GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering
Semester – III
Subject Code: 4735903
Subject Name: Wireless Communication and Mobile Security

Type of course:

Prerequisite:

- Understanding of computer networks and wireless communication.

Rationale:

- The course will provide the insights of wireless communication security, various wireless standards protocols, and security aspects.
- The course will elaborate on wireless and mobile security issues, challenges, and security mechanisms.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
03	00	02	04	70	30	30	20	150

Course Content:

Sr No	Course Content	No of Hours	%
1	**UNIT-I: Introduction** Wireless communication network infrastructure, Network security and wireless security, Security threats and security attacks in wireless networks.	04	10
2	**UNIT-II: Security for Wireless Networks** Challenges in WLAN security, wired equivalent privacy, WEP access control, WEP integrity and confidentiality, WEP key management, WEP security problems, IEEE 802.1X authentication model, Protocols in IEEE 802.1X, Mapping the IEEE 802.1X model to WLAN.	06	15
3	**UNIT-III: Bluetooth Security** Overview of Bluetooth technology, Bluetooth vulnerabilities and threats,	06	15

	Bluetooth security services and security modes, Link Key Generation, Authentication, Confidentiality, Trust and Service levels, Cryptographic functions for security modes, Security issues in IEEE 802.15.		
4	**UNIT-IV: Zigbee Security** Overview of Zigbee, Security threats against Zigbee, IEEE 802.15.4 security features, Security levels, Zigbee Upper Layer Security, Zigbee Security Models, Security Keys in Zigbee, Zigbee Network layer security, Zigbee application support layer security. Security challenges in LoRa for low cost, open source applications.	06	15
5	**UNIT-V: RFID Security** Overview of RFID subsystems, Types of RFID tags, RFID Transactions, RFID frequency bands, Security attacks, risks, and objectives of RFID systems, Security attacks to RFID systems, RFID privacy risks, Security objectives, RFID security mechanisms, Hash locks, Default Hash locking, Randomized Hash locking, HB protocol and the enhancement.	06	15
6	**UNIT-VI: Security for Mobile Networks** GSM system architecture, GSM network access security features, GSM entity authentication, GSM confidentiality, GSM anonymity, GSM security algorithms. UMTS system architecture, UMTS security features, UMTS network access security, Authentication and Key agreement. LTE System Architecture, LTE Security Architecture, LTE Security, LTE Key Hierarchy, LTE authentication and key agreement.	06	15
7	**UNIT-VII Security for Next Generation Wireless Networks** Security requirements for 5G Wireless networks, Major drives for 5G Wireless security, Supreme built-in-security, Flexible security mechanisms, Attacks in 5G Wireless networks, Eavesdropping and Traffic analysis. Security requirements and challenges for 6G technologies and applications, Block chain Security Model for 6G, Quantum Computing Infrastructure for 6G Security.	06	15

Textbook:

1. Security in Wireless Communication Networks, Yi Qian, Feng Ye, Hsiao-Hwa Chen, John Wiley & Sons Ltd.

Reference Book:

1. Wireless Communication Networks and Systems, Cory Beard, William Stallings, Pearson Higher Education.
2. Wireless Network Security, Wolfgang Osterhage, CRC Press, Taylor & Francis Group.
3. 6G: the road to the Future Wireless Technologies 2030, Paulo Serigo, Ramjee Prasad, River Publisher.

Course Outcome:

After completion of the Course, Students will be able to:

No	Course Outcomes	RBT Level*
01	Understand the wireless network and communication standards security issues.	UN
02	Apply the Bluetooth and Zigbee wireless standards to access security risks and threats.	AP
03	Apply the RIFD security standards to predict attack vulnerabilities.	AP
04	Analyse the various mobile communication networks for security aspects.	AN
05	Evaluate the performance of next generation wireless networks on security parameters.	EL

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List:

- The practical work will be carried out based on the content covered during the academic sessions.

List of Laboratory/Learning Resources Required:

- Course-related online MOOCs on NPTEL/SWAYAM platform.
- Recently Published papers/articles in reputed journals.