



GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Subject Code : 3144501

Subject Name : Fundamentals of IOT and Cyber Security

WEF Academic Year :	2021-22
Semester :	4
Category of the Course :	Humanities and Social Science

Prerequisite :

- Understanding of computer networks, communication protocols and network security.

Rationale :

- The course provide an insight of IoT and Cybersecurity with detail concepts.
- The course focus on IoT and Cybersecurity for the real world applications and challenges.

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 :

Unit	Course Content	No of Hours	%
1.	Introduction to IoT : Basic terms for IoT components, IoT Open source architecture (OIC), IoT Functional Blocks, Platforms for IoT, Interoperability in IoT, Privacy and Security Challenges and Issues.	6	10
2.	IoT Design Principles : Working principles of sensors, types of sensors, Wireless sensor networks, IoT communication protocols, Design Challenges and Issues, IoT deployment viz. Raspberry Pi, Arduino platform, Communication, Sensing, Actuating and IOs.	8	20
3.	IoT Development Tools : Programming APIs for IoT applications using python, Cloud environment for applications, Data analytics for IoT applications, Case studies viz. Smart Home, Smart Cities, Healthcare, Automation etc.	6	10



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4.	Cybersecurity and Cryptography : Cyber world terminology, cyber-attacks, security model, symmetric cipher model, substitution techniques, transposition techniques, stream ciphers and block ciphers, steganography.	6	20
5.	Symmetric and Asymmetric key Cryptography : Data encryption standard (DES), types of DES, International data encryption algorithm (IDEA), CAST-128, Advanced encryption standard (AES), Public key cryptosystem, Key management, Key Exchange, RSA.	6	20
6.	Data integrity and authentication protocols : Hashing concepts, Hash functions, Applications of cryptographic hash function, Hash algorithms viz. MD4, MD5, SHA, Message authentication code (MAC), Digital Signature, Digital Certificates.	6	20

Textbooks :

1. Internet of Things: Architecture and Design by Raj Kamal, McGraw Hill (latest edition).
2. Cryptography and Network Security Principles and Practices: William Stallings, Pearson Education (latest edition).

Reference Books :

1. Designing the Internet of Things by Adrian McEwen, Wiley (latest edition).
2. Cryptography and Network Security, Behrouz A Forouzan, Tata McGraw Hill (latest edition).

Course Outcome :

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

No	Course Outcomes	RBT Level*
01	Understand the basic terminologies used for IoT and Cybersecurity.	UN
02	Understand the fundamental concepts related to IoT and Cybersecurity.	UN
03	Apply the IoT communication protocols for real world applications.	AP
04	Apply the encryption algorithms for cryptography and steganography.	AP
05	Analyse the available hash algorithms for data integrity and authentication.	AN

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



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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.

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