

Prepared by Dr. Wesam Ahmed

IT402
Internet of Things

Introduction Lecture



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Internet of Things (IOT) (Cr 3)



Course Title	Internet of Things (IOT)
Course Code	IT402
Prerequisites	IT371
University	Midocean University



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Course Description

The Internet is evolving into a network that connects people with physical objects and enables real-time interactions among physical things, giving rise to the Internet of Things (IoT). This course provides a foundational exploration of IoT concepts, including its architectures, protocols, and middleware solutions, while introducing the Web of Things (WoT) framework. This course gives a simple introduction to how IoT works. Students will learn what IoT is, why it is important, and how it is used in real life. Topics include IoT devices and sensors, how they communicate, and examples of smart applications in homes, healthcare, transportation, and cities. The curriculum will also delve into the synergy between AI and IoT, covering topics like machine learning for IoT data processing, predictive maintenance, and intelligent automation. Through practical projects and case studies, such as AI-enhanced smart city systems, students will be prepared to innovate in this transformative, interconnected field.

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Course Objective:

The objective of this course is to equip students with a comprehensive understanding of the Internet of Things (IoT) by exploring its foundational concepts, architectures, protocols, and practical applications. Additionally, the course will explore the integration of Artificial Intelligence (AI) with IoT, highlighting how AI enhances IoT systems through data analytics, predictive modeling, and intelligent decision-making to create smarter, adaptive solutions.

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Course Learning Outcomes:

1. Explain the foundational concepts, architectures, and protocols of the Internet of Things (IoT), including its role as a network of networks and the Web of Things (WoT) framework.
2. Analyze the components of IoT systems, such as sensors, actuators, middleware, and hardware devices, and their theoretical roles in connectivity and data management.
3. Evaluate the economic and societal impacts of IoT, including its potential applications in areas like smart cities, without practical implementation.
4. Discuss the theoretical integration of Artificial Intelligence (AI) with IoT, including how AI can enhance data analytics, predictive modeling, and decision-making in IoT systems.
5. Compare different IoT architectures, protocols , and tools.

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Major Topics:

1. Introduction to IoT – Definition, evolution, and applications
2. IoT architecture & components (sensors, actuators, devices, gateways)
3. IoT protocols & communication models
4. Wireless Sensor Networks (WSN) and their role in IoT
5. IoT middleware & software frameworks
6. Data analytics in IoT

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Major Topics:

7. IoT hardware: devices, servers, control units, and bridges.
8. IoT security & privacy challenges
9. Cloud integration & IoT (cloud storage, edge/fog computing)
10. IoT applications in smart homes, healthcare, transportation
11. IoT data and AI processing
12. Machine learning for IoT
13. Deep learning for IoT

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Textbook(s) or References

1. Michael Miller, “The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World”, Pearson Education 2015.
2. Francis da Costa, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, Apress Publications 2013, 1st Edition.
3. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice”, Wiley 2014.
4. Pfister C. Getting started with the Internet of things: connecting sensors and microcontrollers to the cloud. Maker Media, Inc.; 2011 May 17.
5. Kapoor A. Hands-On Artificial Intelligence for IoT: Expert machine learning and deep learning techniques for developing smarter IoT systems. Packt Publishing Ltd; 2025 May 16.

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Summary

1. Introduction to IoT.
2. Course Description.
3. Major Topics



Thank You