1. KentVision Code and title of the module

 EENG6770 Electronics for Communications

## Division and School/Department or partner institution which will be responsible for management of the module

Computing, Engineering and Mathematical Sciences

## The level of the module (Level 4, Level 5, Level 6 or Level 7)

Level 6

## The number of credits and the ECTS value which the module represents

15 credits (7.5 ECTS)

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

Autumn

## Prerequisite and co-requisite modules and/or any module restrictions

## The course(s) of study to which the module contributes

BEng/MEng in Electronic and Computer Engineering

BEng/MEng in Electronic and Computer Engineering with a Year in Industry

BEng in Biomedical Engineering

BEng in Biomedical Engineering with a Year in Industry

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

1. Demonstrate knowledge and critical understanding of the structures that guide pulsed, RF and microwave signals, and EM propagation.

2. Demonstrate knowledge and critical understanding of the basic RF circuit design, matching, RF amplifiers, antennas and the circuits involved in the process of high frequency signal transmission.

3. Demonstrate an understanding of information theory, error coding and its application in modern communication systems.

4. Demonstrate an understanding of the principles of optical communication systems and their performance.

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

1. manage their own learning, and make use of ICT

2. apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding.

## A synopsis of the curriculum

Principles of microwave communication technologies and how signals are transmitted via transmission lines. Introduction to microwave circuits used in modern communication systems and the Internet of Things (IoT).

Information theory and Shannon capacity, information measure and mutual information, source coding and channel coding/decoding, multiuser communications.

Optical communication systems. Propagation in optical fibres. Sources (LEDs, laser), modulation. Photodiodes, receivers. Optical components. System power budgets, noise and dispersion.

## Reading list

## The University is committed to ensuring that core reading materials are in accessible electronic format in line with the Kent Inclusive Practices.

## The most up to date reading list for each module can be found on the university's [reading list pages](https://kent.rl.talis.com/index.html).

 Recommended Reading

## Pozar D., Microwave Engineering 4th Edition (2012), Wiley.

## Ludwig, R. and Bretchko, P., RF Circuit Design, 2nd Edition (2008), Prentice Hall.

## Collier R., Transmission Lines, (2014), Cambridge.

## Introduction to Antenna Analysis Using EM Simulators, Kigure and Rautio, Pub: Artech House, 2011

## Fundamentals in Information Theory and Coding by Borda, Monica

## Error Control Coding: Fundamental and Applications by Shu Lin and Daniel J. Costello.

## Optical Fiber Communications: Principles and Practice, Senior et al., Pearson

## Optical Fiber Communications G.Keiser McGraw-Hill 4th Edition (2010)

## Contact Hours

Private Study: 110

Contact Hours: 40

Total: 150

## Assessment methods

* 1. Main assessment methods

• Transmission lines and RF propagation (4%)

• RF Simulation workshops, 2 assignments (28%)

• Optical Communications Systems (4%)

• Information Theory & Coding (4%)

• Exam 2 hours (60%)

13.2 Reassessment methods

Reassessment instrument: like-for-like

## Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section 12) and methods of assessment (section 13)

**Module learning outcomes against learning and teaching methods:**

| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 9.1 | 9.2 |
| --- | --- | --- | --- | --- | --- | --- |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** |
| Lectures  | **x** | **x** | **x** | **x** |  |  |
| Example classes  | **x** | **x** | **x** | **x** |  | **x** |
| Workshops | **x** | **x** |  |  | **x** | **x** |

**Module learning outcomes against assessment methods:**

| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 9.1 | 9.2 |
| --- | --- | --- | --- | --- | --- | --- |
|  Information Theory and Coding examples class assignment |  |  | **x** |  | **x** | **x** |
|  Optical Communication System assignment |  |  |  | **x** | **x** | **x** |
|  Transmission lines and RF propagation assignment | **x** | **x** |  |  | **x** | **x** |
| RF workshop assignments | **x** | **x** |  |  | **x** | **x** |
| Exam | **x** |  | **x** | **x** |  | **x** |

## Inclusive module design

The Division/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

## Campus(es) or centre(s) where module will be delivered

Canterbury

## Internationalisation

Engineering is an international discipline with techniques developed and refined by scientists across the globe. Mastery of the subject-specific learning outcomes, will equip students to apply the theories and techniques of this module in a wide range of international contexts. International standards for communications/telecommunications are covered. The module team includes many members of staff with international experience of teaching and research collaboration. In compiling the reading list, consideration has been given to the range of texts that are available internationally and a selection of texts has been identified to complement the delivery of the material. The support provided to the students is also internationally attuned given our international student body.

**DIVISIONAL USE ONLY**

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

| Date approved | New/Major/minor revision | Start date of delivery of (revised) version | Section revised(if applicable) | Impacts PLOs (Q6&7 cover sheet) |
| --- | --- | --- | --- | --- |
| 15/10/2020 | Minor | Sept 2023 | 1,5,6,7,8,10,11,12,13,14,17 | No |
|  |  |  |  |  |