PH5104 – Project in Theoretical Physics (Mathematics and Theoretical Physics students)

Credits: 65.0  Semester: Whole Year
Number of Lectures:  Co-ordinator: Dr Jonathan Keeling
Academic Year: 2018-19

Overview
The project aims to develop students’ skills in searching the physics literature, in designing/devising appropriate experiments/simulations/calculations, and in the evaluation, interpretation, and presentation of the results of these. The main project is preceded by a review essay on a topic which will typically be related to the theme of the project. There is no specific syllabus for this module. Students taking the MPhys degree usually select a project from a list of those available and are supervised by a member of the academic staff.

Aims & Objectives
This module aims to present students with the opportunity to enhance and develop their research skills through extended scientific investigation. The aim is to prepare the student for research in a professional environment where reviewing literature effectively, planning, critical thinking and the final presentation of data are key elements.

Learning Outcomes
At the end of this module the student should have:

- Developed a level of confidence to plan and work independently in a research environment.
- Developed their literature review skills to effectively emphasise the relevance and context of a research topic.
- Acquired technical skills to record and analyse data appropriately or perform appropriate calculations or simulations.
- Developed critical thinking skills in order to progress their own work through reasoned evaluation.
- Gained experience of the collaborative exchange of ideas in an active research environment.
- Have further enhanced their communication and presentation skills to enable them to emphasise the key outcomes of their work effectively and to support their conclusions when questioned.

Synopsis
The module is project-based and the scheme of work will be dictated by the nature of the project itself.

Pre-requisites
PH3081 or PH3082 or (MT2506 and MT2507), PH3062, PH3007, (PH4022 or PH4040 or PH4041), PH4032. Some projects will need learning from specific modules - please contact potential supervisors.

Anti-requisites
AS4103, AS5101, PH4111, PH4796, PH5101, PH5103, MT5999

Assessment
Coursework (Review essay, Report, Oral Examination, Supervisor Assessment) = 100%

Additional information on continuous assessment etc.
Please note that the definitive comments on continuous assessment will be communicated within the module. This section is intended to give an indication of the likely breakdown and timing of the continuous assessment.

The topic of the project is normally chosen from a list provided by academic staff in semester one. The project usually involves working on a topic that is relevant to one of our research groups. Project allocations are assigned in the middle of semester one, and some work is required before the start of
semester two, in reading relevant literature (in discussion with your supervisor), leading to a short (4000 word) pre-project review that is intended to help prepare for the main project work. This document will focus on questions such as “Why am I going to do this project?”, “What am I going to do”, and “What evidence/science is there that will help get me there?”. Thus whilst a review of the relevant literature is required, there is also a strong forward-look towards the main part of the project. This pre-project review counts for 8 out of the 65 credits allocated to the full module, and will have a deadline for submission in week one of semester two.

The main part of the project is intended to allow the student to use their knowledge and skills to explore some aspect of theoretical physics. The work may contain experimental, computational, observational, or theoretical components. For a theory project, the majority of the project should involve theoretical/computational work. The supervision, experience, and personal reflection should allow research and related skills to be developed further. The student will meet with their supervisor, and possibly other members of the research group, regularly throughout the semester. In order to provide some additional support students will meet with their peer-support group every two weeks.

A project report of approximately 20-25 pages is submitted at the end of week 12 of semester 2. During the May exam diet, each student will give a presentation on their project work to an assessment panel. This is followed by the student being asked a number of questions about the science and methods etc. associated with their project work.

**Accreditation Matters**
This module contains students developing skills and experience in project work that is required for IOP accreditation of the degree.

**Recommended Books**
Please view University online record:
http://resourcelists.st-andrews.ac.uk/modules/ph5104.html

**General Information**
Please also read the general information in the School's honours handbook.