1. **Title of the module**

EENG6830 (EL683) Reliability, Availability, Maintainability and Safety (RAMS)

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 6

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**

None

1. **The course(s) of study to which the module contributes**

BEng Mechanical Engineering

BEng Mechanical Engineering with a year in industry

BEng/MEng Electronic and Computer Engineering

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

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. identify and analyse the concepts of reliability, availability, maintainability and safety (RAMS) in engineering problems;
   2. apply appropriate techniques and tools to evaluate and improve the RAMS in engineering systems;
   3. analyse and interpret failure/degradation data, detect faults and predict failures, and develop maintenance solutions to prevent the faults.
   4. Identify quality, safety and compatibility standards in different engineering disciplines and develop a safety case.
2. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**
   1. critically evaluate data (that may be incomplete), to make judgements and to achieve a solution
   2. communicate more effectively using a variety of methods
   3. apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding,
   4. manage their own learning,
3. **A synopsis of the curriculum**

Introduction to concepts of reliability, availability, maintainability and safety (RAMS) in engineering problems; RAMS requirements, techniques, risks, safety assessments, and Health and Safety examples.

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

* System Reliability Theory: Models, Statistical Methods, and Applications. Marvin Rausand, Arnljot Høyland, John Wiley & Sons, 2003.
* Reliability, Availability, Maintainability and Safety Assessment. Volume 1, Methods and Techniques. Alain Villemeur, 1992.
* Reliability, Maintainability and Risk. David Smith, Butterworth-Heinemann 2011.

1. **Learning and teaching methods**

Total contact hours: 34

Private study hours: 116

Total study hours: 150

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

Exam (2 hours)50%

5 x Homework, each 1-2 pages, each 5% (25%)

Group coursework (25%) [10 pages, group report]

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* | *9.4* | *9.5* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |
| **Private Study** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| lectures | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Example classes | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Labs | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| Homeworks |  | **x** |  | **x** | **x** | **x** | **x** | **x** |  |
| Group coursework | **x** |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| exam | **x** | **x** | **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. This course covers topics on international safety regulations and the European RAMS engineering authorities. 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. The technical methods including formula, terms and notations used to analyse and design are internationally recognised. The module team includes 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.

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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.**

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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) |
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