1. **Title of the module**

EENG5690 (EL569) Signals and Systems

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-requisite:

EL318 Engineering Mathematics

EL319 Engineering Analysis

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

BEng Computer Systems Engineering

BEng Computer Systems Engineering with a Year in Industry

BEng Electronic and Communications Engineering

BEng Electronic and Communications Engineering with a Year in Industry

BEng Biomedical Engineering

BEng Biomedical Engineering with a Year in Industry

MEng in Computer Systems Engineering

MEng in Computer Systems Engineering with a Year in Industry

MEng Electronic and Communications Engineering

MEng 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 the basic techniques used to describe continuous and discrete time signals and systems;

2. demonstrate familiarity with time and frequency domain representation and description of signals and systems;

3. demonstrate an understanding of basic transform techniques used to convert between time and frequency domain descriptions of signals and systems;

4. demonstrate the application of Fourier and Laplace Transform techniques for analysing the behaviour of signals and systems;

5. demonstrate an ability to use MATLAB as a tool for analysing the behaviour of continuous time signals and systems;

6. demonstrate an understanding of Control and Feedback;

7. demonstrate an understanding of Proportional, Integral and Differential (PID) controller architectures;

8. demonstrate an appreciation of the importance of Control in real-life and robotic applications.

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

1. use ICT,

2. learn effectively

3. apply critical thinking

4. manage their time effectively

1. **A synopsis of the curriculum**

This module introduces basic concepts and techniques for describing and analysing continuous and discrete time signals and systems. It also introduces the fundamentals of feedback control systems, covering techniques for the analysis and design of such systems.

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

Core Text

* MCCLELLAN, James H., SCHAFER, Ronald W. and YODER, M. A., (2015). DSP First (second edition) . Pearson
* NISE, Norman S. (2015) Control Systems Engineering (7th edition), J.Wiley

Recommended Reading

* LATHI, B. P., and GREEN, R. (2017). Linear systems and signals. Oxford University Press.
* DORF, Richard C., BISHOP, Robert H., Modern Control Systems (Edition 13), 2016, Pearson Education.

1. **Learning and teaching methods**

Total contact hours: 45

Private study hours: 105

Total study hours: 150

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

* 2 Problems (8%,12%)
* 2 MATLAB workshops (8%, 12%)
* Exam 3 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

Reassessment instrument: 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 | 8.5 | 8.6 | 8.7 | 8.8 | 9.1 | 9.2 | 9.3 | 9.4 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |  |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Lectures | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |  |
| MATLAB workshops | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Example classes |  |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |  |
| Example classes | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| MATLAB workshops | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Exam | **x** | **x** | **x** | **x** |  | **x** | **x** | **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**

The module uses international units (SI) and notations throughout. It also is based on the use of the internationally recognised and adopted software MATLAB.

**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) |
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|  |  |  |  |  |

Revised FSO Jan 2018