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PROGRAMME: M Tech (Cyber Security)   SEM: III

Subject Title	Subject Code
Digital Cyber Crimes & Cyber Criminology	MTCY 301

Unit	Contents *(Theory)*
I	**Computer and Cyber Forensic Basics**- Introduction to Computers, Computer History, Software, Hardware, Classification, Computer Input-Output Devices, Windows, DOS Prompt Commands, Basic Computer Terminology, Internet, Networking, Computer Storage, Cell Phone / Mobile Forensics, Computer Ethics and Application Programs, Cyber Forensic Basics- Introduction to Cyber Forensics, Storage Fundamentals, File System Concepts, Data Recovery, Operating System Software and Basic Terminology
II	**Data and Evidence Recovery**- Introduction to Deleted File Recovery, Formatted Partition Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics, Preserve and safely handle original media, Document a "Chain of Custody", Complete time line analysis of computer files based on file creation, file modification and file access, Recover Internet Usage Data, Recover Swap Files/Temporary Files/Cache Files, Introduction to Encase Forensic Edition, Forensic Tool Kit (FTK) etc, Use computer forensics software tools to cross validate findings in computer evidence-related cases.
III	**Cyber Crimes and Cyber Laws**- Introduction to IT laws & Cyber Crimes – Internet, Hacking, Cracking, Viruses, Virus Attacks, Pornography, Software Piracy, Intellectual property, Legal System of Information Technology, Social Engineering, Mail Bombs, Bug Exploits, and Cyber Security etc.
IV	**Cyber Forensics Investigation**- Introduction to Cyber Forensic Investigation, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Encryption and Decryption methods, Search and Seizure of Computers, Recovering deleted evidences, Password Cracking
V	**Cyber Security**- Introduction to Cyber Security, Implementing Hardware Based Security, Software Based Firewalls, Security Standards, Assessing Threat Levels, Forming an Incident Response Team, Reporting Cyber crime, Operating System Attacks, Application Attacks, Reverse Engineering & Cracking Techniques and Financial Frauds. Mobile transport and application layer protocol - Review of traditional TCP, fast retransmit/fast recovery, transmission/timeout freezing, file systems, WWW, WAP.

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PROGRAMME: M Tech (Cyber Security)   SEM: III

Subject Title	Subject Code
Computer Security, Audit and Risk management	MTCY 302

Unit	Contents *(Theory)*
I	Essentials of computer security - Sources of security threats – Intruders, Viruses, Worms and related threats - Threat identification - Threat analysis - Vulnerability identification and Assessment - Components of Computer Security - Physical security – System access control - Goals of Security - Efforts to secure computer networks – Ethical issues in Computer Security- Operational issues, Human issues.
II	Security assessment planning – Business drivers, scope definition, consultant's perspective, Client's perspective, Development of project plan. Initial information gathering – Initial preparation, analysis of gathered information.
III	Vulnerabilities – Sources of vulnerabilities, Vulnerability identification and Assessment, Cyber crime and Hackers, Viruses and content filtering - Security Assessment, Analysis and Assurance – Computer network security protocol and standards - Security Policies – Integrity policies – confidentiality policies - Security models - Access Control Matrix Model, Take-Grant Protection Model.
IV	Security Monitoring and Auditing - Assurance and Trust, Need for Assurance, Role of Requirements in Assurance, Audit Assurance in Software Development Phases, Building Secure and Trusted Systems - Designing an Auditing System, Implementation Considerations, Auditing to Detect Violations of a security Policy, Auditing Mechanisms, Audit Browsing.
V	Risk management and security planning – Risk management Process Overview- Cost-Benefit Analysis, Risk Analysis, Laws and Customs, Human Issues, Organizational issues – Information system Risk analysis – System approach to risk management, Threat assessment, Assets and safeguards, modes of risk analysis – Effective risk analysis, Qualitative Risk analysis, Value analysis

References:

1. Sudhanshu Kairab, "A practical guide to security assessments", CRC press, 2005.
2. Douglas J.Landoll, "A Security risk assessment Handbook", Auerbach publications, 2006.
3. Matt Bishop, "Computer Security: Art and Science", Addison-Wesley Professional, 2003.
4. Joseph M.Kizza, "Computer Network security", Springer, 2005
5. Matt Bishop, "Introduction to Computer Security", Addison-Wesley Professional, 2005.
6. Thomas R.Peltier, "Information Security Risk Analysis", CRC Press, 2001.
7. C.A.Roper, "Risk management for Security professional", Elsevier, 1999.

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1. Debby Russell and Sr. G.T Gangemi, "Computer Security Basics (Paperback)", 2ⁿᵈ Edition, O' Reilly Media, 2006.
2. Thomas R. Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.
3. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global, 2009.
4. Thomas R Peltier, Justin Peltier and John blackley, "Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996
5. Jonathan Rosenoer, "Cyber law: the Law of the Internet", Springer-verlag, 1997.

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PROGRAMME: M Tech (Cyber Security)   **SEM: III**

Subject Title	Subject Code
Cyber Laws & Security Policy	MTCY 303

Unit	Contents *(Theory)*
I	Introduction to Computer Security: Definition, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation, Privacy considerations, International security activity.
II	Secure System Planning and administration, Introduction to the orange book, Security policy requirements, accountability, assurance and documentation requirements, Network Security, The Red book and Government network evaluations.
III	Information security policies and procedures: Corporate policies- Tier 1, Tier 2 and Tier3 Policies - process management-planning and preparation-developing policies-asset classification, policy-developing standards.
IV	Information security: fundamentals-Employee responsibilities- information classification- Information handling- Tools of information security- Information processing-secure program administration.
V	Organizational and Human Security: Adoption of Information Security Management Standards, Human Factors in Security- Role of information security professionals.

Reference:

1. Debby Russell and Sr. G.T Gangemi, "Computer Security Basics (Paperback)", 2nd Edition, O' Reilly Media, 2006.
2. Thomas R. Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.
3. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global, 2009.
4. Thomas R Peltier, Justin Peltier and John blackley, "Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996
6. Jonathan Rosenoer, "Cyber law: the Law of the Internet", Springer-verlag, 1997.

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PROGRAMME: M Tech (Cyber Security) SEM: III

Subject Title	Subject Code
Ethical Hacking	MTCY$|o$

Unit	Contents *(Theory)*
I	Casing the Establishment - What is foot printing- Internet Foot printing. -Scanning- Enumeration -basic banner grabbing, Enumerating Common Network services. Case study- Network Security Monitoring
II	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.
III	Dial-up ,PBX, Voicemail, and VPN hacking - Preparing to dial up. War-Dialing. Brude-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.
IV	Wireless Hacking - Wireless Foot printing. 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
V	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.

References:
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.

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PROGRAMME: M Tech (Cyber Security)

SEM: III

Subject Title	Subject Code
Cloud Computing	MTCY3

Unit	Contents *(Theory)*
I	**UNDERSTANDING CLOUD COMPUTING** Cloud Computing, History of Cloud Computing, Cloud Architecture, Cloud Storage, Why Cloud Computing Matters, Advantages of Cloud Computing, Disadvantages of Cloud Computing and Cloud Computing Services
II	**DEVELOPING CLOUD SERVICES** Web-Based Application, Pros and Cons of Cloud Service Development, Types of Cloud Service Development, Software as a Service, Platform as a Service, Web Services, On-Demand Computing, Discovering Cloud Services Development Services and Tools.
III	**CLOUD COMPUTING FOR EVERYONE** Centralizing Email Communications, Collaborating on Schedules, Collaborating on To-Do Lists, Collaborating Contact Lists, Cloud Computing for the Community, Collaborating on Group Projects and Events, Cloud Computing for the Corporation
IV	**USING CLOUD SERVICES** Collaborating on Calendars, Schedules and Task Management, Exploring Online Scheduling Applications, Exploring Online Planning and Task Management, Collaborating on Event Management, Collaborating on Contact Management, Collaborating on Project Management, Collaborating on Word Processing, Collaborating on Databases, Storing and Sharing Files
V	**OTHER WAYS TO COLLABORATE ONLINE** Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services, Evaluating Web Conference Tools, Collaborating via Social Networks and Groupware

References

1. Cloud Computing Best Practices for Managing and Measuring Processes for On- demand Computing, Applications and Data Centers in the Cloud with SLAs by Haley Beard, Emereo Pty Limited
2. Enterprise Cloud Computing: Technology, Architecture, Application by Gautam Shroff, Cambridge University Press, New Delhi
3. Cloud Computing for Dummies by Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper, Wiley
4. Enterprise Cloud Computing by Gautam Shroff, Cambridge
5. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India
6. Cloud Computing : A Practical Approach by Antohy T Velte, McGraw Hill,
7. Cloud Computing Bible by Barrie Sosinsky, Wiley India
8. Cloud Computing by Michael Miller, Que Publishing.

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PROGRAMME: M Tech (Cyber Security)

SEM: III

Subject Title	Subject Code
Biometric Security	MTCY3103

Unit	Contents (Theory)
I	Biometrics- Introduction- benefits of biometrics over traditional authentication systems – benefits of biometrics in identification systems-selecting a biometric for a system – Applications – Key biometric terms and processes - biometric matching methods - Accuracy in biometric systems
II	Physiological Biometric Technologies: Fingerprints - Technical description – characteristics -Competing technologies - strengths – weaknesses – deployment - Facial scan – Technical description - characteristics - weaknesses-deployment - Iris scan - Technical description – characteristics - strengths – weaknesses – deployment - Retina vascular pattern – Technical description – characteristics - strengths – weaknesses – deployment - Hand scan – Technical description-characteristics - strengths – weaknesses deployment – DNA biometrics.
III	Behavioral Biometric Technologies: Handprint Biometrics - DNA Biometrics - signature and handwriting technology - Technical description – classification - keyboard / keystroke dynamics - Voice – data acquisition - feature extraction - characteristics - strengths – weaknesses deployment.
IV	Multi biometrics: Multi biometrics and multi factor biometrics - two-factor authentication with passwords - tickets and tokens – executive decision - implementation plan
V	Case studies on Physiological, Behavioral and multifactor biometrics in identification systems.

References:

1. Samir Nanavathi, Michel Thieme, and Raj Nanavathi, "Biometrics -Identity verification in a network", Wiley Eastern, 2002.
2. John Chirillo and Scott Blaul," Implementing Biometric Security", Wiley Eastern Publications, 2005.
3. John Berger," Biometrics for Network Security", Prentice Hall, 2004.

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PROGRAMME: M Tech (Cyber Security)   **SEM: III**

Subject Title	Subject Code
Information Theory and Coding	MTCY1201

Unit	Contents *(Theory)*
I	Source Coding - Introduction to information theory, uncertainty and information, average mutual information and entropy, source coding theorem, Shannon-fano coding, Huffman coding, Arithmetic coding, Lempel-Ziv algorithm, run-length encoding and rate distortion function.
II	Channel capacity and coding - channel models, channel capacity, channel coding, information capacity theorem, random selection of codes. Error control coding: linear block codes and their properties, decoding of linear block code, perfect codes, hamming codes, optimal linear codes and MDS codes.
III	Cyclic codes - polynomials, division algorithm for polynomials, a method for generating cyclic codes, matrix description of cyclic codes, burst error correction, fire codes, golay codes, CRC codes, circuit implementation of cyclic codes. BCH codes: minimal polynomials, generator polynomial for BCH codes, decoding of BCH codes, Reed-Solomon codes and nested codes.
IV	Convolutional codes - tree codes and trellis codes, polynomial description of convolutional codes, distance notions for convolutional codes, generation function, matrix description of convolutional codes, viterbi decoding of convolutional codes, distance bounds for convolutional codes, turbo codes and turbo decoding.
V	Trellis Coded Modulation - concept of coded modulation, mapping by set partitioning, ungerboeck's TCM design rules, TCM decoder, Performance evaluation for Additive White Gaussian Noise (AWGN) channel, TCM for fading channels.

References:

1. Ranjan Bose, "Information theory, coding and cryptography", Tata McGraw Hill, 2002.
2. Viterbi, "Information theory and coding", McGraw Hill, 1982.
3. John G. Proakis, "Digital Communications", 2nd Edition, McGraw Hill, 1989.

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PROGRAMME: M Tech (Cyber Security)   **SEM: III**

Subject Title	Subject Code
Trust management in E-commerce	MTCS32*2

Unit	Contents *(Theory)*
I	Introduction to E-Commerce – Network and E-Commerce – Types of E-Commerce – Ecommerce Business Models: B2C, B2B, C2C, P2P and M-commerce business models – Ecommerce Payment systems: Types of payment system – Credit card E-Commerce transactions – B2C E-Commerce Digital payment systems – B2B payment system.
II	Security and Encryption: E-Commerce Security Environment – Security threats in E-Commerce environment – Policies, Procedures and Laws.
III	Inter-organizational trust in E-Commerce: Need – Trading partner trust – Perceived benefits and risks of E-Commerce – Technology trust mechanism in E-Commerce – Perspectives of organizational, economic and political theories of inter-organizational trust – Conceptual model of inter-organizational trust in E-Commerce participation.
IV	Introduction to trusted computing platform: Overview – Usage Scenarios – Key components of trusted platform – Trust mechanisms in a trusted platform
V	Trusted platforms for organizations and individuals – Trust models and the E-Commerce domain.

References

1. Kenneth C. Laudon and Carol Guercio Trave, "E-Commerce Business Technology Society", Pearson Education, 2005.
2. Pauline Ratnasingam, "Inter-Organizational Trust for Business-to-Business E-Commerce", IRM Press, 2005.
3. Siani Pearson, et al, "Trusted Computing Platforms: TCPA Technology in Context" ,Prentice Hall PTR, 2002.

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PROGRAMME: M Tech (Cyber Security)   **SEM: III**

Subject Title	Subject Code
Steganography & digital Watermarking	MTCS 3203

Unit	Contents (Theory)
I	Introduction to Information hiding – Brief history and applications of information hiding – Principles of Steganography – Frameworks for secret communication – Security of Steganography systems –Information hiding in noisy data – Adaptive versus non adaptive algorithms – Laplace filtering – Using cover models – Active and malicious attackers – Information hiding in written text – Examples of invisible communications.
II	Survey of steganographic techniques – Substitution system and bitplane tools – Transform domain techniques – Spread spectrum and information hiding – Statistical Steganography - Distortion and code generation techniques – Automated generation of English text.
III	Steganalysis – Detecting hidden information – Extracting hidden information - Disabling hidden information – Watermarking techniques – History – Basic Principles – applications – Requirements of algorithmic design issues – Evaluation and benchmarking of watermarking system.
IV	Survey of current watermarking techniques – Cryptographic and psycho visual aspects – Choice of a workspace – Formatting the watermark bets - Merging the watermark and the cover – Optimization of the watermark receiver – Extension from still images to video – Robustness of copyright making systems
V	Fingerprints – Examples – Classification – Research history – Schemes – Digital copyright and watermarking – Conflict of copyright laws on the internet.

References:
1. Stefan Katzenbelsser and Fabien A. P. Petitcolas, "Information hiding techniques for Steganography and Digital Watermarking", ARTECH House Publishers, January 2004.
2. Jessica Fridrich, "Steganography in Digital Media: Principles, Algorithms, and Applications", Cambridge university press, 2010.
3. Steganography, Abbas Cheddad, Vdm Verlag and Dr. Muller, "Digital Image" Aktienge sells chaft & Co. Kg, Dec 2009.
4. Ingemar Cox, Matthew Miller, Jeffrey Bloom, Jessica Fridrich and Ton Kalker, "Digital Watermarking And Steganography", Morgan Kaufmann Publishers, Nov 2007.

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