

**Course Syllabus:****Electronics MA, Sensor Networks, 7.5 Credits****General data**

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|-----------------------------------|---|
| <b>Code</b>                       | EL024A  |
| <b>Subject/Main field</b>         | Electronics   |
| <b>Cycle</b>                      | Second cycle  |
| <b>Credits</b>                    | 7.50  |
| <b>Progressive specialisation</b> | Second cycle, has only first-cycle course/s as entry requirements |
| <b>Answerable department</b>      | Faculty of Science, Technology and Media                          |
| <b>Established</b>                | 2010-09-30  |
| <b>Date of change</b>             | 2017-04-03  |
| <b>Version valid from</b>         | 2013-08-15  |

**Aim**

The course aims to provide an understanding of the opportunities offered by wireless sensor networks and how they are structured in regard to hardware and routines for network communication.

## Course objectives

Upon completing the course the participant should:

- be familiar with the applications where wireless sensor networks can be used
- be able to describe what technologies are required to realize wireless sensor networks
- be able to tell what determines the capabilities and limitations of a wireless sensor units
- be able to select a network topology based on the application and performance requirements
- be able to describe the phenomenon that lead to transmission disturbances in radio channels
- be able to describe various transceiver component's energy properties
- be able to describe different types of MAC protocols for wireless sensor networks and their energy characteristics
- be able to describe some basic routing protocols and their properties
- be able to implement sensor functions of a wireless embedded system for event-driven data generation and periodic sampling of sensor data.

## Content

The course covers:

- Applications suitable for wireless sensor networks and technologies necessary for hardware and software implementation
- Architectures for wireless sensor devices
- Network topologies
- Sources of wireless transmission interference
- Protocol for Multiple Access Control in wireless sensor networks
- Routing algorithms in wireless sensor networks

## Entry requirements

Electrical Engineering BA (AB), 60 Credits, including digital electronics, microprocessors and analogue electronics.

## Selection rules and procedures

The selection process is in accordance with the Higher Education Ordinance and the local order of admission.

## Teaching form

Lectures and laboratory sessions.

## **Examination form**

4.0 credits, T102: Written exam

Grades: A, B, C, D, E, Fx and F. A-E are passed and Fx and F are failed.

2.0 credits, L102: Laboratory sessions

Grades: Pass (P) or Fail (F)

1.5 Credits, I102: Laboratory Assignment

Grades: A, B, C, D, E, Fx and F. A-E are passed and Fx and F are failed.

Grading criteria for the subject are available at [www.miun.se/betygskriterier](http://www.miun.se/betygskriterier).

## **Grading system**

The grades A, B, C, D, E, Fx and F are given on the course. On this scale the grades A through E represent pass levels, whereas Fx and F represent fail levels.

## **Course reading**

### **Reference literature**

Holger Karl, Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, Wiley, 1st, 0-470-09510-5

Waltenegus Dargie, Christian Poellabauer, Fundamentals of Wireless Sensor Networks: Theory and Practice, Wiley, 1st, 0-470-99765-6