Confirmation that this version of the module specification has been approved by the School Learning and Teaching Committee:

………11th March 2015………………………………………….

**MODULE SPECIFICATION**

1. Title of the module

*PH700 Physics Research Project*

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

*School of Physical Sciences*

1. Start date of the module

*Existing module, next running 2015-16*

1. The number of students expected to take the module

*45*

1. Modules to be withdrawn on the introduction of this proposed module and consultation with other relevant Schools and Faculties regarding the withdrawal

*None*

1. The level of the module (e.g. Certificate [C], Intermediate [I], Honours [H] or Postgraduate [M])

*M*

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

*60 (30 ECTS)*

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

*Terms 1 and 2*

1. Prerequisite and co-requisite modules

*None*

1. The programmes of study to which the module contributes

*All MPhys (Physics; Physics with Astrophysics; Astronomy, Astrophysics and Space Sciences; and versions of these programmes with Year in the USA)*

*This is not available as a wild module*

1. The intended subject specific learning outcomes
   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)*

*11.7 An ability to present and interpret information graphically. (C2)*

*11.8 An ability to communicate scientific information, in particular to produce clear and accurate scientific reports. (C3)*

*11.9 A familiarity with laboratory apparatus (including relevant aspects of Health & Safety), theories and techniques. (C4)*

*11.10 The systematic and reliable recording of experimental data or derivation of theoretical results. (C5)*

*11.11 An ability to make use of appropriate texts, research-based materials or other learning resources as part of managing their own learning. (C6)*

*11.12 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)*

*11.13 An ability to communicate complex scientific ideas, the conclusion of an experiment, investigation or project concisely, accurately and informatively. (C8)*

*11.14 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)*

*11.15 An ability to make use of research articles and other primary sources. (C10)*

1. The intended generic learning outcomes

*12.1 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)*

*12.2 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)*

*12.3 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)*

*12.4 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)*

*12.5 Personal skills – the ability to work independently, to use initiative, to organise oneself to meet deadlines and to interact constructively with other people. (D5)*

1. A synopsis of the curriculum

*Aims:*

*a) To provide an experience of open-ended research work.*

*b) To begin to prepare students for postgraduate work towards degrees by research or for careers in R&D in industrial or government/national laboratories.*

*c) 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. Indicative Reading List

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

1. Learning and Teaching Methods, including the nature and number of contact hours and the total study hours which will be expected of students, and how these relate to achievement of the intended module learning outcomes

|  |  |
| --- | --- |
| *100% coursework; 600 hours in total, including:* | |
| *5 hours module introduction, talks guidance and feedback on talks – all lecture*  */workshop hybrids* | *11.7, 11.8, 11.11, 11.13*  *12.3, 12.5* |
| *40 days conducting supervisor-guided research (a minimum of 280 timetabled hours)* | *11.1-11.7, 11.9, 11.13, 11.14*  *12.1-12.5* |
| *2 days project ‘conference’*  *(approx. 14 hours)* | *11.3 11.4, 11.6, 11.7, 11.13*  *12.3, 12.5* |
| *Independent learning, which includes research data collection and analysis, literature-based research, private study,*  *etc.) in preparation for submission of the Report, for a viva voce, for the ‘conference’ talk (the residual 299 hours)* | *11.1-11.12, 11.14, 11.15*  *12.1 12.2, 12.4, 12.5* |

1. Assessment methods and how these relate to testing achievement of the intended module learning outcomes

|  |  |  |
| --- | --- | --- |
| *Project progress (i.e. supervisor assessment)* | *15%* | *11.1, 11.5, 11.8, 11.11, 11.13, 11.15*  *12.1-12.3, 12.5* |
| *Formal written report* | *55%* | *11.1-11.15*  *12.1-12.5* |
| *Viva Voce* | *15%* | *11.1, 11.3, 11.6, 11.9, 11.13,*  *12.1, 12.3-12.5* |
| *Talk (part of a formal module Research Conference).*  *N.B. There may be an element of peer assessment within this module: each student given the opportunity to assess the talks presented by the other students.* | *15%* | *11.3, 11.4 , 11.6, 11.7, 11.13*  *12.3, 12.5* |

1. Implications for learning resources, including staff, library, IT and space

*Resources are wholly project-dependant and may include all or some of: access to research-oriented computing/laboratory space/equipment, a named supervisor, WoS and other information services.*

1. The School recognises and has embedded the expectations of current disability equality legislation as defined within University policies and practices, and supports students with a declared disability or special educational need in its teaching within that framework. Within this module, reasonable adjustments will be made wherever necessary, including additional or substitute materials, teaching modes or assessment methods for students who have declared and discussed their learning support needs. Reasonable arrangements for students with declared disabilities will be made on an individual basis, in consultation with the University’s disability/dyslexia support service, and specialist support will be provided where needed.
2. Campus where module will be delivered:

*Canterbury*