

## Content

| Course Code | Course Name                         | Semester | Theory | Practice | Lab | Credit | ECTS |
|-------------|-------------------------------------|----------|--------|----------|-----|--------|------|
| ISI 542     | Internet of Things and Industry 4.0 | 1        | 3      | 0        | 0   | 3      | 6    |

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| Prerequisites          |  |
| Admission Requirements |  |

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| Language of Instruction | English  |
| Course Type             | Elective   |
| Course Level            | Masters Degree   |
| Objective               | <ul style="list-style-type: none"> <li>• Presents the basic principles of "Wireless Communication" from an academic and engineering perspective.</li> <li>• It conceptually and analytically reveals the differences and similarities between the Internet of Things and its predecessor technologies (WSN, M2M, CPS).</li> <li>• It aims to convey Internet of Things design principles from an application perspective.</li> <li>• It conveys the engineering trade-offs behind the approaches that provide the Internet of Things technological infrastructure.</li> <li>• It provides the necessary opportunities for students to internalize the concepts and experimental methods presented in the course through multi-stage projects and assignments.</li> </ul>   |
| Content                 | <p>Week 1: Introduction to the concept of Internet of Things. Possible application areas. Understanding domain-specific requirements and design criteria.</p> <p>Week 2: Comparison of Internet of Things and traditional networks: Energy awareness and application addition</p> <p>Week 3: Node Features: node hardware, Operating systems, detection modes</p> <p>Week 4: Self-structuring, topology control and repositioning</p> <p>Week 5: Network architecture design for the Internet of Things</p> <p>Week 6: Common access layer in Internet of Things systems, Routing approaches</p> <p>Week 7: Node management framework approaches</p> <p>Week 8: Midterm</p> <p>Week 9: Positioning and Time coordination techniques</p> <p>Week 10: Standards and open source software in the Internet of Things</p> <p>Week 11: Performance evaluation of IoT-based systems through simulation experiments</p> <p>Week 12: Industrial case study</p> <p>Week 13: Advanced topics: E-health applications</p> <p>Week 14: Advanced topics: Industry 4.0</p> |

|            |   |
|------------|---|
| References | <ul style="list-style-type: none"> <li>- Course Notes</li> <li>-BAHGA, Arshdeep; MADISETTI, Vijay. Internet of Things: A hands-on approach. Vpt, 2014. (Auxiliary Resource)</li> <li>- Dargie, W., Poellabauer, C. "Fundamentals of Wireless Sensor Networks: Theory and Practice (Wireless Communications and Mobile Computing)", 1/e, Wiley, 2010 (Auxiliary Resource)</li> </ul> |
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### Theory Topics

| Week | Weekly Contents  |
|------|--|
| 1    | Introduction to the concept of Internet of Things. Possible application areas. Understanding domain-specific requirements and design criteria. |
| 2    | Comparison of Internet of Things and traditional networks: Energy awareness and application addiction  |
| 3    | Node Features: node hardware, Operating systems, detection modes   |
| 4    | Self-structuring, topology control and repositioning   |
| 5    | Network architecture design for the Internet of Things   |
| 6    | Multiple access layer in Internet of Things systems, Routing approaches  |
| 7    | Node management framework approaches   |
| 8    | Midterm  |
| 9    | Positioning and Time coordination techniques   |
| 10   | Standards and open source software in the Internet of Things   |
| 11   | Performance evaluation of IoT-based systems through simulation experiments   |
| 12   | Industrial case study  |
| 13   | Advanced topics: E-health applications   |
| 14   | Advanced topics: Industry 4.0  |