1. **Title of the module**

EENG6470 (EL647) Finite Element Analysis

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)**

Term 1

1. **Prerequisite and co-requisite modules**
2. **The courses to which the module contributes**

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 be able to:**
   1. Explain the underlying principles of the Finite Element method including different element type, boundary condition definition, etc
   2. Use the industry-standard software for interactive FE model generation, analysis and the post-processing
   3. Formulate the boundary conditions of a problem in a suitable form for correct analysis and interpret the output from the software critically in order to obtain the required information
2. **The intended generic learning outcomes.**  
   **On successfully completing the module students will be able to:**
   1. Deploy accurately established techniques of analysis and enquiry within a discipline;
   2. Communicate more effectively using a variety of methods
   3. Show a systematic understanding of key aspects of their field of study, including acquisition of coherent and detailed knowledge
   4. Exercise initiative and personal responsibility;
3. **A synopsis of the curriculum**

Introduction and underlying Principles: of the Finite Element Method; Identification of appropriate domain of solution;;Element formulation and libraries; Creation of mesh; Fundamental of different Boundary condition types; post-processing results, importance of verification, development of checking strategies; sources of inaccuracies and errors.

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

Core:

Jacob, Fish, and Belytschko Ted. A first course in finite elements. Wiley, 2007.

Khennane, Amar. Introduction to finite element analysis using MATLAB® and abaqus. CRC Press, 2013.

1. **Learning and teaching methods**

Contact hours 34  
Hours of private study 116  
Total hours for the module 150

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

2 x Homework, 2-3 pages, each 12.5% (25%)

Problem solution, 5 page (25%)

Mini-project Report & presentation [report: 5 pages, 15 min presentation] (50%)

* 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* | *9.1* | *9.2* | *9.3* | *9.4* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |
| **Private Study** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| lectures | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Example classes | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Labs | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |
| Homeworks | **x** |  | **x** | **x** | **x** | **x** | **x** |
| Problem solution | **x** | **x** |  | **x** | **x** | **x** | **x** |
| Mini-project Report & presentation | **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 mechanics. 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 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) |
|  |  |  |  |  |
|  |  |  |  |  |