राष्ट्रीय प्रौद्योगिकी संस्थान पटना / NATIONAL INSTITUE OF TECHNOLOGY PATNA
संगणक विज्ञान एंव अभियांत्रिकी विभाग / DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
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No:- Date:

CS080702: Advanced Internet of Things

L-T-P-Cr: 3-0-2-4

Pre-requisites: Fundamental knowledge of IoT.

Objectives:

- To understand IoT architecture and standardization.
- To learn the IoT protocol stack.
- To learn about various protocols of IoT
- To understand various applications of IoT and challenges involved in their development.

UNIT I: **Lectures: 4**

What Is IoT, Genesis of IoT, IoT and Digitization, Applications of IoT, IoT Strategy for Smarter Cities, Smart City Use-Case Examples, IoT Challenges

UNIT II: **Lectures: 10**

IoT Network Architecture and Design, Drivers Behind New Network Architectures, The oneM2M IoT Standardized Architecture, The IoT World Forum (IoTWF) Standardized Architecture, A Simplified IoT Architecture, The Core IoT Functional Stack

UNIT III: **Lectures: 10**

Smart Objects: The "Things" in IoT, Sensors, Actuators, and Smart Objects, Connecting Smart Objects, Communications Criteria, IEEE 802.15.4: Standardization and Alliances, Physical Layer, MAC Layer, Topology, Security, LoRaWAN: Standardization and Alliances, Physical Layer, MAC Layer, Topology, Security

UNIT IV: **Lectures: 10**

IP as the IoT Network Layer, The Need for Optimization, Optimizing IP for IoT, From 6LoWPAN to 6Lo, Header Compression, Fragmentation, Mesh Addressing, 6TiSCH, RPL

UNIT V: **Lectures: 8**

Application Protocols for IoT: SCADA, CoAP, MQTT

Text/Reference Books:

1) Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry, Gonzalo Salgueiro, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", First Edition, Cisco Press, USA.
2) Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
3) Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4) Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118- 47347-4, Willy Publications

5) Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1st Edition, VPT, 2014.