COURSE OUTLINE

SPX322 Biomechanics II

Course Coordinator: Mark Sayers (msayers@usc.edu.au) **School:** School of Health and Behavioural Sciences

2021 | Semester 1

USC Sunshine Coast	ON CAMPUS	Most of your course is on campus but you may be able to do some components of this course online.

Please go to the USC website for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1. Description

Biomechanics II extends the applied mechanics knowledge from Biomechanics I to applied situations such as sporting, clinical and coaching applications, exercise efficacy, and workplace health and safety. In addition, Biomechanics II builds on the qualitative movement analysis skills introduced in Biomechanics I before introducing you to a number of biomechanical research techniques used for the quantification of human movement. A key component of the assessment for this course is completion of a small research project.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
ON CAMPUS			
Lecture	2hrs	Week 1	13 times
Laboratory	2hrs	Week 1	13 times

1.3. Course Topics

1. Analysing skill
2. Data interpretation
3. Techniques for recording and analysing sports movement
    a. Video analysis in biomechanics
    b. Kinovea
4. Workplace biomechanics
    a. Introduction to ergonomics
    b. Posture assessment
5. Techniques for recording and analysing sports movement
    a. Gait analysis using motion capture systems
    b. Body segment parameters
    c. Data reduction techniques
    d. Force platforms and external force measurement
    e. Electromyography
6. Clinical gait analysis
    a. Data processing in Qualisys
    b. Data analysis using Visual3D
    c. Introduction to OpenSim
7. Biomechanics and prosthetics
8. Introduction to podiatry
9. Biomechanics of selected weight training exercises
10. Aquatics
    a. Biomechanics of aquatic activities
    b. Swimming analyses
11. Research Careers in Biomechanics

2. What level is this course?

300 Level (Graduate)

Demonstrating coherence and breadth or depth of knowledge and skills. Independent application of knowledge and skills in unfamiliar contexts. Meeting professional requirements and AQF descriptors for the degree. May require pre-requisites where discipline specific introductory or developing knowledge or skills is necessary. Normally undertaken in the third or fourth full-time study year of an undergraduate program.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES On successful completion of this course, you should be able to...		GRADUATE QUALITIES Completing these tasks successfully will contribute to you becoming...
1	Utilise biomechanical principles to interpret kinematic and kinetic data	Knowledgeable Empowered
2	Identify, apply and describe the key issues surrounding standard biomechanical assessment procedures.	Knowledgeable Empowered
3	Communicate biomechanical findings effectively to both scientific and applied audiences.	Knowledgeable Empowered
4	Identify sources of appropriate research and apply research findings to the interpretation of biomechanical data	Knowledgeable Empowered
5	Develop collaborative research skills by working in small teams to evaluate biomechanical data	Empowered Engaged

5. Am I eligible to enrol in this course?

Refer to the USC Glossary of terms for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1. Pre-requisites

SPX202

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

5.4. Specific assumed prior knowledge and skills (where applicable)

Not applicable

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL).

6.2. Details of early feedback on progress

At the end of Week 3 you are required to submit Assessment Task 2a. This Assessment Task takes the form of a brief research proposal for the major project in this course, and has been designed to ensure you will be given feedback on your proposed project prior to undertaking data collection, etc.

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Artefact - Technical and Scientific	Group	20%	4 minutes	Week 8	In Class
All	2a	Written Piece	Individual	10%	Maximum 200 words	Week 3	Online Assignment Submission
All	2b	Oral and Written Piece	Individual	45%	Approximately 300-500 words, plus a 1.5 min presentation	Week 13	Online Assignment Submission with plagiarism check
All	3	Examination - Centrally Scheduled	Individual	25%	1 hour	Exam Period	Online Test (Quiz)

All - Assessment Task 1: Educational Video Clip

GOAL:	You will create a short video that demonstrates your understanding of a biomechanical principle.
PRODUCT:	Artefact - Technical and Scientific
FORMAT:	In this assessment piece you will work with a partner (i.e. in pairs) to prepare a 4 minute video clip (i.e. suitable to be posted on YouTube) that demonstrates your understanding of a common biomechanical principle. The topics for this assessment piece will be selected (randomly) during class in Week 1 from a list that can be found on our Course Blackboard page. The video should be designed so that it explains and contextualises this "principle" to coaches, athletes and/or clinicians (further discussion about what this means will be conducted in class time and on Blackboard). Both students must contribute to the preparation of the video and must identify their specific contributions on the assignment submission sheet.
CRITERIA:	

No.		Learning Outcome assessed
1	Accuracy and educational quality of the material	
2	Quality of video	
3	Innovative use of technology	
4	Clear communication and appropriate use of terminology	
5	Meeting time guidelines	
6	Demonstration of collaboration	
7	Assessment criteria are mapped to the course learning outcomes.	1 2 3 4 5

All - Assessment Task 2a: Quantitative Analysis – Research Proposal

GOAL:	You will develop a research proposal for project you will undertake in Assessment Task 2b.
PRODUCT:	Written Piece
FORMAT:	This assessment piece is the precursor to the major assessment task in this course (Task 1b). You will submit a brief research proposal for Task 1b in Week 3 prior to undertaking this major project. You may choose your own topic, with this proposal briefly indicating the reason (value) in undertaking the project, your proposed research question(s) and methodology.

CRITERIA:	No.	Learning Outcome assessed
	1	Presentation of the proposal (visual presentation, written expression and referencing)
	2	Justification for the project
	3	Depth and breadth of proposed project
	4	Appropriate sample size, with justification for the test variables
	5	Demonstration of analytical and problem solving skills
	6	Meeting time guidelines

All - Assessment Task 2b: Quantitative Analysis – Poster Presentation

GOAL:	You will demonstrate your skills in both conducting quantitative technique analyses and then presenting this data to a contextually relevant audience
PRODUCT:	Oral and Written Piece
FORMAT:	In this assessment piece you will prepare and then present a research poster based on a video based quantitative biomechanical analysis that you have undertaken. You may choose your own topic, although it must be approved by the Course Coordinator. You must collect your own video and complete your analysis using Kinovea® (or a similar program). The format of the poster must follow the guidelines for submission at a scientific conference, the details of which are outlined on th Course Blackboard page. Your presentation will take only about 3 min (maximum of 90 seconds of talking with about 1 or 2 minutes of questions) and will take place in class during Week 13. NB: the electronic version of your poster must be submitted by 5:00 pm on Monday in Week 13.

CRITERIA:	No.	Learning Outcome assessed
	1	The overall presentation of the poster (visual presentation, written expression and referencing)
	2	Interpretation of current research and application to the specific topic investigated
	3	Depth and breadth of data analysis and development of appropriate conclusions
	4	Appropriate use of key elements including: Introduction, Methods, Results, Conclusion, Formatting/ Referencing
	5	Demonstration of analytical and problem solving skills
	6	Meeting time guidelines

All - Assessment Task 3: Final Exam

GOAL:	
PRODUCT:	Examination - Centrally Scheduled
FORMAT:	One hour online exam, held during the exam period, that consists of Multiple Choice questions.

CRITERIA:	No.	Learning Outcome assessed
	1	Describe human movement using standard biomechanical terminology
	2	Apply biomechanical principles in the analysis of human movement.
	3	Describe the various methods and equipment used in biomechanical assessment and evaluate critically the relative advantages and limitations for each.

7. Directed study hours

A 12-unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Directed study hours may vary by location. Student workload is calculated at 12.5 learning hours per one unit.

8. What resources do I need to undertake this course?

Please note: Course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

Please note that you need to have regular access to the resource(s) listed below. Resources may be required or recommended.

REQUIRED?	AUTHOR	YEAR	TITLE	PUBLISHER
Required	Hall, S.J.	2012	Basic Biomechanics	McGraw-Hill
Required	Griffiths, I.W.	2006	Principles of Biomechanics and Motion Analysis	Lippincott Williams and Wilkins

8.2. Specific requirements

The data files that we use in biomechanics can be quite large and so I strongly recommend that you purchase a USB stick specifically for use in this Course. Fortunately, these are quite cheap, with 4 GB sticks available for less than $10 from most major outlets. Some of the laboratory classes in this course (Labs in Weeks 4-11 inclusive) require students to take part in practical sport and exercise science activities, which may include physical contact with other members of the class, require wearing specialist clothing, using sports equipment, partial disrobing, or connection to instruments for scientific measurement require student volunteers to be assessed doing some simple, non-fatiguing activities. Also remember that OH&S rules require that appropriate shoes be worn in our laboratories at all times.

9. How are risks managed in this course?

Risk assessments have been performed for all laboratory classes and a low level of health and safety risk exists. Some risk concerns may include equipment, instruments, and tools; as well as manual handling items within the laboratory. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the online induction training for students, and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1. Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2. Assessment: Additional Requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

The final mark is in the percentage range 47% to 49.4%
The course is graded using the Standard Grading scale
You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submission of assessment tasks may be penalised at the following maximum rate:
- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task's identified value) for the third day - 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task. Weekdays and weekends are included in the calculation of days late. To request an extension you must contact your course coordinator to negotiate an outcome.

10.4. Study help

For help with course-specific advice, for example what information to include in your assessment, you should first contact your tutor, then your course coordinator, if needed.

If you require additional assistance, the Learning Advisers are trained professionals who are ready to help you develop a wide range of academic skills. Visit the Learning Advisers web page for more information, or contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au.

10.5. Wellbeing Services

Student Wellbeing provide free and confidential counselling on a wide range of personal, academic, social and psychological matters, to foster positive mental health and wellbeing for your academic success.

To book a confidential appointment go to Student Hub, email studentwellbeing@usc.edu.au or call 07 5430 1226.

10.6. AccessAbility Services

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, learning disorder mental health issue, , injury or illness, or you are a primary carer for someone with a disability or who is considered frail and aged, AccessAbility Services can provide access to appropriate reasonable adjustments and practical advice about the support and facilities available to you throughout the University.

To book a confidential appointment go to Student Hub, email AccessAbility@usc.edu.au or call 07 5430 2890.

10.7. Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability

Visit the USC website: http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.8. General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC Moreton Bay** - Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **USC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **USC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

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