University of Glasgow | School of Physics & Astronomy

PHYS1016 & 1017 **SUMMER SCHOOL PHYSICS 1 & 2** **Summer 2018**

Course Description: This is a calculus-based introductory level physics course with a laboratory component for international summer students. The course consists of two consecutive 15 credits 4 week long modules. This intensive course introduces fundamental concepts of physics in the areas of dynamics & relativity, fluids, waves & sound (module 1) heat & thermodynamics, geometrical & wave optics, electromagnetism and quantum phenomena (module 2) as a foundation for more advanced studies in Physics and applications in other areas of science. Competence in basic calculus as well as algebra, geometry and trigonometry is essential. The maths skill test is indicative of the level required.

This course uses a student-centered learning design and employs a flexible approach. The focus of the learning design is on small mentor-lead groups. Students are expected to complete pre-session readings and online assignments, participate in full class discussions as well as contribute in group learning activities. There are regular tests and exercises which provide feedback for both the students and the mentors. The final exam for each the modules accounts for 60% of the final grade with the other 40% being continuous assessment, including laboratory work.

Prerequisites: This course assumes working knowledge from two sequential courses of Single-Variable Calculus (e.g. UC Irvine: Math 2AB, UCLA: Math 3ABC or Life Sciences 30A plus Statistics 13, UCSB: Math 3AB. The titles for equivalent courses at other UC campuses vary.). A minimum grade of C is required.

Textbooks: *Principles of Physics* by Walker, Halliday & Resnick, 10th edition, Wiley, 2014. (Please note: textbook and study material will be provided on arrival.)

Purpose of the Course: The aim of the course is to give students a good basic understanding of the main physics topics and to introduce them to methods of experimental physics. It will provide a good foundation of basic physics for aspiring Physicists as well as being applicable to other areas of science and technology. This course provides the opportunity for students to focus their efforts and accelerate their learning over the summer vacation period.

Student Learning Outcomes: On completion of this course students should understand the basic principles and laws of physics in the following areas: dynamics & relativity, elasticity & fluids, thermal physics, waves & oscillations, geometrical & wave optics, electromagnetism, quantum mechanics and atomic structure. In these aspects of physics, students should be able to:

- state the basic laws of physics topics covered and identify how they can be applied in various contexts;
- perform calculations and give predictions of outcomes in simple physical systems;
- identify relevant physical concepts, formulate solutions to problems and present the solutions in a clear and concise manner;
- perform simple physical and virtual experiments using their mobile phones, computers and a variety of apparatus, including the gathering, interpretation and analysis of data.

Assessment Measures: At the end of this course students will demonstrate knowledge of basic physics by obtaining a pass grade on examinations. Students will also demonstrate the ability to perform physics experiments through successful completion of the laboratory work. Continuous assessment will be provided in the form of regular class tests (summative) as well as online pre-session tests (formative).

Assessment: Assessment of performance in the Introductory Physics course is based on the following components. All contribute to the grade awarded at the end of the year.

Assignments & Tests	20%	Laboratory Work	20%
Final Examination	60%	Total	100%

Each piece of assessment is marked by one person and checked by the class or laboratory head. In the case of the course examination as well as the test papers, each question is marked anonymously by a single marker and checked by the class head. MCQs are marked by an automated system and checked.

Students are awarded grades in the standard way for Glasgow University. These grade and bands are A1, A2, A3, A4, A5, B1, B2, B3, C1, C2, C3, D1, D2, D3, E1, E2, E3, F1, F2, F3, G1, G2, H, N (No credit) and CR (Credit Refused). **There is no exemption from the examination for this course.**

Methods of Instruction: This course uses a mix of "flipped classroom" and "contingent teaching" learning design, which means students are expected to complete pre-session reading and tests while the class sessions focus on mentor led group discussions. This will allow specific issues and problems of the students to be addressed. The key to the success of such a learning design is active participation by each member of the class. By signing up to this class, you are entering into a learning partnership with the mentor and the rest of your peer group where your contributions are vital to the whole group. There is a considerable amount of material to be mastered. You should, therefore, be prepared to work hard.

Laboratory record and assessment: Students are to keep clear and concise records of their laboratory work. These are to be submitted at the end of each lab session and assessed by independent markers.

Attendance Policy: It is the student's responsibility to attend class and laboratory sessions. Completion and submission of a minimum of 70% of course work is required for course credits to be awarded.

Accommodation Statement: Students with disabilities who believe that they may need accommodation are encouraged to contact the school disability coordinator Dr Yao (email: eric.yao@glasgow.ac.uk or ext. 6190) as soon as possible to ensure that such accommodation is implemented in a timely fashion. University of California students are encouraged to contact UCEAP Goleta in the first instance.

Academic Integrity: Please refer to the Senate Office website of the University of Glasgow for a formal statement on Plagiarism (https://www.gla.ac.uk/myglasgow/leads/students/plagiarism/). You can also find other student policy documents on the same website.

Contact Availability: All named teaching staff are dedicated, full-time, to this course (see course schedule table on next page). Students are expected to fully participate in face-to-face as well as on-line class activities. Students are organized into small groups, each with an assigned mentor. There is a significant amount of contact time with peer group mentor during group sessions. Students also have access to all teaching staff during whole class discussion and drop-in sessions. Typical academic contact time is 28 hours per week. Students are encouraged to form study groups or find study partners within the class. This is one of the most effective and rewarding ways to learn and consolidate your learning. This is an intensive course and student should expect ***a minimum workload of 40 hours per week***.

Physics is hard but if you spend time and effort studying it, every student will be able to achieve the goals of this course.