

## Master MEE+MEM

Course		Course Acronym
Wireless Sensor/Actuator Networks		WSAN
Responsible	Faculty	
Prof. Dr. Martin Schubert	Elektro- und Informationstechnik	
Lecturer	Offer Frequency	
Prof. Dr. Martin Schubert	Every semester	
Teaching Methode		
50% seminar teaching and 50% practical training		

Semester according to Curriculum	Teaching Scope (SWS or UE)	Lehrsprache (Teaching Language)	Arbeitsaufwand (ECTS-Credits)
2. oder 3.	4 SWS	Deutsch, English on demand, Documents English	5

Campus Program	Self-Study
56 h	Preparation and review: 62 h, Exam preparation: 32 h

Study and Examination Conditions
see Studienplantabelle
Approved Aids for Exam
see Studienplantabelle

Contents
<p><b>Theory:</b></p> <ol style="list-style-type: none"> <li>1. Transmission Fundamentals</li> <li>2. Physical Level</li> <li>3. Data Link Level</li> <li>4. Network Level</li> <li>5. Transport Level</li> <li>6. Current Topics (guest lecturer)</li> </ol> <p><b>Practical:</b></p> <ol style="list-style-type: none"> <li>a) Get familiar with the microcontroller part.</li> <li>b) Getting started with the wireless part</li> <li>c) Student projects concerning wireless transmission.</li> </ol>

## Knowledge/Skills/competences

### **Knowledge:**

The knowledge required to implement the competences listed below.

### **Skills:**

The skills required to implement the competences listed below.

### **Competences:**

#### 1. Fundamentals

- Theory
  - + ISO Layer Model
  - + Most important IEEE standards
- Practical: basic C language needs

#### 2. Physical Level

- Theory
  - + ISM frequency bands,
  - + Wireless physics (FSPL, ERP vs. range, Fresnel zone)
- Practical: Getting started with programming the hardware

#### 3. Data Link Level

- MRFI data type packet\_t
- MRFI transmission matrix data
- MRFI C commands for basic wireless data transmission

#### 4. Network Level

- MRFI basic network components: access point, end device, range extender
- Optimizing battery power

#### 5. Transport Level

- Routing strategies

## Offered Teaching Materials

Script and instructions for practical training

## Teaching Media

Blackboard and beamer, electronics laboratory with experimental setups

## References

- [1] Thomas Watteyne, eZWSN – Exploring Wireless Sensor Networking, available: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.468.2103&rep=rep1&type=pdf>
- [2] Robert Faludi: Building Wireless Sensor Networks, O'Reilly Media, 2010
- [3] F. Zhao, L.J. Guibas: Wireless Sensor Networks, Morgan Kaufmann, 2004
- [4] Chiara Buratti: An Overview on Wireless Sensor Networks, OPEN ACCESS

## Further Information About the Course (optional)

Documents English, teaching language is German or English depending on students.