



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Internet of Things

Subject Code : ME02062051

Subject Name : IoT Security

w. e. f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Professional Elective Course

<b>Prerequisite:</b>	<b>IoT Architecture, IoT Gateway Design, Embedded System and Architecture</b>
<b>Rationale:</b>	This course is designed with aim to explore various vulnerabilities, attacks, and their solutions to provide security measures in the IoT. The students will explore various aspects of security engineering for design and development of IoT applications. The course covers the IoT security lifecycle, cryptographic fundamentals, and access and management control of IoT applications. After this course, the students are able to mitigate risks of hacking of IoT real-time applications.

## Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	Understand the vulnerabilities, attacks, and countermeasures in IoT	UN
02	Apply security engineering for IoT design and development	AP
03	Apply the IoT security lifecycle in the real-time IoT applications	AP
04	Analyze cryptographic principles in IoT systems as a security measures	AN
05	Evaluate various IoT application based on identity and access management solutions.	EL

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

## Teaching and Examination 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



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## Course Content:

Sr No	Course Content	No of Hours	% weightage
1	<b>Unit 1: Vulnerabilities, Attacks, and Countermeasures:</b> Primer on threats, vulnerability and risks, Primer on attacks and countermeasures, Today's IoT attacks, Lessons learned and systematic approaches	8	20
2	<b>Unit 2: Security Engineering for IoT Development:</b> Building Security in to design and development, Secure design, Technology Selection – security products and services	4	10
3	<b>Unit 3: The IoT Security Lifecycle:</b> The secure IoT system implementation lifecycle, implementation and integration, operations and maintenance, dispose,	5	10
4	<b>Unit 4: Cryptographic Fundamentals for IoT Security Engineering:</b> Cryptography and its role in securing the IoT, Cryptographic module principles, Cryptographic key management fundamentals, Examining cryptographic controls for IoT protocols.	12	30
5	<b>Unit 5: Identity and Access Management Solutions for the IoT:</b> The identity lifecycle, Authentication credentials, IoT IAM Infrastructure, Authorization and Access Control	8	15
6	<b>Unit 6: Mitigating IoT Privacy Concerns:</b> Privacy challenges introduced by the IoT, Guide to performing an IoT PIA, PbD Principles, Privacy engineering recommendations.	8	15
<b>TOTAL</b>		<b>45</b>	<b>100</b>



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Recent Development in Data Analytics (Study from latest research papers published in Scopus indexed/web of science journals - 04 hours during laboratory hours)

**Reference Book:**

- Brian Russell, Drew Van Duren, Practical Internet of Things Security, PACKT Publishing, 2016
- Shancang Li, Li Da Xu, Security the Internet of Things, Syngress (Elevier), 2017
- Sridipta Misra, Muthucumaru Maheswaran, Salman Hashmi, Security Challenges and Approaches in Internet of Things, Springer, 2017.

**Suggested Course Practical List:**

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

**List of Laboratory/Learning Resources Required:**

- List of Software : Python, JavaScript, Go, R, MATLAB
- List of Useful websites/MOOCs: <https://nptel.ac.in/courses/106106199>

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