National Forensic Sciences University
Knowledge | Wisdom | Fulfilment
An Institution of National Importance
(Ministry of Home Affairs, Government of India)

Subject Name: IoT Security and Forensics
Subject Code: CTMSCS SIII P2

Teaching and Evaluation Scheme:

Teaching Scheme					Evaluation Scheme								
					Theory						Practical		
Th	Tu	Pr	C	TCH	Internal Exams				University Exams		University Exams (LPW)		Total
					TA-1/TA-2		MSE						
					Marks	Hrs	Marks	Hrs	Marks	Hrs	Marks	Hrs	
3	0	0	3	3	25	45 min	50	1.5	100	3	-	-	200

* Note: TA-2will be in form of assignments or workshops.

Objectives:

1. To understand the basic concept and architecture of IoT.
2. To understand the IoT communication and messaging protocols.
3. To understand the IoT enabling technologies.
4. To understand the Iot security aspects.
5. To understand the basics of IoT security

UNIT – I

Introduction to IoT

- Definition & Characteristics of IoT; Evolution of IoT; Physical Design of IoT–IoT Components; Logical Design of IoT; IoT Levels and Deployment Techniques; IoT Applications & Domains; IoT Enabling Technologies; Challenges in IoT.

UNIT – II

M2M & System Management

- M2M; Difference between IoT and M2M; Software Defined Networking (SDN); Network Function Virtualization (NFV); Simple Network Management Protocol (SNMP); Limitation of SNMP, Network Operator Requirements; H/W and S/W Communications in IoT (UART, SPI, I2C, JTAG).

UNIT – III

IoT Communication and Messaging Protocols

- IoT Protocol Design – Protocol Stack for IoT; IoT Communication Protocol – HTTP Basics, HTTP Architecture; MQTT Basics, MQTT Architecture; XMPP Basics, XMPP Architecture; COAP Basics, COAP Architecture.

UNIT- IV

IoT Security

- IoT Interoperability; Need for IoT Security; Privacy & Threat to Data in IoT, IoT Attack Vectors & IoT Attack Surfaces; IoT Pen testing Approaches; Understanding OWASP Top 10 for IoT; Threat Modeling in IoT; IoT Cloud Security Architecture; Case Study

UNIT– V

IoT Forensics, Standards & Guidelines

- Introduction to IoT Forensics; Forensic Investigation of IoT Devices & Components; IoT Forensic Tools & Techniques; IoT Standards and Guidelines; Case Study

Reference Books

1. Internet of Things_ A Hands-On Approach by Arshdeep Bahga, Vijay Madisetti - Universities Press (India) Private Limited (2015)
2. A Beginner's Guide to Internet of Things Security-Attacks, Applications, Authentication, and Fundamentals - by B. B. Gupta (Author)_ Aakanksha Tewari (Author) - CRC Press (2020).
3. IoT Penetration Testing Cookbook_ Identify vulnerabilities and secure your smart devices – by Aaron Guzman, Aditya Gupta - Packt Publishing (2017)
4. Practical IoT Hacking_ The Definitive Guide to Attacking the Internet of Things – by Fotios Chantzis, Ioannis Stais, Paulino Calderon, Evangelos Deirmentzoglou, Beau Woods - No Starch Press (2021)
5. Practical Internet of Things Security, by Brian Russell and Drew Van Duren, 2016.
6. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, by Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, 1st Edition, Academic Press, 2014.
7. Securing the Internet of Things, by Shancang Li and Li Da Xu, Elsevier, 2017
8. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, by David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017.
9. Digital Forensic Investigation of Internet of Thing Devices, Reza Montasari, Hamid Jahankhani, Richard Hill, Simon Parkinson, Springer; 1st ed. 2021 edition

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Subject Name: IoT Security and Forensics Laboratory
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					Theory						Practical		
Th	Tu	Pr	C	TCH	Internal Exams				University Exams		University Exams (LPW)		Total
					TA-1/TA-2		MSE		Marks	Hrs	Marks	Hrs	
					Marks	Hrs	Marks	Hrs					
0	0	1	1	2	-	-	-	-	-	-	100	3	100

Syllabus:

Experiments to support the associated theory course.