**Module Title:** Wireless Networks and Communications  
**Code:** EE5C2

<table>
<thead>
<tr>
<th>Level:</th>
<th>Year 5 of the MAI</th>
<th>Credits:</th>
<th>5</th>
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<tbody>
<tr>
<td>Lecturers:</td>
<td>Prof Luiz DaSilva / Dr Johann M. Marquez-Barja</td>
<td>Prerequisites:</td>
<td>EE4C4</td>
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<tr>
<th>Terms:</th>
<th>Semester 2</th>
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<tbody>
<tr>
<td>Duration (weeks):</td>
<td>11</td>
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<tr>
<td>Lectures/week:</td>
<td>2</td>
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<tr>
<td>Labs/week:</td>
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<tr>
<td>Total:</td>
<td>22</td>
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<td>Total:</td>
<td>22</td>
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**Aims/Objectives**
The objective of this module is to provide students with practical hands-on experience with networking and wireless communications experimentation. The practical work supports the theoretical concepts taught through the lectures. Students will be able to take the concepts they have studied theoretically and extend and develop these through implementation and experiments with wireless communications and networks, including software defined radio, wireless local area networks, and network protocols.

**Syllabus**
The centre-of-gravity of this module will be the practical element. This component allows students to carry out hands-on work in network experimentation frameworks and to carry out some basic experiments. The experiments will extend communications concepts that they have been exposed to in previous modules such as 3C5 and 4C4.

Some of the wireless networking concepts covered by the course, though lectures and/or experiments, include:

- End-to-end communications protocols at the transport (UDP, TCP) and application layers.
- The IEEE 802.11 standard, in infrastructure and ad-hoc operation mode.
- Mesh networks as a backbone for sensor networks.
- Reconfigurable, software-defined radio.
- Experimentation using the Universal Software Radio Peripheral (USRP).
- Multi-carrier modulation.

**Recommended Text(s)**
- Google scholar and IEEE Xplore are essential resources for the research papers students will access over the duration of the module. The library also has paper versions of many relevant journals.
**LEARNING OUTCOMES**

At the end of the module, students will be able to
1. Take networking ideas from concept to experimentation.
2. Use internationally available testbeds to test new ideas and protocols.
3. Build basic software radios.
4. Understand key advances in experimental research on wireless communications and networks.

**TEACHING STRATEGIES**

The centre-of-gravity of the module are the lab sessions. Students will be encouraged to develop their own ideas as well as follow specific examples.

**ASSESSMENT MODE(S)**

Final marks for 5C2 will be 100% based on continuous assessment. Continuous assessment for this module includes weekly quizzes that students take individually, as well as laboratory reports to be produced for each of the experimental activities in the module.