1. **Title of the module**

EENG5670 (EL567) Electronic and RF Circuit Design

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 or Spring

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

EL303 Electronic Circuits

EL305 Introduction to Electronics

EL318 Engineering Mathematics

EL319 Engineering Analysis

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 practical skills to analyse and design electronic circuits using basic techniques and more advanced methods (i.e. Laplace transform and CAD software);

 2. Show an understanding of the theory and acquiring design skills in filters and matching circuits and the ability to design practical filters and measure the response.

 3. Demonstrate knowledge about the operation and design principles of RF communication circuits (namely oscillators, mixers and modulation/demodulation circuits)

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 builds on the knowledge of the circuit theory and electronic circuits learned in the first year and introduces more advanced analytical and computer-aided techniques of circuit analysis and design in both frequency- and time-domain as well as at very high frequencies (RF and microwaves). It uses these techniques to teach the operation and design principles of various advanced analogue electronic circuits (e.g. filters and oscillators). RF and microwave circuits and technology are also introduced, together with necessary analysis and design skills. Computer simulation and design software is used extensively to gain better understanding of the circuits. Practical experiments in the lab sessions are used so as to help students gain some practical skills in filter designs.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**
* Ludwig, Reinhold, and Gene Bogdanov. 2009. RF Circuit Design: Theory and Applications. Upper Saddle River, N.J.: Pearson/Prentice Hall.
* Nilsson, James William, and Susan A. Riedel. Electric Circuits. London: Prentice Hall.Schaumann, Rolf, and M. E Van Valkenburg. 2010. Design of Analog Filters. Vol. The Oxford series in electrical and computer engineering. Oxford: Oxford University Press.
1. **Learning and teaching methods**

Total Contact Hours: 62

Independent Study Hours: 88

Total Study Hours: 150

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

Exam, 3 hours (60%)

Filter design laboratory (20%)

10 Computer aided design workshops (2% each)

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 | 9.1 | 9.2 | 9.3 |
| **Learning/ teaching method** |  |  |  |  |  |  |
| Lectures  | **x** |  |  |  |  |  |
| Experimental work | **x** | **x** |  | **x** | **x** | **x** |
| CAD workshops  |  |  |  | **x** | **x** | **x** |
| Example classes |  |  | **x** |  |  |  |
| Private study  | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |
| Exam  | **x** | **x** | **x** |  |  |  |
| Filter design laboratory  |  | **x** |  | **x** | **x** | **x** |
| CAD workshops  | **x** |  |  | **x** | **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**

RF circuit engineering underpins many communication system adopted worldwide. 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. CAD tools and design procedures are internationally recognised.

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**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) |
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Revised FSO Feb 2018