The University Of Sheffield.

DEPARTMENT OF PHYSICS AND ASTRONOMY

PHY115-116	***Professional Skills in Physics & Astronomy***
Academic Yr	***10 Credits***
Staff contact	***Dr K Inskip - k.inskip@shef.ac.uk*** ***Dr Mark Quinn - m.quinn@sheffield.ac.uk*** ***Dr Ashley Cadby - a.cadby@sheffield.ac.uk***

Outline Description	Training in practical laboratory work, Introduction to scientific computing, Errors, uncertainties and data analysis, Techniques of problem solving, Scientific Writing, Positional Astronomy
Restrictions	Restricted to PHYU06 BSc Physics & Astrophysics, PHYU11 MPhys Physics & Astrophysics, PHYU25 MPhys Physics and Astrophysics with Study Abroad
Prerequisites	None
Co requisites	None
Approx Time allocation (hours)	Lectures 15, Prob Solving 10, Labs 25, Independent 50
Assessment (%)	PHY115 Laboratory Work (Physics): 20% Laboratory Work (Astronomy): 35% Computing Assignment: 5% Experimental Uncertainties & Data Analysis Assignment: 10% Problem Solving Assignment: 10% Formal Report: 20% PHY116 Laboratory Work (Physics): 25% Laboratory Work (Astronomy): 30% AC Circuits: 20% Formal Report: 25%
Aims	The ability to pursue a career as a professional physicist relies not only on a sound understanding of the subject itself, but also on a number of skills associated with the execution, understanding, presentation and communication of experimental work and its results. These essential skills include: · the ability to operate commonly-used test equipment; · an understanding of basic measurement techniques; · an understanding of the importance of thorough and effective record keeping; · the ability to plan an investigation; · the ability to manage your time effectively; · an understanding of the techniques of data analysis and of the importance of experimental uncertainties; · an appreciation of the correct approaches to problem solving; · the ability to work as a member of a team;

	· the ability to work with commonly-used computer software packages; · the ability to communicate the results of scientific investigations by means of written reports and oral presentations. The aim of the First Year Professional Skills modules is to provide a thorough grounding in all these aspects, in the context of a laboratory environment. It should be apparent that the vast majority of these skills are not only essential for those intending to become professional scientists: they are a key part of all graduate-level careers. We hope, therefore, that all students will appreciate the importance of this module, regardless of their future career aspirations.
Outcomes	See Aims
Recommended Books	Experimental Methods, Les Kirkup (Wiley).
Syllabus	**Additional Syllabus: Positional Astronomy, Observing & Astrophysical Data Analaysis** This course is designed to equip you with the knowledge and skills needed to plan and carry out astronomical observations. To do this, you will need · an understanding of how and why stars and the Sun appear to move in the night sky, and how this depends on your location on the Earth; · a working knowledge of the definitions and use of the principal astronomical coordinate systems; · an understanding of the principles of spherical trigonometry; · a working knowledge of the definition and use of solar and sidereal time and their dependence on the location of the observer. The *Positional Astronomy* course is designed to deliver this. It is a workshop course, combining lectures with computer exercises, so that you both learn the material and develop skills in applying your new knowledge to solve problems. The computer packages used are fairly self-explanatory, and you do not need any prior experience or knowledge of computer programming. The course culmi-nates in a “driving test” qualifying you to use *ROSA*, the department’s remote-operated telescope. You will then put your skills into practice by carrying out an observational practical exercise using *ROSA*. In semester 2, students will be introduced to virtual observatory software and develop their python programming skills to analyse astrophysical data. This material is delivered via CoCalc online notebooks.
Academic Notes	