projections. Encoder-Decoder model, Types of redundancies, Lossy and Lossless compression, Entropy of an information source, Shannon's 1st Theorem, Huffman Coding, Arithmetic Coding, Golomb Coding, LZW coding.

(10 Hrs)

UNIT 3
Transform Coding, Sub-image size selection, blocking artifacts, DCT implementation using FFT, Run length coding, FAX compression (CCITT Group-3 and Group-4), Symbol-based coding, JBIG-2, Bit-plane encoding, Bit-allocation, Zonal Coding, Threshold Coding, JPEG, Lossless predictive coding, Lossy predictive coding, Motion Compensation, Expansion of functions, Multi-resolution analysis, Scaling functions, MRA refinement equation, Wavelet series expansion, Transform(DWT), Continuous Wavelet Transform, Fast Wavelet Transform, 2-D wavelet Transform, JPEG-2000 encoding, Digital Image Watermarking.

(10 Hrs)

UNIT 4
Bit plane slicing , Digital Watermarking, Secret-Key Stego-system, Pure stego-system, , information-hiding capacity, Private Marking system, Public Marking system, Asymetric Marking system, phase space encryption, Wavelet transformation, Use of energy-based embedding using wavelet coefficients, Spread spectrum watermarking. Steganalysis

(10 Hrs)

References:

1. Rafael C Gonzalez and Richard E Woods, õDigital Image Processingö, 3rd edition, 2007, Pearson Education
2. A K Jain, õ Fundamentals of Digital Image Processingö, 1st edition, 1988, PHI

Paper Code: MIS-522	L	P	C
Paper Title: Intellectual Property Rights	4	0	4

INSTRUCTIONS TO PAPER SETTERS	Maximum Marks : 60

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1

Introduction and the need for intellectual property right (IPR). IPR in India ó Genesis and Development IPR in abroad, Some important examples of IPR, Macro economic impact of the patent system Patent and kind of inventions protected by a patent. Legislation Covering IPRS in India.

(10 Hrs)

UNIT 2

Utility models Differences between a utility model and a patent, Trade secrets and know-how agreements, Copy Rights, Distinction between related rights and copyright, Rights covered by copyright, Trademarks, Rights of trademark, signs used in trademarks, Types of trademark function, Protection of trademark, Registration of trademark, Domain name and how does it relate to trademarks , Plagiarism Issues, Tools to detect Plagiarism, Plagiarism Tools Turnitin, Viper

(10 Hrs)

UNIT 3

Geographical Indications, Protection of geographical indication, Reasons to protect geographical indication, Industrial Designs, Protection of an industrial design. Various kinds of protection provided by industrial designs. New Plant Varieties, Unfair Competitions. Plant Breeder and TRIPS agreement.

(10 Hrs)

UNIT 4

Enforcement of IPR, Infringement of intellectual property rights, Enforcement Measures, Emerging Issues, Overview of Biotechnology and Intellectual Property, Biotechnology Research and Intellectual Property Rights Management Licensing and Enforcing Intellectual Property

Commercializing Biotechnology Invention Case studies of Biotechnology, Case studies

(10 Hrs)

References:

1. T. M Murray and M.J. Mehlman, Encyclopedia of Ethical, Legal and Policy issues in Biotechnology, John Wiley & Sons 2000
2. P.N. Cheremisinoff, R.P. Ouellette and R.M. Bartholomew, Biotechnology Applications and Research, Technomic Publishing Co., Inc. USA, 1985
3. D. Balasubramaniam, C.F.A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman, Concepts in Biotechnology, University Press (Orient Longman Ltd.), 2002
4. Bourgagaize, Jewell and Buiser, Biotechnology: Demystifying the Concepts, Wesley Longman, USA, 2000.
5. Ajit Parulekar and Sarita Dø Souza, Indian Patents Law ó Legal & Business Implications; Macmillan India ltd , 2006
6. B.L.Wadehra; Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000
7. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi , 2010

			L	P	C
Paper Code: MIS-524					
Paper Title: Open Ended Research Topic			4	0	4

INSTRUCTIONS TO PAPER SETTERS:
Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.

The syllabus will be designed by the respective dean of the school based on the experts available with the school. However, the entire syllabus will be consisting of 4 units with 10 Hrs each.

	L	P	C
Paper Code: MIS-526			
Paper Title: Cryptographic Protocols and Algorithms Lab	-	2	1

Experiments will be based on the subject Cryptographic Protocols and Algorithms

	L	P	C
Paper Code: MIS-528			
Paper Title: OS Hardening Lab	-	2	1

Experiments will be based on the subject OS Hardening

	L	P	C
Paper Code: MIS-530			
Paper Title : Lab based on elective(s)	-	2	1

Experiments will be based on the elective subject

	L	P	C
Paper Code: MIS-532			
Paper Title: Term Paper	-	2	2

Term papers are generally intended to describe an event, concepts or argue a point. The topic for the term paper may be based on the recent trends in technology / Industry or Academia research outcomes The guidelines for writing are same as that for technical report writing.

Paper Code: MIS-601   L   P   C
Paper Title: Information Security Audit and Security Management   4   0   4

INSTRUCTIONS TO PAPER SETTERS   Maximum Marks : 60
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.** 2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1
Security Audit: Overview of the security audit, Architecture, Requirement, Characteristics, Recent trends, Challenges in the information security audit, Differences between an audit and an assessment, Cyber laws, Indian IT act, ISO standards **Process & Procedure:** Access Control, Cryptography, Telecomm and Network Security, Security Models and Architecture, Physical Security, Security Risk Management Practices, Physical Security, Disaster Recovery and Business Continuity, Law, Investigation, and Ethics, Application and Operations Security, IS Audit Process,, IT Governance, System and Infrastructure Life Cycle Management, IT Service Delivery and Support, Protection of Information Asset.

(10 Hrs)

UNIT 2
Security Investigation Phase: The history of and the need for security, A model for Internetwork security, Internet Standards and RFCs ,The Systems Development Life Cycle (SDLC),Differences between threats and attacks , Security Ethics, Security Attacks (Interruption, Interception, Modification and Fabrication),Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, Availability) and Mechanisms, , Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification.
Security Analysis:- Risk Management & Discussion Points, Risk Assessment, Risk Identification, Risk Control Strategies and Mitigation Selection ,Risk Categories of Control, Risk Assessment in Real Life, Current Issues in Information Security Part 2, Social Engineering.

(10 Hrs)

UNIT 3
Security Architecture and Models: Introduction, Defining the Trusted Computing Base Protection Mechanisms in a Trusted Computing Base, System Security Assurance Concepts, Trusted Computer Security Evaluation Criteria, Information Technology Security Evaluation Criteria, Federal Criteria for Information Technology Security, Confidentiality and Integrity Models

(10 Hrs)

UNIT 4
Security Management: key distribution Approaches ofMessage Authentication, Secure Hash Functions and HMAC, Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos **Email privacy**: Pretty Good Privacy (PGP) and S/MIME **IP Security:** Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining

Security Associations and Key Management, **Web Security:** Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

(10 Hrs)

References:

1. William Stallings, õNetwork Security Essentials (Applications and Standards)ö, 4th edition, 2010, Pearson Education.

2. Eric Maiwald, õ Hack Proofing your network by Fundamentals of Network Securityö, 3rd edition, 2012, Dreamtech press

3. Charlie Kaufman, Radia Perlman and Mike Speciner, õNetwork Security - Private Communication in a Public Worldö, 2nd edition, 2002, Pearson/PHI.

4. Whitman, õPrinciples of Information Securityö, 4th edition, 2011, Thomson.

5. Robert Bragg, Mark Rhodes, õNetwork Security: The complete referenceö, 2nd edition, 2013, TMH.

Paper Code: MIS-603   L   P   C
Paper Title: Advanced Database Management and Information Retrieval 4   0   4

INSTRUCTIONS TO PAPER SETTERS   Maximum Marks : 60
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Relational Model and its difficulties, Object Oriented Databases, Need for complex data types, Object Relational Systems, Data Storage and File Storage, Overview of Physical storage Media, Magnetic Disks, RAID, Tertiary Storage, Storage Access, File Organization, Organization of records in files, Data Dictionary Storage..

(10 Hrs)

UNIT 2
Indexing &Hashing, B+ Tree Index Files, B-Tree Index Files, Dynamic & Static Hashing, Query Processing, Measures of Query cost, Selection Operation, Sorting, Join operation, evaluation of expressions, Query Optimization, estimating statistics of expression results, transformation of Relational Expressions, Choice of evaluation plans, Materialized Views.

(10 Hrs)

UNIT 3
Distributed Databases, Homogeneous & Heterogeneous Databases, Distributed Data Storage, Distributed Transactions and their commit protocols, Concurrency Control in Distributed DataBases, Distributed Query Processing, Decision Support Systems, Data mining & Warehousing, Decision Analysis & OLAP, Multimedia Databases, Mobile Data bases.

(10 Hrs)

UNIT 4
Conversion of Data to information, Information Retrieval, Information Retrieval Models, Classical & Non Classical Models of Informational Retrieval Relation. Matching, Knowledge-based Approaches, Conceptual Graphs, Applications, Information Extraction, Automatic Text Summarization Systems, Question Answering Systems.

(10 Hrs)

References:
1. Data base System Concepts, 5th Edition, 2005, Silberchatz, Korth, Sudershan Tata MC Graw Hills Publishing.
2. Database Management Systems, Ramez Elmasri & Shamkant Navathe, 6th Edition, 2010, Pearson Education Asia.
3. Information Retrieval, D.A Grossman, O.Frieder, 2nd edition, 2004, Springer Publication
4. Database Management Systems, Raghu Ramakrishnan, J.Gerkhe, 3rd Edition, 2003, Tata MC Gran Hill Publications
5. Information Sorage & management óStoring, Managing & Protecting Digital Information- G. Somasundaram, Alok Srivastava, 1st edition, 2009, wiley Publishng Inc.
6. Information Storage & Retrieval Systems :- Theory & Implementation 1st edition, 2000, G.J. Kowalski, M.T. Maybury

Paper Code: MIS-605   L   P   C
Paper Title: Security Architecture for Computational Grids   4   0   4

INSTRUCTIONS TO PAPER SETTERS	Maximum Marks : 60

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT 1
Evolution of Grid computing, Characteristics of Secure System, Security Threats, Different Authentication Schemes Shared Secret Based Authentication, Public Key Based Authentication, Third Party Authentication Schemes, Different Integrity Schemes: Message Authentication Code (MAC), Keyed MAC, Standard Protocols : Public Key Infrastructure, Secure Socket Layer (SSL), Kerberos, IP Security (IPSec) Grid Security Issues, Architecture Related Issues, Infrastructure Related Issues, Management Related Issues,

(10 Hrs)

UNIT 2
Security Architecture in Grid Computing, Grid Information Security Architecture, Grid Security Infrastructure (GSI), Grid Authorization Systems, Different Access Control Models, Push vs. Pull Authorizations, Characteristics of Grid Authorization Systems, VO Level Authorization Systems, Resource Level Authorization Systems.

(10 Hrs)

UNIT 3
Service Level Security in Grid Systems, DoS Attacks and Countermeasures, QoS Violation Attacks and Countermeasures, Host Level Security, Data Protection Issue, Job Starvation Issue, Grid Network Security, Grid Credential Management Systems.

(10 Hrs)

UNIT 4
Managing Trust in the Grid, Definition of Trust, Reputation and Trust, Reputation-Based Trust Management Systems, Policy-based Trust Management Systems, Grid Monitoring Systems, Case studies

(10 Hrs)

References:

1. Anirban Chakrabarti, Grid Computing Security, 1st edition, 2007, Springer
2. Yang Xiao, Security in Distributed, Grid, Mobile, and Pervasive Computing, 1st edition, 2007, Auerbach Publications.
3. Ian Foster, Carl Kesselman, The Grid: Blueprint for a new computing infrastructure, 2nd edition, 2003, Morgan Kaufmann.
4. Barry Wilkinson, Grid Computing: Techniques and Applications, Chapman and Hall, 2nd edition, 2011, CRC Press

Paper Code: MIS-607   L   P   C
Paper Title: Ethical Hacking   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1
Introduction to Ethical Hacking, Hacking Laws, Foot-printing, Reconnaissance, Google hacking, Vulnerable sites, Using Google as a Proxy Server , Directory Listings , Locating Directory Listings, Finding Specific Directories, Finding Specific Files , Server Versioning, Scanning, System hacking Cycle, Enumeration, Cracking Password, Types of password attacks.

(10 Hrs)

UNIT 2
Trojans and Backdoors, Types of Trojans, Viruses, Worms, Sniffers, Types of Sniffing, Phishing, Methods of Phishing, Types of Phishing Attacks, Process of Phishing, Denial of Service, Classification of DoS attacks, System and Network Vulnerability.

(10 Hrs)

UNIT 3
Session Hijacking, Spoofing vs Hijacking, Session Hijacking Levels, Network Level Hijacking3 way handshake, IP Spoofing, RST Hijacking, TCP/IP Hijacking, Hacking web servers, Web Server Defacement, Proxy and Packet filtering, SQL Injection.

(10 Hrs)

UNIT 4
Authentication: HTTP, Basic, Digest, NTLM, Negotiate, Certificate based, Forms-bases, RSA SecurID Token, Biometrics, Hacking Wireless Networks, Bluetooth hacking, Mobile Phone Hacking, Tools for ethical hacking.

(10 Hrs)

References:

1. Ankit Fadia , õ An unofficial guide to Ethical hackingö, 2nd edition, 2006, Mc-Millan
   Publishing.

2. Ankit Fadia , õAn Ethical guide to Hacking Mobile Phonesö, 1st edition, 2005, Mc-Millan Publishing

3. Michael T. Simpson, Kent Backman and James Corley, õHands-On Ethical Hacking and Network Defenseö, 2nd edition, 2010, Cengage Learning

4. By Steven DeFino, Barry Kaufman, Nick Valenteen, õ Official Certified Ethical Hacker Review Guideö, 1st edition, 2008, Sybex Publisher

Paper Code: MIS-609   L   P   C
Paper Title: Biometric Systems   4   0   4

INSTRUCTIONS TO PAPER SETTERS   Maximum Marks : 60
1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1
Introduction to biometric security, Verification, Identification, Methodology, Accuracy, False match rate, False non match rate, Failure to enroll rate, Derived metrics, Layered biometric solutions, Fingerprint identification, Scan, Features, Components, Operation, Finger Scan technologies, Algorithms used for interpretation.

(10 Hrs)

UNIT 2
Facial Scan, Features, Components, Operation, Facial Scan technologies, Iris Scan, Features, Components, Operation, Iris Scan technologies, Voice Scan, Features, Components, Operation, Voice Scan technologies, Strengths and weakness comparison.

(10 Hrs)

UNIT 3
Other physiological biometrics, Hand scan, Retina scan, AFIS (Automatic Finger Print Identification Systems), Behavioral Biometrics, Signature scan, Keystroke scan, Biometrics Application, Biometric Solution Matrix,. Biometric standards, BioAPI, BAPI

(10 Hrs)

UNIT 4
Bio privacy, Comparison of privacy factor in different biometrics technologies, Designing privacy sympathetic biometric systems, Biometric middleware, Biometrics for Network Security, Statistical measures of Biometrics, Biometric Transactions

(10 Hrs)

References:

1. Samir Nanavati, Michael Thieme, Raj Nanavati, õ Biometrics, Identity Verification in a Networked Worldö, 1st edition, 2002, WILEY, Dream Tech.

2. Paul Reid, õ Biometrics for Network Securityö, 1st edition, 2003, Pearson Education.

3. John D. Woodward, õ Wiley Dreamtech Biometrics, The Ultimate Referenceö, 1st edition, 2003, WILEY, Dream Tech

Paper Code: MIS-611   L   P   C

Paper Title: Enterprise Information Security Management   4   0   4

INSTRUCTIONS TO PAPER SETTERS	Maximum Marks : 60

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1

Overview of 27000 family, Evolution of ISO/IEC 27000 family, BS 77pp Part 1 and Part 2, Internationalization, Standardization process, Committees and Working Groups ISO/IEC JTC 1/SC27. Standards supporting ISO /IEC 27000 ISMS family, BSI ISMS Guides

(10 Hrs)

UNIT 2

ISO/IEC 27000 Vocabulary, ISO/IEC 27003 Guidelines, ISO/IEC 27004 Security management Measurements, ISO/IEC 27005 Risk Management, ISO/IEC 27006 Accreditation, Mangement of ISMS Risks, Importance of Risk Mangement, Steps of Risk management, Risk management is an ongoing Process, assets, threats and vulnerabilities, Implementation of ISMS, Deployment plan, Information Security Policy.

(10Hrs)

UNIT 3

Contingency Planning: Corporate Issues, Management responsibility, Disaster Life cycle, Definition of the Problem, Business Continuity Concerns, Planning, Characteristics of a sound plan, Cost Reduction Opportunity, Need for Cost effective solutions, back up, Business Impact analysis, Objective, critical issues, Awareness and Education, Mind Set, Education, Cost, Regulatory Agency reporting, Requirements, Implementation Strategy

(10Hrs)

UNIT-4

BIA Plan Development, Methodology, Plan requirement, Prevention, Recivery, Accounability, Audit, Plan Development steps, Key Tasks, Continuity Strategies, identifying vital records, Evaluating alternate operating strategies, Computer processing alternatives, account payable, accounts receivables, Documentation, Cost benefits, Corporate benefits, Guidelines for internal consultants and consulting firms.

(10Hrs)

References :

1. Edward Humphreys, õImplementing the ISO/IEC 27001 Information Security Management System Standardö, 1st edition, 2007, Artech House publication.
2. Janet G. Butler , Poul Badura, õContingency Planning and Disaster Recovery: Protecting Your Organization's Resourcesö, 1st edition, 2007, Computer Technology Research Corpoaration Publication.
3. Kenneth N. Myers, õManagerøs Guide to Contingency planning for Disasters: Protecting Vital Facilities and Critical Operationsö, 2nd edition , 2006, John wiley & Sons Publication.

Paper Code: MIS-613   L   P   C
Paper Title: E-Commerce and M-Commerce   4   0   4

INSTRUCTIONS TO PAPER SETTERS   **Maximum Marks : 60**
  1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
  2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.**

UNIT 1

Electronic Commerce Introduction:- Definition of E- Commerce ,Electronic commerce and Physical Commerce, Architectural framework, Impact of E-commerce on business, different type of ecommerce, some e-commerce scenario, Economic potential of electronic commerce, Advantages and Disadvantages , Incentives for engaging in electronic commerce, forces behind E-Commerce, Management responses to e-commerce and e-business and Online Commercial Solutions.

(10Hrs)

UNIT 2

E-business strategy: Introduction, Characteristics of e-Business, Business models, E-Business vs E-commerce, e-Business role and their challenges, e-business Requirements, impacts of e-business, Strategic positioning, Levels of e-business strategies, Strategic planning process, consequences of e-Business, Success factors for implementation of e-business strategies, CRM, MRP. **ERP:-** Introduction, need of ERP, Enterprise perspective Production Finance, Personnel disciplines and their relationship, Transiting environment, MIS Integration for disciplines, Information Workflow, Virtual Enterprise, Modules of ERP (HRD, Personnel Management, Training and Development, Skill Inventory Material Planning and Control, Inventory, Forecasting, Sales and Distribution, Finance, Resource Management in global scenario.

(10Hrs)

UNIT 3

Electronic Payment Methods: Overview, SET Protocol for credit card payment, E-cash, E-check, Micropayment system, Credit card, magnetic strip card,Smart cards, Electronics Data Interchange(basics, EDI versus Internet and EDI over Internet), E-Commerce Law. **Security Architecture:-** Network structure , Internet and, Client Server Integrator System , Secure online and Offline transaction processing, Encryption techniques, Symmetric Encryption- Keys and data encryption standard, Triple encryption, Asymmetric encryption- Secret key encryption, public and private pair key encryption, Digital Signatures, Virtual Private Network, IPsec, Threats, Firewalls.

(10Hrs)

UNIT-4

M-Commerce: Introduction, Attributes, customer and provider views, Architecture, Infrastructure of m-commerce, Requirement of the m-commerce, characteristics, Mobile Information device, Mobile Computing Applications, Mobile wallet,Mobile payments, G-Cash, P2P, Mobile portals, Research issues in Mobile Commerce, Pros and Cons of m-commerce
Secure Transaction Processes: Wireless Application Protocol, Bluetooth, The role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, Secure Socket Layer and Transport Layer Secure.

(10Hrs)

Text Books:

1. Ravi Kalakota, Andrew Winston, õFrontiers of Electronic Commerceö, Addison Wesley.
2. E-Business Organizational and technical foundation (Michael P) Wiley Publication
3. õEnterprise resource Planning- Concepts and Practiceö,V.K. Garg and N. K. Venkita Krishna, 1998, PHI.
4. Brian Mennecke and Troy Strader, õMobile Commerce: Technology, Theory and Applicationsö, Idea Group, 2003.
5. Nansi Shi, õMobile Commerce Applicationsö, IGI Global, 2004.
6. Dave Chaffey, õE-Business and E-Commerce Managementö, Third Edition, 2009, Pearson Education.

References:

1. E-Commerce Fundamentals and application (Henry Chan), 1st edition, 2001, Wiley publication
2. Bajaj and Nag, õE-Commerce the cutting edge of Businessö, 2nd edition, 2005, TMH
3. P. Loshin, John Vacca, õElectronic commerceö, Firewall Media, 1st edition, 2005, New Delhi
4. E-Commerce Concepts, Models, Strategies- :- G.S.V.Murthy, 1st edition, 2002, Himalaya Publishing House

Paper Code: MIS-615   L   P   C
Paper Title: Information Security Audit and Security Management Lab   -   2   1

Experiments will be based on the subject Information Security Audit and Security Management

Paper Code: MIS-617   L   P   C
Paper Title: Advance Database Management and information retrieval Lab   -   2   1

Experiments will be based on the subject Advance Database Management and information retrieval

Paper Code: MIS-619   L   P   C
Paper Title: Minor Project   -   8   12

Paper Code: MIS-602   L   P   C
Paper Title: Dissertation   -   30   24

Paper Code: MIS-604   L   P   C
Paper Title: Seminar and Progress Report   -   4   4