



## COURSE OUTLINE

# SPX202 Biomechanics I

**Course Coordinator:** Max Stuelcken (mstuelck@usc.edu.au) **School:** School of Health and Behavioural Sciences

2021 | Semester 2

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 1 is designed to introduce you to the field of biomechanics. In this course you will explore, describe, analyse and predict the characteristics of movement for the human body. Biomechanics 1 is divided into two sections. In the first section, the laws of physics are addressed and then applied to human motion, while the second section is based on the application of these principles to gait analysis and specific sport and exercise activities.

### 1.2. How will this course be delivered?

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

### 1.3. Course Topics

Linear and angular kinematics principles  
Projectile motion  
Laws of motion – linear and angular kinetics, rotation and leverage  
Equilibrium, centre of mass and stability  
Mechanics of human locomotion – walking and running  
Mechanics of dynamic sporting movements – jumping, throwing, hitting, and kicking  
Movement within a fluid medium

## 2. What level is this course?

200 Level (Developing)

Building on and expanding the scope of introductory knowledge and skills, developing breadth or depth and applying knowledge and skills in a new context. May require pre-requisites where discipline specific introductory knowledge or skills is necessary. Normally, undertaken in the second or third full-time year of an undergraduate programs.

## 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	Describe human movement using appropriate terms and concepts	Knowledgeable
2	Use the laws of motion to explain the cause of human movement	Knowledgeable
3	Identify inter-relationships between biomechanical variables	Knowledgeable Empowered
4	Perform calculations based on biomechanical data	Empowered
5	Apply biomechanical principles to human locomotion, activities of daily living, and dynamic sporting skills	Empowered
6	Disseminate the findings of biomechanical experiments ethically, clearly and succinctly	Empowered Ethical

#### 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

LFS122

##### 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

In weeks 2 and 3 you will have a submission for your Applied Biomechanics Workbook. In week 3 you will receive formative feedback on your progress in completing the calculations section of your Applied Biomechanics Workbook. This will help you to prepare for the type of questions that you are likely to receive in the mid semester exam in week 6.

##### 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	Examination	Individual	30%	105 minutes	Week 6	Online Test (Quiz)
All	2	Written Piece	Individual	30%	Completed over the course of the semester	Throughout teaching period (refer to Format)	Online Test (Quiz)
All	3	Examination - Centrally Scheduled	Individual	40%	120 minutes	Exam Period	Exam Venue

### All - Assessment Task 1: Mid semester exam

<b>GOAL:</b>	To provide you with an opportunity to demonstrate your knowledge, understanding, and ability to apply basic biomechanical concepts and principles covered during the theoretical component of the course.	
<b>PRODUCT:</b>	Examination	
<b>FORMAT:</b>	The examination will include all material covered within the theory and practical components of the course during the first 5 weeks. The structure will consist of a range of question types requiring you to apply theoretical concepts, perform calculations, and read and interpret graphs. The duration of the examination is 105 minutes. In preparation for the type of questions that you will receive in this examination you will have an extensive range of practice questions to work through. As you work through these questions you will have the opportunity to check your answers and receive feedback.	
<b>CRITERIA:</b>	<b>No.</b>	<b>Learning Outcome assessed</b>
	1 Use correct terms and concepts	1
	2 Select the appropriate equation, substitute known data into the equation, manipulate the equation to isolate the unknown, and solve for the unknown variable	2 3 4
	3 Use the appropriate scientific units in your answer	4
	4 Convey information clearly and succinctly	1 2 3

### All - Assessment Task 2: Applied Biomechanics Workbook

<b>GOAL:</b>	This workbook has been designed to develop your biomechanical communication skills through the application of biomechanical knowledge to different scenarios. This workbook contains laboratory activities that will require you to demonstrate practical skills in biomechanical data collection, perform calculations, analyse and interpret data, and answer discussion questions using an understanding of the concepts and principles presented in the course. The completion of the workbook will enable you to demonstrate your competency of key professional skills and practices in the field of Sports and Exercise Science.	
<b>PRODUCT:</b>	Written Piece	
<b>FORMAT:</b>	<p>The workbook will be able to be purchased from Mail and Print Services (USC MAPS).</p> <p>The workbook will be completed individually, however, certain tasks will require you to work collaboratively with your peers. There should be time to complete most of the tasks, activities and discussion questions within the two-hour tutorial/laboratory classes. However, some tasks will require more time consuming processes or in depth consideration and need to be completed online outside of the scheduled class times.</p> <p>Throughout the semester you will receive feedback on the quality, comprehensiveness, and accuracy of your work. It is very important that you make sure that you are keeping up with the material and ask questions when you are having difficulties.</p>	
<b>CRITERIA:</b>	<b>No.</b>	<b>Learning Outcome assessed</b>
	1 Communicate effectively using correct terms and concepts	1
	2 Perform calculations on the data collected	4
	3 Identify inter-relationships between variables	3
	4 Use a structured approach to reasoning when analysing and interpreting data	4 5 6
	5 Convey information clearly and succinctly	6

### All - Assessment Task 3: Final exam

<b>GOAL:</b>	To provide you with an opportunity to demonstrate your knowledge, understanding, and ability to apply basic biomechanical concepts and principles covered during the theory and practical components of the course – with particular emphasis on human locomotion, activities of daily living, and dynamic sporting skills.		
<b>PRODUCT:</b>	Examination - Centrally Scheduled		
<b>FORMAT:</b>	The examination will include all material covered within the theory and practical components of the course. The structure will consist of multiple choice and short answer questions. The duration of the examination is 2 hours.		
<b>CRITERIA:</b>	<b>No.</b>	<b>Learning Outcome assessed</b>	
	1	Use correct terms and concepts	1
	2	Interpret kinematic and kinetic data	2 3 5
	3	Explain inter-relationships between biomechanical variables	3
	4	Apply mechanical principles to human locomotion, activities of daily living, and dynamic sporting skills	4
	5	Convey information clearly and succinctly	2 5 6

## 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
Recommended	Hall, S.	2018	Basic Biomechanics. Eighth edition	McGraw-Hill
Recommended	Grimshaw, P., Cole, M., Burden, A. & Fowler, N.	2019	Instant notes in sport and exercise biomechanics. Second Edition	Routledge

### 8.2. Specific requirements

You must have access to a calculator capable of performing trigonometric functions and bring it to all teaching sessions. While calculators can be shared in teaching sessions this practice will not be allowed during exams. Acceptable calculators are available through the USC shop for under \$40. It will be beneficial to have a USB memory stick / flash drive (at least 4GB) for this and future courses so you can compile the relevant lecture notes, podcasts, and additional learning materials. These can be purchased relatively cheaply (less than \$15) from most major outlets.

## 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](mailto: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](mailto: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](mailto: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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