



**Course Syllabus:**

**Electronics MA, Sensor Networks, 7.5 Credits**

**General data**

<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>	2015-03-04
<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 of 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