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Module Descriptor

Internet of Things Standards and Protocols (Computing and Mathematics)

Internet of Things Standards and Protocols (A11306)

Short Title: IoT Standards and Protocols
Department: Computing and Mathematics
Credits: 5 **Level:** Intermediate

Description of Module / Aims

The Internet of Things(IoT) encompasses a broad range and scale of devices and applications. This module examines the protocols and standards used to interconnect the various devices and applications in the Internet of Things. Students will cover range of topics across the IoT protocol stack, including emerging networking protocols and architectures, messaging, programming abstractions, and applications.

Programmes

		stage/semester/status
COMP-0560	BSc (Hons) in Applied Computing (WD_KACCM_B)	2 / 4 / E
COMP-0560	BSc (Hons) in Applied Computing (WD_KCOMP_B)	2 / 4 / E
COMP-0560	BSc (Hons) in Applied Computing (WD_KCOMP_B)	3 / 5 / E
COMP-0560	BSc (Hons) in Computer Science (WD_KCMSC_B)	2 / 4 / E
COMP-0560	BSc (Hons) in Software Systems Development (WD_KDEVP_B)	3 / 6 / E
COMP-0560	BSc (Hons) in the Internet of Things (International) (WD_KINTT_BI)	2 / 4 / M

Indicative Content

- The Internet of Things protocol stack
- Device level communication bus protocols: Event-driven bus protocols; serial communication
- Device interfacing and embedded application APIs
- Wireless communication for the IoT: Introduction to Wireless Networks; wireless protocols for low power devices; short-range wireless technologies
- Messaging protocols for the Internet of Things: Request-Response; Publish-Subscribe

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Distinguish between the communication and data requirements for the general Web protocol stack and Internet of Things protocol stack.
2. Create an appropriate physical layer specification for wireless networked devices based on application requirements.
3. Use low power, low overhead, wireless communication protocols to interconnect resource constrained sensors, actuators and other devices.
4. Apply lightweight messaging solutions that mediate between device level sensors and higher layer applications and services.
5. Use IoT gateway solutions to connect devices and higher level service layer networks.
6. Design domain-specific IoT solutions (e.g. health care) using suitable IoT protocols and standards.

Learning and Teaching Methods

- Combination of lectures and computer/network laboratory work.
- Labs will provide practical knowledge into the design and implementation of IoT-specific communication protocol solutions.
- Lectures will provide the theoretical knowledge of IoT protocols and standards.
- As part of the lectures, case studies will be used to illustrate real-world IoT solutions using the standards and protocols covered in lectures(e.g. smart spaces).

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Lab Report	50%	2,3,4
In-Class Assessment	25%	4,5
Assignment	25%	1,6

Assessment Criteria

<40%: Unable to explain the characteristics and uses of IoT protocols and standards; unable to apply or implement IoT communication protocols.

40%–49%: Be able to describe specific IoT protocols and their applications. Able to successfully implement single IoT protocols.

50%–59%: Able to design and implement a multi-protocol IoT solution. Able to discuss, with sufficient knowledge, the relative merits of IoT protocol stack technologies and solutions.

60%–69%: Be able to create suitably complex IoT protocol solutions involving heterogeneous environments and devices. This is complemented with the knowledge to select and implement suitable technologies at all layers of the protocol stack.

70%–100%: All the above to an excellent level. Be able to analyse and design solutions to a high standard for a range of both complex and unforeseen problems through the use and modification of appropriate skills and tools.

Requested Resources

- Computer Lab: BYOD Lab