MODULE SPECIFICATION TEMPLATE

**SECTION 1: MODULE SPECIFICATIONS**

1. Title of the module

EL614 Biomaterials

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

Engineering and Digital Arts

1. Start date of the module

September 2016

1. The number of students expected to take the module

20

1. Modules to be withdrawn on the introduction of this proposed module and consultation with other relevant Schools and Faculties regarding the withdrawal

N/A – new module for new degree programme

1. The level of the module (e.g. Certificate [C], Intermediate [I], Honours [H] or Postgraduate [M])

H

1. The number of credits and the ECTS value which the module represents

15 (ECTS 7.5)

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

|  |  |  |
| --- | --- | --- |
| EL514 | Biomechanics |  |

1. The programmes of study to which the module contributes

BEng Bioengineering

BEng Bioengineering with a Year in Industry

1. The intended subject specific learning outcomes

Knowledge and Understanding

On successful completion of the module, students should have knowledge and understanding of:

1. the fundamental principles of mechanics of materials
2. the structure and function of biomaterials in the human body
3. the implications of using non-biological materials in the human body

Skills and Attributes

On successful completion of the module, students should be able to:

1. propose biomedical materials for specific applications
2. describe the processes of implant
3. discuss requirements for implant testing and evaluation

These outcomes contribute to the programme learning outcomes in the Bioengineering curriculum maps as follows:

A1, A2, A8, A11, B1-B3, B5, B6, CB1- CB5

1. The intended generic learning outcomes

On successful completion of the module, students will be able:

1. to generate, analyse, present and interpret data.
2. to communicate more effectively in writing.
3. To learn effectively for the purpose of continuing professional development.
4. Ability for critical thinking.
5. Ability to manage time and resources within a project.

These outcomes are related to the programme learning outcomes in the Bioengineering curriculum map as follows:

D1, D4 -D7.

1. A synopsis of the curriculum

Lecture Syllabus

**Mechanics of Materials:**  
Stress and strain  
Axially loaded members  
Torque loaded members  
Stresses in bending beams.  
Equations of stress and strain transformation

**Mechanics of biomaterials:**

Morphology and histology, physical properties, mechanics and function of bone, cartilage, ligaments, tendons and muscles.

**Mechanics of implants:**

Materials for implantation

Biocompatibility

Tissue integration

Implant evaluation and testing

Implant problems

Principles of tissue engineering

Coursework

LABORATORY CLASSES

There will be 6 x 2-hour laboratory classes.

EXAMPLES CLASSES

There will be 1 x 2-hour example class

1. Indicative Reading List

Mechanics of Materials - Beer, Johnston, Dewolf. McGraw-Hill Higher Education,

Biomaterials Science: An Introduction to Materials in Medicine - Ratner et al. Academic Press

1. Learning and Teaching Methods, including the nature and number of contact hours and the total study hours which will be expected of students, and how these relate to achievement of the intended module learning outcomes

There will be 50 contact hours consisting of 36 hours of lectures (to address LOs 11.1-11.5), 12 hours of laboratory classes (to address LOs 11.1-11.6 and 12.1-12.5), 2 hours of examples classes (to address LOs 11.1-11.2). The examples class will consist of an assessed test. There will be 100 independent study hours and the total student workload will be 150 hours.

1. Assessment methods and how these relate to testing achievement of the intended module learning outcomes

Assessment for this module is by an end of year examination (60%) and coursework (40%). The examination will assess the students theoretical knowledge of the subject and their ability to solve mechanics of materials problems (LOs 11.1-11.4). 20% of the module mark will be allocated to the assessment reports based on the laboratory experiments (LOs 11.1-11.6 and 12.1-12.5). The final 20% will be based on the test (LOs 11.1-11.2 and12.1-12.2).

1. Implications for learning resources, including staff, library, IT and space

The laboratory sessions will be housed in the existing laboratory infrastructure within Jennison Building. Some adaptations to experiments will be required but this will be funded from recurrent equipment budgets.

1. The School recognises and has embedded the expectations of current disability equality legislation, and supports students with a declared disability or special educational need in its teaching. Within this module we will make reasonable adjustments wherever necessary, including additional or substitute materials, teaching modes or assessment methods for students who have declared and discussed their learning support needs. Arrangements for students with declared disabilities will be made on an individual basis, in consultation with the University’s disability/dyslexia support service, and specialist support will be provided where needed.
2. Campus(es) where module will be delivered:

Canterbury campus

***If the module is part of a programme in a Partner College or Validated Institution, please complete the following:***

1. Partner College/Validated Institution:
2. University School responsible for the programme:

**SECTION 2: MODULE IS PART OF A PROGRAMME OF STUDY IN A UNIVERSITY SCHOOL**

**Statement by the School Director of Learning and Teaching/School Director of Graduate Studies (as appropriate):** "I confirm I have been consulted on the above module proposal and have given advice on the correct procedures and required content of module proposals"

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| --- | --- |
| ................................................................  Director of Learning and Teaching/Director of Graduate Studies (delete as applicable)  …………………………………………………  Print Name | ..............................................  Date |

**Statement by the Head of School:** "I confirm that the School has approved the introduction of the module and, where the module is proposed by School staff, will be responsible for its resourcing"

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| --- | --- |
| .................................................................  Head of School  …………………………………………………….  Print Name | ..............................................  Date |

**SECTION 3: MODULE IS PART OF A PROGRAMME IN A PARTNER COLLEGE OR VALIDATED INSTITUTION**

(Where the module is proposed by a Partner College/Validated Institution)

**Statement by the Nominated Officer of the College/Validated Institution** *(delete as applicable)***:** "I confirm that the College/Validated Institution*(delete as applicable)* has approved the introduction of the module and will be responsible for its resourcing"

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| .................................................................  Nominated Responsible Officer of Partner College/Validated Institution  ………………………………………………….  Print Name  …………………………………………………..  Post | ..............................................  Date |

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Partner College/Validated Institution

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Last updated February 2013