



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc.), 4th Semester
Branch: Information Technology
Subject Name: Computer Network and Security
Subject Code: 1140502

Type of subject: Core

Prerequisite: Basic knowledge of the Internet and peripherals.

Rationale: Present computing era is based on the internet and networking is an essential requirements prime concern is that in the current advanced digital world required to prevent various security threats for the data confidentiality, integrity and availability. This subject is aims learning basic cryptography techniques and applying security mechanisms for users, systems, operating systems as well as for the private and public networks.

Teaching and Examination Scheme:

| Teaching Scheme | | | Credit | Examination Marks | | | | Total Marks |
|-----------------|---|---|---------|-------------------|---------|-----------------|---|-------------|
| L | T | P | | Theory Marks | | Practical Marks | | |
| | | | ESE (E) | PA (M) | ESE (V) | PA (I) | | |
| 3 | 0 | 0 | 3 | 50 | 0 | 0 | 0 | 50 |

L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit ESE -End Semester Examination; PA - Progressive Assessment.

Course Content Details:

| Sr. No. | Content | Total Hrs. | Module % Weightage |
|---------|--|------------|--------------------|
| 1 | Unit – 1 Introduction and Security Threats: <ul style="list-style-type: none"> Threats to security: Viruses and Worms, Intruders, Insiders, Criminal organizations, Terrorists, Information warfare Avenues of Attack, steps in attack Security Basics Confidentiality, Integrity, Availability Types of attack: Denial of service (DOS), backdoors and trapdoors, sniffing, spoofing, man in the middle, replay, TCP/IP Hacking, Phishing attacks, Distributed DOS, SQL Injection. Malware: Viruses, Logic | 10 | 25 |
| 2 | Unit – 2 Organizational Security <ul style="list-style-type: none"> Password selection, Piggybacking, Shoulder surfing, Dumpster diving, installing unauthorized software/hardware, Access by non-employees. People as Security Tool: Security awareness, and Individual user responsibilities. Physical security: Access controls Biometrics: finger prints, hand prints, Retina, Patterns, voice patterns, signature and Writing patterns, keystrokes, Physical barriers Password Management, vulnerability of password, password protection, password selection strategies, components of a good password. | 10 | 25 |



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| | | | |
|--------------|--|----|-----|
| 3 | <p>Unit – 3 Cryptography and Public key Infrastructure</p> <ul style="list-style-type: none"> • Introduction to Symmetric encryption & Asymmetric encryption. • Encryption algorithm / Cipher, Encryption and Decryption using: Caesar’s cipher, playfair cipher, shift cipher, shift cipher, Vigenere cipher, one time pad (vermin cipher), hill cipher (for practice use small matrix and apply encryption only). • Transposition techniques (rail fence), steganography • Hashing function: SHA1 (only) • Asymmetric encryption: Digital Signatures, Key escrow • Public key infrastructures: basics, digital signatures, digital certificates, certificate authorities, registration authorities, steps for obtaining a digital certificate, steps for verifying authenticity and integrity of a certificate • Centralized or decentralized infrastructure, private key protection • Trust Models: Hierarchical, peer to peer, hybrid | 8 | 20 |
| 4 | <p>Unit - 4 Network security</p> <ul style="list-style-type: none"> • Firewalls working, design principles, trusted systems, Kerberos. • Security topologies – security zones, DMZ, Internet, Intranet, VLAN, security implication, tunneling. • IP security: overview, architecture, IPSec configurations, IPSec security • Email security: security of email transmission, malicious code, spam, mail encryption. | 8 | 20 |
| 5 | <p>Unit - 5 Web Security</p> <ul style="list-style-type: none"> • Intruders, Intrusion detection systems (IDS): host-based IDS, network-based IDS, logical components of IDS, signature-based IDS, anomaly-based IDS, network IDS components, advantages and disadvantages of NIDS, host-based IDS components, advantages and Disadvantage of HIDS. • Web security threats, web traffic security approaches, Introduction to Secure Socket Layer (SSL) & Transport Layer Security (TLS), Concepts of secure electronic transaction | 6 | 10 |
| TOTAL | | 42 | 100 |

Reference Books:

1. Principles Of Computer Security CompTIA Security+ And Beyond (Exam SY0-301), 3rd Edition Books Conklin, Wm. Arthur Gregory White, Dwayne Williams, Roger Davis, Chuck Cothren, Corey Schou McGraw Hill ISBN:9781259061196, 2012.
2. Cryptography and Network Security Principles and Practices Williams Stallings Pearson



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Education, Third Edition.

3. Principles of Computer Security CompTIA Security+ and Beyond Lab Manual Vincent Nestler, Gregory White, Wm.Arthur Conklin, Matthew Hirsch, Corey Schou McGrawHill, 2010, 9780071748568
4. Cryptography and Network Security Principal and Practices Atul Kahate Tata-McGraw-Hill Sixth reprint 2006
5. Cryptography and Network Security B A Forouzen TMH
6. Computer Security Basics Deborah Russell G.T. Gangenisr O'Reilly publication
7. Computer Security Dieter Gollman Wiley India Education, Second Edition

Suggested Specification Table with Marks (Theory): (For B.VOC. Only)

| Distribution of Theory Marks | | | | |
|-------------------------------------|---------|---------|---------|---------|
| R Level | U Level | A Level | N Level | E Level |
| 10 | 20 | 20 | 0 | 0 |

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Bloom's Taxonomy)

Course Outcomes:

| Sr. No. | Co statements: | % Weightage |
|--------------|--|-------------|
| CO-1 | Identify and describe the common types of security threats are risks to the Computer Systems and the nature of common Information hazards. | 25 |
| CO-2 | Identify the potential threats to confidentiality, integrity and availability of Computer Systems. | 25 |
| CO-3 | Describe the working of standard security mechanisms and applied to the external and internal network. | 20 |
| CO-4 | Define cryptography, describe the elements of the encryption process and select the best algorithm to encrypt data and protocols to achieve Computer Security. | 20 |
| CO-5 | Apply accepted security policies, procedures are necessary to secure Operating Systems and applications. | 10 |
| TOTAL | | 100 |

Laboratory work: NA

List of Software/Learning Websites:

1. Software: Wireshark Traffic Analysis/Packet Sniffing Tool, Snort Packet Sniffing tool
2. www.securityplusolc.com.
3. <http://mercury.webster.edu/aleshunas/COSC%205130/COSC%205130%20Home.htm>
4. <http://williamstallings.com/Cryptography/>
5. <http://mercury.webster.edu/aleshunas/COSC%205130/Chapter-22.pdf>
6. <http://nptel.iitm.ac.in/courses.php?disciplineId=106>
7. Network Simulator Tool: GNS3 v0.8.5, NetSimK
8. <http://www.snort.org/docs>



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9. <http://manual.snort.org/node27.html>
10. http://www.wireshark.org/docs/wsug_html_chunked/
11. http://www.pearsonhighered.com/assets/hip/us/hip_us_pearsonhighered/samplechapter/0131407333.pdf
12. http://www.cs.nyu.edu/courses/fall04/G22.2262-01/assignments/assignment4_files/Ethereal_TCP.pdf