

Semester S8	ENSEA	New !
	<b>Internet of Things</b>	
US Credits : 3	Lecture: 36h, Laboratory 28h	Language: English

### Summary

IoT networks interconnect embedded physical objects such as distributed control systems used in autonomous vehicles and sensor networks used in structural health monitoring and smart cities. According to predictions, IoT will account for 45% of all Internet traffic by 2020, showcasing the importance of IoT applications.

This module focuses on the architectures and protocols of IoT communication networks; we will study cases such as wireless sensor networks and vehicular IoT networks (V2V, V2X, X2V to assist driving). The option covers a wide range of topics, starting from the physical layer (PHY), and moving to IoT MAC and network layers (802.15.4, 6LoWPAN, ZigBee, etc.). Special topics, including IoT security protocols – IPSec, DTLS, etc., will also be covered. Students will have the chance to get introduced to the realm of IoT and experiment with intelligent, interconnected objects, they can potentially conceptualize, design and develop in the future as engineers.

### Prerequisites

- Digital communications
- Networking fundamentals

### Contents

- Communication networks for IoT
- Fundamental trade-offs between rate, connectivity, latency
- Wireless sensor networks
- Energy consumption, energy harvesting
- IoT PHY: NB-IoT
- Networking for IoT, TCP-IP, IPv6, 6LoWPAN, ROLL/RPL
- IoT Protocols, 802.15.4, ZigBee, RIOT, CoAP
- IoT Security, DTLS, IPSec
- Automotive IoT, V2V, V2X, X2V

### Laboratory topics:

Laboratory sessions include MatLab® based experiments, experimentation with real IoT devices and remote access experimentation using the IoT FIT Lab at INRIA Saclay <https://www.iot-lab.info/>.

### Textbook

- Moodle online resources

### Similar to the following courses

- IIT Chicago
- University at Buffalo
- University of Pittsburgh
- Mississippi State University
- University of Michigan at AA
- Michigan Tech