

## School of Physics &amp; Astronomy

## Astronomy (AS) modules

AS1001 Astronomy and Astrophysics 1			
<b>SCOTCAT Credits:</b>	20	SCQF Level 7	<b>Semester:</b> 1
<b>Academic year:</b>	2017/8 & 2018/9		
<b>Planned timetable:</b>	11.00 am lectures, one afternoon chosen from Mon, Wed and Fri with tutorial 2.00 pm - 3.00 and lab 3.00 pm - 5.30 pm		
This module surveys our present state of knowledge of the orbits, surfaces and atmospheres of the planets in our solar system; the structure and evolution of the Sun and other stars, including extra-solar planetary systems; the bizarre menagerie of star-forming regions, violent stellar objects and supermassive black holes found within our own Milky Way Galaxy and in other galaxies; and the large-scale structure and ultimate fate of the expanding Universe. Throughout the module, fundamental observations are interpreted using mathematical models to show how distances and other properties of astronomical objects throughout the Universe have been measured, from the time of Copernicus to the era of the Hubble Telescope and beyond.			
<b>Programme module type:</b>	AS1001 or AS1101 is compulsory for Astrophysics		
<b>Pre-requisite(s):</b>	SQA Higher or A-Level Physics and Mathematics, at grade B or better		
<b>Anti-requisite(s):</b>	AS1002, AS1101	<b>Required for:</b>	AS2001, AS2101
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 or 5 lectures, 1 tutorial and 1 x 2.5-hour laboratory.		
	<b>Scheduled learning:</b> 80 hours	<b>Guided independent study:</b> 120 hours	
<b>Assessment pattern:</b>	<b>As defined by QAA:</b> Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%		
	<b>As used by St Andrews:</b> 2-hour Written Examination = 60%, Class Tests = 15%, Laboratory work = 25%		
<b>Re-assessment pattern:</b>	2-hour Written Examination = 75%, Existing Laboratory work = 25%		
<b>Additional information from School:</b>	Please see also the information in the School's Handbook for First and Second Level modules available via <a href="https://www.st-andrews.ac.uk/physics/staff_students/timetables.php">https://www.st-andrews.ac.uk/physics/staff_students/timetables.php</a> This link also gives access to timetables for such modules.		
<b>Module coordinator:</b>	Dr A Scholz		
<b>Module teaching staff:</b>	Dr A Scholz, Prof I Bonnell, Dr R Tojeiro, Prof M Jardine		

Physics & Astronomy - 1000 & 2000 Level - 2017/8 - August 2017

AS1002 The Physical Universe			
<b>SCOTCAT Credits:</b>	20	SCQF Level 7	<b>Semester:</b> 2
<b>Academic year:</b>	2017/8 & 2018/9		
<b>Planned timetable:</b>	11.00 am		
This module presents a descriptive, largely non-mathematical account of the physical universe. It is aimed at students from across the University. It is divided into two components: concepts in astronomy, dealing with our understandings of the properties and ages of planets, stars, galaxies, and their distributions in space, cosmology and the origin of the Universe; and concepts in physics, dealing with our understandings of the nature of light and matter, the structure of atoms, fundamental particles and their links to cosmology.			
<b>Programme module type:</b>	Available to any degree programme.		
<b>Anti-requisite(s):</b>	AS1001, AS1101, AS2001, AS2012, PH1011, PH1012, PH2011, PH2012		
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> Typically 4 lecture slots, with 4 slots during the semester given to a tutorial/seminar.		
	<b>Scheduled learning:</b> 46 hours	<b>Guided independent study:</b> 154 hours	
<b>Assessment pattern:</b>	<b>As defined by QAA:</b> Written Examinations = 100%, Practical Examinations = 0%, Coursework = 0%		
	<b>As used by St Andrews:</b> 2-hour Written Examination = 50%, Coursework (2 x Class Tests) = 50%		
<b>Re-assessment pattern:</b>	2-hour Written Examination = 100%		
<b>Additional information from School:</b>	<p>The intended learning outcomes of this module are more than just recall of facts, and include the development of interpretation and problem-solving skills relevant to both physics and astronomy, and beyond. Although this module aims to make only limited use of mathematics, competence with mathematics at the level of SQA National 5 (or Standard Grade) or GCSE is required.</p> <p>Please see also the information in the School's Handbook for First and Second Level modules available via <a href="https://www.st-andrews.ac.uk/physics/staff_students/timetables.php">https://www.st-andrews.ac.uk/physics/staff_students/timetables.php</a> This link also gives access to timetables for such modules.</p>		
<b>Module coordinator:</b>	Dr M Dominik		
<b>Module teaching staff:</b>	Dr M Dominik, Dr H Zhao		

AS1101 Astrophysics (Direct Entry)			
<b>SCOTCAT Credits:</b>	5	SCQF Level 7	<b>Semester:</b> 1
<b>Academic year:</b>	2017/8 & 2018/9		
<b>Availability restrictions:</b>	Available only to Direct Second level Entry students in Physics or Astrophysics		
<b>Planned timetable:</b>	11.00 am (4 hours of lectures/tutorials every ~ 2 weeks)		
This module provides a streamlined introduction to the science of astrophysics for students who have taken direct entry to Second level and who are planning to take level two astrophysics later in the same academic session. It covers the essential items of observational astrophysics and how the radiation that is detected on Earth can be used to develop a physical model of the Sun, stars, planets, our Galaxy and external galaxies as well as the Universe as a whole. Topics will include stellar evolution, the rotation curves of galaxies and the need for Dark Matter as well as the expanding Universe, Dark Energy and cosmology.			
<b>Programme module type:</b>	Compulsory for Direct Entry to Second Year students in Astrophysics BSc and MPhys		
<b>Pre-requisite(s):</b>	Direct entry to level two at the University of St Andrews with a degree intention of Astrophysics, Physics, Theoretical Physics or a joint degree with one of these.		
<b>Co-requisite(s):</b>	PH2011 <del>and PH1501</del>	<b>Anti-requisite(s):</b>	AS1001, AS1002, PH1501
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1.5-hour lecture (x 8 weeks), 2.5-hour practical work (x 2 weeks) 1-hour tutorial (x 4 weeks)		
	<b>Scheduled learning:</b> 23 hours	<b>Guided independent study:</b> 27 hours	
<b>Assessment pattern:</b>	<b>As defined by QAA:</b> Written Examinations = 75%, Practical Examinations = 0%, Coursework = 25%		
	<b>As used by St Andrews:</b> Coursework (Class test = 50%, laboratory work = 25%, take-home exam = 15%, online quizzes = 10%) = 100%		
<b>Re-assessment pattern:</b>	1-hour Written Examination = 75%, Existing Laboratory work = 25%		
<b>Additional information from School:</b>	Please see also the information in the School's Handbook for First and Second Level modules available via <a href="https://www.st-andrews.ac.uk/physics/staff_students/timetables.php">https://www.st-andrews.ac.uk/physics/staff_students/timetables.php</a> This link also gives access to timetables for such modules.		
<b>Module coordinator:</b>	Dr A-M Weijmans		
<b>Module teaching staff:</b>	Dr A-M Weijmans		

Physics & Astronomy - 1000 & 2000 Level - 2017/8 - August 2017

AS2001 Astronomy and Astrophysics 2				
<b>SCOTCAT Credits:</b>	30	SCQF Level 8	<b>Semester:</b>	2
<b>Academic year:</b>	2017/8 & 2018/9			
<b>Planned timetable:</b>	11.00 am lectures, Tue or Fri afternoons 2.00 pm - 3.00 pm tutorial and 3.00 pm - 5.30 pm lab			
This module comprises four lecture courses which extend knowledge gained in the first level module AS1001, and discuss recent developments in the subject: (i) observational techniques - modern telescopes; instruments and detectors for gamma-, X-, uv, optical, IR and radio radiation; spherical astronomy and essential coordinate systems; (ii) the structure and evolution of stars - nucleosynthesis, stellar properties as a function of age, a complete understanding of the HR diagram; (iii) exoplanetary science - theoretical and observational studies of planetary systems beyond our own; (iv) galactic astronomy - the distribution and motion of stars, gas, dust, and dark matter in our Milky Way and other galaxies.				
<b>Programme module type:</b>	Compulsory for Astrophysics (First Year Entry)			
<b>Pre-requisite(s):</b>	AS1001 or AS1101, PH1011, PH1012 and MT1002.	<b>Anti-requisite(s):</b>	AS2101	
<b>Required for:</b>	Either AS2001 or AS2101 is required for AS3013, AS4010, AS4011, AS4021, AS4022, AS4023, AS4025, AS5003.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 lectures, 1 tutorial and 1 x 2.5-hour laboratory session.			
	<b>Scheduled learning:</b> 85 hours		<b>Guided independent study:</b> 215 hours	
<b>Assessment pattern:</b>	<b>As defined by QAA:</b> Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	<b>As used by St Andrews:</b> 3-hour Written Examination = 60%, 2 x Class Tests = 15%, Laboratory work = 25%			
<b>Re-assessment pattern:</b>	3-hour Written Examination = 75%, Existing Laboratory work = 25%			
<b>Additional information from School:</b>	Please see also the information in the School's Handbook for First and Second Level modules available via <a href="https://www.st-andrews.ac.uk/physics/staff_students/timetables.php">https://www.st-andrews.ac.uk/physics/staff_students/timetables.php</a> This link also gives access to timetables for such modules.			
<b>Module coordinator:</b>	Prof A Cameron			
<b>Module teaching staff:</b>	Prof A Cameron, Dr A Mortier, Prof K Horne, Dr C Cyganowski			

**Physics & Astronomy - 1000 & 2000 Level - 2017/8 - August 2017**

<b>AS2101 Astrophysics 2</b>				
<b>SCOTCAT Credits:</b>	15	SCQF Level 8	<b>Semester:</b>	2
<b>Academic year:</b>	2017/8 & 2018/9			
<b>Availability restrictions:</b>	Normally available only to those who took "direct entry" to second year			
<b>Planned timetable:</b>	11.00 am lectures, plus Tue or Fri 2.00 pm - 3.00 pm tutorial			
This module is designed to extend the knowledge gained in the first level AS1001 or AS1101 module and to prepare the way for more advanced material appearing in the honours astrophysics modules. The module has three basic components dealing with the physics of stellar structure and evolution, the components and dynamics of galaxies, and exoplanetary science - theoretical and observational studies of planetary systems beyond our own . The module is based on the physical principles and mathematical techniques acquired earlier, and applied to the astrophysical concepts covered in AS1001 or AS1101.				
<b>Programme module type:</b>	Compulsory for Astrophysics (Direct Second Year Entry)			
<b>Pre-requisite(s):</b>	AS1001 or AS1101, MT1002, PH2011	<b>Anti-requisite(s):</b>	AS2001	
<b>Required for:</b>	Either AS2001 or AS2101 is required for AS3013, AS4010, AS4011, AS4021, AS4022, AS4023, AS4025, AS5003.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 3/4 lectures and 1 tutorial.			
	<b>Scheduled learning:</b> 50 hours		<b>Guided independent study:</b> 100 hours	
<b>Assessment pattern:</b>	<b>As defined by QAA:</b> Written Examinations = 100%, Practical Examinations = 0%, Coursework = 0%			
	<b>As used by St Andrews:</b> 2-hour Written Examination = 80%, 2 x Class Tests = 20%			
<b>Re-assessment pattern:</b>	2-hour Written Examination = 100%			
<b>Additional information from School:</b>	The School recommends that students who took AS1101 or the Gateway Astronomy course select AS2001 rather than AS2101. Please see also the information in the School's Handbook for First and Second Level modules available via <a href="https://www.st-andrews.ac.uk/physics/staff_students/timetables.php">https://www.st-andrews.ac.uk/physics/staff_students/timetables.php</a> This link also gives access to timetables for such modules.			
<b>Module coordinator:</b>	Prof A Cameron			
<b>Module teaching staff:</b>	Prof A Cameron, Dr A Mortier, Prof K Horne, Dr C Cyganowski			