1. **Title of the module**

EENG5660 (EL566) Microwave Circuits and Electromagnetic Waves

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 5

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)**

Autumn and Spring

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

Pre-requisites:

EL318 Engineering Mathematics

EL319 Engineering Analysis

EL303 Electronic Circuits

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

BEng Electronic and Communications Engineering

BEng Electronic and Communications Engineering with a Year in Industry

MEng in Electronic and Communications Engineering

MEng in Electronic and Communications Engineering with a Year in Industry

1. **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.

2. demonstrate knowledge and critical understanding of EM wave behaviour in free space and at dielectric boundaries.

3. demonstrate knowledge and critical understanding of EM guiding structures, both metallic and dielectric.

4. demonstrate knowledge and critical understanding of the basic design, matching and stability of RF amplifiers and of the circuits involved in the process of high frequency signal transmission.

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

1. learn effectively,

2. think critically

3. manage their time and resources

1. **A synopsis of the curriculum**

This module provides students with a general knowledge of the principles of microwave communication technologies and how signals are transmitted via transmission lines. The module builds on this knowledge by introducing you to some of the microwave circuits used in modern communication systems.

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

* 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.

1. **Learning and teaching methods**

Total contact hours: 39

Private study hours: 111

Total study hours: 150

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

* Example class assignments, 4 at one hour each (10%)
* Workshops assignments, 5 at two hours each (30%)
* Exam 2 hours (60%)

In order to obtain credit for this module on IET accredited programmes, the coursework mark and the exam mark must each be greater than or equal to 30% as well as achieving the pass mark for the module.   This module will only be considered for compensation if the coursework mark and exam mark are each greater than 30%.

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 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Lectures | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Workshops |  |  |  | **x** |  | **x** | **x** |
| Example classes | **x** | **x** | **x** | **x** |  | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |
| Exam | **x** | **x** | **x** |  | **x** | **x** |  |
| Example classes and assignments | **x** | **x** | **x** |  |  | **x** |  |
| Workshop design tasks |  |  |  | **x** |  |  | **x** |

1. **Inclusive module design**

The School 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**

Microwave engineering underpins much international high data rate communications. The principals introduced in this module are globally applicable and are taken from internationally recognized textbooks. Meeting the learning outcomes will provide students with knowledge of internationally recognized technologies and design procedures as well as practice in globally adopted engineering report writing structure.

**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 the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 01/03/19 | Major | September 2019 | 13 | no |
|  |  |  |  |  |

Revised FSO Jan 2018