

# MRes Research Projects

## Objectives

- The students gain research experience in bioinformatics methodologies and techniques.
- The students have the opportunity to develop their own ideas and to demonstrate initiative and originality.
- The students learn to plan and organise their time.
- The students learn to do independent research

The project begins with background reading on the project area and methods to be employed. This is written up as the **literature review** and will be incorporated, in updated form, in preparing the final thesis. At the oral presentation of the literature review, students are also required to present an **outline of their research plan** so that this can be discussed with the examiners.

## Information for compiling the review

The literature review should consist of an introduction to the scientific area and methods to be used in the project. It should be written as a section of the thesis according to the format guidelines given below. In addition, it should be accompanied by an outline of the planned research (not more than one page). The dissertation should not exceed 10,000 words. The format should follow the guidelines given below for the full thesis.

## Information for compiling the thesis

### 1 Aims and Objectives of the Thesis

The aim of the project is to allow students to develop their own ideas and get experience in an original research project. Creative and thoughtful work will be credited over and above the repetition of tried and tested techniques.

Much emphasis is given to the production of a thesis in a proper scientific format since this is the main means of assessment. The format should follow that of a serious scientific paper, and you should carefully read all sections from several papers to see what information is found in each section and how this information is presented.

### 2 Organisation of the Thesis

#### Title page

This should include the full title of the project, your name and your supervisor(s), degree course and institutional address.

#### Abstract or Summary

The abstract or summary should contain an outline of the work carried out and any significant

results achieved.

## **Contents**

The contents should list of the chapters and sections, the tables and figures with the corresponding page numbers.

## **Acknowledgements**

## **Introduction**

The introduction should record the background to the project and place the project in context with already published information. Essentially a literature review, it should also contain the aims of the project.

## **Materials and Methods**

The materials and methods section should describe in detail the procedures followed, indicating an awareness of any likely pitfalls or problems with the techniques. Published techniques need not be described in detail but should be referenced. The student should demonstrate an understanding of established techniques. N.B. no results obtained by the student should appear in this section.

## **Results**

Data must be presented in a form that makes clear the significance of any results obtained by the student. Wherever possible the results should be presented in the form of tables and graphs (with statistics where appropriate). You must also describe your results in the text. Attention should be drawn to interesting results but general discussion should be left until the next section. Figures should be used as appropriate.

## **Discussion**

The discussion should examine in detail the significance of results and place them in the context of other published work. You should not reiterate your results. Any failings or shortcomings of the project should be identified. In this section consideration of the greater significance of the results should be demonstrated. An outline of what follow up work could be carried out may be useful (i.e. future work).

## **References**

References should be cited in text and listed at the end using a plain format and standard journal abbreviations as in:

Meinhardt, J., Sachse, C., Hortschansky, P., Grigorieff, N. & Fändrich, M. (2009). A $\beta$ (1–40) fibril polymorphism implies diverse interaction patterns in amyloid fibrils. *J. Mol. Biol.* 386, 869–877.

References to books or book chapters should include authors, editors, title, pages and publisher.

## **General Guidelines**

You should talk to your supervisor about your results and how to present them before compiling the thesis. Supervisors will be happy to comment on a draft of the thesis before final submission but make sure you provide them with enough time to make useful

suggestions. Remember that July and August are times when supervisors may be on holiday or at conferences so it is up to you to find out their availability and agree on a schedule for providing chapters and comments. Please note that a supervisor seeing your thesis before submission does not guarantee that the project will be passed by the board of examiners. A check list is provided. Read this carefully and ensure that your thesis conforms to these points.

1. The length of the thesis must not **exceed** 40,000 words.
2. Three copies of the printed thesis are required; these should be printed double-spaced on A4 paper. One copy will be retained by the main supervisor and one by the department. Where there is more than one supervisor, the student should provide a copy for each if requested, in addition to the departmental copy. The electronic version in word or PDF format must also be submitted, and will be subject to a standard check for plagiarism.
3. The thesis should have the following structure: Title, Abstract, Contents, Acknowledgements, Introduction, Materials and Methods, Results, Discussion, References, Appendices.
4. The thesis should be paginated (Page 1 = Title Page) and contain a table of contents.
5. Tables, figures, etc. should be interleaved within the main body of the text. Complex or detailed tables of results, computer output, etc. should be included as appendices.
6. Computer program listings more than 10 pages long should NOT be included in printed appendices, but should be provided in the electronic copy.
7. A list of non-standard abbreviations should be inserted before the introduction.
8. The thesis should be submitted on the date requested by the Course Organiser. Late submissions will incur a penalty of reduced marks, and if the thesis is submitted too late to be assessed for the viva date, then the candidate will have to attend the viva and complete the degree the following year.

## **Checklist for preparing the thesis**

### **Abstract**

1. Is the abstract between 200-300 words?
2. Does the abstract describe the nature of the work and the results obtained?

### **Introduction**

1. Does the introduction contain a clear statement of the aims of the project?
2. Does the introduction place the project work in context with a thorough, but concise, review of the relevant literature?

### **Methods and Materials**

Does this section describe in detail the procedures followed? Could you carry out this project following the methods reported here?

### **Results**

1. Does this section contain results in a tabular or graphical form?
2. Are the tables enumerated, each with a correct description of the contents? Are the columns and rows correctly labelled together with units of measurement?
3. Are the figures enumerated and appropriate for the type of data? Does each have a legend containing an accurate description of the contents of the figure?
4. Do graphs have the axes labelled correctly (including units)? Is the scale of the axes

- appropriate for the data?
- 5 Are statistical results used when necessary? Are the correct tests used?
  - 6 Are figures clearly labelled with a key to abbreviations in the legend and an accurate description of what they are?
  - 7 Does the text draw attention of the salient features of the figures or tables, rather than simply repeat what is already in them?
  - 8 Is the results section structured to make clear the significance of the results and to provide a basis for subsequent discussion?

## **Discussion**

- 1 Is it clear that the significance of the results is appreciated?
- 2 Are the results of the project discussed in relation to other published work in the field?
- 3 Are the results obtained discussed in the wider context?
- 4 Are the limitations of the approach used in this project adequately discussed?
- 5 Are any working hypotheses for future work proposed?

## **References**

- 1 Are the references in the text referred to in the correct manner i.e. (Marks 2005, 2007a, 2007b; Marks and Spencer 2008; Marks *et al*, (2009)?
- 2 Are the references listed in alphabetical and chronological order in the reference section?