|  |  |
| --- | --- |
| MONO | **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**  **NATIONAL INSTITUTE OF TECHNOLOGY PATNA**  Ashok Raj Path, PATNA 800 005 (Bihar), India |
| Phone No.: 0612 – 2372715, 2370419, 2370843, 2371929, 2371930, 2371715 Fax – 0612- 2670631 Website: [www.nitp.ac.in](http://www.nitp.ac.in/) |

***CS7401 IoT***

**L-T-P-Cr: 3-0-0-3**

**Pre-requisites:** Fundamentals of Wired/Wireless, Communication, Computer networks.

**Objectives/Overview:**

* To learn concepts of Internet of Things (IoT)
* To learn various applications of IoT and challenges involved in it
* To understand and learn different types of devices used in IoT
* To learn programming IoT applications using PYTHON

**Course Outcomes:**

At the end of the course, a student should:

|  |  |  |
| --- | --- | --- |
| **S.NO** | **Outcome** | **Mapping to PO** |
| CO-1 | Familiarize with the basic concepts and terminology in Internet of Things | PO2 |
| CO-2 | Learn about various domains of IoT and its Design Methodology | PO1, PO3, PO7 |
| CO-3 | Understand the programming background for IoT Applications | PO2, PO3 |
| CO-4 | Identify the hardware and software requirements of IoT based solutions | PO3, PO4, PO6 |
| CO-5 | Learn about the various real time IoT Applications | PO2, PO4, PO6 |

**UNIT I: Lectures: 10**

Definition and Characteristics of IoT, Physical Design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT: IoT Functional Blocks, IoT Communication Models and APIs, IoT Enabling Technologies, IoT Levels and Deployment Templates.

**UNIT II: Lectures: 8**

Domain Specific IoT: Home Automation, Logistics, Agriculture, Introduction to M2M, Difference between IoT to M2M, IoT Design Methodology, Need for IoT System Management, IoT design methodology, Case Study on IoT System for Weather Monitoring.

**UNIT III: Lectures: 10**

Introduction to Python, Python Data Types, Python Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Classes, Python Database Programming, Python Packages for IoT.

**UNIT IV: Lectures: 6**

IoT Physical Devices; Basic Building Blocks of an IoT device, Exemplary Device Raspberry Pi, Arduino Board, Beaglebone Black, Cubieboard.

**UNIT V: Lectures: 8**

Django- Python Web Application Framework, Designing RESTful Web API, Designing a Prototype for Smart City, Smart Parking and Smart Irrigation.

**Text/Referance Books:**

1. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on Approach)”, 1st Edition, VPT, 2014.
2. 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.
3. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, 1st Edition, Academic Press, 2014.
4. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
5. 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