GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

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WEF Academic Year	: 2021-22
Semester	: 2
Category of the Course	: Program Elective Course-IV
Course Name & Code	: Security in IoT (4725908)

Prerequisite:

- Basic of IoT, fundamental concepts related to security.

Rationale:

- The course covers fundamental topics related to IoT Security and its applications.
- The subject is also helpful to understand the network and transport-level security protocols for IoT applications.
- The course also provides insight on Wireless and IP security aspects for IoT domain applications.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	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** Attack and threat terms, Defense terms, Anatomy of IoT cyber-attacks, Physical and hardware security.	06	15
2	**UNIT-II: Cryptography in IoT** Data Encryption using Symmetric and Assymetric Cryptography, Data Integrity and Authentication, Public key infrastructure for Data Exchange.	06	15
3	**UNIT-III: Network Access Control Security**	06	15

	Network Access Control, Extensible Authentication Protocol, IEEE 802.1X Port-Based Network Access Control.		
4	**UNIT-IV: Transport Level Security** Web Security Considerations, Secure Sockets Layer, Transport Layer Security, HTTPS, Secure Shell (SSH).	06	15
5	**UNIT-V: Wireless Network Security** Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security.	06	15
6	**UNIT-VI: IP Security** IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.	06	15
7.	**Unit-VII Advanced Topics** Cloud Security Risks and Countermeasures, Data Protection in the Cloud, Cloud Security as a Service, Blockchains and cryptocurrencies in IoT.	04	10

Textbooks/ Reference Books:

1. IoT and Edge Computing for Architects, Perry Lea, Packt Publishing (2nd Edition)
2. Cryptography and Network Security, Principles and Practice Sixth Edition, William Stallings, Pearson.
3. Security and Privacy in Internet of Things (IoT) Models, Algorithms, and Implementations, Fei Hu, CRC Press.
4. Security in IoT-Enabled Spaces, Fadi Al-Turjman, CRC Press.

Course Outcome:

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

No	Course Outcomes	RBT Level*
01	Understand the basic terminologies used in the IoT security domain.	UN
02	Apply the basic cryptographic algorithm for data encryption/decryption.	AP
03	Apply Network and Transport level security control protocols for specific IoT applications.	AP

04	Analyze Wireless network security protocols based on IoT application standards.	AN
05	Evaluate various IP security policies based on functionality and application.	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 peer-reviewed journals.

White paper on topics covered during the syllabus.