CH956-20 Scientific Research Skills I

22/23

Department
Chemistry
Level
Taught Postgraduate Level
Module leader
Nikola Chmel
Credit value
20
Module duration
52 weeks
Assessment
100% coursework
Study location
University of Warwick main campus, Coventry

Description

Introductory description

CH956-20 Scientific Research Skills I

Module aims

Successful completion of university level research requires student to have made a 'substantial contribution to knowledge' (to quote university regulations) and that this is communicated to an appropriate research community. There are many aspects involved in undertaking original research, including the student's own ability to think and to be creative. In addition, students need to have a range of skills that will enable them to use their intrinsic academic ability and scientific creativity to produce world class research. Some of the skills are technical, e.g. how you use a particular piece of equipment to collect data, but many of them transcend the details of a particular project. This module is designed to help them gain those transferable research skills.

There is a list of tasks (see syllabus) that must be accomplished to a satisfactory standard to pass this module. Unlike many undergraduate courses, the aim should be to accomplish the task as effectively as possible while also taking risks to do things in a new way where that will improve the student's research skills. Thus each task is assessed as pass/fail. To support students in achieving this level on each task they will be assigned a researcher as their personal mentor. The mentor will not help them do the tasks, but will support them as they do them by showing them

how to proceed. The project work will be based in the mentor's research area. The idea is that they will be required to undertake a literature review independently while interacting directly with a world expert in the topic.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module content spans 4 areas:
A. Understanding the scientific background to a research area
B. Planning a project
C. Presenting your work
D. Working with colleagues
Most of this section is devoted to the students' own project, during which they will be mentored by a researcher who is an expert in the specialist area covered by the project remit. It also requires the student to be able to understand material presented in verbal form by other writers in their specialist field.

A1. Review of 3 Research Papers from a refereed research journal. The mentor will recommend a selection of papers or articles for this task. Students will be expected to write a formal (1–2 page) review of each paper in which they:
(i) summarise the background to the paper.
(ii) summarise the methods used in the research (where applicable).
(iii) summarise the results
(iv) indicate the conclusions drawn by the authors
(v) make your own critical assessment of the value of the work.

A2. Undertake a literature review project on the research topic identified for you by your mentor. This will involve finding and reading refereed journal articles in the area and taking notes on them

as a means of preparing for the tasks in section B and C. Web pages are a valuable resource; however, they may not always contain valid or reliable information, so should always be used judiciously. It is anticipated that this task will form the major part of this module.

A3. Present a brief summary (maximum of 1 A4 page) of three seminars attended. Students may wish to include an analysis of podcasts or seminars or lectures recorded on the web; however, they should attend at least one live seminar. The mentor should be able to understand the content of the seminar, based only on reading the summary produced.

B. Planning a project
Research projects involve the use of a wide range of skills, including planning the project to ensure that resources are available at the right time, undertaking tasks in the right order and with the appropriate timing so that later stages of the project can be developed with maximum efficiency, and according to a predetermined time scale. Students will gain skills by the following

B1. Write a timeline for task A2.

B2. Develop a list of questions that form the basis for task A2.

B3. Review the timeline from B1 and revise it in consultation with the mentor.

B4. Write a research project proposal (1–2 pages) on a proforma given that is 'the next stage' in the research area covered by your literature project of A2.

C. Presenting your work
However brilliant one's research, it is unlikely to make an appropriate impact if one is unable to communicate it to one's own academic community, and the wider community too. This section of the course emphasises the presentation aspects of the project that has formed the basis for sections A and B. This section requires students to present their project work in the specific ways required of those working in their subject area.

C1. Present a poster that is designed to catch the eye and engender interest so people will ask you questions if you present it at a poster session or conference. Such a poster is not intended to contain highly detailed academic content.

C2. Describe your project work in a seminar whose target audience is appropriately educated in the discipline of the student, but not necessarily knowledgeable in the student's particular research area. The presentation may be prepared using power point. A copy of the slides, where applicable/relevant, and an analysis of why the material was delivered in a particular order, should be included in your portfolio.

C3. Report on your chosen research area in a structured dissertation (15–20 pages, 1.5 spaced, font 11 point) intended for a reader with some knowledge of the research area (but not the specific project). Before commencing the writing up, the plan should be discussed with the mentor, beginning with broad headings and what should fit into these. Then, each heading should be expanded into subheadings. Finally, when the structure of the dissertation is clear, it should be written. The referencing conventions of the research area should be adopted. Full referencing will be required, and in line with university regulations. Appropriate steps must be taken to avoid plagiarism at all stages in the writing process.

C4. Prepare a web page on your research area for a target audience of 16 year olds.

D. Working with colleagues

Much research is now carried out in teams of two or more people. This means that individuals can benefit from the skills and strengths of their colleagues. However, this may inevitably create tensions arising from different personalities, work practices and research approaches that can hinder one's research. A partial solution to this is for individuals to understand how you work and then to understand how others around them work. This part of the module has 4 tasks.

D1. In this task the student should consider one of the many models that describe different learning styles and assess their preferred approach. This should be compared with that of the mentor and one further colleague.

D2. The student should analyse the roles that are required for a successful team and discuss what his or her preference is and how they might adapt themselves to fill in the gaps, as required. An obvious example here is that if a team has no 'completer-finisher' in it, there is a danger that deadlines will be missed.

D3. The student should write a report on a situation where they worked in a team prior to undertaking D2, describe the situation, and then analyse how well the team worked together, making suggestions for how it could have been more effective with reference to D2.

Learning outcomes

By the end of the module, students should be able to:

- Understand, summarise and evaluate the essential features of the work of others; to present the essential features of the research-level work to various audiences and to plan one's research at a basic level and report on it

Interdisciplinary

Interdisciplinary research skills

Subject specific skills

Subject specific skills achieved from the completion of this module include being able to understand and summarise the essential features of the work of others; to write clearly at a technical level.
Present the essential features of the research-level work of others at a level appropriate for a non-specialist.
Demonstrate an ability to present technical material.
Present technical material verbally
Plan one's research at a basic level and report on it

Team working

Transferable skills

The transferable skills gained from the completion of this module include, discipline-specific

knowledge, ability to gather and interpret information, ability to analyze data, oral communication skills, ability to make decisions and solve problems, written communication skills, ability to learn quickly, ability to manage a project, and creativity/innovative thinking.

Study

Study time

Type	Required
Lectures	5 sessions of 1 hour (2%)
Seminars	10 sessions of 1 hour (5%)
Tutorials	20 sessions of 1 hour (10%)
Other activity	130 hours (65%)
Private study	35 hours (18%)
Total	200 hours

Private study description

Additional study

Other activity description

Portfolio completion

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time	Eligible for self-certification
Portfolio of evidence	100%		Yes (extension)

Feedback on assessment

The content of the module is normally wholly assessed, but the Course director shall have the power to require a candidate to take a written or oral examination or other formal assessment on

any part of the material if he/she considers it appropriate to do so. Students are expected to pass all assignments: re-submission of failed assignments following feedback will be permitted as necessary. Written work will be marked and feedback (usually written) will be given. Seminars, posters etc. will have verbal feedback.

Availability

Courses

Course availability information is based on the current academic year, so it may change.
This module is Core for:

- Year 1 of TCHA-F1PB MSc in Chemistry with Scientific Writing
- Year 1 of TCHA-F1PE Postgraduate Taught Scientific Research and Communication