



The
University
Of
Sheffield.

Department of Physics
& Astronomy.

Third & Fourth Year Information 2011-2012

August 2011

THE THIRD AND FOURTH YEAR PROGRAMMES

This section is intended to provide a summary of important course information for third and fourth-year students taking single or dual honours BSc or MPhys degrees involving Physics and/or Astronomy. It should be read in conjunction with the Department's "*Degree Programmes and Module Descriptions*" on the departmental webpage, which provides detailed information on the courses offered.

1. Year Tutors

3rd Year Physics and BSc Course Tutor: Dr Chris Booth

3rd and 4th Year Astronomy Tutor: Prof Paul Crowther

4th Year Tutor and MPhys Tutor for Physics: Dr Ed Daw

Dr Booth, Prof Crowther and Dr Daw will be happy to advise you if you have any questions or problems regarding your degree course. Course information will be available on the year web sites. Follow links from <http://www.shef.ac.uk/physics/teaching> to reach these sites.

Information will also be posted on the Astronomy noticeboard outside the astronomy lab (E36), the 3rd year noticeboard next to room E34 and the MPhys noticeboard opposite the second year physics lab (E30). Students may also be sent information by e-mail. All students are expected to check the relevant web sites and noticeboards and e-mail on a regular basis.

2. Teaching and Learning in Physics

Introduction

Most physics lecture courses follow the same pattern as in years 1 and 2, although some courses, especially in the 4th year, will involve independent or student-led learning. Further details are given in the relevant module descriptions. One major difference in the 3rd and 4th years is that there are no tutorials. However, students are strongly encouraged to discuss any academic problems with the relevant course lecturers, or with their adviser. Advisers will also do their best to help with any other problems, and to provide guidance on module choice, postgraduate studies etc. In addition you may contact your tutor from Year 2 who is also available to provide support and guidance.

Third Year Progression

For students on the BSc, there are two requirements that must be satisfied in order to graduate with an honours degree, in addition to obtaining an adequate average grade. Firstly, you must obtain **at least 200 credits** from Years 2 and 3 combined – in other words, you must not fail more than 40 credits in these two years. Secondly, the University has introduced a new rule that you must pass **at least 90 credits** at level F6 or above – that is modules with codes PHY3nn or PHY4nn (or equivalent modules from other departments such as Mathematics). Also note that there are no resit examinations in the summer for Third Year courses.

For students on the MPhys, it is necessary that **at least 100 Third Year credits** are obtained, with a **year average of at least 49.5**, in order to progress to Year 4.

Projects

A key major development in years 3 and 4 is the introduction of **project work**. In the 3rd year, all single honours Physics students (BSc and MPhys) undertake a 10 credit research project (PHY341) in Semester 1, followed by a 10 credit Group Project (PHY343) in the Spring semester. Most dual honours students take only the research project (which may be taken in Semester 2 as PHY342), although some students (e.g. Astronomy duals) can opt to take the Group Project instead. In the 4th year, all MPhys students (with the exception of Medical Physics duals) undertake a major research project that runs across both semesters. A summary of all the project modules is given below. More detailed information will be issued by the relevant module leaders at the appropriate time. As a result of a few instances of plagiarism in written work, you will be required to submit an electronic copy of your report to the Turnitin plagiarism detection software, in addition to providing printed copies of the report. Further details are included in the main section of this Undergraduate Guide, and will be provided in the Third and Fourth Year meetings at the start of the semester.

Third Year Research Project: PHY341/342 (Module Leader Dr Chris Booth)

In this module, students build on the experience they have obtained in the first and second year labs to pursue more independent lines of investigation, under the guidance of an academic supervisor. A list of topics offered will be handed out during the meeting held at the start of the semester to introduce project work, and the choice of topic should be decided upon as soon as possible. To aid students in their choice a poster display containing brief details of each project will be arranged in the Third Year Study Room (E42) during the first week of semester. Information will also be available on the web. Choices must be made by the Thursday of that week and a list of allocated projects will be available by the beginning of the following week. It is the responsibility of each student to choose a partner and to decide on their choice of project (with a priority order) as soon as possible. To help with this, supervisors of each project will be prepared to discuss individual projects with interested students during week 1. *You are strongly advised to use this opportunity to ensure you understand what your selected projects entail.*

The normal expectation is that for this half module (10 credit) project you should devote the equivalent of two to three afternoons (about 7 hours) per week. Students should make sure that effort on the project is distributed as evenly as possible throughout the semester. Concentrating most of your project work into the last few weeks can have disastrous consequences, not only for the project but also for your other courses. Supervisors will be happy to provide advice on project time planning. Normally students will work in pairs on each research project but, on completion, will be examined separately.

Assessment of PHY341/342 is split between the **project attempt** (25%), the **written report** (50%) and an **oral examination** (25%).

1. **Project Attempt:** this part of the assessment is based on how well you went about the actual execution of the project work. Part of the assessment will be based on the individual record kept in your laboratory notebook, which must be handed in with your project work. The following criteria (equally weighted) are used in the assessment: *Understanding, Scientific Practice, Effort, Initiative and Self-motivation, and Overall Achievement.*

2. **Written Report:** On completion of the project a written report must be submitted by the deadline indicated on the enclosed 3rd year planner (Section 6). Late submissions will have marks for the report docked by 5% per working day, unless an extension is agreed by Dr Booth. Extensions, which will only be granted in exceptional circumstances (normally for documented medical or similar reasons), must be agreed *in advance* of the project deadline. The report is read and assessed for both content and presentation by the project supervisor and a second marker. Guidelines and instructions for report preparation will be issued at the beginning of each project.

3. **Oral Examination:** After they have read your report, the supervisor and 2nd marker will conduct an oral examination, where you will be asked to give a short (5 minute) **informal** overview of your work. After this, the assessors will ask questions based on the content of your report, and may ask you to clarify any ambiguities and justify any omissions. You may also be asked questions on the background physics appropriate to your project topic. Questions should normally be straightforward to answer if you carried out the work thoroughly and thoughtfully. The oral exam should last for about 30 minutes. The timetables for oral exams will be posted on the year noticeboards. **It is your responsibility to confirm venues and times with project supervisors.**

Group Project in Physics: PHY343 (Module Leader Dr Martin Grell)

There are many occasions in the working life of a physicist when he or she has to work as part of a team, rather than as an individual. This half-module aims to provide such an experience. Projects vary year on year, but always will involve developing and comparing different designs for solving a practical or technological problem, and the manufacture, testing, and optimising of a device of some description that answers to that problem. Groups are randomly selected in a start-up meeting in week 16 (1st week of semester 2). All groups will be assigned the same project, and one of a team of five members of staff as their supervisor. From then on, you are expected to organise yourselves, meet regularly, divide tasks sensibly, communicate efficiently, and take individual responsibility for your part of the programme. Document your work in a 'project diary', and occasionally meet with your supervisor. Deliverables are: In week 19, a 'design study', for which you will get detailed feedback from your supervisor; and on Friday of week 28: A presentation of your device, supported by a poster; a 2000 word report, your project diary, and a group narrative, wherein you give an account of every group member's contribution. Assessment is based on design study (20%), presentation (20%), report (20%), and individual contribution to the group's work (40%), assessed from your project diary and group narrative. For detailed information, see <http://www.shef.ac.uk/physics/teaching/phy343/index>

Fourth Year MPhys Research Project: PHY480 (Module Leader Dr Ed Daw)

Please note that all fourth years taking PHY480 should go to the year 4 web site (URL below) as their main source of information.

This project is core for all 4th year MPhys students in the Department except students in the following three categories:

- Those taking an MPhys in physics with medical physics. These students take a project organized by the medical physics department in place of PHY480.
- Those taking an MPhys. in physics with astrophysics (PHYU11) who opt to study at the Isaac Newton group of telescopes (ING) on La Palma for their fourth academic year.

These students take the modules PHY445, PHY451, PHY456, PHY473 and PHY474 to form an extended 4th year project in place of PHY480. Those astronomy students who do not spend their 4th year on La Palma must take PHY480.

- Those taking an MPhys in physics with enterprise management.

Detailed information on PHY480 is provided on the 4th year web site at:

Fourth Year home: <http://www.shef.ac.uk/physics/teaching/fourth-year>

Handbooks to guide students through the autumn and spring semesters of the project can be obtained by following the links on the right hand side of this web page. This web site also provides a link to a table of upcoming dates and deadlines. This is where you find out about dates associated with the project, such as the dates for turning in written and dates for assessed work such as the poster presentation in semester 1. All students are expected to check this web site regularly and familiarize themselves with dates and deadlines from this source.

Problem Solving/Essay (PHY315/PHY307)

In addition to the lectured units and projects, students take a course in the solving of short problems. This is taken in the third year by all single honours students (MPhys & BSc) and dual honours BSc students, and in the fourth year by some dual honours MPhys students. Most students take PHY315 "Problem Solving in Physics", while Dual Physics/Astrophysics students take PHY307 "Problem Solving in Physics and Astrophysics". In Semester 2 there will be regular weekly sessions devoted to developing such "problem solving" skills, and your abilities will be assessed by an examination at the end of the semester. As part of this module students are also required to write an **essay**. (For Dual Physics/Astrophysics students, the title can be chosen from a joint list of Physics and Astrophysics titles.) This must be completed and handed in during week 24 of Semester 2 (23 – 27 Apr) *immediately* after the Easter vacation. Titles and detailed instructions will be circulated in the first week of the semester, together with guidelines on what is required. As a result of a few instances of plagiarism in written work, you will be required to submit an electronic copy of your essay to the University's plagiarism detection software, in addition to providing printed copies. Further details are included in the main section of the Undergraduate Guide, and will be provided in the meeting at the start of the second semester.

Theoretical Physics in Year 3 and 4

In year 3 both BSc and MPhys Theoretical Physics students can take the optional module PHY344 Reading in Theoretical Physics I. The topics for this module will be displayed on the Theoretical Physics notice board.

Year 3 of the MPhys in Theoretical Physics differs from the MPhys in Physics in that there is a compulsory course in Mathematical Physics, PHY313. There are two optional modules of 10 credits which can be either maths or physics modules, chosen from a list.

The BSc in Theoretical Physics differs from the BSc in Physics in that the following courses are core for theorists and optional for BSc physicists; Further Quantum Mechanics PHY309, Statistical Physics PHY333, Mathematical Physics PHY313. This restricts optional modules to 20 credits from mathematics or physics.

In year 4 theorists take PHY444 Reading in Theoretical Physics II. The topics for this module will be displayed on the theoretical physics notice board. Theorists take PHY480 Research Project in Physics and Astronomy and two compulsory modules, PHY403 Advanced Statistical Physics and PHY472 Advanced Quantum Mechanics. (PHY403 and PHY472 are optional for students taking the MPhys Physics programme.) Theorists then have 50 credits worth of options chosen from 4th and 3rd year courses with the proviso that at least 30 credits are chosen from level 4 courses.

Theoretical students usually do a theoretical project.

3. Teaching and Learning in Astronomy

Lectures

Most lecture courses follow the same pattern as your first and second year courses, although a few (in particular PHY320) involve student presentations similar to the one you did in PHY216. More details can be found in the module descriptions. As in previous years, attendance at lectures will be monitored and you will be asked to account for persistent absences.

Third Year Problem Solving

Third Year astronomy problems classes are run by the Year Tutor, Prof Crowther. Details will be provided at the Astronomy Projects meetings (PHY318) on Wednesday, 28 September 2011. In addition to regular course units there will be a short examination devoted to the solving of short problems in physics & astrophysics. This is taken in the third year by all Physics & Astrophysics dual honours students (PHY307, MPhys & BSc) plus Maths & Astronomy dual honours students (PHY318, MMath & BSc). In Semester 1 there will be weekly general astronomy tutorials, while in Semester 2 there will be weekly sessions devoted to developing such "problem solving" skills in Physics (timetabled under PHY315) and Astronomy/Astrophysics (timetabled under PHY318). Physics & Astrophysics dual honours students registered for PHY307 are expected to attend **both** sessions.

Essays

Several of the modules in Y3 and Y4 involve essays similar to that you wrote for PHY216. An essay forms half of your assessment of PHY307/PHY318. This must be completed and handed in during week 25 of Semester 2 (3 – 6 May) **immediately after the Easter vacation**. Titles and detailed instructions will be circulated in the first week of Semester 2, together with guidelines on what is required.

Detailed guidelines for other relevant modules concerning the length of the essay, the audience for whom it should be written, and the deadline for handing it in will be supplied by the person responsible for the module in question, but the points listed below are valid for any essay you will be asked to do.

- Essays should be word-processed, and should be clearly marked with the relevant module code and your anonymous number. *We cannot always mark essays anonymously: in many modules each student will write on a different subject, so that anonymity becomes impossible to maintain. However, the second marker (see below) will not usually know the topic allocation, so we would still ask you to hand in your essays labelled with your UCard number.*
- Essays are not marked on content alone. You *will* be penalised for poor layout, errors in spelling or grammar, inadequate references, etc. The essay guidelines should state what proportion of the total mark is allotted to presentation and style: if they do not, complain to the lecturer responsible. If you are aware that you have problems in this area, consult the Writing Advisory Service of the English Language Teaching Centre.
- You may, if you wish, ask a member of staff to read a first draft of your essay and offer comments. You will not be penalised in any way for doing this.
- All essays which contribute more than 30% to a module grade are double-marked to ensure fairness. The second marker is not told the first marker's opinion until after the marks have been returned. If there is disagreement, a third marker may be called in, or the two original markers may hold a meeting to resolve their differences. This may result in a slight delay in returning your mark, but it is intended to increase the reliability of the procedure.

As a result of a few instances of plagiarism in written work, you will be required to provide an electronic copy of your essay, which will be submitted to the University's plagiarism detection software, in addition to the printed copies of the report. Further details are included in the main section of this Undergraduate Guide, and will be provided in the Third Year meeting at the start of the second semester.

Third Year Projects

All Dual Honours Astronomy students are required to complete one 10-credit project in the third year (PHY319). This is co-ordinated by Prof Paul Crowther. You should expect to do around 70–80 hours of work (two afternoons a week over 10 weeks) for the project. It is important to start on your project as early as possible: you do not want to leave yourself with most of the work still to do at the end of the semester when you should be revising for your exams! You should organise regular meetings with your supervisor to ensure that any problems are addressed promptly and to give yourself a frame-work around which to plan your work. Project work is normally carried out in pairs, or occasionally small groups, but each person is assessed separately. In PHY319 the assessment is by project attempt (25%), written report (50%) and oral exam (25%) as in the equivalent physics project PHY341/342 outlined above. As with essays, both the written report and oral viva will be graded by two members of staff.

A number of students will be permitted to conduct their third year project, PHY319, at Teide Observatory on Tenerife. The places are limited and selection will be made on past examination performance. Students who stay in Sheffield will be required to complete a traditional third-year astronomy project. If you are selected to go to Tenerife you are required to submit an observational proposal quite early in the spring semester and you will be orally examined a few days later. Further details will be given to you at the first lab meeting, if you require any more information please contact Prof Vik Dhillon, room E40.

Fourth Year Projects

Fourth year MPhys students complete a 40-credit research project in the fourth year: the topic of this project may be physics-related or astronomical (PHY480). The procedures, requirements and assessment criteria for the astronomy projects are identical to the equivalent physics modules. You are expected to spend about three days a week for 10 weeks on the MPhys project.

It is usually possible for one or two 4th year students to spend the entire academic year at the Isaac Newton Group of Telescopes (ING) in La Palma, Canary Islands. To be considered for this, students should have a good academic record and have demonstrated an aptitude for project work by a good performance in PHY319. Interested students will be asked to prepare a project proposal for consideration by ING staff, who will select the most promising project in consultation with Sheffield staff. Further details can be obtained from Prof Dhillon.

Note: Student(s) studying at La Palma take PHY445, PHY451, PHY456, PHY473, PHY474.

4. Safety

Before you begin your project work it is essential that you are fully familiar with the rules and procedures described in the *University Safety Guide for Undergraduates*. Your supervisor will inform you if your work requires any specific safety precautions. In particular, if your project is likely to involve the use of lasers, X-rays, sealed radioactive sources or the handling of any potentially hazardous substances you must inform the **departmental safety officer (Mr R Nicholson)** who will arrange appropriate safety training. Before undertaking **any** experiment or other laboratory procedure you **must** obtain the permission of your project supervisor.

NB: It is forbidden for undergraduate students to carry out any laboratory work outside normal working hours (9am-5pm, Monday to Friday, excluding Bank Holidays).

5. Postgraduate Opportunities

The 3rd and 4th year provide the opportunity for students to obtain direct experience of the research work of the Department, and to discuss possibilities for postgraduate research with members of the academic staff. If you are interested in staying in Sheffield to carry out research for a PhD, and you expect to graduate with at least an upper second class degree, then you should contact the Postgraduate Tutor, Prof Mark Fox (room E14), as early as possible in your final year.

6. Year Schedules

Year 3, 2011-2012

Semester 1 Monday, 26 Sep – Saturday, 4 Feb

Week 1	Mon 26 Sept	Third year (Project) Meeting
Week 1	Thurs 29 Sep	12:00 Deadline for project choices
Week 2		Project allocation/start project work
Week 12	Fri 16 Dec	12:00 <i>Deadline for handing in project reports*</i>

17 Dec – 14 Jan

Christmas vacation

Week 13	Mon 16 Jan	Start of exam period
Week 13-15		<i>Project oral examinations</i>

Semester 2 Monday, 6 Feb – Saturday, 9 June

Week 16	Mon 6 Feb	Third year (Project) Meeting
Week 16		PHY343 Kick- off meeting
Week 16	Thurs 09 Feb	12:00 Deadline for project choices
Week 17		Project allocation/Start project work
Week 18		Semester 1 project feedback available
Week 19		PHY343 Design study

2 April – 21 April

Easter Vacation

Week 24	Fri 27 Apr	Deadline for handing in essays (PHY315/PHY307*)
Week 27	Fri 18 May	12:00 <i>Deadline for handing in project reports*</i>
Week 27	Fri 18 May	2pm PHY343 Presentations
Week 28	Mon 21 May	Start of exam period
Week 28-30		<i>Project oral examinations</i>

*** NB Project reports or essays handed in after these deadlines will be penalised by having the mark reduced by 5% for each working day they are late.**

Project reports and essays handed in more than 5 working days late cannot be assessed at all.

You will be able to pick up a 2 free binding covers from G12 in which to put your projects in.

Third year project reports and laboratory diaries have to be handed in together.

Year 4, 2011-2012

For deadlines please see:

<http://www.shef.ac.uk/physics/teaching/fourth-year/deadlines.html>

*** NB Project reports or essays handed in after these deadlines will be penalised by having the mark reduced by 5% for each working day they are late.**

Project reports and essays handed in more than 5 working days cannot be assessed at all.

You will be able to pick up a 2 free binding covers from G12 in which to put your projects in Fourth year project reports and laboratory diaries have to be handed in together.

REMEMBER TO CHECK YOUR E-MAIL AND THE 3rd AND 4th YEAR NOTICEBOARDS FOR FURTHER ANNOUNCEMENTS