Name of the Programme: M.Sc. in Artificial Intelligence
Course Code: CSI-524
Title of Course: IoT Architecture and Protocols
Number of Credits: 4 (2L-2T-0P)
Effective from AY: 2023-24

Prerequisites for the course	Internet Technologies, Computer Organization and architecture, Operating Systems.	
Objectives	To understand the fundamentals of Internet of Things and the protocols and standards designed for IoT	
Theory	Introduction to IoT: Introduction, IoT ecosystem, Applications, Challenges. Fundamentals: IoT Devices - Sensors, Actuators, and gateways, Basics of the wireless sensor network. IoT Architecture & Design: oneM2M, IoTWF, Additional Reference Models, Core functional stack, Data Management and compute stack. Communicating smart objects: Communication criteria, communication models, IoT access technologies – 3GPP MTC, IEEE 802.11, IEEE 802.15, WirelessHART, ZWave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7 IoT Network Layer: IP as IoT network layer, IPv6, 6LoWPAN, 6TiSCH, RPL, CORPL, CARP IoT Transport and Application protocols: Transport Layer: TCP, UDP, DCCP, SCTP, TLS, DTLS IoT application transport methods, HTTP, CoAP, XMPP, MQTT, AMQP, DDS Security in IoT: MAC802.15.4, 6LoWPAN, RPL, Application Layer security. IoT Application case study: Discuss any 3 applications of IoT	2 hours 4 hours 4 hours 8 hours 3 hours 3 hours 3 hours 3 hours
Any 15 Case Studies / Systems to be discussed during the Tutorial Slots:	1. Smart Agriculture System 2. Weather Reporting System 3. Home Automation System 4. Face Recognition Bot 5. Smart Garage Door 6. Smart Alarm Clock 7. Air Pollution Monitoring System 8. Smart Parking System 9. Smart Traffic Management System 10. Smart Cradle System 11. Smart Gas Leakage Detector Bot 12. Streetlight Monitoring System 13. Smart Anti-Theft System 14. Liquid Level Monitoring System 15. Night Patrol Robot 16. Health Monitoring System 17. Smart Irrigation System 18. Flood Detection System	15 * 2 = 30 hours

	19. Mining Worker Safety Helmet 20. Smart Energy Grid	
Pedagogy	lectures/ tutorials/Hands-on assignments/self-study	
References/ Readings	1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017 2. Hersent, Olivier, David Boswarthick, and Omar Elloumi, The internet of things: Key applications and protocols. John Wiley & Sons, 2011. 3. Buyya, Rajkumar, and Amir Vahid Dastjerdi, eds. Internet of Things: Principles and Paradigms. Elsevier, 2016.	
Course Outcomes	1. Understanding and knowledge of various IoT protocols. 2. Ability to select and implement appropriate IoT protocols based on application requirements. 3. Awareness of security and privacy considerations in IoT protocols. 4. Familiarity with interoperability, performance optimization, and emerging trends in IoT protocols.	

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