1. **Title of the module**

PHYS7000 (PH700) - Physics Research Project

1. **School or partner institution which will be responsible for management of the module**

Physical Sciences

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 7

1. **The number of credits and the ECTS value which the module represents**

60 credits (30 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Autumn and Spring

1. **Prerequisite and co-requisite modules**

None

1. **The programmes of study to which the module contributes**

MPhys Physics/Physics with Astrophysics & Astronomy, Astrophysics and Space Sciences.

This is not available as a wild module.

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**

Have:

1. An ability to identify relevant principles and laws when dealing with problems, and to make approximations necessary to obtain solutions. (B1)
2. An ability to solve problems in physics using appropriate mathematical tools. (B2)
3. An ability to execute and analyse critically the results of an experiment or investigation and draw valid conclusions. To evaluate the level of uncertainty in these results and compare them with expected outcomes, theoretical predictions or with published data; thereby to evaluate the significance of their results in this context. (B3)
4. An ability to interpret mathematical descriptions of physical phenomena. (B7)
5. An ability to plan an experiment or investigation under supervision and to understand the significance of error analysis. (B8)
6. A working knowledge of a variety of experimental, mathematical and/or computational techniques applicable to current research within physics. (B9)
7. An ability to present and interpret information graphically. (C2)
8. An ability to communicate scientific information, in particular to produce clear and accurate scientific reports. (C3)
9. A familiarity with laboratory apparatus (including relevant aspects of Health & Safety), theories and techniques. (C4)
10. The systematic and reliable recording of experimental data or derivation of theoretical results. (C5)
11. An ability to make use of appropriate texts, research-based materials or other learning resources as part of managing their own learning. (C6)
12. C&IT skills which show fluency at the level and range needed for project work such as familiarity with a programming language, simulation software or the use of mathematical packages for manipulation and numerical solution of equations. (C7)
13. An ability to communicate complex scientific ideas, the conclusion of an experiment, investigation or project concisely, accurately and informatively. (C8)
14. Experimental skills showing the competent use of specialised equipment, the ability to identify appropriate pieces of equipment and to master new techniques and equipment. (C9)
15. An ability to make use of research articles and other primary sources. (C10)
16. **The intended generic learning outcomes.  
    On successfully completing the module students will be able to:**

Have a knowledge and understanding of:

1. Problem-solving skills, in the context of both problems with well-defined solutions and open-ended problems; an ability to formulate problems in precise terms and to identify key issues, and the confidence to try different approaches in order to make progress on challenging problems. Numeracy is subsumed within this area. (D1)
2. Investigative skills in the context of independent investigation including the use of textbooks and other available literature, databases, and the interaction with colleagues to extract important information. (D2)
3. Communication skills in the area of dealing with surprising ideas and difficult concepts, including listening carefully, reading demanding texts and presenting complex information in a clear and concise manner. C&IT skills are an important element to this. (D3)
4. Analytical skills – associated with the need to pay attention to detail and to develop an ability to manipulate precise and intricate ideas, to construct logical arguments and to use technical language correctly. (D4)
5. Personal skills – the ability to work independently, to use initiative, to organise oneself to meet deadlines and to interact constructively with other people. (D5)
6. **A synopsis of the curriculum**

Aims:

* To provide an experience of open-ended research work.
* To begin to prepare students for postgraduate work towards degrees by research or for careers in R&D in industrial or government/national laboratories.
* To deepen knowledge in a specialised field and be able to communicate that knowledge orally and in writing.

Syllabus

All MPhys students undertake a laboratory, theoretical or computationally-based project related to their degree specialism. These projects may also be undertaken by Diploma students. A list of available project areas is made available during Stage 3, but may be augmented/revised at any time up to and including Week 1 of Stage 4. As far as possible, projects will be assigned on the basis of students' preferences – but this is not always possible: however, the project abstracts are regarded as 'flexible' in the sense that significant modification is possible (subject only to mutual consent between student and supervisor). The projects involve a combination of some or all of: literature search and critique, laboratory work, theoretical work, computational physics and data reduction/analysis. The majority of the projects are directly related to the research conducted in the department and are undertaken within the various SPS research teams.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

None; appropriate background reading will be suggested by individual project supervisors.

1. **Learning and teaching methods**

Total contact hours: 40

Private study hours: 560

Total study hours: 600

1. **Assessment methods**
   1. Main assessment methods

Project progress (i.e. supervisor assessment of performance) (15%)

Project report (55%), max. 12,000 words

Viva voce (15%)

Presentation (15%), duration 15 minutes

13.2 Reassessment methods

Like-for-like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *8.1* | *8.2* | *8.3* | *8.4* | *8.5* | *8.6* | *8.7* | *8.8* | *8.9* | *8.10* | *8.11* | *8.12* | *8.13* | *8.14* | *8.15* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Research (supervisor guided)** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  | **x** |  |  |  | **x** | **x** |  |
| *Lectures* |  |  |  |  |  |  | **x** | **x** |  |  | **x** |  | **x** |  |  |
| *Talks* |  |  | **x** | **x** |  | **x** | **x** |  |  |  |  |  | **x** |  |  |
| *Private study* | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Project progress* | **x** |  |  |  | **x** |  |  | **x** |  |  | **x** |  | **x** |  | **x** |
| *Project report* | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| *Viva voce* | **x** |  | **x** |  |  | **x** | **x** |  |  |  |  |  | **x** |  |  |
| *Presentation* |  |  | **x** | **x** |  | **x** | **x** |  |  |  |  |  | **x** |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *9.1* | *9.2* | *9.3* | *9.4* | *9.5* |
| **Learning/ teaching method** |  |  |  |  |  |
| **Research (supervisor guided)** | **x** | **x** | **x** | **x** | **x** |
| *Lectures* |  |  | **x** |  | **x** |
| *Talks* |  |  | **x** |  | **x** |
| *Private study* | **x** | **x** |  | **x** | **x** |
| **Assessment method** |  |  |  |  |  |
| *Project progress* | **x** | **x** | **x** |  | **x** |
| *Project report* | **x** | **x** | **x** | **x** | **x** |
| *Viva voce* | **x** |  | **x** | **x** | **x** |
| *Presentation* |  |  | **x** |  | **x** |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

Physics is an international subject with physical laws discovered and techniques developed and refined by Physicists across the globe. Mastery of the subject-specific learning outcomes, will equip students to apply the theories and techniques of this module in a wide range of international contexts. The module team is drawn from the School of Physical Sciences, which includes many members of staff with international experience of teaching and research collaboration. In compiling the reading list, consideration has been given to the range of texts that are available internationally and a selection of texts has been identified to complement the delivery of the material. The support SPS provides to its students is also internationally attuned given our international student body.

**FACULTIES SUPPORT OFFICE USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
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Revised FSO Jan 2018