

SPX322 Biomechanics II

School: School of Health - Sport and Exercise Science

2023 | Semester 1

UniSC Sunshine Coast

**BLENDED
LEARNING**

Most of your course is on campus but you may be able to do some components of this course online.

Please go to usc.edu.au 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
BLENDED LEARNING			
Learning materials – Online material consisting of pre-recorded lectures and a variety of other resources	1hr	Week 1	13 times
Tutorial/Workshop 1 – Question and answer sessions relating to the Learning Materials	2hrs	Week 1	13 times
Laboratory 1 – Face-to-face on campus laboratory activities designed to contextualise the Learning Materials	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		GRADUATE QUALITIES
On successful completion of this course, you should be able to...		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 [UniSC 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	Group	10%	Maximum 250 words	Week 3	Online Submission
All	2b	Oral and Written Piece	Group	45%	Approximately 300-500 words, plus a 3 min presentation	Week 13	Online Assignment Submission with plagiarism check
All	3	Examination - Centrally Scheduled	Individual	25%	90 mins	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 Canvas 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 Canvas). 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	3
	2	Innovative use of technology	3
	3	Clear communication and appropriate use of terminology	3
	4	Demonstration of collaboration	5
GENERIC SKILLS:	Communication, Collaboration, Organisation, Applying technologies		

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

GOAL:	You will work in pairs to develop a research proposal for the project that 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 2b). You and your partner will submit a brief research proposal for Task 2b 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)	3 4 5
	2	Justification for the project	4
	3	Depth and breadth of proposed project	4
	4	Appropriate sample size, with justification for the test variables	3 4
	5	Demonstration of analytical and problem solving skills	1 3
	6	Meeting time guidelines	5
GENERIC SKILLS:	Communication, Collaboration, Problem solving, Organisation, Applying technologies, Information literacy		

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:	<p>In this assessment piece you will work in pairs and 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 the Course Canvas page. Your presentation will take only about 5 min (maximum of 3 mins of talking with about 1 or 2 minutes of questions) and will take place in class during Week 13.</p> <p>NB: the electronic version of your poster must be submitted electronically</p>		
CRITERIA:	No.		Learning Outcome assessed
	1	The overall presentation of the poster (visual presentation, written expression and referencing)	3
	2	Interpretation of current research and application to the specific topic investigated	3 4
	3	Depth and breadth of data analysis and development of appropriate conclusions	1 3
	4	Appropriate use of key elements including: Introduction, Methods, Results, Conclusion, Formatting/ Referencing	1 4
	5	Demonstration of analytical and problem solving skills	1
	6	Meeting time guidelines	5
GENERIC SKILLS:	Communication, Collaboration, Problem solving, Organisation, Applying technologies, Information literacy		

All - Assessment Task 3: Final Exam

GOAL:	To assess your knowledge and understanding of key biomechanical principles discussed during the laboratory sessions	
PRODUCT:	Examination - Centrally Scheduled	
FORMAT:	A 90 minute 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	1
	2 Apply biomechanical principles in the analysis of human movement.	1 2
	3 Describe the various methods and equipment used in biomechanical assessment and evaluate critically the relative advantages and limitations for each.	2
GENERIC SKILLS:	Problem solving, Organisation, Information literacy	

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. 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 Canvas 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	EDITION	PUBLISHER
Recommended	Susan J. Hall	0	Basic Biomechanics	(9th Ed)	n/a
Recommended	Iwan W. Griffiths	2006	Principles of Biomechanics & Motion Analysis	n/a	Lippincott Williams & 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 studio and 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 Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

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. SafeUniSC

UniSC is committed to a culture of respect and providing a safe and supportive environment for all members of our community. For immediate assistance on campus contact SafeUniSC by phone: [07 5430 1168](tel:0754301168) or using the [SafeZone](#) app. For general enquires contact the SafeUniSC team by phone [07 5456 3864](tel:0754563864) or email safe@usc.edu.au.

The SafeUniSC Specialist Service is a Student Wellbeing service that provides free and confidential support to students who may have experienced or observed behaviour that could cause fear, offence or trauma. To contact the service call [07 5430 1226](tel:0754301226) or email studentwellbeing@usc.edu.au.

10.5. 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.

10.6. 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.

10.7. 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.

10.8. 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
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit <https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching>

10.9. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The [Student Charter](#) sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.10.General Enquiries

In person:

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

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au