IMPERIAL

# Module Specification

## Basic details

| | | | |
|---|---|---|---|
| UID | | Cohorts covered (Earliest cohort) | 2025 |
| Long title | Sensor Systems and Networks | | |
| New code | ELEC70131 | New short title | |

Brief description of module *(approx. 600 chars.)*

Sensors provide the essential interface between the physical and the electronic domains, transducing a wide variety of signals to provide information about our surroundings. This module covers how sensors systems can be designed to provide the information required, with a separate module covering the physical operation of sensors themselves.

This module will provide an insight into how sensor systems are implemented and deployed to best provide information about the physical world. Building up from the individual sensors, we will consider how best to locate the sensors, whether static or mobile, provide the communication to convey the signals, supply the power for both the operation and communication, and combine the signals to enhance the information available.

Available as a standalone module/ short course? N

## Statutory details

| | ECTS | CATS | Non-credit | |
|---|---|---|---|---|
| Credit value | 5 | 10 | N | HECOS codes |
| FHEQ level | Level 7 | | | |

## Allocation of study hours

| | Hours | |
|---|---|---|
| Lectures | 20 | |
| Group teaching | 0 | *Incl. seminars, tutorials, problem classes.* |
| Lab/ practical | 0 | |
| Other scheduled | 0 | *Incl. project supervision, fieldwork, external visits.* |
| Independent study | 105 | *Incl. wider reading/ practice, follow-up work, completion of assess* |
| Placement | 0 | *Incl. work-based learning and study that occurs overseas.* |
| Total hours | 125 | |
| ECTS ratio | 25.00 | |

## Project/placement activity

Is placement activity allowed? No

## Module delivery

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|---|---|---|---|
| Delivery mode | Taught/ Campus | Other | |
| Delivery term | Term 2 | Other | |

## Ownership

Primary department: Electrical Engineering

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| Additional teaching departments | |
| | |
| | |
| Delivery campus | South Kensington |

## Collaborative delivery

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|---|---|
| Collaborative delivery? | N |

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|---|---|
| External institution | N/A |
| External department | N/A |
| External campus | N/A |

## Associated staff

| Role | CID | Given name | Surname |
|---|---|---|---|
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| Module Leader | | Tom | Pike |
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## Learning and teaching

### Module description

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| Learning outcomes | On successfully completing this module, you will be able to:<br>-Describe and appraise operation principles and components of sensor systems and networks<br>-Formulate requirements on sensor systems and networks<br>-Design and characterise sensor systems and networks for specific applications<br>-Critically analyse the performance of sensor systems and networks in view of design constraints |
| Module content | Introduction to sensor systems and networks<br>MAC Layer, Internet of Things, Mobile Infrastructure Communication and Opportunistic Networking<br>Sensor Systems data transfer, wireless and hardwire protocols<br>Sensor data processing, including AI/ML approaches<br>Mobile Sensing<br>Reliability and Privacy in Sensor Systems.<br>Localization and Navigation<br>Sensor delivery systems |
| Pattern of learning and teaching | 2 hours of lectures weekly |
| Learning and Teaching Approach | Taught material will be introduced in traditional-style face-to-face lectures (20 hrs).<br>These will be supported by reading assigned before the lectures and online quizzes run during the lectures. |
| Assessment Strategy | This module is assessed by a 3-hour open book written exam.<br>Quizzes set up before and during lectures will serve as formative assessment. |
| Feedback | Informal feedback during lectures can be obtained by participating in lecture quizzes, and question-and-answer sessions.<br>Solutions to the exam questions will be released after the paper has been marked; these will comment on typical mistakes and problems. |
| Reading list | Agrawal, D. P., & Zeng, Q. A. (2015). Introduction to wireless and mobile systems. Cengage learning.<br>Schiller, J. H. (2003). Mobile communications. Pearson education. |

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|---|---|
| Required equipment/ software | |

## Quality assurance

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| Date of first approval | |
| Date of last revision | |
| Date of this approval | |
| Module leader | Tom Pike |
| Notes/ comments | |

## Office use only

| | |
|---|---|
| QA Lead | |
| Department staff | |
| Date of collection | |
| Date exported | |
| Date imported | |

Template version

## Assessment details

| Grading method | Numeric | Pass mark | 50% |
|---|---|---|---|

## Assessments

| Assessment type | Assessment description | Weighting | Pass mark | Must pass? |
|---|---|---|---|---|
| Examination | 3 hrs written open book exam | 100% | 50% | N |
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