PH3014 - Transferrable Skills for Physicists

Credits: 15.0  Semester: Whole Year
Number of Lectures:  Lecture: Dr Bruce Sinclair and team
Academic Year: 2016-17

Overview
This module allows students to practise and extend their knowledge and understanding of physics (including astronomy) at the same time as gaining important and useful experience in transferable skills. These skills, which are sometimes referred to as professional skills or key skills, are a vital part of the abilities of a graduate (astro)physicist. While many of these skills are developed in 'conventional' modules, concentrating on these skills in this module should ensure that all our students have all these important abilities to a high level. These skills are vital for academic study and research, and for careers in industry, business, and elsewhere. They will help with the final year project report and presentation.

Guidance, practice and assessment will be provided in the preparation and delivery of talks, critical reading of the literature, report writing, developing and writing a case for resources to be expended to investigate a particular area of science, tackling case studies.

Aims & Objectives
We intend that this module should strengthen skills in the following areas:

- Using knowledge and solving ‘new’ problems
- Finding information from books, journals, the web, and people
- Critically evaluating and interpreting information gained from the sources above
- Managing your own learning - Applying initiative
- Communicating orally
- Communicating on paper - Working as part of a team - Using a variety of IT skills
- Extending your knowledge and understanding of physics and astronomy

Learning Outcomes
By the end of this module students should be able to

- determine what it is that they do not yet know, but need to know in order to carry out a scientific task - use bibliographic search engines to find relevant scientific papers
- use the literature and the web to find scientific information
- evaluate critically information from different sources, and use this to inform a scientific argument or overview
- present such an argument or overview on paper and orally
- use PowerPoint appropriately to support a scientific presentation
- work independently and as part of a collaborative team
- know why these outcomes are important, and be confident in their ability to perform these tasks

Synopsis
Overview of the course and its need. The scientific literature, and associated information retrieval. Critical evaluation of material, including a student-comparison of two scientific papers. What makes a good oral presentation? Introduction to PowerPoint. The production of a short talk on one chosen-subject to a small group, followed later in the session by a 20 minute talk on a different subject at a weekend conference (often at the Burn House in the Scottish Hills). Scientific writing, with the production of a 2000-word review article. Team skills, including case studies using scientific knowledge to solve particular problems. The final assignment in the module involves using all the above skills as each group develops a proposal for a new teaching lab experiment or a research project.

Pre-requisites
PH2011, PH2012, MT2001 or (MT2501 and MT2503), Entry to the School’s Honours Programme.
Anti-requisites
PH4040

Assessment
Continuous Assessment on basis of assignments = 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.

This module runs through the teaching weeks of both first and second semester. This is a 15 credit module, so is expected to take 150 hours of study for the average student at this level. The module handbook gives a calendar for the module with suggested hours to be spent on what in which weeks, with most weeks asking for about 7 hours to give the 150 hour total. There are several compulsory tutorials through the two semesters. In semester one students consider two research papers and submit some written work associated with these, with the deadline expected to be in week three. There is then work preparing for and giving a short presentation in week six. The final piece of work for semester one is the writing of a scientific review article on a chosen topic within physics and astronomy, which is submitted at the start of week 11. In semester two the primary assignment for the earlier part of the semester is preparing for a talk to be given at the Burn Conference, which is normally run over a weekend around the end of week five. The final assignment is a group-based proposal for a new teaching lab experiment or some research. This is normally submitted in week nine, with student groups attending panel sessions about this in week eleven.

The assessment breakdown is expected to be

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>First talk</td>
<td>10%</td>
</tr>
<tr>
<td>Burn Conference talk</td>
<td>25%</td>
</tr>
<tr>
<td>Comparison of two papers</td>
<td>8% for report, 2% for discussion</td>
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<tr>
<td>Review Article</td>
<td>25%</td>
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<tr>
<td>Input to peer review of article plan</td>
<td>4%</td>
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<tr>
<td>Input to peer review of article</td>
<td>3%</td>
</tr>
<tr>
<td>Feed forward for Burn talk</td>
<td>3%</td>
</tr>
<tr>
<td>Proposal</td>
<td>20%</td>
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</tbody>
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Accreditation Matters
This module may not contain material that is part of the IOP “Core of Physics”, but does contribute to the wider and deeper learning expected in an accredited degree programme. The skills developed in this module, and others, contribute towards the requirements of the IOP “Graduate Skill Base”.

Recommended Books
Please view University online record:
http://resourcelists.st-andrews.ac.uk/modules/ph3014.html

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