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	*2018*
Course Code	*PHYS1131*
Course Name	*Higher Physics 1A*
Academic Unit	*School of Physics*
Level of Course	*1*
Units of Credit	*6UOC*
Session(s) Offered	*Session 1, Session 2*
Assumed Knowledge, Prerequisites or Co-requisites	Assumed Knowledge : HSC Physics and Mathematics Extension 1 or equivalent. If you have not reached this level of physics and mathematics you may wish to take PHYS1111 Fundamentals of Physics before enrolling in this course. *MATH1131 or MATH1141 or MATH1151 are co-requisites*
Hours per Week	*3 hours lectures per week (or online if enrolled in web stream), 1 hour problem solving workshop, 2 hour lab. It is expected that students will spend an additional 6 hours per week solving problems.*
Number of Weeks	*12 weeks*
Commencement Date	26th February
Component	**Details**
Lectures	*In lectures you will be introduced to new material, shown demonstrations and examples of how to solve problems. Lectures are 3 hours per week. Check your timetable for times.*
Laboratories	*This course has 10 laboratory experiments, approximately one each week. In laboratory classes you will collect data, design experiments and make use of the theories covered in lectures. You will need to complete a prelab quiz before each experiment.*
Problem solving workshops	*In problem solving workshops you will solve problems related to the theory covered in lectures. You will have practice tests in some classes to give you feedback about how you are going.*
Tutorial problems	*Each fortnight there will be a set of tutorial problems. You should work through these at home. Video solutions are provided to all the tutorial problems.*
Online quizzes	*Every fortnight you will have an online quiz due. The questions are pulled randomly from a bank of questions. You can try these quizzes as many times as you want. Your highest mark counts. You will have invigilated quizzes in the lab in weeks 8 and 13 pulled from this same*

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

	bank.

2. Staff Involved in the Course

Staff	Role	Name	Contact Details	Consultation Times
Course Convenor		*Dr Elizabeth Angstmann*	*e.angstmann@unsw.edu.au* *Room G61F, Old Main Building* *School of Physics*	Email to arrange a time
Additional Teaching Staff	Lecturers	*Prof. Joe Wolfe* *Prof Alex Hamilton* *Dr Elizabeth Angstmann (Web stream)*	*j.wolfe@unsw.edu.au* *alex.hamilton@unsw.edu.au* *e.angstmann@unsw.edu.au*	Times will be advertised during lectures
	Lab director	*Dr Krystyna Wilk*	*k.wilk@unsw.edu.au*	Email to arrange a time
	Other Support Staff	Ranji Ballala	firstyear@phys.unsw.edu.au Room G06 School of Physics office, Old Main Building	9:30-12:30 2:00-5:00
	Teaching assistants		There will be teaching assistants in room 201A in the old main building if you have questions about physics	12-2 PM Monday, Wednesday and Friday

3. Course Details

Course Description (Handbook Entry)	This course provides an introduction to Physics. It is a calculus based course. The course is examined at two levels, with Physics 1A being the lower of the two levels. Mechanics: particle kinematics in one dimension, motion in two and three dimensions, particle dynamics, work and energy, momentum and collisions. Thermal physics: temperature, kinetic theory and the ideal gas, heat and the first law of thermodynamics. Waves: oscillations, wave motion, sound waves. Assumed Knowledge : HSC Physics and Mathematics Extension 1 or equivalent. If you have not reached this level of physics and mathematics you may wish to take PHYS1111 Fundamentals of Physics before enrolling in this course.
Course Aims	This course gives an introduction to mechanics, thermal physics and waves, and to the techniques of analysis and problem solving in the physical world. With its companion subject (Physics 1B, Higher Physics 1B or (Special) Higher Physics 1B), this constitutes a broad introduction to physics. This background supports higher level study in physics and engineering.
Student Learning Outcomes	By the end of this course students should be able to: • Analyse motion in two dimensions using vectors. Apply Newton's laws of motion to objects undergoing uniform translational or rotational acceleration. • Analyse problems involving friction and the forces and deformations described by Hooke's law • Explain the difference between kinetic and potential energy and use the law of conservation of energy and the work-energy theorem to solve mechanics problems. • Apply the conservation laws of momentum and energy to solve mechanics problems, including problems involving collisions, extended objects and their centres of mass. • Apply the law of universal gravitation and Kepler's laws in combination with other laws covered in this course to describe, predict and explain the motion of satellites, planets, stars and galaxies. • Explain how energy conservation is related to the first law of thermodynamics. Apply the first law to solve problems. • Recognise and solve problems relating to different thermodynamic processes, including adiabatic, isothermal, isobaric and isovolumetric processes. For cyclic processes, calculate changes in internal energy, work done and heat

	transferred in cycles. • Describe different heat transfer mechanisms and calculate the amount of heat transferred in different processes. • Identify physical systems that can be understood using models of simple harmonic oscillation and write down equations to describe this motion. • Write down and solve equations describing wave motion, and use these equations to explain physical phenomena such as (but not limited to) standing waves and interference. • Recognise that physics is an experimental science, plan and conduct experiments and analyse the outcomes, and include reliable estimates of uncertainties in measurements.
Relationship to Other Courses within the Program	PHYS1121 is a pre requisite for PHYS1221, Physics 1B. Students need to score at least 65 in PHYS1121 to enroll in PHYS1231, Higher Physics 1B.

4. Rationale and Strategies Underpinning the Course

Teaching Strategies	Students will be introduced to new ideas and concepts during lectures (which they can choose to attend in person or online). These will include demonstrations, discussions of applications and examples of how to solve problems. Students are encouraged to actively participate during lectures. Students will apply this knowledge in laboratory and problem solving workshops. Students will also be provided with tutorial problems to practice with worked solutions.
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 workshops and online quizzes.

5. Course Schedule

Week	Scheduled activities (check lecture, lab and problem solving workshop times on your timetable on myUNSW)	Assignment and Submission dates (see also 'Assessment Tasks & Feedback')
Week 1	Three lectures First problem solving workshop: uncertainties Complete the online safety induction for the lab	
Week 2	Three lectures Problem solving workshop on Motion in one and two dimensions Laboratory class: Introductory experimentation	Lab Complete homework set 1
Week 3	Three lectures Laboratory class: The pendulum	Lab First online at home quiz due
Week 4	Three lectures Problem solving workshop: forces and friction Laboratory class: see schedule	Lab Complete homework set 2
Week 5	Three lectures Problem solving workshop: Practice test 1 Laboratory class: see schedule	Lab Second online at home quiz due
Week 6	Two lectures (Due to Good Friday holiday the last lecture this week will not be held) Problem solving workshop: Changes in energy and momentum Laboratory class: see schedule	Lab Complete homework set 3
Week 7	Three lectures Problem solving workshop: Distinguishing effects of net force and net torque Laboratory class: see schedule	Lab Third online at home quiz due
Week 8	Three lectures Problem solving workshop: Practice test 2 Online quiz held in lab time this week in lab	Invigilated online quiz Complete homework set 4
Week 9	Three lectures Problem solving workshop: Ideal gas law Laboratory class: see schedule	Lab Fourth online at home quiz due
Week 10	Two lectures (due to ANZAC day one lecture this week will be cancelled)	Lab

	Problem solving workshop: PV plots Laboratory class: see schedule	Complete homework set 5
Week 11	Three lectures Problem solving workshop: Practice test 3 Laboratory class: see schedule	Lab Fifth online at home quiz due
Week 12	Three lectures Problem solving workshop: Revision Laboratory class: see schedule	Lab Complete homework set 6
Week 13	Problem solving workshop: Practice test 4 Online quiz held in lab time this week in lab	Invigilated online quiz Sixth online at home quiz due

6. Assessment Tasks and Feedback

Task	Knowledge & abilities assessed	Assessment Criteria	% of total mark	Date of		Feedback		
				Release	Submission	WHO	WHEN	HOW
Lab Exercises and prelab quizzes	Recognise that physics is an experimental science, plan and conduct experiments and analyse the outcomes, and include reliable estimates of uncertainties in measurements.	Marking rubric for each exercise can be found in the laboratory manual. Prelab quizzes are 5% of total mark, lab exercises 15%.	2 % × 10 = 20%	1 week prior to lab	Prelab quizzes before the start of your lab time, lab book at the end	*Demonstrator*	During lab	*Your demonstrator will talk to you*
Online quizzes	Recognise the quantitative nature of physics and be able to solve simple problems – tests entire syllabus of this course	Students need to correctly perform calculations and solve problems	1.67 % x 6 = 10% 10% 10%	1 week prior to due date Week 8 Week 13	9 PM Sunday at ends of weeks 3, 5, 7, 9, 11, 13	These quizzes use a question bank. Every fortnight you will have a quiz to complete at home. You may attempt this as many times as you wish. Your highest mark will count. At the end of each attempt you will receive feedback on how to answer any questions you answered incorrectly. In weeks 8 and 13 you will have a 40 minute 4 question quiz drawn from the same question banks during your lab time in the first year lab. Check on Moodle to see which hour you need to attend for.		
Final exam	Recognise the quantitative nature of physics and be able to solve simple problems – tests entire syllabus of this course	Students need to correctly perform calculations and solve problems	50 %	You can view your exam timetable on myUNSW. This is a 2 hour exam.				

7. Additional Resources and Support

Text Books	Halliday, D., Resnick, R., & Walker, J. (2014). Fundamentals of Physics, John Wiley & Sons. Note: the library has an eBook subscription to this. The link is provided on the Moodle site. The book can be purchased from the publisher here: http://www.wileydirect.com.au/buy/fundamentals-of-physics-10th-edition/
Course Manual	Laboratory manual can be purchased from the bookshop or downloaded from Moodle, printed and bound. You can will receive the homework booklets when you purchase the lab manual. Alternatively you can print them from Moodle.
Required Readings	Lecture notes provided on Moodle.
Additional Readings	Most calcus based introductory physics text books are suitable. Physics Vol 1 by Serway, Jewett, Wilson and Wilson is an example of one of these.
Recommended Internet Sites	Will be made available on Moodle
Computer Laboratories or Study Spaces	Room 201A in the old main building is available for group or individual study.

8. Required Equipment, Training and Enabling Skills

Equipment Required	Access to a computer to complete online quizzes. There are suitable computers in the UNSW library.
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.

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 outline conveys how feedback has helped to shape and develop this course.

Mechanisms of Review	Last Review Date	Comments or Changes Resulting from Reviews
Major Course Review		
myExperience		In 2018 the assessment of this course has changed based on student feedback. The final exam is now worth 50% (down from 70%). There are two invigilated quizzes each worth 10%.
Other		

10. Administration Matters

Expectations of Students	There is an assumption that sututdents will spend six hours per week in face-to-face classes (or completing the web stream lectures) and six hours per week working through problems and online quizzes.		
Assignment Submissions	If a student is sick and misses a lab they should complete the "Missed experiment for medical reasons" form on Moodle. If a student misses a la for any other reason they should complete a catch up lab within a fortnight of the missed lab exercise. If a student is sick and misses an online quiz they should apply for special consideration through myUNSW, a doctor's certificate will be needed and this must be verified at student central. For the at home quizzes this certificate needs to cover at least three days while the quiz was available. For the quizzes held in the lab the certificate needs to cover the day of the lab.		
Occupational Health and Safety[2]	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**[3]	The school of physics special consideration policy can be found here: https://www.physics.unsw.edu.au/current-students/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.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[4]	**School Contact**	**Faculty Contact**	**University Contact**
	Dr Elizabeth Angstmann First year Physics Director e.angsmtann@unsw.edu.au Tel: 9385 4542 Or A. Prof. Yvonne Wong Director of Teaching, Physics info@phys.unsw.edu.au Tel: 9385 5618	A. Prof. Janelle Wheat Deputy Dean education j.wheat@unsw.edu.au Tel: 9385 0752 Or Dr Gavin Edwards Associate Dean (Undergraduate Programs) g.edwards@unsw.edu.au Tel: 9385 6125	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[5] Tel: 9385 5418

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

UNSW Academic Honesty and Plagiarism

What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one's own.
*Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne