

Course Name : Computer Engineering Group

Course Code : CO/CM

Semester : Fifth

Subject Title : Computer Security

Subject Code : 17514

Teaching and Examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

Computer security is one of the most important and relevant area of computing today. The requirement to address security in computer system design is an important design consideration in many of today's systems. It is essential to understand various threats to secure computing and the basic security design principles and techniques developed to address these threats. The student will achieve a firm intuition about what computer security means, be able to recognize potential threats to confidentiality, integrity and availability.

This course will introduce basic cryptography, fundamentals of computer/network security, Risks faced by computers and networks, security mechanisms, operating system security, secure System design principles, and network security principles. It will develop knowledge for security of information and information systems within organizations. It focuses on concepts and method associated with planning, managing, and auditing security at all levels including networks

General Objectives:

Student will be able to

1. Understand the risks faced by Computer Systems and the nature of common Information hazards.
2. Identify the potential threats to confidentiality, integrity and availability of Computer Systems.
3. Understand the working of standard security mechanisms.
4. Use cryptography algorithms and protocols to achieve Computer Security.
5. Understand the threats and security mechanisms for Computer Networks.
6. Build systems that are more secure against attacks.
7. Apply security principles to secure Operating Systems and applications.

Objectives:

To develop following skills:

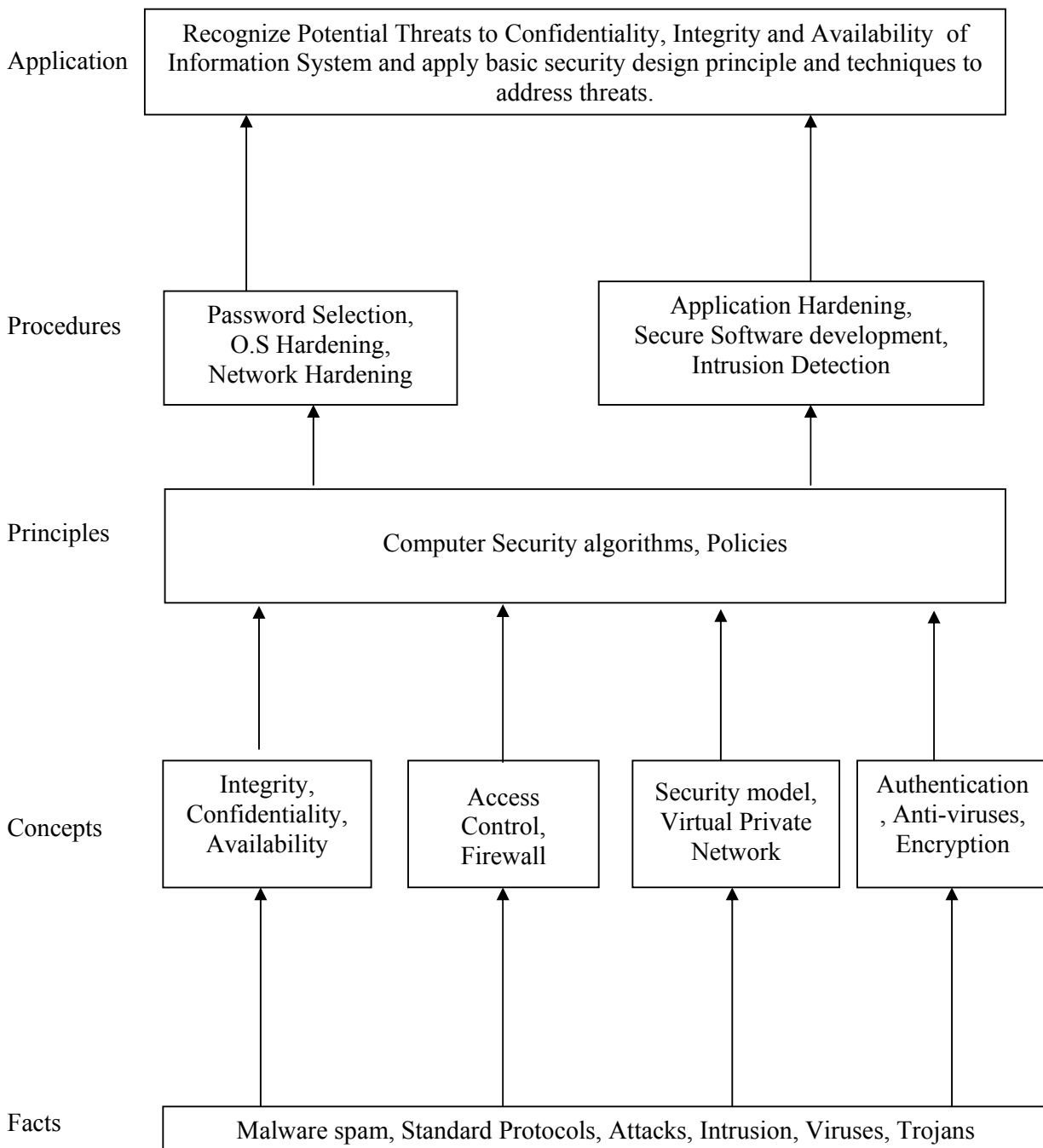
Intellectual Skills:

- Understand basics of computer security
- Know about security attacks, threats, viruses in computer security
- Will gain knowledge about system and network security
- To understand cryptography and steganography
- Know web security and O.S hardening

Motor Skills:

- Proper Handling of Computer System.
- Basics knowledge of computer network.

Learning Structure:



Theory:

Topic No	Contents	Hours	Marks
1	<p>Introduction to computer security and security trends.</p> <p>Objectives:</p> <ul style="list-style-type: none"> ➤ To understand CIA model. ➤ To identify the risks and threats. ➤ To understand security attacks. <p>1.1 Definition of Computer Security, Need for security, Security basics: Confidentiality, Integrity, Availability, Accountability, Non-repetition. Example of Security, Challenges for security, Model for Security.</p> <p>1.2 Risk and Threat Analysis: Assets, Vulnerability, Threats, Risks, Counter measures.</p> <p>1.3 Threat to Security: Viruses and Worms, Intruders, Insiders, Criminal organizations, Terrorists, Information warfare Avenues of attack, steps in attack</p> <p>1.4 Security attacks: Active and Passive attacks, Denial of service, backdoors and trapdoors, sniffing, spoofing, man in the middle, replay, TCP/IP Hacking, encryption attacks.</p> <p>1.5 Malware : Viruses, Logic bombs</p>	10	22
2	<p>Identification, Authentication and Operational Security</p> <p>Objectives:</p> <ul style="list-style-type: none"> ➤ To understand role of people in security ➤ To study access control methods ➤ To understand biometrics and network security. <p>2.1 User name and password, Managing passwords, choosing password.</p> <p>2.2 Role of people in Security: Password selection, Piggybacking, Shoulder surfing, Dumpster diving, Installing unauthorized software/hardware, Access by Nonemployees, Security awareness, Individual User responsibilities</p> <p>2.3 Access controls: Definition, principle, policies: DAC, MAC, RBAC.</p> <p>2.4 Biometrics: finger prints, hand prints, Retina, patterns, voice patterns, signature and writing patterns, keystrokes.</p>	10	20
3	<p>Cryptography</p> <p>Objectives:</p> <ul style="list-style-type: none"> ➤ To understand cryptography. ➤ To understand transposition techniques ➤ To understand symmetric and asymmetric cryptography <p>3.1 Introduction : Cryptography, Cryptanalysis, Cryptology, Substitution techniques: Caesar's cipher, monoalphabetic and polyalphabetic, one-time pad.</p> <p>3.2 Transposition techniques – Rail fence technique, simple columnar, Steganography.</p> <p>3.3 Hashing – concept</p> <p>3.4 Symmetric and asymmetric cryptography: Introduction to Symmetric encryption, DES (Data encryption Standard) algorithm, Asymmetric key cryptography : Digital Signature.</p>	08	16

4	<p>Computer Security Technology and Intrusion Detection Objectives:</p> <ul style="list-style-type: none"> ➤ To understand Firewall technique ➤ To understand VPN, Kerberos, security topologies ➤ To understand intrusion detection system ➤ To understand email security, IP security <p>4.1 Firewalls: Need for Firewall, limitations, characteristics. Types of Firewall : Hardware, Software, Packet filter, Proxy Server, Hybrid, Application gateways, circuit level gateway, Implementing Firewall.</p> <p>4.2 Virtual Private Network work, Kerberos – concept, security topologies: security zones, DMZ, Internet, Intranet, VLAN.</p> <p>4.3 Intrusion Detection: Intrusion detection systems (IDS), host based IDS, network based IDS, Honey pots.</p> <p>4.4 Email security: Email security standards: Working principle of SMTP, PEM, PGP, S/MIME.</p> <p>4.5 IP security: overview, architecture, IPSec Configuration, IPSec Security.</p>	12	24
5	<p>IT Act and Cyber law</p> <p>Objectives:</p> <ul style="list-style-type: none"> ➤ Learn about different cyber crimes ➤ Understand IT acts in India <p>5.1 Introduction to Deleted File Recovery Formatted Partition Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics.</p> <p>5.2 Introduction to Cyber Crimes – Hacking, Cracking, Viruses, Virus Attacks, Pornography, Software Piracy, Intellectual property, Legal System of Information Technology, Mail Bombs, Bug Exploits, Cyber Crime Investigation</p> <p>5.3 Introduction Cyber Laws- Introduction to IT act 2000 and IT act 2008, Introduction to the cyber laws.</p>	04	10
6	<p>Application and Web Security</p> <p>Objectives:</p> <ul style="list-style-type: none"> ➤ To understand application hardening and patches. ➤ To understand web security. <p>6.1 Application hardening, application patches, web servers, active directory.</p> <p>6.2 Web security threats, web traffic security approaches, Secure socket layer and transport layer security, secure Electronic transaction.</p>	04	08
Total		48	100

List of Practical:

Sr. No.	Title of Experiment	No. of Hours
1	Knowing the security provided with windows operating system(User authentication)	02
2	Recovery the password of windows machines using password recover utility (John the ripper) or any other utility	02
3	Tracing of email origin using eMailTracePro utility	04

4	Tracing the path of an website/ web server using tracert utility	04
5	Install open source Latest version of Cryptool software and Encrypt and decrypt the message using Simple Transposition – Permutation(Cryptool)	04
6	Encrypt and decrypt the message using Caesar Cipher With Variable Key(Cryptool)	04
7	Encrypt and decrypt the message using 3 X 3 Hill Cipher(Cryptool)	04
8	Create Digital Signature document using Cryptool	04
9	Installation and working of Open source Firewall –Free BSD/iptables Firewall	04
Total		32

Learning Resources:**1. Books:**

Sr. No.	Author	Title	Publisher
1	Atul Kahate	Cryptography and Network Security	Tata McGraw Hill
2	William Stallings, Lawrie Brown	Computer Security Principles and Practices	Pearson Education
3	Dieter Gollman	Computer Security	Wiley India Education (Second Edition)
4	Wm. Arthur Conkin Dwayne Williams Gregory B. White Roger L. Davis Chuck Cothren	Principles of Computer Security Security + and Beyond	Mc Graw Hill Technology Education international Edition 2005
5	C K Shyamala, N Harini, Dr. T. R. Padmanabhan	Cryptography and Security	Wiley India

2. Website:

1. <http://www.pgpi.org/doc/pgpintro>
2. <http://www.emailtrackerpro.com>
3. <http://www.kmint21.com>
4. <http://www.jjtc.com/Steganography/tools.html>