Masters Projects

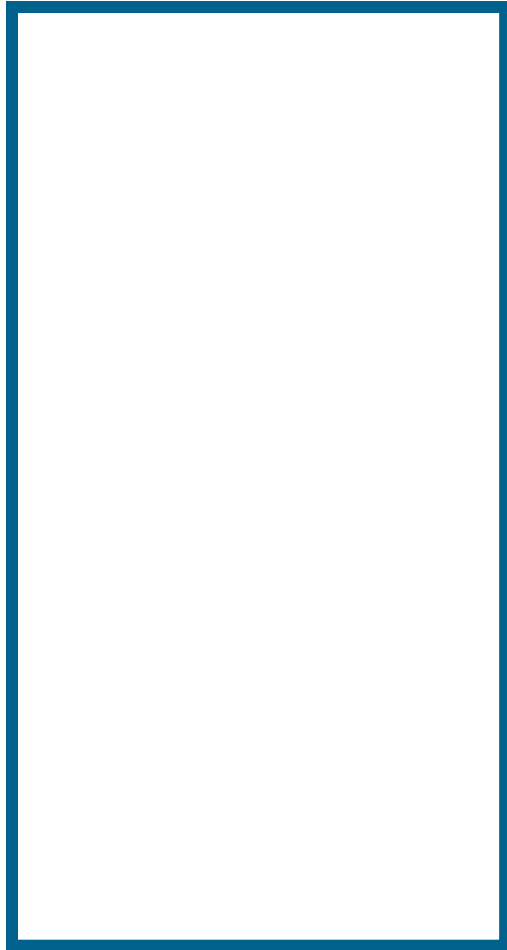# Conducting your masters project

Prof Joemon Jose

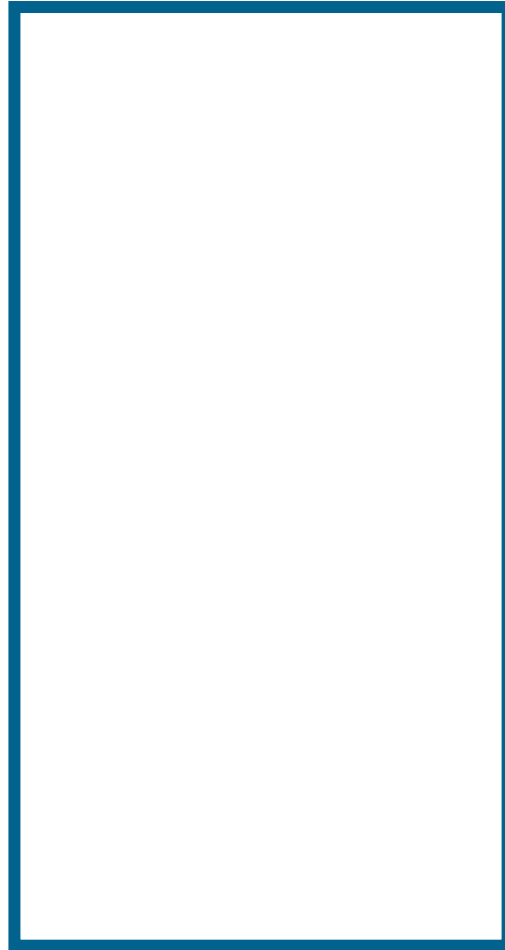**School of Computing Science
University of Glasgow**

Progression

To clarify for progression to the project:

- a total of at least 120/130 credits (130 for MSc–IT and MSc–SD)
- at least 90 credits at level M
- at least 90 credits are grade D or above
- no credits at grades G or H
- GPA $\geq$ 12.0

MSc development projects overview

Development
Project

60 credits

semester 1

semester 2

semester 3
(summer)

Impact on your results

Your project is critically important...

Master degree

- taught stage $\geq$ 12.0 and project at least D3

Master degree with merit

- taught stage $\geq$ 15.0 (normally) and project at least B3

Masters degree with distinction

- taught stage $\geq$ 18.0 (normally) and project at least A5

Outline

Meet your supervisor regularly

Perform your project work

Submit a written dissertation

Evaluation Criteria

Meeting your supervisor

Meet your supervisor about once per week (30 minutes – 1 hour)

Agree dates in advance, for the whole summer
- contact your supervisor as soon as possible to arrange these meeting

Your supervisor might be absent for a few weeks during the summer
- plan for your supervisor's absence
- your supervisor will arrange alternative means for keeping up to date with your progress during this time
  - e.g. blog or email or an alternative supervisor

- Initiatives from the student – not from the supervisor!!

Meeting your supervisor

Always listen carefully to your supervisor's advice

However, it is your project and you must make your own decisions

You should lead the meetings:
- plan in advance what issues you wish to discuss
- review progress against your work plan
- say what you have achieved since the last meeting
- say what you hope to achieve before the next meeting

Send intermediate deliverables (e.g., design documents) to your supervisor before a meeting

MSc Development Project – Initial Stages

Study the problem domain
- read articles about related projects and survey related software products

Critically evaluate previous projects and products:
- what are their strengths?
- then aim to build on these strengths
- what are their weaknesses?
- then aim to avoid these weaknesses

Develop a clear statement of the development problem

Choose a suitable development method and develop a work-plan

MSc Development Project

Following you workplan

Design, implement, and test your software product

MSc Development Project

Plan the evaluation of your software product well in advance

You may ask friends, fellow students, etc., to act as participants

You might need ethical approval
- more to come…

Once you submitted your thesis

- **Examiners**
  - Supervisor
  - Reader

- **Independent marking**

- **If their marks differ by 1 band**
  - Supervisor mark is the final mark

- **If their mark differ by more than 2 bands**
  - They discuss and agree on a mark

- **If they cant agree**
  - A third marker will be appointed
  - All there discuss and agree

MSc Development Project

You must arrange to demonstrate your software product to your reader (and supervisor)

Demonstrations are normally on the first week of September

- You create a presentation of your software; how it works and mail it to the reader and supervisor
- You can create a YouTube video and mail

Submission

Your dissertation has a strict page limit of 40
- two band penalty for non-adherence to submission instructions
- previous A grade dissertations on moodle for reference
  (these are 60 pages and included a proposal phase in semester 2)

Plan to start writing it at least 3 weeks before the deadline

The deadline is Wednesday 07 September 2016 at 12:00
- late submission will be penalised
- Getting extensions is a difficult process –

If you have any problems please contact me as soon as possible

Evaluation Criteria

Analysis 15% (Please note this is not updated on moodle page yet!!)

- surveyed relevant literature and existing software products, captured the requirements, analysed the problem and devised a suitable approach

Product 40%

- product well-designed, functional, reliable, robust, efficient, usable, maintainable, and well-documented and demonstrated

Evaluation 15%

- software tested and user evaluation, suggestions for further work

Report 20%

- complete, well-organised, clear, and literate, clearly explain the steps of the project with bibliography and proper citations

Conduct 10%

- did the student attend meetings & engage effectively with the supervisor?

MSC development Project assessment criteria

- Look at

- http://moodle2.gla.ac.uk/course/view.php?id=2983 in section

MSc Development Project Assessment						
Grade (Band)	**Analysis**	**Product**	**Evaluation**	**Dissertation**	**Conduct**	**Overall**
A (A1–A5)	The problem analysis is excellent. The survey is comprehensive. The approach is clearly feasible and innovative.	The software product is extremely well designed, implemented, and documented.	The evaluation is really thorough. There are excellent suggestions for further work.	The dissertation is complete, very well organised, very clear, and highly literate.	Excellent.	An excellent project of MSc distinction standard, and possibly worthy of dissemination. (A1 or A2 signifies a truly outstanding and challenging project, definitely worthy of dissemination.)
B (B1–B3)	The problem analysis is very good. The survey is wide. The approach is feasible.	The software product is very well designed, implemented, and documented.	The evaluation is very thorough. There are very good suggestions for further work.	The dissertation is complete, well organised, clear, and literate.	Very good.	A very good project of MSc merit standard.
C (C1–C3)	The problem analysis is good. The survey is adequate. The	The software product is well designed, implemented,	The evaluation is quite thorough. There are some	The dissertation is nearly complete, fairly well organised.	Good.	A good project of MSc pass standard.

Structure

First decide the structure of your dissertation: how it will be divided into chapters (and appendices)

You might decide to subdivide some chapters into sections

You might even subdivide some sections into sub-sections

0. Title page: including (in order from top to bottom), your project title, your name in full; and the month and year of submission.

1. **Introduction:** briefly explain the context of the project problem.
1. **Statement of Problem:** clearly state the problem to be addressed in your forthcoming project. Explain why it would be worthwhile to solve this problem.

2. Background Survey (ANALYSIS) : present an overview of relevant previous work including articles, books, existing software products and requirements identification. Critically evaluating their strengths and weaknesses.
A1-A5 :: The problem analysis is **excellent**. The survey is comprehensive. The approach is clearly feasible.

3. Design : Provide architecture; design details at right level and discuss alternatives considered
4. Implementation – how you implemented; software testing;
A1-A5 :: The software product is extremely well designed, implemented, and documented.

5. Evaluation of the system The evaluation is really thorough.

6. Bibliography: list, in alphabetical order by author and date, all articles that you have consulted.

Marking Procedure – Grade descriptors

Supervisor and a READER marks the project

A–B–… C/D

A

Excellent: MSc distinction standard.
(A1 or A2 signifies exceptionally good work, definitely worthy of wider dissemination.)

The dissertation is complete, very well organised, very clear, and highly literate.
20% of marks

Chapter 6. Bibliography:

- list, in alphabetical order by author and *date, all articles that you have consulted. For each article, give full bibliographic details*

- **Use consistent style**
  - Full bibliographic details for all items
  - Web pages – access date
  - Books/articles – full details; use APA style– readability is high

- **Collect all the details when you access a document first**
  - Update the .bib file or Endnote
    - Provide a summary

The report is complete, very well organised, very clear, and highly literate.

Requirements chapter:

- . Statement of Problem/MOSCOW/Use cases: clearly state the problem to be addressed in your forthcoming project. Explain why it would be worthwhile to solve this problem.
  - The problem statement is excellent and fully justified.

- 3. Background Survey/Analysis: present an overview of relevant previous work including articles, books, existing software products and requirements identification. Critically evaluating their strengths and weaknesses.
  - The survey is comprehensive and incisively critical

- Effectively combine 2 and 3 in one chapter– articulation is something like: I have a problem (statement of the problem) and here is the background

- Or here is the background and I am going to solve the following problem

"A1–A5" :: The problem analysis is excellent. The survey is comprehensive. The requirements are clearly specified. (15% mark!!)

Content – Development project

In your design chapter:

- discuss the main features of your design and how it evolved
- highlight any novel features
- but don't include design documentation here

In your implementation chapter:

- discuss the main algorithms and data structures and how they evolved
- highlight any novel features
- also discuss your testing strategy

Product – 40% of marks

product well-designed, functional, reliable, robust, efficient, usable, maintainable, and well-documented and demonstrated

Content – Development project

In your evaluation chapter:

- describe how you evaluated your product
- summarise the evaluation results, and use them to critically evaluate your own work
- be honest about any shortcomings

Evaluation – 15% of marks!!

In your conclusion:

- describe the status of your product
- summarize what you have achieved
- compare to what you originally set out to achieve
- relate your work to relevant previous work
- suggest further work that you think would be worthwhile

Example 1 – Development project

Title page
Acknowledgements
Abstract
Table of Contents
1 Introduction
2 Survey
3 Requirements
4 Design
5 Implementation
6 Evaluation
7 Conclusion
A Requirements
B Design Documents
C Evaluation Results
Bibliography

Content – Title page

Developing a new operating system ← title

William Gates ← author's full name & Programme & id

MSc ??? – Matriculation Number

A dissertation presented in part fulfilment of the requirements of the Degree of MSc in Information Technology at The University of Glasgow ← degree

September 2016 ← date

Content – Abstract

The abstract is a short summary of the dissertation

Its purpose is to catch the reader's attention: is this dissertation worth reading in full?

It should be ½–1 page long

It should briefly outline the context of the project, its goals, and its achievements

It should highlight any novel aspects of the project

Content – Table of contents

The table of contents lists the chapters of the dissertation

– showing each chapter's number and title, and the number of its first page

Similarly, it lists the abstract, acknowledgements, appendices, bibliography, …

If chapters are subdivided into sections, these should also be listed

– showing each section's number and title and the number of its first page
– section and sub-section details should be indented and less prominent

What shall we do?

- ## Create a project template
  - You can get templates on moodle
    - Use **Latex** or Word
  - This help your formatting easy and simple

- ## Use a bibliography
  - Endnote
  - .BIB FILE

- ## Use picture drawing packages consistently

- ## Create place holders for each chapter
  - Compile your template

- ## Already got an empty project report

<u>The report is complete, very well organised, very clear, and highly literate.</u>

Content – Avoiding plagiarism

Plagiarism means:

using another person's work without acknowledgement
- i.e. presenting another person's work as if it were your own

You must cite the source of anything that is not your work, including:
- text (either direct quotation or paraphrase)
- ideas
- designs
- code
- data
- diagrams, images, etc

Content – Avoiding plagiarism

If you **must** use another person's words exactly, include quotation marks as well as a citation

Almost always it is better to paraphrase the other person's words (using your own words) – but still include a citation

"Testing can prove the presence of errors, but never their absence." (Dijkstra 1968)

direct quotation

Dijkstra (1968) observed that testing might expose errors in a program, but no amount of testing can ever prove the program free of errors.

paraphrase

Content – Avoiding plagiarism

On the projects moodle page you can check you proposal for plagiarism using Turnitin

"The University's primary focus in using Turnitin is to provide a means whereby students may enhance their knowledge and understanding of plagiarism"

It is there to help you so use it before the submission deadline
– if there are problems, then you have the chance to fix things

If you have any problems using Turnitin let me know
– it can be slow at times (which unfortunately I cannot do anything about)

Content – Plagiarism vs acknowledgement

Every project builds on previous work

It is normal to use previous work in your project, but you are also expected to contribute something new
- you will be assessed on your own contribution

Whenever you use another person's work, you must acknowledge its source

Failure to acknowledge a source is plagiarism
- this means presenting another person's work as if it were your own

Content – Plagiarism vs acknowledgement

Wherever you reuse another person's code, acknowledge the source in the code itself (as a comment) and in your dissertation

Wherever you use another person's idea, design, data, table, figure, image, …, acknowledge the source in your dissertation. E.g.:

Year	2004	2005	2006	2007
UK	2.8%	2.6%	2.8%	1.5%
France	1.8%	2.0%	1.9%	1.5%

Table 4.1 Annual growth rates (The Economist 2008).

Content – Bibliography

The bibliography must list all sources (books, articles, web sites, etc.)

- that are cited in your report
- that provide useful background information

Normally order the sources by authors' surnames and dates

For every source, include the author names, date, title and

- for an **article**: the title of the journal or conference record in which the article was published, and page numbers
- for a **book**: the name of the publisher
- for a **web site**: the URL
- also, if useful, briefly summarize the content

Content – Citations

The Harvard style: author_surname, date

The quick–sort algorithm was invented by Hoare (1962); see also Wikipedia (2007).

Python (Downey et al. 2002, Martelli, 2006) is a highly dynamic language, suitable for object–oriented and functional programming.

citations in the text

Downey, A., Elkner, J., Meyers, C. (2002) *How to Think Like a Computer Scientist – Learning with Python*, Green Tea Press.

Hoare, C.A.R. (1962) Quicksort, *Computer Journal 5*, pp. 10–15.

Martelli, A. (2006) *Python in a Nutshell*, O'Reilly.

Wikipedia (2007) Quicksort, en.wikipedia.org/wiki/Quicksort.

bibliography

Masters Projects

Content – Citations

The Vancouver style (numbered) is an alternative

The quick-sort algorithm was invented by Hoare [2].

Python [1, 3] is a highly dynamic language, suitable for object-oriented and functional programming.

citations in the text

[1] Downey, A., Elkner, J., Meyers, C. (2002) *How to Think Like a Computer Scientist – Learning with Python*, Green Tea Press.

[2] Hoare, C.A.R. (1962) Quicksort, *Computer Journal 5*, pp. 10–15.

[3] Martelli, A. (2006) *Python in a Nutshell*, O'Reilly.

bibliography

Latex supports automatic styles (bibtex), while MS Word does not

Content – Supplementary material

Supplementary material includes code, documentation, detailed evaluation results, …

Do not include supplementary material in chapters of the dissertation

Put supplementary material:
- in an appendix but only if
  - it is essential to understanding of the dissertation
  - and it is not too bulky
- if it is not an appendix include separately in the electronic submission

Include references to the supplementary material where necessary in your dissertation

Ethical approval

If your project involves the participation of other people (for example in an evaluation), or data relating to other people, then you should complete an ethics checklist form

You may also need to apply for approval from the schools ethics committee see: http://www.dcs.gla.ac.uk/ethics for further details