

Internet of Things: Connectivity and Networking

Internet of Things: Connectivity and Networking

Module 1: Introduction to IoT and Connectivity

- Overview of IoT: history, evolution, and trends
- IoT communication technologies and protocols: WiFi, Bluetooth, ZigBee, ZWave, LoRaWAN, and more
- IoT network architecture and design principles: sensors, gateways, cloud, and clients
- IoT network components: sensors, actuators, microcontrollers, and wireless modules
- Hands-on practical: Setting up an IoT network using a development board and connecting sensors

Module 2: IoT Networking Technologies

- IoT networking technologies: WiFi, Bluetooth, ZigBee, Z-Wave, LoRaWAN, and more
- IoT networking protocols: MQTT, CoAP, HTTP, and more
- IoT networking topologies: star, mesh, and hybrid
- IoT networking architectures: cloud, edge, and fog computing
- Hands-on practical: Building an IoT network with different networking technologies

Module 3: IoT Security Fundamentals

- IoT security fundamentals: authentication, encryption, and access control
- IoT security threats: data breaches, hacking, and DDoS attacks
- IoT security protocols and standards: TLS, DTLS, and 802.1X
- Hands-on practical: Implementing security measures on an IoT network

Module 4: IoT Privacy and Data Management

- IoT privacy issues: data collection, storage, and usage
- IoT data analytics: real-time and batch processing, machine learning, and AI
- IoT data storage and management: cloud, edge, and hybrid solutions
- IoT data visualization and reporting: dashboards and APIs
- IoT data governance: ownership, access, and ethics
- Hands-on practical: Collecting and analyzing IoT data using various analytics tools

Module 5: Advanced IoT Networking Technologies

- Advanced IoT networking technologies: 5G, NB-IoT, LTE-M, and more
- Advanced IoT networking protocols: XMPP, AMQP, and more
- Advanced IoT networking topologies: tree, ring, and more
- Advanced IoT networking architectures: blockchain and swarm computing
- Hands-on practical: Implementing advanced networking technologies on an

IoT network

Module 6: IoT Security and Privacy Best Practices

- Introduction to IoT security: Overview of IoT security issues and challenges
- IoT Security Architecture and Design: Security protocols and standards for IoT networks
- IoT Privacy: Data collection, storage, and use in IoT networks
- IoT Security Best Practices: Security policies, access control, and secure communication in IoT networks
- Hands-on practical: Securing an IoT network and implementing security best practices

Module 7: IoT Project Development and Deployment

- Overview of IoT project development and deployment process
- IoT project development: ideation, prototyping, testing, and validation
- IoT project deployment: installation, configuration, and maintenance
- Hands-on practical: Developing and deploying an IoT project from start to finish