DEVI AHILYA VISHWAVIDYALAYA, INDORE
INSTITUTE OF ENGINEERING & TECHNOLOGY
ME (Information Technology) With Specialization in *Information Security*
(Full Time)
Schemes of Subjects & Examination (Subject to revision)

Th Marks (Max 100,Min 50) shall be based on Theory paper-It shall be an examination in the end of the semester.

CW Marks (Max 50, Min 25) shall be based on Attendance (25), Marks obtained in Test-I & Test-II of 25 marks each. Average of the two tests will be taken for awarding the 25 marks.

SW Marks (Max 50, Min 25) shall be based on Attendance (25), Marks obtained in Two Experiments and Viva Voce (25)

Pr Marks (Max 50, Min 25) shall be based on Viva-Voce by External Examiner.

Th- Theory, CW – Class Work, SW – Sessional Work, Pr – Practical

Semester I

SNo	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5IT401	Advance Computer Systems	3	1	-	100	50	-	-	150
2.	5IT402	Object Oriented Analysis & Modeling	3	1	2	100	50	50	50	250
3.	5IT403	Secure Computing Techniques	3	1	2	100	50	50	50	250
4.	5IT404	Advance Computer Networks	3	1	2	100	50	50	50	250
5.		Elective-I	3	1	-	100	50	-	-	150
6.	5IT410	Comprehensive Viva-I	-	-	-	-	-	-	-	100
	TOTAL		**15**	**5**	**6**	**500**	**250**	**150**	**150**	**1150**

Semester II

SNo	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5IT451	Security Assessment, Risk Management & Digital Forensics	3	1	-	100	50	-	-	150
2.	5IT452	Security in e-Commerce Applications	3	1	2	100	50	50	50	250
3.	5IT453	Information Security Management	3	1	2	100	50	50	50	250
4.	5IT454	Secure Wireless Networks	3	1	2	100	50	50	50	250
5.		Elective-II	3	1	-	100	50	-	-	150
6.	5IT460	Comprehensive Viva-II	-		-	-	-	-	-	100
	TOTAL		**15**	**5**	**6**	**500**	**250**	**150**	**150**	**1150**

List of Electives in Semester-I & II

S No	Sub Code	Elective-I	S No	Sub Code	Elective-II
01	5IT405	Data Security	01	5IT455	Cyber Crime & Information warfare
02	5IT406	Intelligence in Information Security	02	5IT456	Biometrics & Human Interface
03	5IT407	Complexity of Security Algorithms	03	5IT457	Database Security & Access Control
04	5IT408	Information Theory and Coding	04	5IT458	Secure multi party Computation
05	5IT409	Optimization Algorithms	05	5IT459	Operating System Security

Semester III

SNo	Sub Code	Subject	L	P	Th	CW	SW	Pr	TOTAL
							Maximum Marks		
1.	6IT401	Dissertation Phase-I	-	8	-	-	100	50	150
	TOTAL		**-**	**8**	**-**	**-**	**100**	**50**	**150**

Semester IV

SNo	Sub Code	Subject	L	P	Th	CW	SW	Pr	TOTAL
							Maximum Marks		
1.	6IT451	Dissertation Phase-II	-	12	-	-	250	100	350
	TOTAL		**-**	**12**	**-**	**-**	**250**	**100**	**350**
		GRAND TOTAL OF FOUR SEMESTERS							**2800**

DEVI AHILYA VISHWAVIDYALAYA, INDORE
INSTITUTE OF ENGINEERING & TECHNOLOGY

ME(Information Technology)(Part Time) With Specialization in *Information Security*
Schemes of Subjects & Examination (Subject to revision)
Th Marks (Max 100,Min 50) shall be based on Theory paper-It shall be an examination in the end of the semester.
CW Marks (Max 50, Min 25) shall be based on Attendance (25), Marks obtained in Test-I & Test-II of 25 marks each. Average of the two tests will be taken for awarding the 25 marks.
SW Marks (Max 50, Min 25) shall be based on Attendance (25), Marks obtained in Two Experiments and Viva Voce (25)
Pr Marks (Max 50, Min 25) shall be based on Viva-Voce by External Examiner.
Th- Theory, CW – Class Work, SW – Sessional Work, Pr – Practical

Semester I

SNo	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5IT431	Advance Computer Systems	3	1	-	100	50	-	-	150
2.	5IT432	Object Oriented Analysis & Modeling	3	1	2	100	50	50	50	250
3.	5IT433	Secure Computing Techniques	3	1	2	100	50	50	50	250
4.	5IT440	Comprehensive Viva-I	-		-	-	-	-	-	50
	TOTAL		**9**	**3**	**4**	**300**	**150**	**100**	**100**	**700**

Semester II

SNo	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5IT434	Advance Computer Networks	3	1	2	100	50	50	50	250
2.		Elective-I	3	1	-	100	50	-	-	150
3.	5IT441	Comprehensive Viva-II	-	-	-	-	-	-	-	50
	TOTAL		**6**	**2**	**2**	**200**	**100**	**50**	**50**	**450**

Semester III

SNo	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5IT481	Security Assessment, Risk Management & Digital Forensics	3	1	-	100	50	-	-	150
2.	5IT482	Security in e-Commerce Applications	3	1	2	100	50	50	50	250
3.	5IT483	Information Security Management	3	1	2	100	50	50	50	250
4.	5IT490	Comprehensive Viva-III	-	-	-	-	-	-	-	50
	TOTAL		**9**	**3**	**4**	**300**	**150**	**100**	**100**	**700**

Semester IV

SNo	Sub Code	Subject	L	T	P	Th	CW	SW	Pr	TOTAL
1.	5IT484	Secure Wireless Networks	3	1	2	100	50	50	50	250
2.		Elective-II	3	1	-	100	50	-	-	150
3.	5IT491	Comprehensive Viva-IV	-	-	-	-	-	-	-	50
	TOTAL		**6**	**2**	**2**	**200**	**100**	**50**	**50**	**450**

List of Electives in Semester-II& IV

SNo.	Sub Code	Elective-I	SNo	Sub Code	Elective-II
01	5IT435	Data Security	01	5IT485	Cyber Crime & Information warfare
02	5IT436	Intelligence in Information Security	02	5IT486	Biometrics & Human Interface
03	5IT437	Complexity of Security Algorithms	03	5IT487	Database Security & Access Control
04	5IT438	Information Theory and Coding	04	5IT488	Secure multi party Computation
05	5IT439	Optimization Algorithms	05	5IT489	Operating System Security

Semester V

SNo	Sub Code	Subject	Maximum Marks						
			L	P	Th	CW	SW	Pr	TOTAL
1.	6IT401	Dissertation Phase-I	-	8	-	-	100	50	150
	TOTAL		**-**	**8**	**-**	**-**	**100**	**50**	**150**

Semester VI

SNo	Sub Code	Subject	Maximum Marks						
			L	P	Th	CW	SW	Pr	TOTAL
1.	6IT451	Dissertation Phase-II	-	12	-	-	250	100	350
	TOTAL		**-**	**12**	**-**	**-**	**250**	**100**	**350**
		GRAND TOTAL OF SIX SEMESTERS							**2800**

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) SEMESTER I					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT401/5IT431 Advance Computer System	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	1	-	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	50	25	-	-	75

Objective:
To strengthen the knowledge of computer architecture based on the recent developments and to appreciate internal working of modern computer systems.

Prerequisites:
Basic knowledge of computer organization, data structures and programming.

<div align="center">COURSE CONTENTS</div>

UNIT-I
Traditional Development from Von-Neumann Model to Parallel Model; Computer Design Principles.

UNIT-II
Instruction Set Principles and Examples; Instruction Level Parallelism: Concepts; Techniques and Software Approaches.

UNIT-III
Memory Hierarchy Design; Multiprocessors and Threaded Architectures; Storage Systems.

UNIT-IV
Interconnection Networks and Clusters.

UNIT-V
Cases of Microprocessors; Micro controllers and Embedded Architectures.

Books Recommended:
1) J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, 3/e, Morgan Koffman Press, 2002.
2) K. Hwang and Briggs, Computer Architecture and Parallel Processing, McGrawHill, 1986.
3) Latest white paper from the relevant websites.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security)					
Subject Code & Name	Instructions Hours per Week			Marks					
5IT402/5IT432 Object Oriented Analysis and Modeling	L	T	P		TH	CW	SW	PR	Total
	3	1	2	Max	100	50	50	50	250
Duration of paper: 3 hrs				Min	50	25	25	25	125

Objective: To be able to analyze the system/ application to be developed; and to be ready to design and implement the software systems from industry perspective.

Prerequisites: Preliminary Object Oriented Concepts.

COURSE CONTENTS

UNIT I
Software Engineering Best practices; Unified Process: Workflow and Lifecycle; Modeling
UNIT II
Object Orientation and Mechanisms; Requirements Management; Creating Artifacts; SRS, Use Case Models, Supplementary Specifications
UNIT III
Use-Case Analysis, Responsibilities, Attributes and Associations
UNIT IV
Analysis and Design Overview; Architectural Analysis
UNIT V
Unified Modeling Language, Structural, Behavioral, Architectural Modeling, UML Diagram and Tools

Books Recommended:
1) P.Kruchten, The Rational Unified Process: An Introduction, Pearson Education Asia, 2000.
2) G. Booch, I. Jacobson, J. Rumbaugh, The Unified Modeling Language- User's Guide, Addison Wesley, 1999.
3) W. Boggs and M. Boggs, Mastering UML with Rational Rose, BPB Publication, 1999.
4) G.Booch, Object-oriented Analysis and Design with Applications, Addison Wesley, 1994.
5) M.Blaha, J.Rambaugh, Object-Oriented Modeling and Design with UML, Pearson Education 2nd edition, 2007.
6) www.sdmagazine.com, www.rational.com

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) SEMESTER I					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT403/5IT433 Secure Computing Techniques	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**2**	**Max**	**100**	**50**	**50**	**50**	**250**
Duration of paper: 3 hrs				**Min**	**50**	**25**	**25**	**25**	**125**

Objective: To enhance the programming and coding skills at a professional level and to be able to develop the useful programs.

Prerequisites: Basic knowledge of problem solving on computers and programming fundamentals.

COURSE CONTENTS

UNIT I
Introduction:- Introduction to software construction and Java programming language. Importance of Java to the Internet, Java buzzwords, overview of Java, data types, variables and arrays, operators and control statements, Data structures

UNIT II
Introducing classes and methods, overloading methods, argument passing, nested and Inner class, Inheritance, multilevel hierarchy, abstract classes, Packages and interfaces.

UNIT III
Exception handling, Multithreaded programming- Java thread model, Thread priorities, synchronization, interthread communication.

UNIT IV
Input/Output, java I/O classes and interfaces, streams classes, Serialization, Networking, Java and Net, Applet basics and architecture, passing parameters to the applet, event handling.

UNIT V
Server side programming, Java servlets, servlet chaining, server side include, session tracking, JSP, scripting, Jar files and web application development, Connectivity and SQL, JDBC, Java Beans; J2EE Overview- EJBs;

Books Recommended:
1) C.S.Horstmann and G. Cornell, Core Java-I: Fundamentals, Sun Microsystems Press, 1999 (Pearson Asia, 2000).
2) C.S.Horstmann and G. Cornell, Core Java-II: Advanced, Sun Microsystems Press, 2000 (Pearson Asia, 2000).
3) Ivor Horton, Beginning Java 2 JDK 1.3 Edition, WROX (Shroff Pub.) 2000.
4) P. Naughton and H.Schildt, Java 2 Complete Reference, Tata McGrawHill, 1999.
5) S. McConnell, Code Complete, Microsoft Press, 1993 (or latest available).
6) Latest white paper from the relevant websites.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) SEMESTER I					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT404/5IT434 Advance Computer Networks	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**2**	**Max**	100	50	50	50	250
Duration of paper: 3 hrs				**Min**	50	25	25	25	125

Objective: To Develop the skills of designing, Implementing network.

Prerequisites: NIL

COURSE CONTENTS

UNIT I
Network overview, review of underlying network technologies, structure of network software in an operating system; internetworking concept and architectural model,, classful internet addresses, mapping internet addresses to physical addresses (ARP),

Unit II
Internet Protocol-datagram delivery, forwarding IP datagrams, error messaging (ICMP), classless and subnet address extensions (CIDR), Routing architecture cores, peers and algorithms,

Unit III
TCP & UDP protocol implementation, routing architecture, IP switching and MPLS, mobile IP, routing between peers (BGP), routing within autonomous system (OSPF,RIP), Internet Multicasting –

Unit IV
 Private network interconnection (NAT, VPN), Socket interface, Bootstrap and auto configuration (DHCP), Domain Name system, Remote Login (TELNET, SSH),

Unit V
Electronic Mail –SMTP,POP,IMAP, WWW-HTTP, Network Management (SNMP) Voice and Video over IP (RTP), Traffic Scheduling & Policing, QoS, Internet Security and Firewall Design (IPSec, SSL)

Books Recommended:
1) Douglas E.Comer Internetworking with TCP/IP Vol. I Principles,Protocols and Architecture, 5nd Edition 2006
2) Douglas E. Comer,David L. Stevens; Internetworking with TCP/IP Vol. II design, Implementation of Intranets. PHI, 3nd Edition 2000.
3) B. Forouzan, TCP/IP Protocol Suite, McGraw Hill,3/e,2006
4) James F. Kurose, Keith W. Ross, "Computer Networking: A Top Down Approach Featuring the Internet", Addison Wesley, July 2002
5) S. Tanenbaum; Computer Network; 4th Edition PHI 1999.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) SEMESTER I					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT405/5IT435 Data Security	L	T	P		TH	CW	SW	PR	Total
	3	1	-	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	50	25	-	-	75

Objective: To impart the knowledge of encryption and decryption techniques and their applications in managing the security of data.

Pre-requisite: NIL

<div align="center">COURSE CONTENTS</div>

UNIT-I
Classical Cryptography: Introduction, Various types of Cipher, Cryptanalysis Shannon's Theory: Elementary probability theory, Entropy, Product Cryptosystems Block Ciphers and the Advanced Encryption Standard: Introduction, Linear and differential Cryptanalysis, Data encryption standard, Advanced Encryption standard, Modes of operation.

UNIT-II
Cryptographic Hash Functions: Security of Hash functions, Iterated Hash functions, Message Authentication Codes, Unconditionally Secure MACs.

UNIT-III
The RSA Cryptosystem and Factoring Integers: Number Theory, RSA Cryptosystem, Factoring Algorithms, Attacks on RSA, The Rabin Cryptosystem, Semantic Security of RSA.

UNIT-IV
Public key Cryptosystems Based on the Discrete Logarithm Problem: Algorithms for the Discrete Logarithm Problem, Lower bounds on the complexity of generic algorithms, Finite fields, Elliptic curves, security of ElGamal Systems.

UNIT-V
Signature Schemes: Security requirements, ElGamal Signature Scheme, Provably secure Signature Schemes; Undeniable, Fail-stop Signatures

Books Recommended:
1) Douglas R. Stinson;"*Cryptography Theory and Practice"*; Chapman & Hall/CRC 2nd edition
2) Williams Stallings; "*Cryptography & Network Security"*; Pearson Education 3rd edition

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	Instructions Hours per Week			Marks						
5IT451/5IT481 **Security Assessment, Risk Mgmt.&** **Digital Forensics**	L	T	P		TH	CW	SW	PR	Total
	3	1	-	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	50	25	-	-	75

Objective: To develop skills required for data and network security auditing.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I

Network security assessment, tools required- free network scanning tools, commercial network scanning tools, protocol development assessment tools, internet host and network enumeration, NIC,DNS, IP network scanning- ICMP probing, TCP Port Scanning

UNIT-II

Risk management- Importance, Process overview, asset identification, threat identification and assessment, the risk assessment

UNIT-III

Effective and qualitative Risk analysis, value analysis, Facilitated Risk Analysis Process (FRAP) Introduction of Software Forensics- Digital forensics definition, objectives, advance tools Dcc, JPlag, YAP.
Assessing Remote Information Services , SNMP, LDAP, who,

UNIT-IV

Security Assessment: Case Studies for Implementing the Nsa Iam Computer crime Investigation and Forensics, Industrial espionage and cyber-terrorism , principles of criminal law, computer forensic investigation, elements of personnel security and investigations, principles of risk and security management, conspiracy in computer crime, and computer fraud investigation.

UNIT-V

Accessing remote information services, web services, remote maintenance services FTP database services, windows networking services, E-Mail services , IP VPN services, Unix RPC services, Security audit C security policies.

Books Recommended:
1) Chris Mcnah ; "*Network security Assessment* ; publication O' Reilly 2nd edition.
2) Merkow ;"*Information Security; Principles and Practices"*; Pearson Education Aug. 2005

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT452/5IT482 **Security in e-Commerce Applications**	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**2**	**Max**	100	50	50	50	250
Duration of paper: 3 hrs				**Min**	50	25	25	25	125

Objective:
To boost security issues involve in e-Commerce applications.

Pre-requisite: NIL

<div align="center">COURSE CONTENTS</div>

UNIT-I
Introduction to internet business: Defining E-business, E-business categories.
Preparing the online business: Designing, Developing, and Deploying the System.
Selecting the technology: IT infrastructure, choosing the right enterprise applications.

UNIT-II
Legal Issues: Global contracts, Web site domain name battle, National encryption laws, Digital signatures, Digital complaint services, IT act 2000.

UNIT-III
E-business Applications: Searching the internet, Portal sites, the new all in one mega web sites, shopping solutions, Auctions and trading mechanisms, safe exchange, payment mechanisms, Chat solutions.

UNIT-IV
Security on the internet: Creating a security strategy, Applications of cryptography, privacy, fighting virus and hoax virus warnings, conflict in the information age, Client based security, Server based security.

UNIT-V
Paying via internet: Payment business, minimizing the risk, Internet payment models, fraud detection, post payment systems, credit card solutions, internet cheques, debit cards, online experience, electronic cash, smart cards.
Biometrics.

Books Recommended:
1) Daniel Amor ; *"The E-business Evolution"* ; Pearson Education Asia 2nd edition

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Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT453/5IT483 **Information Security Management**	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**2**	**Max**	100	50	50	50	250
Duration of paper: 3 hrs				**Min**	50	25	25	25	125

Objective:
To study the methods of managing information systems in a secure way.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
Introduction- Computer Security, Threats to security, History of Computer security, Computer System Security and Access Controls (System access and data access).
Threats - Viruses ,worms , Trojan horse, bombs, trap doors, spoofs, email virus, macro viruses, remedies, Intruders, Malicious software.

UNIT-II
Communication security- Encryption, Public Key Infrastructure, Digital Signatures.

UNIT-III
User Authentication Mechanisms: Passwords, Authentication tokens, Certificate based Authentication, Single Sign on (SSO), Kerberos, X.509, Cryptographic Solutions- A case study.

UNIT-IV
Internet Security Protocols: Secure Socket Layer (SSL), Secure Hyper Text Transfer Protocol (SHTTP), Secure Electronic Transaction (SET), Electronic Money, Email Security.

UNIT-V
Intrusion detection techniques – Techniques to provide privacy in Internet Application and protecting digital contents(music, vedio, software) from unintended use, authentication.
System and Application Security- IP security, Web security. file System security, program and security, memory security, Sandboxing.
Security threads protection intruders- Viruses-trusted system.
Firewalls, vulnerabilities & threats, Network Denial of service attack, Contract Signing, Secret Splitting.

Books Recommended:
1) Dieter Gollman; *Computer Security*; John Wiley & Sons 1999
2) Mathew Bishop*; Computer Security*; Art and Science; Addison-Wisley Oct. 2007
3) Mathew Bishop; *Introduction to computer Security*; Addison-Wisley Oct 2004
4) Kaufman, Perlman and Speciner; "*Network security*"; Pearson Education 1995

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
5IT454/5IT484 **Secure Wireless Networks**	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**-**	**Max**	100	50	50	50	250
Duration of paper: 3 hrs				**Min**	50	25	25	25	125

Objective: To study the methods of managing wireless systems in a secure way.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
Challenges to Wireless Networks and Wireless Security : Properties of Ad-hoc Networks, Challenges to Wireless networks like Constrained resources, Mobility, Security, Traditional Security issues, Mobile and Wireless Security issues, Problems in Ad-hoc Networks, Types of Attacks, Different approaches for providing Security.

UNIT-II
Security in Local Area Networks: Introduction to WLAN, Advantages, 802.11 Standard, WLAN Architecture, Protocols, Security in WLANs, Wireless Alphabet Soup, Wired Equipment Privacy, WPA, 802.11 Encryption Protocols.

UNIT-III
Security in Wide Area Networks: Introduction to Global System for Mobile Communication, GSM Architecture, Call routing, Hand-off, Frequency Allocation, GSM Authentication and Encryption.
 CDMA, Spread Spectrum Technique, CDMA v/s GSM, Security in CDMA.

UNIT-IV
Security in Metropolitan Area Networks: Introduction to Wi-max, Advantages, IEEE 802.16 Standard, Architecture, Protocols, 802.16 Security, Problems and Limitations.

UNIT-V
Security in Personal Area Networks: Introduction to Bluetooth, it's Specifications, Bluetooth Architecture, Bluetooth security models, Basic Security Mechanisms, Encryption, Authentication, Limitations and Problems.

Books Recommended:
1) F. Adelstein, S. Gupta, G. G. Richard, L. Schwiebert, "Fundamentals of Mobile and Pervasive Computing" TMH Publications, TMH edition, 2005.
2) A. K. Talukder, R. R. Yavagal, "Mobile Computing" TMH Publications, 2005.
3) G. S. Rogers, J. Edwards, "An Introduction to Wireless Technology" Pearson Education, First Impression 2007.

Objective:
To have an insight of offensive activities in the cyber space and study the preventive measure techniques.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
Introduction of Cyber Crime, Categorizing cyber crime, perception of cyber criminals: hackers, insurgents and extremist groups, Privacy, surveillance and protection, hiding crimes in cyberspace, encryption, anonymity, privacy and security at risk in the global information society.

UNIT-II
Information Warfare- concept, information as an intelligence weapon, attacks and retaliation, attack and defense.

UNIT-III
An I-War risk analysis model, implication of I-WAR for information managers, Perceptual Intelligence and I-WAR

UNIT-IV
Handling Cyber Terrorism and information warfare.

UNIT-V
Web defacements and semantic attacks, DNS attacks cyber Law Industrial espionage and cyber terrorism.

Books Recommended:
1) Kaufman, Pearlman and Speciner; *"Network Security"*; Pearson Education. 1995
2) William Hutchinson Mathew Warren;Information Warfare : *"Corporate attack and defense in digital world"*; Elsevier

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
5IT406/5IT436 **Intelligence in Information Security**	L	T	P		TH	CW	SW	PR	Total
	3	1	2	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	50	25	-	-	75

Objective: To enhance soft computing skills for development of intelligent information security systems

Pre-requisite: NIL

<div align="center">COURSE CONTENTS</div>

UNIT-I
Introduction to neural networks, working of an artificial neuron, linear seperability, perceptron, perceptron training algorithm, back propagation algorithm, ada lines and mada lines.

UNIT-II
Supervised and unsupervised learning, counter-propagation networks, adoptive resonance theory, neocognitron and bidirectional associative memory.

UNIT-III
Introduction to fuzzy logic and fuzzy sets, fuzzy relations, fuzzy graphs, fuzzy arithematic and fuzzy if-then rules.

UNIT-IV
Applications of fuzzy logic, neuro-fuzzy systems and genetic algorithm.
Introduction to probability theory, conditional probability, Baye's theorem, random variables and expectations.

UNIT-V
Probability distributions, various types of probability distributions like joint distributions, normal distributions etc., fuzzy logic and its relationship with probability theory.

Books Recommended:
1) Mohammad H. Hassoun; *Fundamentals of artificial neural networks* ; Prentice Hall of India. 1995
2) Bart Kosko; *Neural networks and fuzzy systems* ; Prentice Hall of India. 2008
3) John Yen and Reza Langari; "*Fuzzy logic, intelligence, control and information*" ;Pearson Education. Nov. 1998
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7/22/2009

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
5IT407/5IT437 Complexity of Security Algorithms	L	T	P		TH	CW	SW	PR	Total
	3	1	-	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	50	25	-	-	75

Objective: To develop the skills of evaluating the performance of security algorithms.

Pre-requisite: NIL

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COURSE CONTENTS

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UNIT-I
Introduction, A min-cut algorithm, Las Vegas and Monte Carlo, Binary planar partition, A probabilistic recurrence, Computational models and time complexity.

UNIT-II
Markov Chains and Random Walks: A 2-sat example, Markov chains, Random Walks on graphs, Cover times, Graph connectivity. Random Data Structure : The fundamental data structure problem, Treaps, skip lists, Hash tables, Hashing with $O(1)$ time.

UNIT-III
Geometric algorithms and Linear programming: Randomized incremental construction, Convex Hulls in the plane, Duality, Half space Intersection, Delaney triangulation, Trapezoidal decomposition, Binary pace partition, The diameter of point set, Random sampling, Linear programming.

UNIT-IV
Graph algorithms: All pairs shortest paths, The min cut problem, Minimum Spanning tree.

UNIT-V
Parallel and Distributed Computing: The PRAM Model, Sorting on a PRAM, Maximal independent sets, Perfect Matching, The choice coordinate problem, Byzantine Agreement.

Books Recommended:
1) Motwani and Raghavan; "*Randomized Algorithm*" ; Cambridge press. August 1995
2) Murray R. Spiegel; "*Probability and statistics*" ; John Schiller and R. Alu 2nd edition

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT408/5IT438 **Information Theory and Coding**	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**-**	**Max**	**100**	**50**			**150**
Duration of paper: 3 hrs				**Min**	**50**	**25**			**75**

Objective: To learn the fundamentals of various coding techniques used in information.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
Uncertainty, Information and Entropy Information Measures Characteristics on information measure, Shannon's concept of information, Shannon's measure of information, Model for source coding theorem communication system: Source coding ad line / channel coding, channel mutual information capacity (Bandwidth).

UNIT-II
Channel coding, Theorem for discrete memory less channel, Information Capacity theorem: Error detecting & error correcting codes, types of codes: Block codes, Tree codes, Hamming and Lee Metrics, Description of linear block codes by matrices,

UNIT-III
Description of linear tree codes by matrices, Parity check codes, and Parity check polynomials.

UNIT-IV
Compression: Loss less and lossy, Huffman codes, Binary image compression schemes, Run length encoding, CCIIT group 31-D compression, CCITT group 3 2D compression, CCITI group 4 2D compression.

UNIT-V
Video Image Compression: Requirement of full motion video compression. CITT H 261 Video coding algorithm, MPEG compression methodology. MPEG-2 compression, Audio (speech) compression.

Books Recommended:
1) Gareth A. Jones & J Mary Jones ; Information & Coding Theory; Kindle edition 2000.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II SEMESTER					
Subject Code & Name	**Instructions Hours per Week**			**Marks**						
5IT409/5IT439 **Optimization Algorithms**	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**	
	3	**1**	**-**	**Max**	**100**	**50**	**-**	**-**	**150**	
Duration of paper: 3 hrs				**Min**	**50**	**25**	**-**	**-**	**75**	

Objective:
To understand the optimization and search techniques.

Pre-requisite: NIL

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COURSE CONTENTS

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UNIT-I
Introduction: Engineering applications of optimization. Design variables. Constraints, objectives function, variable bounds, statement and formulation of an optimization problem, Examples of chemical Engg.

UNIT-II
Optimization problems, classification of optimization problems, different optimization algorithms.

UNIT-III
Optimal Point: Local optimal point, global optimal point and inflection point.
Single Variable Optimization Techniques: Optimality criterion. Bracketing method (Bounding phase method) Region elimination methods (Internal halving method, Golden section search method) Point estimation method (successive quadratic estimation methods) Gradient-based methods (Newton-Raphson method, Bisection method, secant. Cubic search method.) Root finding using optimiation techniques.

UNIT-IV
Multivariable Optimization Techniques: Optimality criterion Unidirectional search method Direct Search method (Hooke-Jeeves Pattern Search method, Powell's conjugate direction method) Gradient-based methods (Steepest descent method, Newton's method, Marquardt's methods)

UNIT-V
Construined Optimization Algorithms: Kuhn-Tucker conditions.Transformation method (Penalty function method) Direct search for constrained minimization (variable elimination method, complex search method)
Linear Programming: Linear programming problems, Simplex method of linear programming techniques.

Books Recommended:
1) Kalyanmoy Deb; "*Optimization for engg. Design"* ; Prentice Hall Engg. Optimization by S.S. Rao New Age 1998
2) T.I. Edgar & D.M. Himmelblau; "*Optimization of Chemical Processes"* ; McGraw Hill 2nd edition.
3) Beveridge & Schecter; "*Optimization :Theory & Practice*" ; McGraw Hill 2nd edition.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
5IT456/5IT486 **Biometrics & Human Interface**	L	T	P		TH	CW	SW	PR	Total
	3	1	-	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	50	25	-	-	75

Objective:
To study the concepts of various biological based information security systems.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
Overview of Biometrics: Definitions, biometric modalities, course outline, Basic applications: access control, e-commerce, forensics.

UNIT-II
Design of a Biometric System: Building blocks, Modes of operation, Fingerprint verification: Minutiae Based Fingerprint Matching, Non-minutiae Based Representations, Fingerprint Enhancement, and Fingerprint Classification.
Face Recognition:- Introduction, Authentication vs. Identification, Challenges in Face recognition, Algorithms for face recognitions.

UNIT-III
Iris Recognition: Introduction, devices for capturing Iris, Iris representation schemes, Iris recognition
algorithms. Biometrics based on hand geometry, signature, ear, palm, voice and DNA.

UNIT-IV
Multimodal Biometrics: Limitations of unimodal systems, multibiometric scenarios, levels of fusion, system design, score fusion techniques, score normalization, user-specific parameters, and soft biometrics.

UNIT-V
Case Study Presentations: Biometrics in Banking Industry, Biometrics in Computerized,
Patient Records, Biometrics in Credit Cards, Biometrics in Mass Disaster Victim,
Identification Forensic Odontology

Books Recommended:
1) D. Maltoni, D. Maio, A. K. Jain, and S. Prabhakar; "*Handbook of Fingerprint Recognition*"; Springer Verlag, 2003.
2) A.K. Jain, R. Bolle, S. Pankanti (Eds.); "*BIOMETRICS: Personal Identification in Networked Society*", Kluwer Academic Publishers, 1999.
3) J. Wayman, A.K. Jain, D. Maltoni, and D. Maio (Eds.); Biometric Systems: Technology, "*Design and Performance Evaluation*"; Springer, 2004.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT457/5IT487	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
Database Security & Access Control	**3**	**1**	**-**	**Max**	**100**	**50**	**-**	**-**	**150**
Duration of paper: 3 hrs				**Min**	**50**	**25**	**-**	**-**	**75**

Objective:
To understand about databases and the security mechanisms that can be implemented to avoid catastrophic failures.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
Fundamentals of databases: Database system concepts & architecture, data modeling using E-R Model, relational data model and algebra.

UNIT-II
Database design theory and methodology: Functional dependencies, 1st, 2nd, 3rd and Boyce-Codd normal form, design guidelines. System implementation technologies: Query processing and optimization, transaction processing concepts, concurrency control techniques, database recovery techniques.

UNIT-III
Database and data mining security: Security requirements, reliability & integrity, sensitive data, inference, multilevel databases, proposal for multilevel security, data mining.

UNIT-IV
Database recovery techniques: Concepts, techniques based on deferred and immediate update, shadow paging, recovery algorithm, back up and recovery from catrostrophic failures.

UNIT-V
Database Security: Introduction to database security issues, access control, access control for multilevel security, statistical database security, Securing Databases with Cryptography. Managing the Cryptographic Project. Requirements Hardening. Design Hardening. Secure Development.

Books Recommended:
1) Kenan ;"*Cryptography in the Database: The Last Line of Defense*" ; Pearson Education 2nd edition.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II SEMESTER					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT458/5IT488 **Secure Multiparty Computation**	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**-**	**Max**	**100**	**50**	**-**	**-**	**150**
Duration of paper: 3 hrs				**Min**	**50**	**25**	**-**	**-**	**75**

Objective: To impart the knowledge of multiparty computation techniques and their applications in managing the security of data.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
Security Overview-Information Security, Network security, Database security, Document security, Privacy, anonymity, Authentication.

UNIT-II
Data warehousing & Mining- Operational Database, Informational Database, Three tire Data warehouse architecture, Data Mart, type of data warehouse, KDD Process, OLAP tools, Data cleaning, data extraction, Data mining process using single and multiple organization.

UNIT-III
Types of computation – cryptography based computation, secure two party computation, secure circuit evaluation, secure sum, Secure set union, secure size of set intersection, scalar product, perturbation, applications, Oblivious transfer, privacy preserving data mining. Types of Adversariy - Semi-honest, Malicious, Byzantine, Mobile, Coercing. Different issues of secure multi party computation (SMC) – Security, Privacy, Complexity, Correctness and Implementation. Different views of SMS – Data source, Network, application. Applications of SMC

UNIT-IV
Protocols of Secure Multi-party computation-Yao,s Millionaires protocol, Circuit Evaluation, 1-out-of-N Oblivious Transfer, Scalar Product protocol 1 and 2 (Permutation), Scalar two party Vector Dominance, Anonymity based protocol – Anonypro, Extended Anonypro, multi_ttp, equi_class, encropoly, SMC_anonymizer, min_ adversary.
UNIT-V
 Case study using secure Multi-party computation like electronic voting system, banking, e-Commerce, joint audit, service oriented architecture etc.

Books Recommended:

1) Jaideep Vaidya, Chri Clifton, Michael Zhu, "Privacy Preserving Data Mining" Springer. Nov 2004
2) Ralph Kimball, Joe Caserta, The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming and Delivering Data 2nd edition.
3) Ralph Kimball, Margy Ross, Data Warehouse Toolkit: The complete Guide to Dimensional Modeling 2nd edition.
4) Jaideep Vaidya, "Secure Multiparty Computation", Springer 2003
5) Goldreich O., "The Foundation of Cryptography: General Cryptographic Protocols," Cambridge university press, Vol. 2, May 2004.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME.(Information Technology) (Sp. Information Security) II Semester					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
5IT459/5IT489 Operating System Security	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	3	**1**	**-**	**Max**	100	50	-	-	150
Duration of paper: 3 hrs				**Min**	50	25	-	-	75

Objective: To study the concepts of operating system & discuss the security of information stored in the system (both data & code) from unauthorized access.

Pre-requisite: NIL

COURSE CONTENTS

UNIT-I
OS functions & Overview: Introduction, process management, multithreaded programming, synchronization and deadlocks.
Memory & Storage Management: Virtual memory management. File system, I/O systems. Disks I/O. Disk scheduling.

UNIT-II
Protection & Security: System protection, goals of protection, principles of protection, domain of protection, access matrix, system security, system and network threats, implementing security defenses.

UNIT-III
Case studies: Linux and Windows (History, design principles, kernel modules, process management, scheduling, memory management, file systems, I/O, security features
Influential Operating Systems: Early systems, atlas, XDS-940, THE, RC 4000, CTSS, MULTICS, IBM OS/360, Mach.

UNIT-IV
Protection in general purpose operating systems: Memory and address protection. Control of access to general objects. File protection mechanisms. User authentication.

UNIT-V
Designing trusted operating systems: Security policies. Models of security. Trusted operating system design. Assurance in trusted operating systems.

Books Recommended:
1) Bacon, J. & Harris, T. ; "*Operating systems*" (3rd ed.);Addison-Wesley.
2) Silberschatz, A., Peterson, J.L. & Galvin, P.C. ; "*Operating systems concepts*";Addison-Wesley (7th ed.).
3) Tanenbaum, A.S. ; "*Modern operating systems*";Prentice-Hall (2nd ed.).
4) Solomon, D. & Russinovich, M.; "*Inside Windows 2000*"; Microsoft Press (3rd ed.).
5) Singhal, M. & Shivaratri, N.; "*Advanced concepts in operating systems*": distributed, database, and multiprocessor operating systems; McGraw-Hill. 2nd edition.

7/22/2009

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