

Vikram University, Ujjain

Board of studies in Computer science (Faculty of Engineering Science)

SYLLABUS of

Certificate Course in Internet of Things (IoT)

Exclusively for University Teaching Department (ICS, VUU)

PROGRAMME of UTD (ICS, VUU)

(Effective from Academic Session 2020-21)

[Modified as according to the provision of “Ordinance”]

COURSE STRUCTURE

Certificate Course in Internet of Things (IoT)

Paper code	Title of Paper	Theory External Marks	Min. Pass marks	Internal Marks	Min. Pass marks	Total
CIT -101	Internet of Things	75	27	25	09	100
CIT- 102	Data Analytics in IOT	75	27	25	09	100
CIT -103	Internship/Industrial Training/Project Work	<u>150</u>	<u>54</u>	50	28	200
	Total	<u>300</u>		100		400

CIT-101-Internet of Things

UNIT-1:

Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

UNIT-2:

Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

UNIT-3:

Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.

UNIT-4:

Sensor Technology , Participatory Sensing, Industrial IOT and Automotive IOT , Actuator, Sensor data Communication Protocols ,Radio Frequency Identification Technology, Wireless Sensor Network Technology.

UNIT-5:

IOT Design methodology: Specification -Requirement, process, model, service, functional & operational view.IOT Privacy and security solutions, Raspberry Pi & arduino devices. IOT Case studies: smart city streetlights control & monitoring.

Reference Book:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication
2. Vijay Madisetti and Arshdeep Bahga, "Internet of things(A-Hand-on-Approach)" 1st Edition ,Universal Press
3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.
4. Charless Bell "MySQL for the Internet of things", Apress publications.

CIT-102- Data Analytics in IOT

UNIT 1

Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

UNIT 2

IoT & M2M Machine Machine, Difference between IoT and M2M, Software define Network

UNIT 3

Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.

UNIT 4

Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges. **Domain specific applications of IoT** Home automation, Industry applications, Surveillance applications, Other IoT applications

UNIT 5

Developing IoTs Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python

Reference Books:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things": A Hands-On Approach
2. Walteneagus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

DMT-101: Network Security

UNIT-1

A Definition of Computer Security, The Challenges of Computer Security, The OSI Security Architecture. Security Attacks (Passive Attacks, Active Attacks). Security Services (Authentication, Access Control, Data Confidentiality, Data Integrity, Nonrepudiation, Availability Service).

UNIT-2

Symmetric Encryption Principle (Cryptography, Cryptanalysis) Symmetric Block Encryption Algorithms (Data Encryption Standard, Triple DES, Advanced Encryption Standard). Stream Ciphers and RC4 (Stream Cipher Structure, The RC4 Algorithm). Cipher Block Modes of Operation (Electronic Codebook Mode, Cipher Block Chaining Mode, Cipher Feedback Mode, Counter Mode).

UNIT-3

Public-Key Cryptography Principles (Public-Key Encryption Structure, Applications for Public-Key Cryptosystems, Requirements for Public-Key Cryptography). Public-Key Cryptography Algorithms (The RSA Public-Key Encryption Algorithm, Diffie-Hellman Key Exchange, Other Public-Key Cryptography Algorithms). Digital Signatures.

UNIT-4

Approaches to Message Authentication: Secure Hash Functions (Hash Function Requirements, Security of Hash Functions, Simple Hash Functions, The SHA Secure Hash Function). Message Authentication Codes (HMAC, MACs Based on Block Ciphers).

UNIT-5

Security Threats and Vulnerability: Types of attacks on Confidentiality, Integrity and Availability. Vulnerability and Threats, Malware: Viruses, Worms, Trojan horses, Security Counter Measures; Intrusion Detection Systems, Antivirus Software

Reference Books:

1. W. Stallings, Cryptography and Network Security Principles and practice, 3/e, Pearson Education Asia, 2003. 2. Charlie Kaufman, Radia Perlman and Mike Speciner, “Network Security: Private Communication in a public world”, Prentice Hall India, 2nd Edition, 2002.
2. Charles P. Pleeger, “Security in Computing”, Pearson Education Asia, 5th Edition, 2001.
3. William Stallings, “Network Security Essentials: Applications and standards”, Person Education Asia, 2000.
4. W. Mao, Modern Cryptography: Theory & Practice, Pearson Education, 2004

