1. **Title of the module**

EENG5200 (EL520) Failure of Materials and Structures

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)**

Term 2

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

EL323 Engineering Design and Mechanics

EL324 Fundamentals of Materials and Mechanics

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

1. **The intended subject specific learning outcomes.**  
   **On successfully completing the module students will have knowledge and understanding of:**
2. The mechanisms of failure of different materials;
3. The performance of components and structures subjected to mechanical stresses and environmental effects;
4. The mechanics of failure in engineering components and structures;
5. Appropriate testing approaches to evaluate materials' service performance;
6. How failure of materials informs future design and manufacturing;
7. **The intended generic learning outcomes.**  
   **On successfully completing the module students will be able to:**
   1. Generate, analyse, present and interpret data
   2. Communicate more effectively using a variety of methods
   3. Undertake critical analysis, and propose solutions;
   4. Manage their time and resources within a task.
8. **A synopsis of the curriculum**

Fundamental mechanical properties of materials and composites; Micro-mechanisms of failure in materials;

Fracture and fracture mechanics;

Failure of materials and structures;

Performance of components and structures subjected to environmental effects;

Methods of inspecting and preventing failures in materials and structures.

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

The Theory of Materials Failure, R. M. Christensen, Oxford, 2013.

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 (70%)

Homework, 2500 words (15%)  
Presentation on Lab task, 15 minutes (15%)

* 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* | *8.5* | *9.1* | *9.2* | *9.3* | *9.4* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |
| **Private Study** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| *Labs* | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| *Example classes* | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| *Lectures* | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| *Presentation on Lab task* |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| *Homework* | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| *Examination* | **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. 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 are used as reading material for this course.

The module will use internationally developed and recognised notations and mathematical theories of materials and engineering structures. 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 | Minor | Sept 2021/22 | 1, 6, 8, 9, 10, 13, 14. 17 | No |
|  |  |  |  |  |