School of Physics

Course Outline 2022

PHYS1111/1149

FUNDAMENTALS OF PHYSICS/ PHYSICS 1A (AVIATION)

School of Physics

Faculty of Science

Term 1, 2022

Faculty of Science - Course Outline

1. Information about the Course

NB: Some of this information is available on the UNSW Handbook[1]

Year of Delivery	*2022*
Course Code	*PHYS1111/1149*
Course Name	*Fundamentals of Physics/Physics 1A (Aviation)*
Academic Unit	*School of Physics*
Level of Course	*1*
Units of Credit	*6UOC*
Session(s) Offered	*Term 1, Term 3*
Assumed Knowledge, Prerequisites or Co-requisites	*none*
Hours per Week	*Approximately 14 hours per week. Note that this course is predominantly online this term so this time is spent watching videos, completing experiments, answering tutorial problems and completing assessment. The time spent watching videos is about 3 hours, and the rest is self-directed study and investigations.*
Number of Weeks	*10 weeks*
Commencement Date	14th February 2022
Grading	This course uses standard university grading.
Component	**Details**
Lectures	*There will be two two-hour synchronous online lectures each week.*
Experiments	*There are eight experiments over the term. These are comprised of a combination of activities you complete at home and simulations with questions to answer. These activities aim to familiarizes you with the content of the course and teach you about good experimental design.*
OTH classes	You enrol in either a two-hour face-to-face session that takes place most weeks or a one-hour online session. In these sessions, you will practice solving problems and have the opportunity to ask questions. While online we will run these as one hour synchronous sessions.
Online quizzes	*There will be an online quiz each week on material covered the previous week. This is to give you practice answering questions.*

[1] UNSW Online Handbook: http://www.handbook.unsw.edu.au

2. Staff Involved in the Course

Staff	Role	Name	Contact Details	Consultation Times
Course Convenor		*A. Prof. Liz Angstmann*	e.angstmann@unsw.edu.au	*Email to arrange a time*
Lecturers	Weeks 1-4	*Prof. Chris Tinney*	c.tinney@unsw.edu.au	
	Weeks 5, 7-9	*A. Prof. Clemens Ulrich*	c.ulrich@unsw.edu.au	
Additional Teaching Staff	Lab director	*A. Prof. Rajib Rahma*	*rajib.rahman@unsw.edu.au*	
	Other Support Staff	*Zofia Krawczyk* *Tom Dixon (lab)*	z.krawczyk-bernotas@unsw.edu.au thomas.dixon@unsw.edu.au	

3. Course Details

Course Description (Handbook Entry)	This is an introductory level course in physics for students from all disciplines. The course has both a laboratory and theoretical component. Topics covered include the description of motion; forces and momentum; the dynamics of particles; kinetic and potential energy; the conservation of energy; oscillations and simple harmonic motion; waves, wave reflection, refraction and interference; the wave nature of light; electric fields and charge; electric potential and energy; electric currents; magnetism; electromagnetic induction and Faraday's law. This is a quantitative course using algebra and trigonometry but not calculus. Note: There is no Assumed Knowledge for this course. It also serves as a suitable introduction to Physics for students whose Program requires them to take PHYS1121 or PHYS1131 but who do not have the recommended level of Assumed Knowledge for these courses.
Course Aims	This course aims to introduce physics to students without HSC level physics. It aims to show students how to apply physical principles to solve a range of problems. The experimental nature of physics, and importance of accounting for uncertainties, is emphasized through the laboratory program.
Student Learning Outcomes	At the conclusion of this course students should be able to: ○ State, using words, equations, and diagrams, the fundamental principles of classical mechanics, waves, electric and magnetic fields and simple electrical circuits. ○ Apply these fundamental principles to solve conceptual problems. ○ Solve quantitative problems by identifying and then solving the relevant equations. ○ Recognise that physics is an experimental science, conduct experiments, analyse the outcomes, including reliable estimates of uncertainties in the measurements.
Relationship to Other Courses within the Program	This course is good preparation for Physics 1A for students who have not done physics in high school.

4. Rationale and Strategies Underpinning the Course

Teaching Strategies	New content will be introduced through synchronous online lectures. Students will apply this knowledge to solve problems in the weekly quizzes. A problem solving workshop each week will give students a chance to ask questions and for further clarification of any concepts covered the previous week. Students will develop their laboratory skills through the laboratory component of the course. While the course is online many of the laboratory exercises will be conducted with common household equipment.
Rationale for learning and teaching in this course	Many studies have shown that students learn effectively by solving problems (see Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. Psychological Science in the Public Interest, 14(1), 4-58. for example). After being presented with new concepts and ideas students are given many opportunities to solve problems including in the lab, problem solving worksheets and online quizzes.
Rationale for assessment in this course	The Dunlosky et. al. meta-analysis showed that the best study techniques students could use to prepare for an exam was to practice answering a lot of questions over the course. The assessments for this course have been designed with this in mind. Students are given weekly quizzes with an unlimited number of attempts to ensure that they are confident answering questions on course material. These same questions are then used under invigilated conditions to give students practice answering questions under exam conditions and ensure academic integrity is maintained. The final exam is used to ensure that students are able to solve problems quickly and correctly. The material covered in this course is foundational to many higher year physics and engineering courses so an ability to quickly recall and use skills are vital. Labs are also assessed, as physics is an experimental science, students need to be able to conduct measurements to test models.

5. Course Schedule

Week	**Scheduled activities and recommended allocation of time**	**Assignment, Submission dates time needed (see also 'Assessment Tasks & Feedback')**
Week 1	Attend online lectures and tutorial. Start quiz 1. *This week you should spend 4 hours on lecture content, 1 hour in the TUT class. You should also spend 3 hours reviewing lecture material and attempting problems.*	8 hrs
Week 2	Attend online lectures and tutorial. Lab: Projectile motion online lab (via moodle) or projectile motion in-person lab. Complete quiz 1, start quiz 2. *This week you should spend 4 hours in lecture content, 1 hour in TUT class, and 2 hours on the lab activity and 1 hour preparing for it. You should also spend 6 hours reviewing lecture material and attempting problems, including the quiz problems.*	Online Quiz 1 due Monday 11:59 PM Complete Lab 1 14 hrs
Week 3	Attend online lectures and tutorial. Lab: Equilibrium of Rigid bodies at-home lab or equilibrium of rigid bodies in-person lab. Complete quiz 2, start quiz 3. *This week you should spend 4 hours in lecture content, 1 hour in TUT class, and 2 hours in the lab and 1 hour preparing for it. You should also spend 6 hours reviewing lecture material and attempting problems, including the quiz problems*	Complete Lab 2 Online Quiz 2 due Monday 11:59 PM 14 hrs

Week 4	Attend online lectures and tutorial. Lab: Linear motion online lab (via moodle) or linear motion in-person lab. Complete quiz 3, start quiz 4. *This week you should spend 4 hours in lecture content, 1 hour in TUT class, and 2 hours in the lab and 1 hour preparing for it. You should also spend 6 hours reviewing lecture material and attempting problems, including the quiz problems*	Complete Lab 3. Online Quiz 3 due Monday 11:59 PM 14 hrs
Week 5	Attend online lectures and tutorial. Lab: Standing waves at-home lab or standing waves in-person lab. Complete quiz 4, start quiz 5. *This week you should spend 4 hours in lecture content, 1 hour in TUT class, and 2 hours in the lab and 1 hour preparing for it. You should also spend 6 hours reviewing lecture material and attempting problems, including the quiz problems*	Complete Lab 4. Online Quiz 4 due Monday 11:59 PM 14 hrs
Week 6	*Flexibility week: Use this week to catch up and get ahead.*	10 hrs
Week 7	Attend online lectures and tutorial. Complete the class test. Lab: Snell's law at-home lab or snell's law in-person lab. Complete quiz 5, start quiz 6. *This week you should spend 4 hours in lecture content, 1 hour in TUT class, and 2 hours in the lab and 1 hour preparing for it and 1 hour completing the class test. You should also spend 5 hours reviewing lecture material and attempting problems, including the quiz problems*	Complete Lab 5 Online Quiz 5 due Monday 11:59 PM Class test 1 14 hrs

Week 8	Attend online lectures and tutorial. Lab: Electrostatic field plotting online lab (via moodle) or electric field plotting in-person lab. Complete quiz 6, start quiz 7. *This week you should spend 4 hours in lecture content, 1 hour in TUT class, and 2 hours in the lab and 1 hour preparing for it. You should also spend 6 hours reviewing lecture material and attempting problems, including the quiz problems*	Complete Lab 6 Online Quiz 6 due Monday 11:59 PM 14 hrs
Week 9	Attend online lectures and tutorial. Lab: Circuits online lab (via moodle) or circuits in-person lab. Complete quiz 7, start quiz 8. *This week you should spend 4 hours in lecture content, 1 hour in TUT class, and 2 hours in the lab and 1 hour preparing for it. You should also spend 6 hours reviewing lecture material and attempting problems, including the quiz problems*	Complete Lab 7 Online Quiz 7 due Monday 11:59 PM 14 hrs
Week 10	Attend online tutorial. Complete class test 2 Lab: Magnetic fields online lab (via moodle) or magnetic fields in-person lab. Complete quiz 8. *This week you should spend1 hour in TUT class, and 2 hours in the lab and 1 hour preparing for it and 1 hour doing the class test. You should also spend 6 hours reviewing lecture material and attempting problems, including the quiz problems*	Complete Lab 8 Online Quiz 8 due Monday 11:59 PM Class test 2 11 hrs
Stu vac	Spend 23 hours revising material. The best way to prepare for an exam is to take past exam papers under simulated test conditions. Exam papers and solutions are available on Moodle.	23 hrs
Total time for course:		150 hrs

6. Assessment Tasks and Feedback

Task	Knowledge & abilities assessed	Assessment Criteria	% of total mark	Date of		Feedback		
				Release	Submission[2]	WHO	WHEN	HOW
Experiments	Be able to investigate the physics behind a phenomenon and develop skills associated with good experimental technique	Lab assessments are pass/fail, as assessed by your demonstrators. A 'pass' for online/at-home labs is considered as 60% or above on the laboratory assessment for that week. Marking rubric can be found on the Moodle site for the course. *Note that online labs will not be marked without a selfie of the student with the equipment included in the report.*	3.75 % × 8 = 30%	At start of course (at-home labs). At beginning of lab week (online labs)	Due 11:59 PM Sunday at end of each week.	*Demonstrator*	At home experiments Monday one week after submission. Immediately for online labs.	*Comments and rubric in Turnitin[3] for at home experiments, automatic feedback for online labs.*
Online quizzes	Recognize the quantitative nature of physics and be able to solve problems	Students need to correctly perform calculations and solve problems based on lecture materials	1 % × 8 + 2 % × 6 = 20%	Weekly quiz available Friday week before it is due. Class tests available during weeks 7 and 10.	Due 11:59 PM Monday from week 2. Tests due 40 minutes after start time.	Automated	*Marks and feedback available during weekly quiz and at end of test.*	*Marks and feedback provided in Moodle quiz.*
Final Exam (online)	Be able to solve problems based on the content covered in this course	Students will receive marks for correctly answering questions	50%	Held during exam period, 30th April-12th May		Lecturer	Mark included in final grade	

[2] All times and dates are given for Australian Eastern Standard Time (AEST, Sydney). If a student is submitting from overseas it is their responsibility to check that they submit it by the due time. In class experiments run on a fortnightly schedule, students will be assigned to either the first or second group on Moodle, at home experiments due the weeks in class experiments are not due.

[3] Feedback will only be given for reports properly submitted through Turnitin. If a student has an issue with submission and submits via email then feedback will not be given.

7. Additional Resources and Support

Text Books	Physics: 11th Edition, Cutnell & Johnson (Wiley), Australia Custom Edition, ISBN: 978-1-119-56179-8 The library has an ebook version of this text which can be accessed for free.
Course Manual	Will be available on Moodle
Recommended Internet Sites	Will be made available on Moodle

8. Required Equipment, Training and Enabling Skills

Enabling Skills Training Required to Complete this Course	ELISE It is highly recommended that you complete the Moodle module on academic integrity before submitting assessment for this course. Plagiarism and contract cheating have been a problem with previous cohorts. These cases have been found and acted upon. Please ensure that you are aware of the university's expectations around academic integrity.

9. Course Evaluation and Development

Student feedback is gathered periodically by various means. Such feedback is considered carefully with a view to acting on it constructively wherever possible.

This course is running in a very different format this term than in previous terms due to the shift online. Please provide feedback during the course. Either email the course convener or give your feedback to the course representatives who will meet regularly with teaching staff to discuss how the course is going.

10. Administration Matters

Expectations of Students	Even though this course is completely online the assumption is that students will spend the same amount of time working on it as a face-to-face first year physics course. Students should spend approximately eight hours a week engaging with the online materials and a similar amount of time in self-directed study of the subject.		
Submissions	All submission times are in Australian Eastern Standard Time (AEST, Sydney). **If a student experiences any difficulty submitting a lab report through Moodle they must email a copy of the lab to Tom Dixon, thomas.dixon@unsw.edu.au , before the due time, with a report of what went wrong (so that we can fix it).** If you are not able to submit one of the assessments for reasons beyond your control you should submit a special consideration request with supporting documentation.		
Occupational Health and Safety[4]	OH&S is very important. You must complete and abide by a risk assessment for each of the investigations you conduct, including the one for your final report.		
Assessment Procedures UNSW Assessment Policy[5]	The UNSW special consideration information can be found here: https://student.unsw.edu.au/special-consideration		
Equity and Diversity	Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course Convenor prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or http://www.equity.unsw.edu.au/disabil.html, http://www.studentequity.unsw.edu.au/). Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.		
Student Complaint Procedure[6]	**School Contact**	**Faculty Contact**	**University Contact**
	A. Prof. Elizabeth Angstmann First year Physics Director e.angsmtann@unsw.edu.au Or Prof. Adam Micolich, Director of Teaching, Physics adam.micolich@unsw.edu.au	Deputy Dean Education A. Prof. Alison Beavis a.beavis@unsw.edu.au	Student Conduct and Appeals Officer (SCAO) within the Office of the Pro-Vice-Chancellor (Students) and Registrar. Telephone 02 9385 8515, email studentcomplaints@unsw.edu.au University Counselling and Psychological Services[7] Tel: 9385 5418

[4] UNSW OHS Home page
[5] UNSW Assessment Policy
[6] UNSW Student Complaint Procedure
[7] University Counselling and Psychological Services

11. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.

Further information about referencing styles can be located at student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage.[8] *At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.*

Further information about academic integrity and plagiarism can be located at:

- *The Current Students site* student.unsw.edu.au/plagiarism*, and*
- *The ELISE training site* subjectguides.library.unsw.edu.au/elise

The Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: student.unsw.edu.au/conduct*.*

[8] International Centre for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.