



University
of Glasgow | School of Physics
& Astronomy

EXPLORING THE COSMOS 1Y

Exploring the Cosmos 1Y

Course Information Guide 2023 –24

This course is intended to give a survey of our present understanding of observational astronomy, stars and cosmology for students not wishing to enter an Honours course in Astronomy.

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1 Welcome statement from Head of School

As the Head of School of Physics and Astronomy, I would like to welcome you to your new class. The School prides itself in providing an excellent and supportive learning and teaching environment that is fully integrated with our research; you will have the opportunity to interact with world-leading researchers working at the cutting edge of a wide range of fields of physics and astronomy, who are tackling some of the biggest contemporary challenges in science and technology.

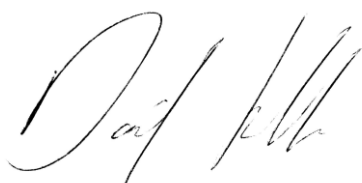
During the pandemic, our staff developed new ways of delivering high quality learning and teaching, and have been working to combine these with our traditional approaches. This is an ongoing process of development, and I ask that you engage with us through any of the available communication channels in letting us know what works and what does not.

One thing that will not change is the School's firm commitment to supporting equally the careers and development of all its students and staff, as exemplified by our receipt of an Athena Swan Silver award. We value the diversity of our student body and recognise that this diversity improves the quality of our work by bringing a wide range of skills and viewpoints. We therefore expect that all staff and students will work productively and professionally together in an atmosphere of mutual respect.

To support this, all our staff and graduate students undertake equality and diversity training, our lab guides include a code of conduct for students, supplementing the University code^[1], and we support the University's Dignity at Work and Study policy^[2]. You can be assured that any instances of bullying, harassment, or offensive language or behaviour will be both taken seriously by the School and treated with sensitivity. Points of support for students are your adviser of studies, your Class Head and Lab Head, and in addition the School has two appointed Equality and Diversity offices, to whom students may speak in confidence.

I wish you success with your current and future studies

Best wishes



Professor David Ireland
Head of School

^[1] [University of Glasgow - MyGlasgow - Academic Policy & Governance - Student Contract](https://www.gla.ac.uk/myglasgow/humanresources/equalitydiversity/dignityworkstudyover/)
<https://www.gla.ac.uk/myglasgow/humanresources/equalitydiversity/dignityworkstudyover/>

2 General Information and Introduction

Fast Facts	
Course title	Exploring the Cosmos 1Y
Course Credits	20 level 1 credits
Semesters taught	2 nd Semester
Essential Prerequisites, corequisites	none
Important dates:	Class tests
Class test(s)	Friday 2 February, 23 February, 15 March 2023
Class Head	Dr Christopher Berry
Deputy Class Head	Dr Sophie Renner

3 Course Description

This course is intended to give a survey of our present understanding of the solar system, for students not wishing to enter an Honours course in Astronomy. It aims to bring these students (whether in the Arts, Science, or Social Science Faculties) some understanding of how data are gathered, evidence assessed and arguments conducted in a physical science.

3.1 Intended Learning Outcomes

To survey our present understanding of the structure and evolution of stars, galaxies, and the Universe as a whole and how this is derived from investigating the full range of radiation reaching the Earth.

3.2 Course structure

§ Exploring the Cosmos (ExCos) 1Y runs through the second teaching semester – i.e., from January to March. The degree examination then follows in April/May.

§ The module carries 20 level 1 credits.

§ Within the module there are 5 lecture course topics. Each of these comprises of 8 lectures and one tutorial.

§ There are no practical classes.

§ The Class Head is Dr Christopher Berry. If you have any questions or concerns regarding the course, please contact Dr Berry either in person or electronically. His office is Room 463 of the Kelvin Building and email address is christopher.berry.2@glasgow.ac.uk. The Class Head and Deputy Class Head may be both reached via phas-classhead-ExCos@glasgow.ac.uk.

3.3 Timetable

§ All lectures take place at 13:00 Monday to Friday. The lecture room changes day to day, but is typically the same for each day of the week. Details can be found via the University's timetabling app.

§ Class tests are held on specific Fridays indicated in the timetable. The tests are taken online, and so students may take the test anyway with a stable Internet connection.

§ The detailed lecture and class test timetable is available on the class Moodle website. The timetable itself may occasionally change due to personnel constraints.

3.4 Handouts

§ Electronic handouts will be posted on Moodle for each of the lecture courses. These are available electronically via the Moodle site prior to the relevant class test.

3.5 Announcements

Class announcements will be made in one or more of the following ways:

§ Electronically via the Exploring the Cosmos 1Y Moodle website.

§ At the start of lectures – please try and arrive promptly each day so you do not miss anything. It is also a courtesy to your lecturers and fellow students.

3.6 Moodle

Moodle is a Virtual Learning Environment. As with all other courses offered by the Department of Physics and Astronomy, ExCos1Y will use Moodle in various ways: it will be the main source of class announcements; it will provide lecture notes for downloading and various revision/study aids. There is also a social forum on the ExCos1Y Moodle site, which is a safe space where you can interact with your colleagues about whatever you like (this forum will be moderated by the Class Head and any use which contravenes the University's strict rules on the use of the internet will be acted upon).

3.7 Assessment

3.7.1 Class tests

- § Three 30 minute tests will be held in normal class time.
- § The class tests will together contribute 30% of the total mark.
- § Each test consists of 30 multiple -choice questions, covering all the course modules being taught at the time of the test.
- § The class tests will be run online via Moodle, and marked automatically following the closing of the test. Queries about your results should be directed to the Class Head as soon as possible.
- § As the class test is online, you may take it anywhere. For those in need of a quiet space on campus, a lecture theatre is reserved, but you will need to provide your own device for taking the class test. Computers for use by students can also be found in the University Library and various departmental computer rooms, but we do not have them reserved for the time of the class test.

3.7.2 Degree examination

- § A two hour paper at the end of the module in April/May will contribute to 70% of the total assessment. This paper will consist of multiple-choice questions and a choice of long-form.
- § The multiple-choice questions will be computer marked, and the long-form questions will be marked by the lecturer or other academic staff.
- § The overall grades will be determined by an Examination Committee, which includes an External Examiner, who makes the final decision in borderline cases. The examination results are published by the University Registry.
- § Appeals, on grounds of unfair procedure or medical evidence, may be made to the Faculty of Physical Sciences, following the Code of Procedure set out in the section 'University Fees and General Information for Students' of the University Calendar. Medical certificates or other letters explaining absence from the final examination have to be *submitted to the Registry, normally within 7 days of the examination*. The Registry intends to enforce this regulation strictly.

3.7.3 Resits

- § Students awarded grade E, F, G, H or CW after the end of module degree examination or absent from examination due to illness will have the opportunity to resit this examination in August. Those with a CR grade (Credit Refused) cannot, so it is important to attempt the class tests.
- § An opportunity for re-assessment will be provided for the degree examination paper for Exploring the Cosmos 1Y.
- § For all other assessment components of Exploring the Cosmos 1Y there will be no re-assessment opportunity routinely available, due to the impracticality of such provision. This policy has been adopted with the approval of the Head of School and following the recommendation of the Physics and Astronomy Learning and Teaching Committee. Students who miss all three class tests may take the supplemental class test, which covers all of the course material, and is not a direct re-assessment of any one of the original class tests.

3.8 Course Materials

§ The textbook for this course is *The Cosmic Perspective* by Bennett, Donahue, Schneider and Voit. This is published by Pearson Addison Wesley. This book is not essential for this course, but provides additional context and explanation to accompany the material in lectures.

3.9 Minimum requirements to avoid CR

Students are expected to attend all the lectures and to make a serious attempt at all 3 class tests. The marks from the 3 tests contribute 30% towards the final assessment – i.e., each test is worth 10% of your final mark.

§ To receive credit for this module, you must sit a ***minimum of one class test***. To mitigate the potential of students failing the course due to missing all the class tests, a supplemental class test will be offered to those who miss all 3 of the regular class tests. The supplemental class test will follow the same format as the other tests, be worth 10% of the final mark (replacing one of the three misses tests), and cover material from the entire course. Following the supplemental class test, those students who have not attended any test will normally be registered as not completing the module: credit will be refused (CR grade) and no grade points awarded.

§ Those attending only 1 test may take the end of course examination and will be considered by the examination committee. If awarded an H or N grade, also giving no credit or grade points, they may resit once.

§ If you are finally awarded CR, H or CW grade you will probably have to take this class again, or an extra class in a later year.

3.10 Withdrawal

If you wish to leave the class to enroll in another class, you must get approval from your Adviser of Studies and inform the Class Head in writing or by email.

3.11 Less abled Students

Students should have these assessed by the University Disability Service. Please also discuss any special requirements or arrangements with the Class Head as soon as possible. The Class Head is not automatically informed of updates to accommodations recommended for assessments, so please send details ahead of Class Tests.

3.12 Conduct

University policies on student conduct can be found at <https://www.gla.ac.uk/myglasgow/apg/studentcodes/conduct/studentconductstudents/>. Included in this is the University's policy on plagiarism. The Class Head will take a dim view of any student shown to be plagiarising another's work. This includes copying or sharing questions in the class tests and/or degree examinations. Discussing work outside of assessments is encouraged, but answers to assessments must be a fair representation of your own work.

Outside of academic behaviour, students are expected to act respectfully towards their peers and members of teaching staff. University guidelines on how the dignity of staff and students should be ensured are found at <https://www.gla.ac.uk/myglasgow/equalitydiversity/dignityworkstudyover/>.

3.13 Working together

On a friendlier note, as this is a large class containing people from different educational and social backgrounds, you are encouraged to make an effort to get to know others in the class. Studying with your peers is an excellent way to learn.

3.14 Complaints Procedures

If you have a complaint please raise it with a member of staff in the area concerned. We aim to provide a response to the complaint within five working days. This is Stage 1.

If you are not satisfied with the response provided at Stage 1 you may take the complaint to Stage 2 of the procedure. Similarly, if your complaint is complex, you may choose to go straight to Stage 2. At this stage the University will undertake a detailed investigation of the complaint, aiming to provide a final response within 20 working days.

You can raise a Stage 2 complaint in the following ways:

by e-mail: complaints@glasgow.ac.uk; by phone: 0141 330 2506

by post: The Senate Office, The University of Glasgow, Glasgow, G12 8QQ

in person: The Senate Office, Gilbert Scott Building, The University of Glasgow.

Complaints do not have to be made in writing but you are encouraged to submit the completed Complaint Form (available at: <https://www.gla.ac.uk/connect/complaints/>) whether it is at Stage 1 or Stage 2. This will help to clarify the nature of the complaint and the remedy that you are seeking.

Remember that the SRC Advice Centre is available to provide advice and assistance if you are considering making a complaint. (Tel: 0141 330 5360; e-mail: advice@src.gla.ac.uk)

4 Course Component Details

4.1 Content overview

ExCos 1Y is split into 5 main lecture courses plus an Introduction lecture :

Introduction

Dr Christopher Berry

Stars & Stellar Structure:

Dr Christopher Messenger

A closer look at our Sun and other stars.

Life & Death of Stars:

Dr David Millar

The evolution of stars from birth to death.

Galaxies & Large Scale Structure

Dr James Howarth

Our galaxy and beyond.

Mapping the Universe:

Dr Christopher Berry

How we observe the Universe.

Particles, Forces & the Big Bang:

Prof. Craig Buttar

The Universe – how it came about and what's in it.

4.2 Course component aims

4.2.1 Introduction

Aims:

- § To familiarise students with the jargon of basic astronomy beyond the solar system, and give an overview of the course ExCos 1Y.
- § To relate our Solar System to the wider and larger cosmic context of distances and objects, including stars and galaxies.
- § To convey power-of-10 notation and introduce cosmic distance scales such as astronomical unit, light year, parsec, etc.

4.2.2 Mapping the Universe

Aims:

- § To describe the instruments and observational techniques used by Astronomers to map the Universe.
- § To discuss the distorting effects of the Earth's atmosphere on ground-based observations.
- § To describe, in addition to optical instruments, telescopes for studying radio waves, X-rays, gravitational waves and neutrinos, and the view of the Universe that they give.
- § To understand the relative merits of different types of observations and observatories, and the merits of combining different types of observations.

4.2.3 Stars & Stellar Structure

Aims:

- § To consider the basic nature of the stars and to compare them with the Sun.
- § To define the physical quantities that describe stars and determine their structure.
- § To examine the observations that can be made of individual stars to see what can be deduced from them and to understand their practical limitations.
- § To classify the stars so that we may recognise their similarities and their differences.
- § To examine the surface detail that is observable on the sun alone and to identify evidence for similar phenomena on other stars.

4.2.4 Life & Death of Stars

Aims:

- § To consider stellar clusters – their types and value for studying stellar evolution.
- § To discuss young clusters of stars.
- § To discuss the evolution of stars like our own and more massive stars.
- § To discuss the fate of extremely massive stars – supernovae.
- § To discuss the properties of white dwarfs and neutron stars.
- § To discuss the production and properties of black holes.

4.2.5 Galaxies & Large Scale Structure

Aims:

- § To obtain a picture of our galaxy, the Milky Way, and our position in it.
- § To describe some of the techniques used to study galaxies and, in particular, to measure distances on the galactic scale.
- § To look at galaxies outside our own and see what that teaches us about the structure of galaxies in general.
- § To compare different galactic forms and how they may have arisen in evolution from some pre-galactic cloud.
- § To look at the universe on larger scales, that of galactic clusters and superclusters, and discuss evidence that the universe is expanding.

4.2.6 Particles, Forces & the Big Bang

Aims:

- § To understand the current cosmological models as well as more historical views.
- § To understand current models/theories describing the expansion of the Universe.
- § To discuss the contents of the Universe from quarks upwards.
- § To describe the Big Bang model.
- § To discuss the mass of the Universe and the role of dark matter.

5 Attendance and Adverse Circumstances

Students are expected to attend all lectures, tutorials and class tests. The lectures define this course, and provide a chance to interact with the lecturers, so you must attend them. Lectures are recorded for students to catch up should a lecture be missed, and students are expected to keep up-to-date with lectures. This course guide gives a synopsis of what we expect to teach but minor variations may be made. The prescribed textbook is a good resource, and you are expected to have access to a copy. It should be used in conjunction with your lecture notes. Reading is not a substitute for attending lectures and engaging with your lecturers.

You must attend all class tests, unless unable to do so for medical or other good reasons. If you are unable to take a class test, you should **email the Class Head** as soon as possible to explain the issue. If you miss a class test, or if you believe your performance has been affected by adverse circumstances, you should submit a **Good Cause Claim**, and this must be via MyCampus.

Submission of a Good Cause Claim is the mechanism that allows your circumstances to be considered by the Board of Examiners. Please note all Good Cause Claims must be submitted within **one week** of the date of the affected assessment.

Students should note that the University's Code of Assessment allows grades to be awarded only on the basis of demonstrated work. So, if you feel that some piece of assessed work has been affected by adverse circumstances, and if staff agree, then the only course of action available is for the grade for that piece of work to be set aside (in the case of continuously assessed work and class tests) or to allow a resit (in the case of Degree Exams) – marks cannot be adjusted.

To submit a Good Cause Claim on MyCampus:

1. Go to the 'Student Centre' and select *My Good Cause* from the Academics menu.
2. Select the relevant course(s).
3. Complete the report in MyCampus (there is provision for particularly sensitive information to be provided separately, outwith the system, but a claim report must still be entered into MyCampus).
4. Add supporting evidence by uploading documents. (Scanners are available on level 3 of the University Library.) It is the responsibility of the student to keep all original documentation and submit it to the Class Head on request.

If you encounter any difficulties with this process, please contact the Class Head immediately to let them know you have a problem with your Good Cause Claim.

What will happen to your Good Cause Claim

The Course Administrator and/or Class Head will ensure that your claim is considered and this will be in accordance with the section of the Code of Assessment which covers incomplete assessment and good cause (paragraphs 16.45 to 16.53). The outcome of your claim will be posted into the Approval Information section on your Good Cause Claim in MyCampus. If it is accepted that your assessment was affected by good cause, the work in question will be set aside and you will (as far as is practicable) be given another opportunity to take the assessment with the affected attempt discounted.

For absences that are significant but for which a Good Cause Claim is not being filed, students must complete a **MyCampus absence report**. A significant absence is defined to be:

- an absence of **more than seven consecutive days** during working periods
- an absence of **any duration** if it prevents a student from for example fulfilling any minimum requirement for the award of credit (e.g., missing attendance at one day of a two-day laboratory, but where the work was nonetheless submitted and therefore not involving a Good Cause claim).

All potentially significant absences should be reported as soon as is practical, by completing part 1 of the MyCampus absence report. Part 2 of the MyCampus absence report should be completed on return to university. The normal submission deadline for the completed absence report is 7 days after return to university. Documentary evidence is required when reporting any significant absence.

See also the Senate Office Absence Policy:

<http://www.gla.ac.uk/services/senateoffice/policies/studentsupport/absencepolicy/>

There will normally be no chance to take missed tests at a later date, but if the Class Head accepts that you have good cause for having missed tests, you will be excused from these assessments so that your overall mark is not impacted. As all students must sit at least one class test to receive credit, the Class Head will generate one supplemental class test (of similar format to the other class tests, but covering all course material) to be sat by any students who have missed all the other class tests.

If you have another class which clashes regularly with the ExCos lecture time you should arrange to have this changed; otherwise you risk missing a large fraction of one of the ExCos courses and failing the module.

6 Student societies

[PhySoc](#) and [AstroSoc](#) are student run societies that arrange evening lectures and events during the year. [oSTEMGlasgow](#) is a society set up by physics students to support gay, lesbian, bisexual, transgender and other students in science and engineering subjects.

7 Getting help and advice

The University offers a range of services to students, including counselling and study advice, it is always better not to suffer in silence, but to talk to someone and seek advice from the appropriate resources that are provided for this purpose. Information on how to reach out can be found at <https://www.gla.ac.uk/myglasgow/counselling/>.