

**ELECTRONIC SYSTEMS ENGINEERING (ESE)**

**ENEL 890AN**

**Wireless Sensor Networks: Architectures and Protocols**

**Fall 2018**

**Course Description**

This course covers the following topics: Introduction to WSNs, applications and challenges. WSNs scenarios, energy efficiency, reliability and scalability. WSNs design principles, service interfaces and gateways. WSNs physical layer, MAC protocols, link layer protocols. Addressing in WSNs. WSNs synchronization. WSNs positioning and topology control. WSNs routing protocols, transport layer protocols and QoS.

**Course Objectives**

In this course students will appreciate and build a foundation and an understanding of WSNs, applications and challenges. Understand different WSNs architectures and protocols. WSNs scenarios, energy efficiency, reliability and scalability issues.

**Instructor:** Irfan Al-Anbagi, Ph.D., P.Eng., SMIEEE

**Office:** ED 478

**Phone:** 585-4703

**Email:** Irfan.Al-Anbagi@uregina.ca

**Office hours:** by appointment

**Lectures location and times**

M, W: 1:30 pm – 2:45 pm (ED61)

**Syllabus**

During this course the following topics are covered:

- 1. Introduction to WSNs**
- 2. Single-node and network architecture.**
- 3. WSNs physical layer**
- 4. MAC and link layer protocols**
- 5. Naming and addressing**
- 6. WSNs synchronization**
- 7. WSNs localization and positioning**
- 8. Routing protocols**
- 9. Content-based networking**
- 10. Quality of service and reliability**

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**Learning Resources**

There is no specific textbook in this course.

Lecture will be based on different chapters from:

1. **Author:** H. Karl and A. Willig  
**Title:** Protocols and Architectures for Wireless Sensor Networks  
**Publisher and year:** Wiley, 2007  
**ISBN:** 13 978-0-470-09510-2 (HB)
2. **Author:** W. Dargie and C. Poellabauer  
**Title:** Fundamentals of Wireless Sensor Networks  
**Publisher and year:** Wiley, 2010  
**ISBN:** 978-0-470-99765-9 (H/B)

**A WSN simulation tool is needed to solve some assignments and produce the project results.**

A few options are available:

- **NS2**
- **NS3**
- **OMNET++**

Riverbed modeler can also be used to obtain limited WSNs results.

MATLAB will be needed to solve some assignment questions

**Mark Distribution:**

- Class assignments = 10%
- Midterm test: 20%
- Project + Paper: 30%
- Final Exam: 40%

**Dates of class tests:**

Project and paper: submission: Monday, December 03 2018.

Midterm: Third week of October, 2018.

Final Exam: December 10 2018.

**Important Notes:**

- The paper must be completed and passed to receive a passing grade in this course.
- You must pass the exam portion of the course and you must pass the paper to receive a passing grade in the course.

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- If you do not pass the exam portion of the course and/or do not pass the design project, you will receive a grade of NP.
- Late submissions of class assignments will receive a mark of 0%.
  - All class assignments are due in hard copy at the beginning of the lecture period.

**Special Needs Students:**

If there is any student in the course who, because of a disability, may have a need for accommodations, please come and discuss it with me, as well as contact the Centre for Student Accessibility at 585-4631.