University of Essex | Online

MSc Computing

Project

Module Handbook

University of Essex | Online

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1. Introduction

The Computing Project comprises of a Dissertation and a resulting Artefact. The Computing project is an important part of your Master's studies. It provides an opportunity to demonstrate your ability to generate original research and independently investigate a well-defined research question in a coherent, well-organised and critical manner. It is a critical investigation of a specific problem or issue, and you will need to demonstrate an innovative, academic approach to your research design, planning and written dissertation.

Since this is an MSc conversion course, the main themes have been defined leaving no room for elective modules. For this reason, you are asked to consider possible areas for a topic during the early modules within the subject domain that is not covered on the course that you would like to study further. Your tutors will be able to help you with this. This topic will then become the subject of your dissertation, which is one third of the course. The

academic team endeavours to match a student's research interests with an available tutor to act as your supervisor.

Once allocated, you should then discuss your project outline with your supervisor. Please see **section 7** for more information on allocation of supervisors.

1.1 Purpose of the Dissertation

The aim of the Dissertation is to provide students with the opportunity to produce an original piece of research that advances knowledge in their subject area. Computing projects are most commonly, but not limited to, development projects and research projects. You should critically review the literature to identify a gap in the research base. The main aim is not the acquisition of new technical skills but a demonstration of your ability to start, plan, manage and present a computing project. It is important that the topic chosen fulfils the learning outcomes of your programme of study, including the production of a computing artefact. The dissertation submission must describe the whole project.

1.2 Nature of the Dissertation

You have the opportunity to conduct and submit a dissertation on a subject of their choosing (however, this must be agreed with your supervisor) over a period of 30 weeks, accounting for around 600 hours in total (based on 10 hours per credit). In investigating novel issues, primary data is gathered, which may be qualitative or quantitative in nature. Throughout, the emphasis is on conducting research and development work, combined with a review of literature and data, to solve a given problem. Particular attention needs to be paid to the reliability and validity of the approaches used.

Primary Research

The research involved may aim to collect original data on a given research problem then analyse and report the findings form this data collection. Primary research should only be used where the research question can only be answered by the collection of new data and where suitable data to inform the research question has not already been collected either for similar or different means. Please note due to the time constraints associated with completing the dissertation module, it may not be practical to undertake research which requires external ethics approval, as this can be a particularly timely process. Please discuss this with your supervisor during your first meeting, to see if the dissertation timescales will allow for you to undertake such approval processes.

Secondary Research

Following the identification of the research problem to be investigated, the approach involves an in-depth study of the available literature, combining synthesis and critical analysis of secondary data. The approach also provides a rigorous evaluation of the methods used, the conclusion drawn, and the theories proffered in the literature. In considering the type of research that you will undertake from the 2 broad categories above, you may like to consider key factors that will influence your decision such as available time, ethical approval, resources and confidence with chosen methodology.

2. Module description

This module is the culmination of your post-graduate studies. It is an independent research project that you will undertake on a topic of your choosing, which offers the opportunity to tailor your studies to area of interest which you may have developed over the course of your previous taught modules or from your own professional or academic experience. Your dissertation will be undertaken with supervision from two members of the academic faculty who will support you to clarify your research process, structure of the report, writing up and artefact presentation. The choice of topic remains your choice and responsibility throughout, though your supervisor will have research experience and so will be able to offer valuable insights which may help to your guide key decisions regarding the type of research you will conduct, ethical considerations, timings, methodologies and evaluation techniques (where applicable).

2.1 Module aims

This module aims to

1. Enable students to plan and undertake an independent technical project into a specific topic of their choice.
2. Further develop and enhance students' technical skills such as coding, programming and algorithm development skills
3. Develop students' transferable skills, including time and project management, organisational skills, data collection and analysis, and communication skills.
4. Develop students' critical thinking skills.
5. Develop students' understanding of their chosen topic to an advanced level, considering legal and ethical issues surrounding this topic.
6. Enable students develop a stand-alone artefact that meets the identified requirements and conforms to a design specification.
7. Help students develop and critically reflect on key skills – independent, self-aware and organised academic skills, as well as well as self-management skills with regards to time and tasks.

2.2 Learning outcomes

1. Systematically identify research problem(s) within a suitable research topic involving computing.
2. Carry out, structure, and present effectively a focused critical and analytical reading and synthesis of accessed information on the topic.
3. Articulate the professional, legal, ethical and social issues related to the chosen topic and follow relevant professional codes of conduct.
4. Evaluate critically the research conducted and present the resulting artefact as a form of a defence of the research.

3. Master's level study

Students often express concerns in relation to the standard required for a Master's level piece of work. In general terms, two key areas can be identified that differentiate Masters' projects or reports from undergraduate work.

Firstly, a Master's piece of research is invariably **narrower in its focus** than the undergraduate equivalent, in that a more in-depth treatment is required. For example, instead of researching databases and their uses, as might be the case at undergraduate level, a more appropriate focus at Master's level would be to investigate the hypothesis that the distribution of databases provides information access speedup.

Secondly, Master's level work demands a greater degree of critical thinking. Exploring weaknesses in theories and contrasting authors' views is an important aspect of master's work. Of equal importance is providing a clear justification for approaches used in the report along with the rationale for rejecting alternatives.

So, it is **important** to note that a simple set of webpages, or work based solely on a literature review and/or surveys will not be acceptable for an MSc project or report. As mentioned in section 1.1, your MSc project is an extended piece of research which **should result in the production of a computing artefact** (a software artefact, system design, mathematical proof/model, or similar).

4. Choice of research topic

You are encouraged to submit drafts of your proposal for your supervisor to review before the final submission and this proposal should contain the following (these are **not** section headings):

- Project Title
- Significance/Contribution to the discipline/Research Problem
- Research Question
- Aims and Objectives
- Key literature related to the project.
- Methodology/Development strategy/Research Design
- Ethical considerations and risk assessment (as part of your ethical approval application)
- Description of artefact(s) that will be created
- Timeline of proposed activities

If following the discussion of your project r research proposal, your supervisor will identify aspects of the research which may make it unfeasible, and will support you to make amendments which will help to ensure that it is suitable. If any major changes are required after the submission of the research proposal, this must be agreed with the academic faculty and a new proposal must be presented to your supervisor.

Your choice of topic is important for not only must you be able to access the relevant data and produce a computing artefact, but you must also choose a topic that excites you. In addition, the area needs to be specific and reasonably narrow, as the dissertation needs to be completed in a manageable timeframe.

4.1 Ethical approval and data collection

Ethics in research is part of the code of professional conduct, knowing the difference between right and wrong, distinguishing between acceptable and unacceptable behaviour. Norms of conduct are another way in which ethics can be distinguished when looking into the realms of research. These are applied to everyday life in that everyone has a sense of right or wrong and moral development occurs throughout life. However, different individuals interpret, apply and assess these norms in different ways depending on their own life experiences and values. More specifically, there may be cultural geographical and contextual variations in the approach to ethical considerations.

- Who should apply for ethical approval?

Any student undertaking a research project as part of a University of Essex Online (UoEO) course must apply for ethical approval by completing the online 'Application for Ethical Approval' form and submitting it to their supervisor. The supervisor will be able to approve the application only if the research project does not involve human

participants. Students must obtain ethical approval BEFORE STARTING data collection. Please note due to the time constraints associated with completing the dissertation module, it is not practical to undertake research which requires a lengthy approval process by external organisations (such as Government ministries), as this is a particularly timely process.

- Ethics and the Dissertation

The UoEO is aware of its responsibility for ensuring that new researchers (i.e. UoEO students) understand good research practice, and the academic faculty is responsible for ensuring that new researchers receive appropriate advice and guidance in relation to undergraduate and postgraduate research practice. With this in mind, you should make sure you are familiar with our 'Application for Ethical Approval' procedure. Further details can be found in the 'Ethical Guidance Booklet'.

- **How to apply for ethical approval**

For access to our guidance materials please visit the Ethics unit of the module.

WARNING: DO NOT commence your data collection BEFORE the date that your application is approved. There can be no retrospective approval of research involving human participants. Failure to comply with the ethics approval policy will be grounds for potentially very serious action to be taken under the University's Academic Offences Procedures. This means you cannot undertake your research without obtaining ethical approval.

5. Marking procedure

The supervisor will assess your dissertation independently, after which a mark is agreed. In addition, as part of the University's quality control process reports are provided to an External Examiner for moderation. The External Examiner, who has been appointed by the University of Essex, is considered as an independent 'voice' as he or she is from another University.

A pass mark of 50 per cent is required for the MSc Computing Project Module.

6. Plagiarism

Plagiarism is taken very seriously by the UoEO. The policy on plagiarism, collusion and other academic impropriety can be found on Moodle under Student Services & Academic Policies/Course Information.

It is your responsibility to make yourself familiar with this and to ensure that all work which you submit is correctly referenced, clearly identifying all sources of material which you cite or paraphrase in your submission.

In short, all words, concepts, ideas that are not your own must be attributed and referenced. It is appropriate and necessary to consult the work of others but when other people's work is used in your writing this must be made clear within the text and referenced fully in the List of References. You must fully understand that passing off another person's works, thoughts and ideas as your own, is an academic offence and will result in penalties as noted in the UoEO Academic Offences and Procedures document, accessed here:

Academic Offences Policy and Procedures

7. Supervision

7.1 Procedure for allocating supervisors

Students are allocated to a suitable and appropriate supervisor to guide them through the research process. The onus is on the student to make arrangements with the supervisor once they have been notified of their details. At the initial meeting, it is essential that you arrive with your draft proposal for your supervisor to review.

7.2 Supervision role

The project and dissertation are the responsibility of the student and provide an opportunity to demonstrate your ability to complete an independent research project. The final dissertation must be the product of your own work, rather than that of your supervisor. Your supervisor is there to provide advice on the methodology and relevant literature needed to complete a competent piece of work and to guide you.

Areas in which a supervisor can provide advice are set out below:

- The refining of a subject area to achieve an achievable topic
- Approaches to conducting a literature review
- Methodology, with respect to an appropriate match between the research question and paradigm
- Methods (where applicable) to include data gathering techniques such as interview schedules, questionnaires, and focus groups.
- Analysis of findings (where applicable)
- Overall structure and layout
- Format for presenting your project artefact

To achieve the above, supervisor should:

- Maintain contact through scheduled meetings based on the agreed frequency.
- Be accessible at appropriate times and respond in reasonable time to justified requests
- Maintain adequate records of the supervisory process

Key student responsibilities include:

- Discussing with the supervisor the type of guidance the student finds most helpful
- Agreeing a schedule of meetings and/or frequency of email correspondence
- Taking the initiative in raising problems or difficulties
- Maintain the progress of work in accordance with the stages agreed with the supervisor
- Maintain an adequate record of meetings and advice provided

It is not appropriate for the supervisor to read drafts of your full dissertation, nor to provide detailed comments on each section. However, your supervisor is able to review each section briefly (apart from the conclusion), but **only once** and provide general constructive feedback on both content and style. The overall style, standard of English and presentation of the report remains the student's responsibility.

If you are using a questionnaire, or interview schedule, it is important to seek advice from your supervisor. In addition, it is extremely important that, before any thought is given to administering a questionnaire or schedule, ethical approval is received, and your supervisor clears the final draft. If the data-gathering instrument is poor, it is difficult to see how the data, ensuing development, discussion and conclusion can similarly be anything but poor.

The frequency and duration of contact is a matter to be arranged between the supervisor and the student, although students can reasonably expect a minimum of least five hours of supervision, which may be video calls, or telephone conversations. This will usually be in the form of five one-hour meetings. At your meeting, it is your responsibility to set the agenda, keeping your supervisor informed of your progress frequently. Any materials that need to be discussed should be sent well in advance of the meeting. If you do not have a personal meeting, please send your documentation via email and your supervisor will reply usually within 48 hours. Details of meetings held should be logged on the Supervisory Form available on the learning platform.

At the start of the research process, you should draft a supervisory plan. It is important that supervisors and students should, at an early stage, clarify the nature of the supervisory relationship, in order to minimise the risks and problems of misunderstanding, inadequate supervision or unsatisfactory work. The nature of the relationship is likely to vary from individual to individual.

7.3 Support and guidance

This document is only a guide to the processes associated with the project. It includes information about the supervisor roles, your responsibilities and other important details. If you experience problems whilst undertaking your work, please consult with your supervisor first and then, if necessary, with your Student Adviser. Although research can be hard work, it is a rewarding experience for it is an independent piece of work that belongs to you and will contribute to you gaining your masters.

At your initial meeting with your supervisor, you need to establish the preferred means of communication. It is important to keep your supervisor informed and, if you do consult with other tutors, then it is polite to seek your supervisors' opinions about the issues raised. However, please bear in mind that other tutors are frequently busy supervising their own students.

7.4 The supervisor-student relationship

It is important that at the outset for students and their supervisor to be aware of their duties and individual responsibilities. Procedures must be available to deal with any problems which may arise quickly.

The supervisor role is to give guidance, direct you and answer your queries. For instance, they may give you advice on the various literature sources, or inform you of possible methodological approaches, or generally comment on your structure and content. The responsibility for all these areas lies with the student and it is your decision as to what you include or exclude but listen to your supervisor carefully for, they are experienced in supervision.

Your supervisor will provide formative feedback on your research proposal You are encouraged to provide drafts of the proposal for your supervisor to review before the final submission. This will ensure that your project meets the given requirements for this programme (e.g. BCS accreditation).

It is not the supervisors' role to correct all your written pages of writing; you will need to take ownership yourself. Ensure that you use the spell and grammar check in Microsoft Word as you progress. Although the supervisor will not always make specific and detailed comments, they will support you in the best possible way. Supervisors will help you regarding the general structure and overall content. Before you submit your final dissertation, you will need to get it proofread to ensure that it is as error-free as possible. Professional help or a competent friend or colleague might be called upon to assist.

8. The layout of the dissertation

Not all dissertations are alike, with subject areas and research design often influencing the layout, which must always be logical and ordered. There is no universal template which must be applied.

It is advisable to seek guidance from your supervisor with regard the best layout for your dissertation. You should make enquiries with regards to the use of appendices, for example, as some reports incorporate more statistical tests or models in comparison to others, which may be better summarised in the text, with the full tables being placed in the appendices.

Dissertation style

The dissertation should be presented in Times New Roman font, size 12 with 1.5 line spacing and appropriate use of headings and sub-headings.

Dissertation structure

A possible structure for your report is provided here:

- Title Page
- Declaration (check with your supervisor) • Abstract - a ½-page overview of your project.
- Acknowledgements (check with your supervisor)
- Contents page (including section titles and page numbers)
- List of tables and figures (including titles and page numbers)

- The Dissertation -The number and structure of sections will depend on the research topic and design:

  - Introduction (to the Research Problem and Question) – This should clearly state the aims, objectives, motivation and scope of the project. It should also point to the remaining sections of the dissertation which contain the technical content.
  - Background (Critical Review of Literature) – This should also include a description and evaluation of as many alternative approaches as possible, to support your final decision on methodology for the project.
  - Ethical and Professional Considerations - This section should also include a discussion of the **ethical and professional considerations** of the project. The BCS Code of Conduct should be a starting point for this discussion.
  - Main Body – These sections are very much dependent on your project and your supervisor can provide further guidance here. It will involve providing a problem/requirements analysis, refined project specifications, solution/experiment design, as well as a description of the tools that you have used in the development/build process. It should also include details of implementation/integration, experimentation/testing, and/or optimisation.
  - Evaluation – An evaluation of the results of your project is required. The method of evaluation (such as

experiments or customer/user feedback) is dependent on the nature of your project. You should also evaluate alternative solutions.

- Learning - Personal reflection that involves an in-depth and critical analysis of what you have learned, as well as skills gained/improved during the project.
- Conclusion – This is a summary of key points (successes and failures, as well as limitations) and suggestions for future work. This should all be done considering your original objectives/problem description.

- List of References*
- Bibliography*
- Appendices (appropriate support to the main text, such as project logs, test data, full design documentation and similar materials)

**List of References/Bibliography* – Technically, a 'List of References' section at the end of a report just contains the references used in the text, whilst a 'Bibliography' includes all other references used, plus other works that contributed to the study, but which were not directly referenced in the text. Both should be provided in the Harvard referencing style for the University.

For Development projects, all solutions should be technically non-trivial. For Research projects, the aim is to provide a modest contribution to knowledge. So, bear in mind that negative results from an effective investigation re often as valuable as positive results. No matter the form your project takes, always ensure you discuss the structure of your dissertation with your supervisor.

Project Module Assessment

Description of unit of assessment	**Indicative Length**	**Submission Date**	**Weighting**
Research proposal and Ethical Approval Application	4000 words equivalent	By the end of Week 8	N/A - Formative compulsory
Dissertation	13000 words	End of Week 28	80%
Artefact Presentation & Online Conference	10 minutes	Weeks 29 and 30	20%