USC

Course Outline

Code: SCI107
Title: Physics

School: Science and Engineering
Teaching Session: Semester 1
Year: 2019
Course Coordinator: Damon Kent Email: dkent@usc.edu.au
Course Moderator: Rob McDougall

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

In this course you will learn fundamental principles in physics, including measurement, kinematics in one and two dimensions, projectile motion, forces and Newton's Laws of Motion, work and energy, uniform circular motion, rotational kinematics and dynamics and gravity. The topics selected are essential for advanced-level studies in physics and engineering. Your understanding of the theory will be enhanced by a selection of practical exercises designed to reinforce your appreciation of a variety of physical systems.

1.2 Course topics

Measurement and Uncertainty; Kinematics; Dynamics; Work, Energy and Power; Rotational Motion; Gravity

2. What level is this course?

100 level Introductory - Discipline knowledge and skills at foundational level, broad application of knowledge and skills in familiar contexts and with support. Normally associated with the first full-time 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?

Specific Learning Outcomes On successful completion of this course, you should be able to:	**Assessment tasks** You will be assessed on the learning outcomes in task/s:	**Graduate Qualities or Professional Standards mapping** Completing these tasks successfully will contribute to you becoming:
Effectively communicate concepts and techniques relevant to physics, using written English and mathematical notations	1: Mid-semester Exam 2: Assignment 3: Final Exam	Empowered Knowledgeable
Apply conceptual understanding of physics to solve problems using appropriate techniques and relevant theory	1: Mid-semester Exam 2: Assignment 3: Final Exam	Creative and Critical Thinkers Empowered Engaged Knowledgeable
Effectively work in a team to collect, analyse, evaluate and report on data from practical experiments.	2: Assignment (Practicals)	Creative and Critical Thinkers Engaged Ethical Knowledgeable
[Communicate scientific principles relevant to physics to professional and lay audiences.	[1: Mid-semester Exam 2: Assignment (Practicals) 3: Final Exam	[Creative and Critical Thinkers Knowledgeable
Creatively apply relevant physics theory to the solution of practical problems	1: Mid-semester Exam 2: Assignment 3: Final Exam	Creative and Critical Thinkers Knowledgeable

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 Enrolment restrictions

Nil

5.2 Pre-requisites

Nil

5.3 Co-requisites

Nil

5.4 Anti-requisites

SCI108 or SCI507

5.5 Specific assumed prior knowledge and skills (where applicable)

Nil

6. How am I going to be assessed?

6.1 Grading scale

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

6.2 Assessment tasks

Task No.	Assessment Tasks	Individual or Group	Weighting	What is the duration / length?	When should I submit?	Where should I submit it?
1	Mid-Semester Exam	Individual	20%	50 minutes	Tutorial/Lab class in week 7	Handwritten , given to the invigilator of exam
2	Assignment	Individual	30%	As Required	At tutorial class on due date, and at the end of laboratory classes as appropriate	Handwritten, given to tutor/demonstrator
3	Final Examination	Individual	50%	2 hours	End of semester exam period	Handwritten, given to the invigilator of exam
			100%			

Assessment Task 1: Mid-Semester Exam

Goal:	The mid-semester examination gives you an opportunity to demonstrate your knowledge, understanding and skills associated with the learning outcomes in weeks 1 - 6 of this course.
Product:	Mid-semester exam
Format:	Individual. Mixed practical and theoretical written questions. During a scheduled class in week 7 (see Blackboard for dates and times)
Criteria:	You will be assessed on your ability to: • recall and communicate the theoretical and practical components of the course materials covered in both the lectures, tutorials and practical exercises from weeks 1-6 • apply the relevant theory to particular examples • produce correct solutions to particular problems

Generic skill assessed	**Skill assessment level**
Problem solving	Introductory
Communication	Introductory

Assessment Task 2: Written Assignment

Goal:	There are two main goals: 1. Tutorial: To ensure that you are reviewing the course material on a frequent basis, and to provide on-going feedback regarding your written communication of mathematical working and physics concepts. 2. Laboratory experiment: You will perform six (6) experiments related to the content of the course in order to enhance your knowledge and understanding of the theory.
Product:	Written assignments: tutorial problems and laboratory experiments (must be hand-written)
Format:	For the tutorials: four tutorials each containing a set of problems will be posted on BlackBoard. You will be required to write out a fully-worked solution, including diagrams, and submit the work on the dates listed at the course website (there will be four dates on the list). You must give your work to your tutor at that tutorial. For the 6 laboratory experiments: hardcopy (paper) submission at the end of the practical class.
Criteria:	For the Tutorial problems all four submissions will count towards your grade. Your submission will be kept and scored before the next tutorial, at which time you will receive written and/or verbal feedback regarding your work. Your work will be assessed against criteria which include correctness of working, correct use of mathematical notation and communication, presentation and layout. For the Practicals, you will be assessed on your ability to: • Gather and analyse data accurately and write a short summary describing the outcome(s) of the experiment and any conclusions that may be drawn from the results • Present your work in a clear and professional manner (layout, language, spelling, general presentation) • Work collaboratively in a team.

Generic skill assessed	**Skill assessment level**
Communication	Introductory
Problem solving	Introductory
Applying Technologies	Introductory
Information Literacy	Introductory

Assessment Task 3: End of Semester Exam

Goal:	The end of semester examination gives you an opportunity to demonstrate your knowledge, understanding and skills associated with all the learning outcomes of this course.
Product:	Final Exam
Format:	Individual. Mixed practical and theoretical written questions. During Central Examination Period - Centrally Scheduled.
Criteria:	You will be assessed on your ability to: • recall and communicate the theoretical and practical components of the course materials covered in both the lectures, tutorials and practical exercises from weeks 1-13 • apply the relevant theory to particular examples • produce correct solutions to particular problems

Generic skill assessed	**Skill assessment level**
Problem solving	Introductory
Communication	Introductory

7. What are the course activities?

7.1 Directed study hours

2 x 2-hour lectures per week
1 x 1-hour tutorial per week
1 x 3-hour practical per fortnight

7.2 Teaching semester/session(s) offered

Sippy Downs: Semester 1

7.3 Course content

Teaching Week / Module	What key concepts/content will I learn?	What activities will I engage in to learn the concepts/content?	
		Directed Study Activities	Independent Study Activities
1	Introduction to Physics: Standards, Units & Measurements, Estimates & Uncertainty, Co-ordinate Systems & Trigonometry	Lectures and Tutorials	Lecture Notes and Textbook.
2	Motion in One Dimension: Displacement. Velocity, Acceleration, Graphical Representation of Motion, Motion with constant acceleration and freely falling objects.	Lectures, Tutorial Practical 1 – Measurement & Uncertainty	Lecture Notes and Textbook. Practical 1 Notes and Textbook.
3	Two-Dimensional Motion: Properties and components of vectors, Two dimensional displacement, velocity and acceleration, Relative motion.	Lectures, Tutorial	Lecture Notes and Textbook.
4	Projectile Motion: Displacement, Velocity and Acceleration in 2 dimensions, Time of flight, Range.	Lectures, Tutorial Practical 2 – Simple Pendulum	Lecture Notes and Textbook. Practical 2 Notes and Textbook.
5	Newton's Laws of Motion (Part 1): Forces, Newton's Laws, Free Body Diagrams, Normal Forces, Tension	Lectures, Tutorial	Lecture Notes and Textbook. Practical 3 Notes and Textbook.
6	Newton's Laws of Motion (Part 2): Friction, Incorporating Resistive Forces into force analyses, Centripetal Forces	Tutorial, Practical 3 – Forces	Lecture Notes and Textbook. Text Chapters 1 to 5.
7	Mid-semester review of weeks 1 to 6	Lectures, Tutorial, Mid Semester Exam. To be held during the scheduled tutorial classes in week 7	Lecture Notes and Textbook.
8	Work done by forces, Kinetic Energy Potential Energy, Power	Lectures, Tutorial Practical 4 - Conservation of Energy	Lecture Notes and Textbook. Practical 4 Notes and Textbook.
9	Momentum and Collisions: Impulse and Momentum, Conservation of Momentum, Elastic and Inelastic Collisions.	Lectures, Tutorial	Lecture Notes and Textbook.
10	Rotational motion: Angular position, velocity and acceleration Torque, Moment of Inertia	Lectures, Tutorial Practical 5 - Conservation of Momentum (1-D collisions)	Lecture Notes and Textbook. Practical 5 Notes and Textbook.

11	Energy & Momentum in Rotating Systems: Rotational kinetic energy, Angular momentum	Lectures, Tutorial	Lecture Notes and Textbook.
12	Gravity: Newton's Law of Universal Gravitation, Gravitational Potential Energy, Escape Speed, Kepler's Laws, Planetary Motion and Satellites	Lectures, Tutorial Practical 6 – Rotational Dynamics	Lecture Notes and Textbook. Practical 6 Notes and Textbook.
13	Review of weeks 1 to 12	Lectures, Tutorial	Lecture Notes and Textbook.

NOTE: The above schedule is a guide to Course topics. While every endeavour will be made to keep to the schedule, timing and treatment of material may vary, in order to accommodate student needs, availability of staff, resources, events of significance and extreme weather events.

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

Please note that 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)

Please note that you need to have regular access to the resource(s) listed below as they are required:

Author	Year	Title	Publisher
R. Serway, J. Jewett, K. Wilson, A. Wilson	2017	"Physics for Global Scientists and Engineers", Volume 1, Chapters 1-22, (2nd) Edition	Cengage Learning Australia Pty. Ltd. ISBN: 9780170355513

8.2 Specific requirements

Scientific calculator, or a more advanced calculator if you prefer. You may also bring portable computers to the practical sessions. You must wear a lab coat and covered shoes in the practical laboratory.

9. Risk management

Health and safety risks for this course have been assessed as low. You will be required to complete a laboratory induction prior to commencement of the practical component.

It is your responsibility as a student to review course material, search online, discuss with lecturers and peers, and understand the health and safety risks associated with your specific course of study. It is also your responsibility to familiarise yourself with the University's general health and safety principles by reviewing the online Health Safety and Wellbeing training module 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:

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

10.3 Assessment: Submission penalties

Late submission of assessment tasks will 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 and supply the required documentation to negotiate an outcome.

10.4 Study help

In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to Student Hub.

Contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au

10.5 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

10.6 General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **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

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au