1. **Title of the module**

EENG8720 (EL872) – 5G Mobile Communications

1. **School or partner institution which will be responsible for management of the module**

Engineering and Digital Arts

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 7

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Spring

1. **Prerequisite and co-requisite modules**

EENG8270 Advanced Digital Communications

1. **The programmes of study to which the module contributes**

MSc/PGDip in Advanced Communications Engineering

MEng Electronic and Communications Engineering (option)

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**

8.1 Understand the key theoretical concepts and protocols involved in the operation of broadband wireless communications.

8.2 Understand the key theoretical concepts of advanced technologies and architectures towards fifth generation (5G) wireless communications.

8.3 Be able to research and make realistic assessments of current technology trends.

8.4 Be able to research and make realistic assessments of potential technologies for 5G wireless technologies.

These outcomes are related to the programme learning outcomes in the appropriate curriculum maps as follows:

A3, A4

1. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**

9.1 Use mathematical models and scientific principles and have the ability to integrate information and data that contribute to the Intellectual Skills. (B1, B2, B6)

9.2 Use mathematical techniques to solve hardware/software problems, and demonstrate ability in searching for information, applying the information, preparing technical reports and presentations, and contributing to generic programme learning outcomes in the category of Professional Practical Skills. (C1, C4, C6)

9.3 Effectively use ICT, and develop interpersonal skills and core key skills, such as learning effectively, critical thinking and time management, to contribute to the Transferable/Key Skills in the generic learning outcomes for the MSc and PDip programmes. (D2, D3, D5 – D7)

9.4 Present solutions to their fellow students contributing to the effective communication learning outcome. (D4)

1. **A synopsis of the curriculum**

Overview of wireless communications; wireless channel models; capacity of wireless channels; cellular and cell-free concept; handoff; adjacent cell interference; adaptive modulation; diversity; (massive) MIMO and beamforming technologies, CDMA and OFDMA; radio resource allocation; machine learning and mobile edge computing technologies; fourth generation (4G) LTE, and fifth generation (5G) mobile communication systems;

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

Recommended Reading:

* Wireless Communications, A. Goldsmith, Cambridge Press, 2006
* Latest research results

Background Reading:

1. **Learning and teaching methods**

Total contact hours: 29

Private study hours: 121

Total study hours: 150

1. **Assessment methods**
   1. Main assessment methods

Presentation (10%)

Assignment (15%)

Examination (75%)

13.2 Reassessment methods

Like-for-like

1. ***Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 9.1 | 9.2 | 9.3 | 9.4 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |
| **Private Study** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| *Lectures* | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |
| *Example classes* | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |
| *Colloquia* |  |  | **X** | **X** |  | **X** | **X** |  |
| *Case-study presentation* |  |  | **X** | **X** |  |  |  |  |
| **Assessment method** |  |  |  |  |  |  |  |  |
| *Case Study & Presentation* |  |  | **X** | **X** |  | **X** | **X** | **X** |
| *Essay (<1000words)* |  |  | **X** | **X** |  | **X** | **X** | **X** |
| *Examination* | **X** | **X** |  |  | **X** | **X** |  | **X** |

1. **Inclusive module design**

The School/Collaborative Partner *(delete as applicable)* recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

Consideration is made in the design aspects of this module to include international variations in system requirements. For instance, the differing frequency bands used in different legislative regimes.

**FACULTIES SUPPORT OFFICE USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 26/11/2019 | Minor | January 2021 | 1, 7, 8, 10 |  |
|  |  |  |  |  |