1. **Title of the module**

EENG5170 (EL517) Control and Mechatronics

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

Computing, Engineering and Mathematical Sciences

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)**

Terms 1 and 2

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

None

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

BEng Mechanical Engineering with a foundation year

BEng Mechanical Engineering

BEng Mechanical Engineering with a year in industry

BEng Electronic and Computer Engineering with a foundation year

BEng/MEng Electronic and Computer Engineering

BEng/MEng Electronic and Computer Engineering with a year in industry BEng Biomedical Engineering with a foundation year

BEng Biomedical Engineering

BEng Biomedical Engineering with a year in industry

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**
   1. Understand the classical feedback control methods adopted for design and analysis of engineering systems;
   2. Design and analyse feedback control systems using a range of techniques;
   3. Use effectively the specifications of mechatronic components and systems, including sensors, actuators, controllers and microprocessors;
   4. Undertake the design, analysis and performance of a mechatronic system.
2. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**
   * 1. Generate, analyse, present and interpret data
     2. Communicate effectively using a vareity of methods
     3. Think critically
     4. Manage their time and resources within a task.
3. **A synopsis of the curriculum**

**Control:** Control fundamentals and modelling: Modelling of engineering processes, Laplace transfer, system description in frequency domain and time domain. Feedback control design with feedback and PID control: Digital - control: Implications of digital implementation and controller emulation methods.

**Mechatronics:** Sensors and transducers for mechatronic systems; Actuation: pneumatic and hydraulic actuators, mechanical actuators, electronical actuators; Microprocessors: Microprocessor systems, microcontrollers.

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

* Control Systems Engineering – By: Norman S. Nise; John Wiley & Sons; 7th Edition 2013.
* Feedback Control of Dynamic Systems – By: Gene Franklin, J. David Powell, Abbas Emami-Naeini; Pearson; 2014.
* Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering – By: W. Bolton; Pearson; 5th Edition 2011.
* Mechatronics: Electronics in Products and Processes – By: David Allan Bradley; CRC Press, 1993.

1. **Learning and teaching methods**

Contact hours 34

Private study hours: 116

Total study hours: 150

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

Exam, 2 hours (50%)

5 x Homeworks (each 1-2 pages at 5%) (25%) Practical lab-based project & presentation [ 5 page lab report and 10 min presentation (25%)]

* 1. 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** | **x** |
| Example classes | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Labs |  | **x** |  | **x** | **x** | **x** |  | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |
| Exam | **x** | **x** | **x** |  | **x** | **x** | **x** | **x** |
| Homeworks | **x** |  | **x** |  | **x** | **x** | **x** | **x** |
| Project report & Presentation |  | **x** |  | **x** | **x** | **x** | **x** | **x** |

1. **Inclusive module design**

The Division 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**

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.Internationally recognised books and research articles are used as reading material for this course.

The module will use internationally developed theories and technologies for control and mechatronics of mechanical and electrical systems. 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 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.**

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 15/10/2020 | Major | Sept 2021 | 1, 6, 7, 8, 10, 11, 13, 17 | Yes |
|  |  |  |  |  |