1. **Title of the module**

SPOR5770 (SS577) Biomechanical Analysis

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

School of Sport and Exercise 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)**

Autumn or Spring

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

Prerequisite: SPOR3270 (SS327) Introduction to Biomechanics

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

BSc (Hons) Sport and Exercise Science

1. **The intended subject specific learning outcomes.
On successfully completing the module students will be able to:**

1. Apply Newton’s Laws to whole body and segmental angular motion.

2. Identify the steps involved in computing resultant joint moments using a two-dimensional inverse dynamics procedure and critically discuss methodological issues involved in collecting the necessary data.

3. Explain the advantages of muscle indeterminacy and the limitations of an inverse dynamics analysis.

4. Interpret a joint moment-time profile to identify common gait issues.

5. Recognise a typical stress-strain relationship for biological tissues and the changes in mechanical properties that occur with training, ageing and disuse.

1. **The intended generic learning outcomes.
On successfully completing the module students will be able to:**

1. Apply knowledge to the solution of familiar and unfamiliar problems.

2. Apply communication, presentation, numeracy and IT.

3. Apply interactive group skills.

4. Apply problem solving.

5. Self-appraise and reflect on practice.

6. Plan and manage learning.

1. **A synopsis of the curriculum**

This module is concerned with angular mechanics and the biomechanics of complex movements. Laboratory experimentation will provide the opportunity for students to develop practical skills in the use of a range of analysis equipment such as a force plate and computer-based motion analysis. A range of sport and exercise situations will be used to illustrate the mechanical principles considered. These could include kinematic analysis of walking; the kinetics of weight lifting; the computation of resultant joint moments and gait analysis.

Indicative content includes:

Definition and computation of angular kinematic quantities.

Newton's Laws in their angular formulation.

Methodology: motion analysis, force plates, anthropometry.

Interpretation of resultant joint moment profiles in gait analysis.

Basic material properties such as stress and strain and the relationship between these measures and injury.

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

Hamill, J. and Knutzen, K.M. (2009) Biomechanical basis of human movement. 3rd Ed. London: Lippincott Williams and Wilkins.

Hay, J.G. (1993) The biomechanics of sports techniques. 4th Ed. Englewood Cliffs NJ: Prentice-Hall.

McGinnis, P. (2005) Biomechanics of sport and exercise. 2nd Ed. Champaign, IL: Human Kinetics.

Nordin, M. and Frankel, V. H. (2001) Basic biomechanics of the musculoskeletal system. 3rd Ed. London: Lippincott Williams & Wilkins.

Nigg, B. and Herzog, W. (2007). Biomechanics of the Musculoskeletal System. 3rd Ed. Chichester: Wiley & Son.

Winter, D. A. (2009) Biomechanics and Motor Control of Human Movement. 4th Ed. Chichester: Wiley & Son.

1. **Learning and teaching methods**

Total contact hours: 22

Private study hours: 128

Total study hours: 150

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

online quiz – 20 % (3 hours)

online quiz – 20 % (3 hours)

written worksheet – 30% (20 hours)written worksheet – 30% (20 hours)

13.2 Reassessment methods

Single worksheet 100% (46 hours)

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* | *9.5* | *9.6* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  | **x** | **x** | **x** |
| Lectures | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  | **x** | **x** | **x** |
| Seminars | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |
| Online quizzes | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Worksheets | **x** | **x** | **x** | **x** |  | **x** | **x** | **x** | **x** | **x** | **x** |

1. **Inclusive module design**

The School 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**

This module has been designed with reference to educational standards published or recommended by the International Society of Biomechanics and the American Society of Sports Medicine.

**FACULTIES SUPPORT 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.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 19/02/19 | Major | September 2019 | 13 | No |
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