![Mittuniversitetet — MID SWEDEN UNIVERSITY]

Course Syllabus:

Electronics MA, Sensor Networks, 7.5 Credits

General data

Code	EL024A
Subject/Main field	Electronics
Cycle	Second cycle
Orientation (name)	
Credits	7.5
Progressive specialisation	A1N , Second cycle, has only first-cycle course/s as entry requirements
Answerable institution	Electronics Design
Adapted	2010-05-15
Established	2010-09-30
Date of change	2021-09-30
Valid from	2022-01-01

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

After the successful completion of this course, the student will be able to:
- Exemplify applications of sensor networks, as well as to analyze which requirements these applications place on the underlying hardware and networking technologies.
- Describe properties of wireless communication, such as path loss and phenomena that lead to signal interference.
- Describe relevant MAC protocols, routing protocols and network topologies for wireless sensor networks, as well as to analyze their impact on system performance.
- Compare different methods for the reduction of energy consumption in wireless sensor networks.
- Search, analyze and summarize relevant scientific literature on an application domain of sensor networks.
- Implement wireless sensor networks by programming realtime operating systems for embedded systems, as well as to verify system functionality.

Content

The course covers:
- Applications of sensor networks and technologies necessary for hardware and software implementation
- Architectures of wireless sensor devices
- Network topologies
- Sources of interference in wireless communication
- Protocols for Multiple Access Control in wireless sensor networks
- Routing in wireless sensor networks
- Methods for the reduction of energy consumption in wireless sensor networks
- Programming of wireless sensor nodes

Entry requirements

Electrical Engineering BA (AB), 60 Credits, including digital electronics, analog electronics and embedded system programming.

Selection rules and procedures

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

Teaching form

This course contains lectures, group seminars and laboratory sessions.

Examination form

I105:   Report with oral and written examination , 3,0 credits

Grading: Seven-grade scale, A, B, C, D, E, Fx and F. Fx and F represent fail levels.

I205:   Literature study - Written Assignment, 1,5 credits

Grading: Seven-grade scale, A, B, C, D, E, Fx and F. Fx and F represent fail levels.

L105:   Laboratory exercises , 3,0 credits

Grading: Fail (U) or Pass (G)

Grading criteria for the subject are available at www.miun.se/betygskriterier.

The examiner has the right to offer alternative examination arrangements to students who have been granted the right to special support by Mid Sweden University's disabilities adviser.

Grading system

Seven-grade scale, A, B, C, D, E, Fx and F. Fx and F represent fail levels.

Course reading

Reference literature

Author:	Holger Karl, Andreas Willig
Title:	Protocols and Architectures for Wireless Sensor Networks
Edition:	1st
Publisher:	Wiley

Author:	Jean-Philippe Vasseur, Adam Dunkels
Title:	Interconnecting Smart Objects with IP
Edition:	1st
Publisher:	Morgan Kaufmann

Author:	Waltenegus Dargie, Christian Poellabauer
Title:	Fundamentals of Wireless Sensor Networks: Theory and Practice
Edition:	1st
Publisher:	Wiley