



UNIVERSITY OF  
LINCOLN

# Maths and Physics Projects

## MTH3011 – MTH3005

Katharine Johnston

# Summary

- Learning objectives
- Module schedule
- Assessments:
  - Project Management and Professionalism:
    - Research Plan
    - Logbook/meetings
    - Professionalism
  - Report
  - Viva
- Deadlines
- Computer work

# Learning objectives (MTH3011)

**LO1** Undertake an independent programme of work in mathematics and/or physics aligned with the course subject specialism, that includes the analysis, interpretation and critical evaluation of the results to reach conclusions that are appropriate for the particular project.

**LO2** Write a full and clear report that conforms to agreed guidelines.

**LO3** Manage time, setting and achieving appropriate targets throughout the project, including the provision of any necessary documentation, so that the work is completed by the stated deadline.

**LO4** Present and defend the results of the project in a viva.

# Learning objectives (MTH3005)

**LO1** Undertake a programme of work, without unduly close supervision, meeting agreed targets, critically analysing the results and reaching conclusions that are appropriate for the particular project.

**LO2** Manage time, setting and achieving appropriate targets throughout the project, including the provision of any necessary documentation, so that the work is completed by the stated deadline.

**LO3** Write a full and clear report that conforms to agreed guidelines.

**LO4** Present and defend the results of the project in a viva.

# Components

Assessment Component	Component of the Module grade (total: 65% of module)
Research Plan	20 % (equally weighted)
Logbook	
Professionalism	
Scientific report (R)	45% $R^{\frac{2}{3}} \cdot V^{\frac{1}{3}}$
Viva (V)	

# Research Plan

1. The **title** of the project.
2. A **brief description** of the project.
3. **Connection** of the project **with** your **previous studies**
4. A **literature survey** (see later).
5. A list of **references**.
6. **Equipment** and **facilities** required.
7. Likely **cost** of consumables required.
8. An **action plan** showing what has to be done and the date by which it will be completed (e.g. Gantt chart)
9. Ethics document ([link](#)) (I will complete the application)
10. A **risk assessment** wherever appropriate (compulsory for Physics and Joint Physics programmes).
11. Arrangements made for **regular discussions with** your **supervisor**.

# Research Plan: Literature Survey

*The aim of a literature survey is to identify (all) published material relevant to your project or work.*

- It is essentially an information gathering exercise.
- The survey should be a report on the literature search and not on the literature itself.

## Example Literature survey (first few entries)

**Title:** Literature concerning approaches to magnetic quantum dots

Author	Year	System
Schwartz <i>et al</i>	2003	Co <sup>2+</sup> and Ni <sup>2+</sup> doped ZnO QDs
Norris <i>et al</i>	2001	Mn <sup>2+</sup> doped ZnSe QDs
Wang <i>et al</i>	2007	Mn <sup>2+</sup> doped CdSe/ZnS QDs
Kim <i>et al</i>	2006	CdSe/ZnS QDs and Fe <sup>3</sup> O <sub>4</sub> nanoparticles in mesoporous silica spheres

# Research Plan: Literature Review

*The aim of a literature review is to identify, evaluate and interpret (all) relevant published material.*

- Compare the results of various works: is there a general consensus or are findings contested?
- Identify best methods - be critical!
- Highlight 'seminal' studies (strongly influencing later developments)
- Highlight 'gaps' in the literature; and
- Finish by placing your work in the context of the literature you have reviewed.

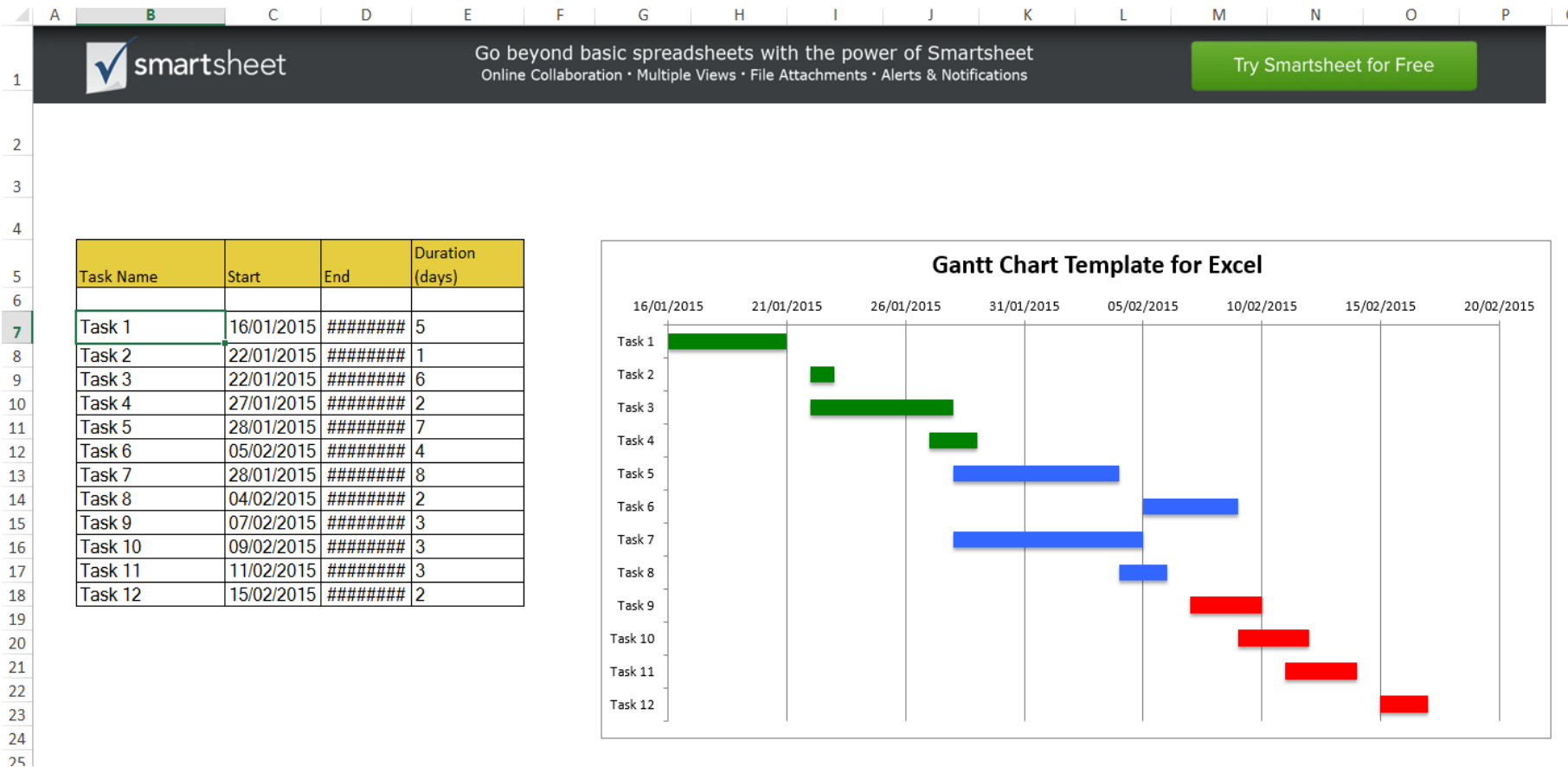
*A short literature review should (usually) be included in the introduction of your final report.*



# Research Plan: Work Schedule

Ganttcharts are used to plan projects or a series of tasks

<https://www.smartsheet.com/>



# Research plan marking scheme

Project Management and Professionalism Marking scheme							
Learning outcomes met: LO1, LO3							
	Failing	40-49	50-59	60-69	70-79	>79%	
Research Plan	<ul style="list-style-type: none"> <li>• Very poorly presented and difficult to follow.</li> <li>• No equations/tables or figures are present.</li> <li>• No evidence of reflection</li> <li>• No references are reported.</li> <li>• Very Poor understanding of the project.</li> <li>• Very poor reflection about the objective of the project.</li> </ul>	<ul style="list-style-type: none"> <li>• Poorly presented and difficult to follow</li> <li>• Some Equations/tables / figures are present.</li> <li>• Limited evidence of reflection</li> <li>• Limited references with inconsistency in style.</li> <li>• Limited understanding of the project.</li> <li>• Some of the objectives of the project are not realistic or cannot be performed in an adequate timeline.</li> </ul>	<ul style="list-style-type: none"> <li>• Fair attempt at a logical structure using standard format.</li> <li>• Fair use of equation/diagrams/tables and their presentation.</li> <li>• Fair range of key references used and presented in a standard style with only minor inconsistencies.</li> <li>• Fair understanding of the project.</li> <li>• Fairly good timeline of the objectives.</li> </ul>	<ul style="list-style-type: none"> <li>• Generally, coherently, and well structured (date, section, title, page numbers, eq. number etc).</li> <li>• Good use and presentation of the equations/diagram s/tables</li> <li>• Good range of key references used and consistently in a standard style.</li> <li>• Good critical analysis and good reflection on the significance of the project.</li> <li>• Good proposal and realistic timeline of the main objectives.</li> </ul>	<ul style="list-style-type: none"> <li>• Generally, coherently and well structured (date, section, title, page numbers, eq. number etc).</li> <li>• Very good use and presentation of the equations/diagrams/ tables.</li> <li>• Very good range of key references used and consistently in a standard style.</li> <li>• Very good critical analysis and good reflection on the significance of the project.</li> <li>• Excellent proposal and good timeline of the main objectives of the project.</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent presentation and use of equations/diagrams/ta bles.</li> <li>• Wide range of key references used and presented accurately and consistently in a standard style.</li> <li>• Clearly developed, showing a thorough understanding of the theory behind the project.</li> <li>• An excellent critical and concise reflection on the significance of the project.</li> <li>• Outstanding proposal with ambitious objectives in a good timeline frame.</li> </ul>	

# Logbook (1)

- *Should be used to record **ALL** work done on your project, as you do it.*
  - *Reading*
  - *Planning*
  - *Method*
  - *Calculations*
  - *Simulations*

**Logbooks can be collected from my office  
INB3128 starting Thursday 2<sup>nd</sup> October 2025**

# Logbook (2)

On paper, A4. Scanned and saved regularly. The log-book should be signed by supervisor at each meeting. It should be submitted on/before project deadline with the report.

Make a record of the work being done:

1. Reading a book section or an article
2. Performing a calculation
3. Learning a new piece of theory
4. Working for solving a problem
5. Making notes questions to ask the supervisor
6. Critical reflection on the work done or on the literature

# Logbooks

## Project Management and Professionalism Marking scheme

### Learning outcomes met: LO1, LO3

	Failing	40-49	50-59	60-69	70-79	>79%
Logbook	<ul style="list-style-type: none"> <li>No evidence of a logical structure.</li> <li>Very poorly presented and difficult to follow.</li> <li>No equations/tables or figures are present.</li> <li>No evidence of reflection</li> <li>No references are reported</li> <li>No evidence of ideas for future work</li> <li>Very Poor understanding of the problem.</li> </ul>	<ul style="list-style-type: none"> <li>Limited evidence of coherence or structure</li> <li>Very limited analysis of the problem and difficult to follow</li> <li>Some Equations/tables / figures are present.</li> <li>Limited evidence of reflection</li> <li>Limited references with inconsistency in recorded detail so they cannot be found by another reader.</li> <li>Limited evidence of ideas for future work.</li> <li>Limited understanding of the problem.</li> </ul>	<ul style="list-style-type: none"> <li>Competently written in a way that is easy to follow</li> <li>Fair attempt at a logical structure using a consistent format.</li> <li>Fair use of equation/diagrams/tables and their presentation.</li> <li>Fair range of key references recorded and presented with sufficient detail for these to be recovered by another reader.</li> <li>Evidence of consideration of possible future work.</li> <li>Fair understanding of the problem.</li> </ul>	<ul style="list-style-type: none"> <li>Good presentation skills with good analysis of the problem</li> <li>Coherently and well structured (date, section, title, page numbers, eq. number etc).</li> <li>Good use and presentation of the equations/diagrams/tables</li> <li>Good range of key references recorded with sufficient detail for these to be easily recovered by another reader.</li> <li>Good consideration of future work and clearly linked with the work done</li> <li>Good critical analysis and good reflection on the significance of the results/problem</li> </ul>	<ul style="list-style-type: none"> <li>Very good presentation skills with good analysis of the problem</li> <li>Coherently and well structured (date, section, title, page numbers, eq. number etc).</li> <li>Very good use and presentation of the equations/diagrams/tables.</li> <li>Very good range of key references recorded with consistent detail for these to be easily recovered by another reader.</li> <li>Very good presentation about the future work and clearly linked with the work done</li> <li>Very good critical analysis and good reflection on the significance of the results/problem.</li> </ul>	<ul style="list-style-type: none"> <li>Outstanding presentational skills showing an accurate and fluent analysis of the topic or problem.</li> <li>Excellent presentation and use of equations/diagrams/tables.</li> <li>Wide range of key references used and recorded with clear and consistent detail for these to be easily recovered by another reader.</li> <li>Clearly developed, showing a thorough understanding of the theory behind the project.</li> <li>Excellent reflection about possible future work that is closely linked to the work carried out.</li> <li>An excellent critical and concise reflection on the significance of the results/problem.</li> </ul>

# Professionalism

14

Over the duration of the project, students are expected to demonstrate professional behaviour, which includes:

- **Engagement:** actively participating in all stages of the project, attending meetings, and contributing to discussions and collaborative work.
- **Organization and Planning:** setting clear goals, managing time effectively, and keeping track of progress to ensure the project stays on course.
- **Communication:** maintaining regular, clear, and professional communication with supervisors and peers, ensuring that updates, challenges, and progress are shared promptly.

This approach will help ensure the successful and professional completion of the project.

Project Management and Professionalism Marking scheme						
Learning outcomes met: LO1, LO3						
	Failing	40-49	50-59	60-69	70-79	>79%
Professionalism	Student has not engaged with supervisor and been unable to manage any aspect of their project independently.	A student that has made limited effort to manage their project and has needed considerable assistance to plan, send their work for feedback and communicate.	A student that has engaged but needed assistance to manage their project, to timely send work for feedback, plan work and/or has been weak at communicating	A student that has overall sent work for feedback in a timely manner, has planned and organized their work and has been consistent in their communication.	A professional and engaged student who has sent work for feedback in a timely manner, taken responsibility for planning and organizing project and communicated effectively.	An excellent engaging student who has sent their work for feedback in a timely manner, taken full responsibility for planning and independently organizing project and communicated very effectively.

# Meetings with Supervisor

- 30 minutes every two weeks.
- You are responsible for initially contacting and arranging a regular time and location for these meetings with your supervisor.
- Lost slots cannot be carried over (unless for extenuating circumstances backed by the form...)
- Students may ask for an extra session, but the supervisor may not be able to accommodate them; extra session means one less regular session.
- Plan your meeting beforehand (e.g. bring findings and list of questions) to make the most of your contact time!
- **First meeting:** *before* sending your research plan for feedback (indicative deadline for research plan is 22/10/25)

# Report

*Should include:*

- A title page
- An abstract (max. 150)
- A table of contents
- An introduction
- A method section
- Results/calculations/simulations, etc.
- A discussion
- A conclusion
- Acknowledgements
- References
- An appendix

Figures can be placed  
throughout text  
(usually preferable)  
or at end

Approx word count 10,000 but this may depend on your project (discuss with your supervisor).  
Max word count 20,000 (not including references). <30% of the references should be online.



# Report - formatting

- Use Times Roman Font or any other font consistently through your report (Arial Font for example – if you are unsure please contact your module coordinator).
- Use font point size 16 bold for Chapter headings
- Use font point size 14 bold for Section headings
- Use font point size 12 for normal script
- Use top and bottom margins of 1 inch, right/left hand margin of 1.25 inches.
- Justify on both left and right hand margins and use 1.5 spacing
- Use headers and footers as appropriate and number your pages in the footer in the bottom centre or right
- Check spelling with the spell-checker

# Report marking scheme

## (can be found in handbook)

18

Report Marking scheme						
Learning outcomes met: LO1, LO2	Fail - (0-39)	Third - (40-49)	Lower second - (50-59)	Upper second - (60-69)	First - (70-79)	High first - (80-100)
<b>Abstract, aims and objectives</b>	<ul style="list-style-type: none"> <li>No abstract or aims/objectives</li> </ul>	<ul style="list-style-type: none"> <li>Abstract is evident; aims and objectives are evident</li> </ul>	<ul style="list-style-type: none"> <li>Abstract is relevant to the project; aims and objectives are clearly described</li> </ul>	<ul style="list-style-type: none"> <li>A well written abstract that is relevant to the project; aims and objectives are clearly described, are appropriate and achievable</li> </ul>	<ul style="list-style-type: none"> <li>A concise, well-written abstract, that is relevant to the project, details main outcomes, and sets project set into context; aims and objectives are well directed, ambitious and achievable, with appropriate deliverables</li> </ul>	<ul style="list-style-type: none"> <li>Abstract and aims/objectives are the standard of a published paper</li> </ul>
<b>Presentation Skills</b>	<ul style="list-style-type: none"> <li>Report is very poorly presented</li> </ul>	<ul style="list-style-type: none"> <li>Report is adequately typeset</li> </ul>	<ul style="list-style-type: none"> <li>Report is consistent; figures are sufficient quality; equations are typeset to a sufficient standard (e.g., Latex)</li> </ul>	<ul style="list-style-type: none"> <li>Report is consistent and logically presented; figures include captions and are well labelled; equations are well typeset, and notation described; language style and grammar are of a good standard</li> </ul>	<ul style="list-style-type: none"> <li>Report is consistent and logically presented with appropriate subject headings to guide reader; figures are excellent quality and referenced correctly; equations are correctly typeset, well-labelled and cross-referenced correctly and notation is correctly described; language style is fluent and sophisticated</li> </ul>	<ul style="list-style-type: none"> <li>Report is the presented to the standard of a published paper</li> </ul>
<b>Background Theory and References</b>	<ul style="list-style-type: none"> <li>No evidence of background research</li> </ul>	<ul style="list-style-type: none"> <li>Evidence of background research; some references cited</li> </ul>	<ul style="list-style-type: none"> <li>Evidence of background research into a topic appropriate for 3rd year level; some understanding of background theory; relevant references cited</li> </ul>	<ul style="list-style-type: none"> <li>Detailed background research into a sufficiently challenging 3rd year topic; clear understanding of background theory; fair insight into the literature; range of relevant references cited appropriately; bibliography typeset correctly</li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive background research into a complex 3rd year topic; thorough understanding of background theory; excellent insight into the literature which is referred to throughout report; a wide range of relevant references are cited appropriately; bibliography is typeset to a high standard</li> </ul>	<ul style="list-style-type: none"> <li>The depth and breadth of the background research is the standard of a published review paper.</li> </ul>
<b>Analysis and Interpretation of the Results</b>	<ul style="list-style-type: none"> <li>No evidence of results</li> </ul>	<ul style="list-style-type: none"> <li>Results are communicated fairly; various information is considered</li> </ul>	<ul style="list-style-type: none"> <li>Results are at satisfactory level for 3rd year and are well communicated; a range of information is evaluated; arguments are logical</li> </ul>	<ul style="list-style-type: none"> <li>Results are well developed for 3rd year level and are communicated to a high degree of proficiency; a range of information is critically analysed; arguments are coherent and substantiated with supporting evidence; thoughtful interpretation of results</li> </ul>	<ul style="list-style-type: none"> <li>Results are involved and elaborate for 3rd year and are communicated to an accomplished level; complex information is analysed to an advanced level; arguments are well developed, substantiated with supporting evidence, and compared to literature results; perceptive interpretation of results in a wider context</li> </ul>	<ul style="list-style-type: none"> <li>Results are exceptional and have the potential to be published.</li> </ul>
<b>Conclusion and Future Work</b>	<ul style="list-style-type: none"> <li>Conclusions are inadequate</li> </ul>	<ul style="list-style-type: none"> <li>Conclusions are relevant to the project aim</li> </ul>	<ul style="list-style-type: none"> <li>Conclusions provide an adequate summary of the project; evidence of future work</li> </ul>	<ul style="list-style-type: none"> <li>Conclusions provide a detailed overview of the research and the main results; clear ideas on how the project could be extended</li> </ul>	<ul style="list-style-type: none"> <li>Conclusions link together aims, methodology, and main results; project is put into wider context; detailed description of various ways to extend the work</li> </ul>	<ul style="list-style-type: none"> <li>Conclusions communicated exceptionally; future work is discussed in the context of the research landscape</li> </ul>
<b>Content and Creativity</b>	<ul style="list-style-type: none"> <li>Content is inadequate</li> </ul>	<ul style="list-style-type: none"> <li>Content is relevant to degree programme; some creativity demonstrated</li> </ul>	<ul style="list-style-type: none"> <li>Content is suitable level of difficulty for 3rd year; creative work is evident</li> </ul>	<ul style="list-style-type: none"> <li>Content covers sufficient depth/breadth at a level of difficulty appropriate for 3rd year; creativity is demonstrated throughout the report</li> </ul>	<ul style="list-style-type: none"> <li>Content is sufficiently advanced for 3rd year, demonstrating both depth and breadth of research; excellent creative flair and originality</li> </ul>	<ul style="list-style-type: none"> <li>Content goes beyond the level expected for 3rd year; standard of research is that of a published paper.</li> </ul>

# Viva

Aim of viva:

- To test your knowledge of the subject
- To confirm that you have undertaken the project work yourself
- To ensure that you understand your results

30 minutes in total:

- 2-3 minutes a short general introduction aimed at a non-scientific audience
- Max 12 minutes presentation of the main results
- Remaining time spent in answering questions and in discussion with audience

# Viva marking scheme

Viva Marking scheme (Learning outcomes met: LO1, LO4)	Bad Fail	Marginal Fail	III	Iiii	Ili	I	High First
Ability to summarize project to a lay person as required in brief in under 3 minutes (should be timed)							
Comprehension of the background material or research							
Understanding and interpretation of the results of your studies							
Presentation skills (quality of slides and speaker's communication with the audience)							
Ability to suggest improvements and/or extensions to the project							
Ability to answer questions							

# Your project

- Putting in effort is your responsibility
- It's best to work in a regular and organised fashion. Do not leave to the last minute!
- Equally, the project should not take up all of your time, as there are other modules, exams, etc.
- Final year projects can often be a topic that employers ask about at interviews.

# Deadlines

Component	Percentage of total module mark (65% total for Project)	Submission Deadlines (indicative in brackets)
Draft research plan	0%	(22/10/2025)
Project Management and Professionalism (including logbook and final project plan)	20%	3pm 22/05/26
Draft Report (to receive feedback)	0%	(01/05/2025)
Final Report (R)	45%	Report - 3pm 22/05/26
Viva (V)	$R^{\frac{2}{3}} \cdot V^{\frac{1}{3}}$	Viva - Week 35

**Note:** although the mark allocated for the project plan and report drafts is 0%, timely submission of these will count towards the mark for the *Project Management and Professionalism* component.

# Computer work

- BSc computer project room is INB2304
- Computer software and system in INB2304 are currently being updated so please don't use room until you are assigned your project
- Email SEPS admin cc'ing kajohnston@lincoln.ac.uk if your keycard does not let you into the room
- Login username: **Student**, password: **SEPS**
- It is very important to **backup your work regularly** to e.g. OneDrive or a USB drive
- We have also asked whether INB2304 can be accessible until 10pm (Mon-Fri)...TBC

# Questions?