

K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BENGALURU - 560109
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-PO Mapping

Course: Internet of Things			
Type: Core		Course Code: 18CS81	
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total/Week	Total teaching hours
4	3	4	40
Marks			
Internal Assessment	Examination	Total	Credits
40	60	100	4
Aim/Objectives of the Course			
<ol style="list-style-type: none"> To assess the genesis and impact of IoT applications and architectures in real world. To illustrate diverse methods of deploying smart objects and connecting them to network. To compare different Application protocols for IoT. To infer the role of Data Analytics and Security in IoT. To identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry. 			
Course Learning Outcomes			
After completing the course, the students will be able to			
CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.	Understanding (K2)	
CO2	Outline the deployment of smart objects and access technologies to frame network.	Understanding (K2)	
CO3	Describe the role of IoT protocols for efficient network communication.	Understanding (K2)	
CO4	Exhibit the need for Data Analytics, Big Data Analytics and Tools & Security in IoT.	Applying (K3)	
CO5	Illustrate different sensor technologies for sensing real world entities and Identify the applications of IoT in Industry.	Applying (K3)	
Syllabus Content			
Module 1: What is IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute.			CO1 08 hours PO1-3 PO4-1 PO5-1

<p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. What is mean by IOT? 2. What are the difference between IOT and Digitization? 3. Write a short note IOT network architecture designs. 4. Explain the the drivers behind new network architecture. 5. Explain IoT Data Management and Compute Stack. 6. Explain Core IoT Functional Stack 	<p>PO6-1 PO7-3 PO12-1</p> <p>PSO1-3 PSO2-1</p>
<p>Module 2: Smart Objects: The “Things” in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the IOT with help of Sensors and actuators 2. Explain the smart objects. 3. Explain connecting smart objects 4. Explain IoT Access Technologies. 	<p>CO2 08 hrs.</p> <p>PO1-3 PO4-1 PO5-1 PO6-1 PO7-2 PO9-1 PO12-1</p> <p>PSO1-3 PSO2-1</p>
<p>Module 3: IP as the IoT Network Layer, The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain IOT network layer. 2. Explain the business case for IP. 3. What is the need for Optimization? 4. Explain the IoT Application Transport Methods. 	<p>CO3 08 hrs</p> <p>PO1-3 PO5-1 PO6-1 PO7-2 PO9-1 PO12-1</p> <p>PSO1-3 PSO2-1</p>
<p>Module 4: Data and Analytics for IoT, An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Demonstrate the need for Data Analytics inIoT 2. Explain Big Data Analytics Tools and Technology 3. Write a Brief History of OT Security. 4. What are Common Challenges in OT Security. 5. Explain Formal Risk Analysis Structures: OCTAVE and FAIR 	<p>CO4 08 hrs</p> <p>PO1-3 PO5-1 PO6-1 PO7-2 PO9-1 PO12-1</p> <p>PSO1-3 PSO2-1</p>

<p>Module 5: IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture, Smart City Security Architecture, Smart City Use-Case Examples.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Develop programs using Arduino UNO. 2. Explain Physical Devices and Endpoints. 3. Explain remote access to RaspberryPi. 4. Develop steps required for Configuring RaspberryPi. 5. Show use case examples for temperature sensors and smart city. 	<p>CO5 08 hrs</p> <p>PO1-3 PO5-1 PO6-1 PO7-2 PO9-1 PO12-1</p> <p>PSO1-3 PSO2-1</p>
<p>Text Books:</p> <ol style="list-style-type: none"> 1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743) 2. Srinivasa K G, "Internet of Things", CENGAGE Learning India, 2017. 	
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. (ISBN: 978-8173719547) 2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224) 	
<p>Useful Websites</p> <ol style="list-style-type: none"> 1. https://www.goodfirms.co/internet-of-things 2. https://builtin.com/internet-things/iot-examples 3. https://new.siemens.com/ 4. https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-cs66/ 5. https://nptel.ac.in/courses/106/105/106105166/ 	
<p>Useful Journals</p> <ol style="list-style-type: none"> 1. International Journal of Computers and Applications on IOT. 2. International Journal of Computer Techniques Internet of Things Technologies. 	
<p>Teaching and Learning Methods</p> <ol style="list-style-type: none"> 1. Lecture class: 40hrs 	

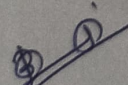
CO to PO Mapping

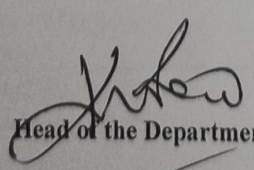
<p>PO1: Science and engineering Knowledge</p> <p>PO2: Problem Analysis</p> <p>PO3: Design & Development</p> <p>PO4: Investigations of Complex Problems</p> <p>PO5: Modern Tool Usage</p> <p>PO6: Engineer & Society</p>	<p>PO7: Environment and Society</p> <p>PO8: Ethics</p> <p>PO9: Individual & Team Work</p> <p>PO10: Communication</p> <p>PO11: Project Mngmt & Finance</p> <p>PO12: Lifelong Learning</p>
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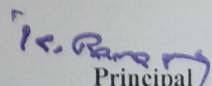
PSO1: Understand fundamental and advanced concepts in the core areas of Computer Science and Engineering to analyze, design and implement the solutions for the real world problems.

PSO2: Utilize modern technological innovations efficiently in various applications to work towards the betterment of society and solve engineering problems.

CO	PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
18CS 81	K-level														
CO1	K2	3	-	-	1	1	1	3	-	-	-	-	1	3	1
CO2	K2	3	-	-	1	1	1	2	-	1	-	-	1	3	1
CO3	K2	3	-	-	-	1	1	2	-	1	-	-	1	3	1
CO4	K3	3	1	1	-	1	1	2	-	1	-	-	1	3	1
CO5	K3	3	1	1	-	1	1	2	-	1	-	-	1	3	1


Course in charge


Head of the Department


Principal

Dr. K. RAMA NARASIMHA

Principal/Director

Engineering and Management.

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