

Offer Holders' Day Physics and Astronomy

Laura Cowan, PhD Student

WORLD CHANGERS WELCOME



Programme overview

- Why physics and astronomy at Glasgow?
- The study of physics and astronomy offers a fundamental understanding of the way the Universe works.
- It brings you to the very forefront of technology.
- Some of the technologies you might be working on in the future do not yet exist.
- It opens career paths in science, engineering, industry, finance, teaching, and many more sectors.



Why is Physics important?

- > 1,000 000 employee jobs in UK in sectors where the use of physics-based technologies or expertise is critical. This is equivalent to 4% of all jobs in the UK.
- Gross value added (GVA) due to the physicsbased sectors is about £77 billion, making up 8.5% of the economic output of the UK.
- Productivity levels in physics-based sectors in Scotland almost twice as high as the UK average.





Why study physics?

Figure 8: Comparison of stated earnings between 2009 and 2014



Source: IoP, Physics in Scotland: the brightest minds go further, 2014



Why study physics?

Figure 4: Current sector of employment of respondents (%)

education - university electronics, electrical and IT other manufacturing or research other industry government - other consultancy financial services education - school education - other other service industry oil and petrochemicals aerospace government – research laboratory health and care telecomms armed forces



% of employment

Source: IoP, Physics in Scotland: the brightest minds go further, 2014





Diversity and Equality

 Glasgow University has attained Athena Swan silver status.





Learning & teaching

- We teach our students to use physics and maths to investigate and explore the nature of the universe.
- We strive to encourage an in-depth and integrated understanding of modern physics and astronomy.
- We promote a wide range of transferable skills to prepare students for many possible careers.
- At the heart of our learning and teaching strategy are the concepts of:
 - Student-centered learning
 - Graduate attributes
 - Research-led teaching



Astronomy and Astrophysics





- Astronomy and Astrophysics
- Institute for Gravitational Research





- Astronomy and Astrophysics
- Institute for Gravitational Research
- Optics:
- Imaging concepts
- Optics
- Quantum information





- Astronomy and Astrophysics
- Institute for Gravitational Research
- Optics:
 - Imaging concepts
 - Optics
 - Quantum information
- Materials and Condensed Matter Physics





- Astronomy and Astrophysics
- Institute for Gravitational Research
- Optics:
 - Imaging concepts
 - Optics
- Quantum information
- Materials and Condensed Matter Physics
- Nuclear Physics





- Astronomy and Astrophysics
- Institute for Gravitational Research
- Optics:
 - Imaging concepts
 - Optics
- Quantum information
- Materials and Condensed Matter Physics
- Nuclear Physics
- Particle Physics
 - Experimental
 - Theoretical





Research Highlights: Discovery of the Higgs Boson

In 2012, teams of scientists at the LHC in CERN announced the discovery of the Higgs Boson – the final piece of the Standard Model of Particle Physics. The Glasgow group has played a leading role in the ATLAS programme for over twenty years.





Research Highlights: The detection of gravitational waves

After more than thirty years leading international research, the Glasgow team was at the heart of the revolutionary 2016 discovery of gravitational waves. Ultra-sensitive detectors in the US observed two black holes colliding 1.8 billion years ago. The energy released in the collision was more than the energy from all the stars in the universe.





Research Highlights: Quantum imaging hub

Glasgow was awarded £29 million in 2014 to work in partnership with industry and translate our world-leading discovery science into revolutionary imaging systems that will benefit the UK economy across commercial, scientific and security sectors.





Degree Programmes

- The Glasgow ethos is to allow students to keep their options flexible for as long as possible.
- The choice of degree subjects can be made at the end of 2nd year.
- The choice of whether to study for a BSc (4 years) or MSci (5 years) degree can be made in the middle of 3rd year.
- All BSc and MSci degrees offered in Physics and Astronomy are accredited by the Institute of Physics.
- Several specialised Postgraduate Taught Masters programmes have recently been introduced.





Physics 1

- The class meets daily, at 9am or at 1pm.
- There are weekly tutorials, and weekly laboratory workshops
- Topics studied include:
 - optics, waves and lasers
 - dynamics and relativity
 - quantum phenomena
 - electricity and magnetism





Astronomy 1

- The class meets daily at 10am.
- There are fortnightly tutorials and practical sessions at the observatory.
- Topics include stellar physics, positional astronomy, cosmology and astronomical observations.

Exploring the Cosmos 1

- A popular non-mathematical astronomy course, which can be taken by any student.
- EXCOS1 (or Astronomy 1) is required for the Physics with Astrophysics degree.





Student Societies

- There are two student societies which organise a programme of guest lectures and social events for students and staff.
- Physoc has an annual ceilidh.
- Astrosoc has an annual Burns' supper.
- Other events include beer & doughnuts, film screenings, laser tag and observing nights..



WORLD CHANGERS WELCOME



Physics 3 Group Project

- Students gain laboratory and computational research skills, experience in team work, presentations and report writing.
- The range of projects include:
 - X-ray radiography
 - Biophysical thermography
 - Compton camera
 - Holography
 - Temperature stabilization
 - Java programming





Summer Internships

- The first experience in the research environment for many of our students is during a summer internship within the school.
- These are usually six-week long paid placements, during which students can further improve their research and interpersonal skills.
- The research covered during these internships covers the full range of our research groups: from applied to fundamental research; from the smallest to the largest distance scales.





Final year project

- Physics and astronomy students spend a significant portion of their final year working on an independent research project.
- Embedded in one of our 9 research groups, students are given the opportunity to make a lasting contribution to world leading research.
- Examples from recent years include:
 - Top quark physics
 - Blood flow imaging
 - Quantum encryption techniques
 - Advanced Sagnac interferometers





Why Physics and Astronomy?

- Our flexible degree programmes promote:
 - A logical and numerate mind;
 - The ability to solve problems;
 - Communication skills, developed through report-writing and presentations;
 - Cutting-edge computational and experimental skills;
 - Teamwork, planning, initiative and flexibility (essential for lab work and projects).





Why Glasgow?

- Student-centered learning
- Excellent teaching
- One-to-one student support
- A research-led department
- Student research opportunities
- An attractive campus in a cosmopolitan city





Thank you

Marketing-brand@glasgow.ac.uk

1 40 ---





i i 14

...



UofGlasgow

in Þ

Search: University of Glasgow

#UofGWorldChangers



Extra slides



Course structure

	Semester 1	Semester 2
Year 1	Provide titles of modules covered in year 1, semester 1	Provide titles of modules covered in year 1, semester 2
Year 2	Provide titles of modules covered in year 2, semester 1	Provide titles of modules covered in year 2, semester 2



Course structure

	Semester 1	Semester 2		
Year 3	Provide information regarding year three content and optional honours modules.			
Year 4	Provide information regarding yea modules/industry placement, rese	ar four content (optional honours earch project/dissertation etc.)		



Course structure

	Semester 1	Semester 2		
Year 3	Provide information regarding year three content and optional honours modules.			
Year 4	Provide information regarding year 4 content (optional honours modules/ work placement/industry placement/ dissertation/ research project etc.)			
Year 5	Provide information regarding year 5 content (optional honours modules/ work placement/industry placement/ dissertation/ research project etc.)			



1 Contraction

Core modules

 Provide title and expand detail of core modules in year 1&2



Optional modules

- Provide examples and expand detail of optional modules
- Provide link to course catalogue: <u>www.glasgow.ac.uk/coursecatalogue</u>



Example lecture timetable

	Mon	Tue	Wed	Thur	Fri
9-10am					
10-11am	Tutorial: Politics	Meeting: Advisor of Studies		Tutorial: Sociology	
11-12am					Meeting: study group
12-1pm	Lecture: Sociology	Lecture: Sociology		Lecture: Sociology	Lecture: Sociology
1-2pm		Lecture: Politics	Lecture: Politics	Lecture: Politics	
2-3pm	Lecture: Economics	Lecture: Economics	Lecture: Economics	Lecture: Economics	Lecture: Economics
3-4pm					
4-5pm		Tutorial: Economics	Judo		
5-6pm	Meeting Politics club		obul		



Assessment

- Exam versus course work weighting.
- Examples of assessed course work.
- Are any practical assessments included?
- Number of exams and when they happen.





Reading list

- Provide year 1 key text information.
- If this is not possible please provide information outlining when and where this will be available.



Facilities

Include any facilities or building information specific to subject, for example...

Sara

English Language facilities at Glasgow include a phonetics laboratory and recording studio with acoustic analysis software.

Astronomy lectures are complemented by our observatory, planetarium and telescope facilities.



Study abroad

- Provide information regarding study abroad opportunities.
- What year does this take place?
- Does this programme work with any affiliated universities via Erasmus?
- You may wish to provide examples of previous student destinations/ experiences.



Fieldwork & excursions

- Include information relating to any fieldwork or excursions incorporated within programme, for example...
 - First year Scottish Literature students enjoy a week long reading week on the Isle of Arran.
 - Third year Zoology students take part in field courses on Loch Lomond and at the Marine Biology Station on the Isle of Millport.

TITTE T



Working with industry

- Incorporate any information relating to industry partnerships, for example...
- Engineering students work closely with industry throughout the programme which may lead to internship and employment opportunities.
- A number of Accountancy tutorials are led by external tutors. These professional accountants offer the opportunity to learn from their experience.



Accreditations

- Include accreditations if applicable.
- Outline how this benefits students on graduating.





Careers

- Outline career pathways from your subject.
- Provide graduate destinations by company/sector if possible e.g. last year 20 graduates went on to work for Proctor & Gamble
- Provide examples of past students and their current employment.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
 - We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
 - We recommend that you use headings or bullet points
 - Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





Thank you

Marketing-brand@glasgow.ac.uk

1 40 ---





i i 14

...



UofGlasgow

in Þ

Search: University of Glasgow

#UofGWorldChangers



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



Why study Physics

- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



• Your body text should be min font size 16 and we recommend that you use the images we have provided

- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.





- Your body text should be min font size 16 and we recommend that you use the images we have provided
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.



- Your body text should be minimum size 16.
- We recommend that you use headings or bullet points
- Your audience want to hear and see you present not read from a slide.
- To insert an image, right-click (ctrl + click Mac) and select 'send to back', to place it behind the University marque at the top.