The University Of Sheffield.

DEPARTMENT OF PHYSICS AND ASTRONOMY

PHY241	***Observational Astronomy***
Acad Year	***10 Credits***
Staff contact	***Stuart Littlefair - s.littlefair@shef.ac.uk***

Outline Description	This level 2 module builds upon astronomy material taught in level 1 and aims to equip students with the skills and understanding to plan, obtain and analyse optical imaging data of astronomical objects. Topics include astronomical telescopes, instrumentation, electronic detectors and data analysis in the Python computing language.
Restrictions	Core for PHYU06, PHYU11 and PHYU25.
Prerequisites	PHY104, PHY111
Co requisites	PHY242
Approx Time allocation (hours)	12 Lectures:, 5 Problem solving; 15 Laboratory Sessions; 66 Independent; Examination
Assessment (%)	Written examination -60%, homework -20%, Lab work - 20%,
Aims	This unit aims to... 1. provide students with a knowledge of the tools and techniques used in optical astronomical imaging; 2. provide examples of how basic statistical techniques are used in astronomical data analysis; 3. introduce students to the Python programming language, in the context of astronomical data analysis; 4. foster students' ability to plan and carry out experimental tests of scientific hypotheses.
Outcomes	By the end of the unit, a candidate will be able to:

	1. assess the relative merits of different telescope and mounting designs; 2. assess the relative quality of astronomical observing sites; 3. describe the effect of optical aberrations and the Earth's atmosphere, and how they can be corrected; 4. discuss the operating principles of astronomical imagers; 5. summarise the operating principles of CCD detectors; 6. demonstrate the procedures required to reduce and calibrate astronomical data; 7. explain the origin of noise sources, and predict the signal-to-noise ratio of an astronomical observation; 8. discuss the meaning of error bars, and calculate the uncertainties on astronomical data; 9. demonstrate an ability to manipulate and plot data and images in the Python programming language; 10. use the Python language to fit simple models to data; 11. use the Python programming language to perform simple statistical tests.
Recommended Books	To Measure the Sky by Frederick R. Chromey (CUP) ISBN: 9780521747684. How to think like a computer scientist: interactive Python http://interactivepython.org/runestone/static/thinkcspy/index.html
Syllabus	
Academic Notes	