BIRMINGHAM CITY University

Birmingham City University
School of Computing and Digital Technology
Individual Undergraduate Project UG3
CMP6200/DIG6200

Project Handbook 2021–2022

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This guide is intended to be used towards completion of the individual undergraduate project within the following modules/courses:

CMP6200
BSc Business Information Technology/Systems
BSc Computer Forensics
BSc Computer Games Technology
BSc Computer Networks
BSc Computer Networks and Security
BSc Computer Science
BSc Computing and Information Technology
BSc Computer and Data Science

DIG6200
BSc Digital Media Computing
BSc Digital Media Technology
BSc Film Production Technology
BSc Film Technology and Visual Effects
BSc Music Technology
BSc Sound Engineering and Production

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1 INTRODUCTION

1.1 Welcome

Welcome to the final year undergraduate project!

The project is a unique module in your degree program as it is **your opportunity** to explore an area of interest that excites you. The module runs across an entire year with several staged assessments designed to develop your initial idea into a final dissertation.

Please read through this document carefully. It describes how to undertake the project and includes essential information. However, it is **not** a substitute for regular discussions with your supervisor. While projects vary in nature, the stages a project goes through can be summarised as:

- **Idea:** You need to have a project that is appropriate for the course you are studying.
- **Proposal:** A formal outline of the proposed project. This is the starting point for discussions with your supervisor to ensure it is appropriate for the course, is academically challenging, can be completed in the timescales available, and is manageable with the resources available.
- **Research:** You need to underpin your project with **academic research**. You will need to identify the different topics that your project will include and research them in depth. Research will continue throughout the project.
- **Planning:** A dissertation is a large undertaking. To be successful, you need to strategically plan how you will undertake the project. To do this effectively you need to identify the different methods you could apply throughout the entirety of the project, research and select—with justification—what methods you plan to use and produce a timeline that indicates when activities will take place.
- **Requirements:** It is essential that you regularly review your proposal idea and produce a detailed set of requirements and specifications.
- **Design and Develop:** The majority of the project will be working on the project specific outputs to solve a research question. The way in which you do this is your **method**. Depending on your specific project this may involve the design and development of an artefact.
- **Critical evaluation:** Carefully executed evaluation of the research question (and artefact) is necessary to understand the success of the design.
- **Reporting:** Production of the final dissertation report.
- **Presentation:** Showcase the work and final viva presentation.

An overview of project assessment information can be found in Section 4: Project Assessment Overview.

NB: Please refer to the separate assessment guides that provide are provided on Moodle for information on the individual criteria for each individual assessment point.

1.2 Project Support

1.2.1 Tutorials

There are regular tutorials, led by the School Project Coordinator, throughout the first semester of the module. For 2021–22, these will be uploaded to Moodle each Thursday. During selected weeks (more frequent in the second semester), these tutorials will take the form of support sessions, hosted by a team of supervisors from all departments, in which you can ask any question related to the project.

All supporting documentation for the module is available on Moodle:

https://moodle.bcu.ac.uk/course/view.php?id=84582

Here you will find up-to-date assessment details, submission points and tutorial information and includes:

- Current version of this handbook
- Assessment guide
- Module specification
- Templates and forms
- Tutorial presentations
- Supporting resources

1.2.2 Supervisors

As final-year BSc candidates, you are expected to work on your projects independently; however, you will be allocated a supervisor/personal tutor (termed technical supervisor) who will be familiar with your chosen topic area. Meetings will take place in both timetabled group sessions and one-to-one support sessions.

A second supervisor (termed academic supervisor) will also be allocated as the second marker for your project. The academic supervisor will be available to provide advice and guidance as requested.

The project operates over the entire school and as such there are a several staff involved.

1.2.3 School Project Coordinator

Responsible for the overall delivery of the project and assessment.

Dr Jason Hockman: jason.hockman@bcu.ac.uk

1.2.4 Centre Project Leads

Responsible for the support of students on courses within their centre, issues with marks or supervision issues.

Centre for Computer and Data Science
Dr Quanbin Sun: quanbin.sun@bcu.ac.uk

- Computer and Data Science
- Computer Science
- Computer Studies

Centre for Networks and Cybersecurity
Dalia El Banna Abdelghany Ashmawy: dalia.elbanna@bcu.ac.uk

- Computer Forensics
- Computer Networks
- Computer Networks and Security

Centre for Digital Media Technology
Jay Patel: jay.patel@bcu.ac.uk

- Computer Games Technology
- Digital Media Computing
- Digital Media Technology
- Film Production Technology
- Film Technology and Visual Effects
- Music Technology
- Sound Engineering and Production

Centre for Digital Transformation
Paul Shemmell: paul.shemmell@bcu.ac.uk

- Business Information Technology
- Computing and Information Technology

NB: It is your responsibility to ensure that your supervisor is kept up to date with your progress. If you encounter any problems, contact your supervisor or Centre Project Coordinator immediately.

1.3 Project Credits

The Individual Undergraduate Project is a 40-credit module and will reflect 400 hours allocated across two semesters. As a double module the project mark will have a substantial impact on your degree classification.

1.4 The Project Module

The purpose of the module is to enable you to undertake a sustained, in-depth and research-informed project exploring an area that is of personal interest to you. In agreement with your supervisor, you will decide upon your topic which will take the form of a practical outcome (artefact) with accompanying contextual material. The main consideration when choosing your topic is that it must be aligned to the programme you are studying, and you should consider the relevance of this topic to your future academic or professional development.

This module is an opportunity for you to develop not only academically, but it will also help you to acquire life-long skills and attributes that identify you as a graduate of Birmingham City University. These include being a creative problem solver, professional, industrious, entrepreneurial, and having a global perspective. In the context of technology-related industries, this means:

- Developing an ability to create work which demonstrates the professional standards relevant to your discipline;

- Gaining an understanding of successful project planning, which may include budget, time management and other relevant constraints;

- Being innovative, experimental and pushing the boundaries of your knowledge;

- Being able to self-evaluate and reflect critically on your work, placing it within the context of relevant debates within your chosen field of study.

For the purposes of the project, the exact nature of the research problem to be solved or artefact you create will be agreed in discussion with your supervisor to ensure its relevance to your subject discipline.

2 Aims and Objectives

2.1 Aims

The aims of the project are:

- To give the student the opportunity to carry out, under supervision, an extended study into an agreed topic relating to their degree course;
- To foster the student's independent investigation allowing them to demonstrate initiative and make use of skills and knowledge acquired elsewhere in the course;
- To give the student training and experience in planning and managing a major study and of working on a problem for which there is not a unique solution.

2.2 Transferrable Skills

The transferrable skills that may be developed are:

- **Applying numeracy:** Developing theories and making mathematical calculations to support experimental findings;
- **Managing own learning:** Planning and executing a major individual project;
- **Problem solving:** Carrying out a thorough literature search and critically analysing existing published information. From this, developing a line of reasoning leading to the formulation of an experimental investigation or design to solve a particular problem or investigate, in depth, a particular aspect of a subject. Choosing appropriate techniques and instrumentation for the collection and analysis of data;
- **Information Technology:** Using computer searches to find relevant publications; using computer software to prepare the project reports and to present and analyse data.

2.3 Learning Outcomes

The project module learning outcomes are as follows:

1. Plan a research-informed project using appropriate literature and/or professional outputs.
2. Design an artefact using appropriate techniques and tools.
3. Implement a design to produce an artefact using appropriate techniques.
4. Critically evaluate the implementation of the artefact and the overall project.
5. Assemble and organise information to successfully communicate the results and findings of the project.

3 Project Management

3.1 Project Timeline and Keeping on Track

Projects operate at different speeds but by the start of the second semester you should have undertaken significant work on the project deliverables. Projects also vary in the requirements necessary for completion. While some projects include the creation of prototypes, others may require surveys or iterative software builds. Regardless of the project specifics, ensure that you have discussed your deliverables with your supervisors well in advance, and are aware of the timelines and definitions of the assessments. They have been strategically placed to ensure successful project completion.

As the dissertation is a large undertaking, it is comprised of a variety of wide-reaching components. It is important not to allow yourself to become overwhelmed by this and find ways of completing tasks that are relevant to overall dissertation completion. If a large assessment is due but you are finding it difficult to write, maybe your energy may be better spent making a diagram or editing a previous section. In this way, work will be completed, and you will get past a temporary obstacle.

3.2 Project Logbook/Journal

It is recommended that you maintain an accurate detailed logbook record of all activity related to the project, as it is undertaken with notes, experiments and information search results, and references maintained throughout the duration of the project.

The logbook forms a day-to-day record of progress and should build up to become the basis from which the final dissertation report is derived. It is also highly useful for recording details of your meetings with your supervisor.

It is strongly recommended that you have some form of physical notebook to record key information, references and activities as you proceed through the project. Electronic means can also be used; however, you may find the programmatic restrictions may inform the type of notes you take. Diagrams, flow charts, and mathematical equations are still far easier to develop with a pencil and eraser.

Any physical logbook should be robust and able to withstand the rigours of the laboratory environment and be suitable for travel without losing pages or getting lost. An ideal physical logbook should:

- have fixed pages (i.e., no ring binders, lever arch files);
- have a strong, though not necessarily rigid cover;
- be A4 in size smaller books sometimes prevent the clear recording of activities (e.g., meetings, ideas, results, sketches, diagrams).

Your logbook should be an accurate record of your progress. You should maintain a logbook record as you work so that problems do not occur either through errors in memory, or through individual papers being lost.

A logbook entry is an account of a planned practical activity, research, references, measurements, interviews or results. Each entry should be dated and is summarising the achievements and recommendations for further action. The key actions and summary activity should be added to the project management journal weekly.

Throughout the timeline of the project, you will accumulate copies of reference documents, journal papers, data sheets, and background information. These should be kept in a properly indexed file so you can readily find items as they are needed.

You may optionally wish to keep a record of your project through the journal feature of the University ePortfolio system embedded in a Mahara page (see guidance on Moodle):

https://moodle-portfolio.bcu.ac.uk/

3.3 Gantt Chart

A Gantt chart is a bar chart that depicts the various stages of a project in a timeline. It is a useful tool for staying up to date with the project and keeping the deliverables in perspective. The horizontal axis shows the range of the project from its start to its completion, while the vertical axis contains the tasks. The resultant chart will demonstrate the times during which different aspects of the project are being worked upon. It is good practice to include dates during which you will not be working (e.g., holidays), to ensure that you can meet the module and personal deadlines without impeding upon non-scholastic activities and events. As you traverse the timeline of the project you will need to amend the chart. Figure 3.1 presents an example Gantt chart.

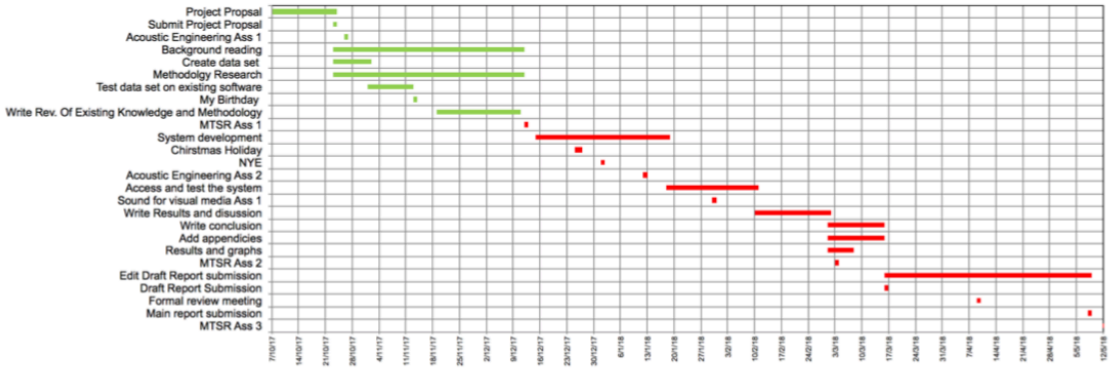

Figure 3.1: Gantt chart with various project stages and key personal events. The green horizontal bars depict completed activities while the red are future activities.

4 Project Assessment Overview

4.1 Assessment Plan

	Name	Type	Weight	Outputs	Sem	Week	Deadline[1]
A1	**Proposal**	Planning Report	10%	• Aim/Objectives (5) • Literature Review Strategy (2.5) • Initial Design Plan (2.5)	1	5	18/10/2021
A2	**Literature Review and Methods**	Progress Meeting	25%	• *Pre-submitted*: - Literature Review and Design/Methods (20) • *Verbal*: - Implementation and Evaluation Strategy (5)	2	2	31/01/2022
A3	**Dissertation**	Academic Report	50%	• Introduction (2.5) • Literature Review (5) • Methods (5) • Implementation (15) • Evaluation (15) • Conclusions (2.5) • Structure (5)	2	10	04/04/2022
A4	**Presentation**	Video Submission	15%	• Project Outcomes (15)	2	Exam Wk 1	09/05/2022
		In-person Viva				TBD[2]	

Table 4.1: Individual undergraduate project assessment plan for 2021–22.

As seen in Table 4.1, the individual undergraduate project assessment plan divides the coursework across four assessment points over two semesters. It is important to note that all outputs in **A1** and **A2** are intended to generate much of the content associated with the full dissertation submission (**A3**). This is followed by a presentation video submission and viva (**A4**), in which you will present your project and associated outcomes and engage in a professional discussion to demonstrate your knowledge of project details.

4.2 Assessment Criteria

Each summative assessment has a set of assessment criteria with them. These are provided in the official separate assessment guides provided on Moodle.

NB: It is essential that you refer to the assessment criteria on Moodle for each individual assessment point and updated deadline.

Submissions will be automatically entered into the **Turnitin system** that identifies similarities with other works to assist with referencing correctly. The submission will produce Turnitin reports visible to you so you can check you are correctly referencing work.[3] You should discuss your Turnitin scores with your supervisor.

[1] Deadlines are subject to change, refer to Moodle for any changes.

[2] To be arranged with supervisor.

[3] See the guidance on Moodle regarding interpreting Turnitin reports.

4.3 Assessment Templates

Detailed assessment templates will be made available along with explanations of each section for the project proposal (**A1)**, literature review and methods **(A2)**, and full dissertation **(A3)** submissions. While the section layout in these templates is not prescriptive, the information to be provided in these is generally seen as crucial to the assessment, and alterations should be discussed with your supervisor prior to undertaking written work.

5 Assessment A1: Proposal (10%)

5.1 Learning Outcome

This assessment contributes towards the following learning outcome:

1. Plan a research-informed project using appropriate literature and/or professional outputs.

5.2 Report Requirements

The project proposal template is a document available on Moodle. This section will provide information on its completion. By completing and submitting the proposal template, you will have registered for the project.

The project is a significant piece of work, and it is important that you start your work early. You may have already begun on the project through your submission of ideas during your second year or on placement.

You are required to discuss your project ideas with your course team as soon as possible. This is essential to formally allocate your supervisor. Even if your ideas are still not fully formed, then as long as it is clear to which topic area your project resides, then we can allocate a supervisor. Allocation is dependent on supervisor availability and workload.

NB: Where a supervisor was allocated during the second year this will only be confirmed after submission of the registration.

Prior to submission of your project proposal, you should meet with your allocated supervisor to discuss the following aspects of the proposed project (see below for details):

1. Overall project idea
2. Aim and objectives
3. Rationale and benefits
4. Project origin
5. Resources required for completion

You should focus on developing a **clear aim** for your project. At this stage it is most important that you concentrate on: 1) the outputs that you envision will result from project completion, 2) the rationale and benefit of the project, and 3) the general skills and resources needed.

Once you have discussed the above with your allocated supervisor you can utilise this feedback and complete the template for your proposal. At this stage you should be able to complete the following aspects which are discussed in detail in the subsequent subsections. Many of these fields (e.g., tasks and methods, bibliography) will be completed with initial ideas and in mind.

1. Project origin
2. Introduction, project title, background, and themes
3. Aim and objectives
4. Rationale and benefits

5. Initial design plan
6. Resources
7. Critique of past final year projects
8. Literature search methodology
9. Risk assessments
10. Ethics review
11. Bibliography

5.2.1 Project Origin

In this portion of the proposal template, you will simply complete the field that is appropriate to the origin of your project idea (e.g., second year, placement, research, industry, tutor, your own).

5.2.2 Introduction, Project Title, Background, and Themes

The introduction introduces your project. The project title should provide a concise indication of the project directives and content. The background should set the context and initial scope for the project. The key themes/topics should identify the relevant fields and aspects involved in the project. Often projects bring together a variety of areas across your discipline. This is an opportunity to ensure that you identify areas in which you will research and develop advanced skills. You should research your initial ideas and **include citations and references**, demonstrating both the scholarly value and the feasibility of the proposed project.

This should include citations and references to demonstrate that you have researched your initial ideas, and that there are facts behind them.

5.2.3 Aim and Objectives

The aim states what you want to achieve overall but excludes the method by which you plan to do it. It is a broad and generalised statement of intent.

The objectives set out how you are going to achieve your aim. Objectives should be made to be Specific, Measurable, Achievable, Resourced and Time-limited (SMART). They **do not** cover how you are going to achieve the stated goals, but rather what you are going to achieve. SMART objectives information is available on Moodle. Objectives often start with a keyword taken from Bloom's Taxonomy and they are written as a set of bullet points.

NB: Aims and objectives will often evolve throughout your project.

5.2.4 Rationale and Benefits

Outline the value and benefits to be derived from the project and who will gain from it, apart from you. You should consider how your project could support and impact industry and/or research into your topic.

5.2.5 Initial Design Plan

This will be an initial attempt to identify what you need to do to meet your project objectives. You will develop this further in your next assessment (i.e., literature review and methods). This should be a set of tasks or methods associated with the objectives

listed above. Provide contextualisation of the task by describing what is involved and how it is associated with achieving the stated goals.

5.2.6 Critique of Past Final Year Projects

Discuss how two past projects have influenced your understanding of the final year project and what you see as their key strengths and weaknesses. It is advantageous to identify projects that are in similar areas to your own. Briefly explain the purpose of reviewing previous knowledge, methodologies and results from the two projects you have chosen and the key points you need to apply to your project. If you had done this previously in Year 2, this is an opportunity to revisit the projects to get a better understanding of the requirements and outcomes.

5.2.7 Resources

Consider the resources that will be required for your project. These could exist within various categories, including laboratory or physical equipment, IT hardware/software, and information (e.g., library, databases). Any additional costs beyond the resources already available to you from the university that the project may entail should be estimated.

NB: Funds are not available from the University to support student projects; you must consider the financial viability of your project prior to submitting a proposal.

5.2.8 Literature Search Methodology

List the search terms you will use to research your topic, including the various topics and themes your project will cover, making note of the library databases you will use. You should provide some examples of the initial key resources identified.

5.2.9 Risk Assessments

Consider any health and safety issues and other risks to the success of your project. Please refer to the Moodle page for current guidelines and risk assessment information.

5.2.10 Ethics Review

All projects must undertake a formal ethical review process. The details of this requirement and the approach will be covered in tutorials and in Moodle resources. The areas the BCU ethical policy covers are in consideration of:

- Physical or psychological harm, discomfort or stress
- Participant/client confidentiality
- Consent and data handling
- Conflicts of interest
- Vulnerable participants
- Bringing the University into dispute
- Issues in line with government prevent strategy guidance

5.2.11 Bibliography

Include any literature and resources you have identified in the initial stage of your project. These should be presented in Harvard format. It is essential that you utilise the appropriate referencing convention as it allows your readers to identify the sources of information you have chosen to reinforce your text. Please follow the link on the Moodle page to learn more about the correct usage of Harvard format and discuss this with your supervisor or the Centre for Academic Success for further information.

Tips on writing a proposal (and **all** future sections):

1. Read the project handbook!

2. Always write notes first. If you drive to another town, you don't start by getting in the car and driving, but with a plan for the route.

3. Write with your audience in mind. Avoid jargon and colloquial terminology, and make sure your text is free from spelling, grammatical and punctuation errors.

4. Review the proposal before submission. Share it with others. Read through it **out loud!** You will be surprised how many errors can be found by proofreading out loud. Over time this will make you a better writer and improve your writing voice.

5. Nothing is set in stone and this project is yours. Please read that again. As you develop you project over the next year, the scope can and will shift. This is due to your increased knowledge of the subject area specialisms, and an understanding of the unique project requirements that can only emerge through experiential learning.

6 Assessment A2: Literature Review and Methods (25%)

6.1 Learning Outcomes

This assessment contributes towards the learning outcome:

1. Plan a research-informed project using appropriate literature and/or professional outputs.

2. Design an artefact using appropriate techniques and tools.

6.2 Report Requirements

The document will include the following:

1. *Updated* aim and objectives;
2. *Updated* literature search methodology;
3. **Literature review**;
4. **Design and methods**;
5. Bibliography and references.

NB: Progress meeting requirements are discussed in Section 6.7.

6.3 Updated Aim and Objectives

Update your aim and objectives with modifications generated from the feedback as provided by your supervisor.

List objectives with modifications if applicable and agreed with your supervisor. Objectives should be **SMART** (Section 1.1.6) and together meet the overall aim of the project. Objectives **do not** relate to the academic processes of the module, but to the problem or area of investigation.

6.4 Updated Literature Search Methodology[4]

Provide an updated list of the search terms used in the literature review, including the various topics and themes your project covers, and library databases used.

6.5 Literature Review Content

The report is a **comprehensive** overview of the literature relevant to your project. This is an organised, critical report detailing the various sources of applicable research found by you on and around relevant topics.

The sources will be of a high scholarly standard and usually appear in the format of journal publications, conference proceedings and book chapters (cf. online content is acceptable in lieu of similar information when not present in the aforementioned sources).

[4] Subsequent sections of this guide will not include a description of updated content (e.g., updated method and implementation) as it is assumed this material will be updated throughout the course of the project.

For each of the relevant fields of study you will provide:

1. Historical account of prior scholarship in the area;

2. Relational information about each reference selected to provide context to the various sources;

3. Modes of interpreting the sources (e.g., separating sources into different classes, approaches);

4. Describe current open research if relevant to your intended approach.

Offer evidence to demonstrate that you have achieved a foundation of knowledge in your chosen subject area. This is normally broken into a number of separate themes for different aspects of the project. In writing the literature review, you will include the following:

1. An explanation of the objective of the review and topics under analysis. What are the topics being discussed? How are they relevant to your chosen project?

2. In depth subject overviews for each topic under analysis.

3. A clear system of categorisation of the topics, and the sources within each topic. This categorisation should be defined by the different modes of thought inherent in the sources.

4. Brief reduced description of the important aspect of each source. These should be held together with larger statements that identify similarity and/or difference to other sources.

The literature review is **not your personal critique** on research undertaken by established scholars. Instead, you will identify thematic content and competing approaches to similar problems in the relevant literature. It is your task to identify this latent structure from within the timeline of the historical research and convey it to your reader.

While you should consider the appropriateness of the sources used, the main focus of this section is to show how the sources highlight the expected contribution towards understanding the project area as a whole, or aids in achieving project objectives. Through completion of the literature review, you will have generated a clear picture of what is known within an area, and possibly be able to separate this from that which has not yet been determined by prior scholarship. Completion of the literature review should also importantly provide you with an informed view on the details required to produce the subsequent **method** section.

NB: As your research progresses, you should review and adapt your objectives and idealised method to reflect your research findings.

The literature review will be written in **past tense**, as the research that will have been included has already been performed.

Word count of the literature review content should be equivalent to around 2000 words. This does not include the title page, list of references, tables, charts and bibliography.

Tips on writing a literature review:

1. Remember to start with notes first. Identify the subject/scope of the review, and break this down into the various relevant topics. Take notes on every source and determine similarities and differences between approaches.

2. Utilise various catalogues of information (e.g., library, online resources) with subject specific search terms. This is an acquired skill so start early and search often.

3. Evaluate sources with a critical lens and ensure that the source is relevant and of a high standard. While this may be related to quantitative data such as a citation count, the paper could be of excellent quality with less citations.

4. How is performance measured for artefacts similar to yours? Evaluation strategies should also form part of your literature review and will save you time when it comes to considering how to evaluate your artefact.

5. A good literature review demonstrates reflection upon the information derived from the sources. Once this information has been initially collated try to classify the various approaches using different methods of categorisation, finding the best one(s) that help understand the fields of research inherent in the project area.

The report should be based on the final dissertation report and is the initial content for the section Design and Development.

You may include information updated from the literature review as a start although that section **will not be marked** for this assessment, although feedback on the level of content may be provided.

6.6 Design and Methods Content

The design and methods section explains the methods, techniques and overall design that has been implemented in the project artefact and reflects the work that you have undertaken since writing the literature review (but not in a timeline view). This is the section in which you describe, in detail, the design you have built or the study you have developed. By this submission, you will have designed your artefact (e.g., algorithm, hardware) in preparation for the upcoming implementation and evaluation.

The point of the literature review was to develop a comprehensive knowledge of the areas associated with your project, which is required to identify an appropriate route forward. The design and methods section is informed by the literature review in that it is a product of the knowledge gained through the research undertaken to understand what is crucial to the project and what is not. Through this process you will produce a hypothesis, user requirement or specification—depending on the type of project you are undertaking.

You should clearly describe and justify your conceptualised solution to the project aim. It is recommended you provide a block diagram, flow chart or other appropriate representation depicting your methodology. Oftentimes this appears in the earlier portion of the section and is used as a guide for the reader to follow throughout the remainder of the section.

NB: Projects incorporating iterative development schemes will often contain in-built evaluations for the various builds that are realised throughout the project timeline. For this deliverable, you will have presented your chosen design and methods as it exists up to this point as it is understood that the project will continue to develop beyond the deadline of this assessment.

While various fields differ on the way this information is presented, it is expected that the design and method section will include:

1. Implementation options (where appropriate);
2. User requirements;
3. Algorithm, component, or parameter selection motivation;
4. Specifications;
5. Implementation approach selected.

NB: Many of the scholarly sources used in the literature review contain method sections. It is useful to learn the latent structure present within these in developing your own section.

The design and methods section is a reflective and detailed description of the widget (i.e., engineering term for an idealised gadget or software with a specific task) you have developed and will evaluate in the following section. Note that some projects will evaluate subtasks or smaller aspects of the widget rather than compare the full widget to other pre-existing widgets.

Consider the validity and appropriateness of your approach to achieving the project objectives and describe the influence of your research on your method by citing relevant references where influence is drawn for decisions—for example, using a particular component in the build might be motivated by sources in your literature review having done so. In this case, be sure to briefly explain their initial motivation as well. Where appropriate, possibly draw attention to, and provide justification for, any developments and changes that have been made since you submitted the proposal document. However, bear in mind that it is appropriate for research goals to become more resolute as knowledge is gained about the relevant fields, so discuss this with your supervisor to identify the right tone for the text.

Ensure you have covered the **end-to-end requirements for reproducibility**, so that another researcher can achieve the same results in a future study.

The design and method section will be written in the present tense, as this is the work you are proposing. There are of course some exceptions to this rule which you can discuss with your supervisor (e.g., use past tense to describe previous iterations of a build).

Tips for writing design and methods:

1. Remember to start with notes first. Write down as many details as you can before starting to turn the notes into a narrative.

2. Make a good diagram for your artefact. Refer to this figure throughout the section and design it such that it takes into account the various high-level stages or information flow.

3. Motivation before method. Before explaining what you selected, explain why you have selected it. Don't make the reader wait to find out why you have implemented a design or added a part; let them know what the issue is first.

6.7 Progress Meeting

Once you submit your literature review and design and methods materials, you will meet with your supervisor to assess your progress in the project thus far. In this meeting it is expected that you will discuss the submitted report, as well as: (1) detail your current progress (or plan) towards the **implementation** of your design and (2) explain your chosen **evaluation strategy** and how it will appropriately test your method and implementation.

Your explanation of the implementation will contain details of the current state of your build and the tools utilised in its realisation thus far. You should explain what has been achieved thus far towards the completion of the build and/or explain in detail your plan for completion.

6.7.1 Evaluation Strategy

The evaluation section of your final dissertation will provide a detailed description of the testing undertaken to determine the performance of your design. It will also include outcomes of this testing. It must take into consideration appropriate and relevant academic, ethical and professional requirements.

NB: For this assessment you will only be responsible for a proposed evaluation setup (i.e., experimental setup)—not the results and discussion, which are outcomes of a completed evaluation.

While the particular approach to evaluation will differ considerably for various project areas, your **proposed experimental setup** should consider:

1. **Evaluation/Experimental methodology:** The selected approach to evaluating your design, as well as the motivation for the approach. If this is a standard way of measuring particular phenomena, then it can be motivated through previous research.

2. **Evaluation metrics:** These define the specific metrics being used to assess success. These should ideally be generated from **objective measurements** (see below).

3. **Systems under analysis** or **Baseline systems:** The designs being tested apart from the one proposed in the method section. Note that these may also be variants of the proposed approach.

4. **Dataset:** A collection of data that is used to provide reliable consistency in comparative assessments across systems. Depending on your chosen project **this may or may not be relevant**.

6.7.2 Objective and Subjective Measurement

As this module is designed for BSc courses the method of evaluation preferred relies heavily on objective measurements. Objective measurement allows us to measure phenomena consistently in a controlled manner, ultimately towards making comparative assessments between the outputs of various system designs. An example of an objective measurement might be to record the top speeds and acceleration capable of multiple motor designs. You may also wish to measure the loudness of the motors under analysis during these top speeds. Objective measurements are variables that are recorded which are not influenced by a personal opinion.

This is contrasted with subjective measurement, which is necessary to identify, for example, how a particular user group experiences various system designs. Do they prefer the motors that are quieter? Or do they prefer a louder motor for this (arbitrary) task? Subjective measurements are dependent on the perception, cognition and preference of a participant.

While both measurements are crucial in gaining a full understanding of the worth of a design, this module will focus on the development of objective measurement evaluations. Subjective measurements may also be utilised, but these testing strategies are generally seen as secondary to the objective measurements that will demonstrate the impartial performance of your design. It is up to you to identify appropriate objective evaluations associated with your project; however, you will find excellent examples of these in the sources you read during the preparation of your **literature review**.

6.8 Bibliography and References

Your report should be presented in a formal academic style (see guidance on Moodle) with citations and references in **Harvard format**.

It is often useful to summarise key research information existing across many sources using tables, diagrams and charts; however, **do not** simply place the brief summary of each source in a table.

You should use the framework/template required for the main report. It is important to start the structure for the final report early rather than trying to write it all up at the end. If you have appropriate headings and sub-heading in the report you can add notes and comments on what will be required in each section which ensures you do not overlook anything and can build the project report as you progress.

6.9 Updated Gantt Chart

An updated version of your Gantt Chart (see Figure 3.1) should be included in the Appendices. This should clearly demonstrate a link between project objectives, planned methods and activities taking into account other workloads, deadlines, and holidays. Note that this should be included in the report and **clearly readable** on a normal A4 page.

7 Draft Report (0%)

The draft report submission is an opportunity for you to receive feedback on the progress you have made thus far towards the project aims and objectives. In this milestone you will effectively hand in an early version of your final dissertation, regardless of the amount you have completed.

Projects will progress at different rates but at this point you will receive feedback on the production of an initial draft report that has all the main sections identified, appropriate content and/or notes in every section, identifying what will need to be in each section. All sub-headings should be included, demonstrating your plan for your completion of the report. This will also help your supervisor understand your strategy and determine where you should focus your energy.

To produce the draft report submission it is expected that you follow the guidelines provided in Appendix 11.1 (Dissertation Style and Conventions).

If time allows following your first draft, you may provide your supervisor the opportunity to comment on further drafts as you work towards your final submission.

8 Assessment A3: Dissertation (50%)

8.1 Learning Outcomes

This assessment contributes towards the following learning outcomes:

1. Implement a design to produce an artefact using appropriate techniques.

2. Critically evaluate the implementation of the artefact and the overall project.

3. Assemble and organise information to successfully communicate the results and findings of the project.

8.2 Report Requirements

The main project report should be a stand-alone document that can be read independently of other documents. Thus, it will include information from the previous assessments (i.e., literature review, method and implementation), updated and revised as necessary. In addition, this submission will include an evaluation section (discussed below), in which you will perform an appropriate form of testing.

The report should be approximately 10000 words (±10%). You should state your word count at the bottom of the contents page. The word count does not include the title page, abstract, acknowledgements, contents, glossary, references, bibliography and appendices.

NB: You should follow the expected guideline given in the Appendix 11.1 (Dissertation Style and Conventions). Marks may be lost if this guidance is not followed.

It is easy to underestimate the time it takes to convert the source material into a finished final account, and you should start planning well in advance of the final submission date.

It is important that the work is underpinned by research with appropriate referencing throughout. The report must be your own work and should not contain extended extracts from the work of others. Brief quotations for work that is cited should be identified in quotation marks and should always be appropriately referenced to the source using the Harvard referencing system. Paraphrasing the work of others also requires citation and referencing.

8.3 Report Structure

The report should include the following contents:[5]

- **Cover and title pages**: The front cover will contain the project title (typically a maximum of 10 words), student name, ‘‘BIRMINGHAM CITY UNIVERSITY’’, award title (e.g., BSc (Hons) Data Communication Engineering) and the month and year of submission. The first (title) page should contain the report title and the names of the student and supervisor.

[5] This is provided for guidance only. The numbering of sections is indicative and may be changed to meet individual project requirements.

- **Abstract:** A short summary of the report (100–200 words), which should cover the topic, aim, methodology and main findings (quantitative if applicable) and conclusions.

- **Acknowledgements:** Identifying those from whom assistance has been received. It is important to provide gratitude to your Supervisors, Laboratory Managers, peers, and all others that have helped along this journey.

- **Contents page:** List the chapter and section headings with page numbers (as in this handbook). The easiest way to create this is to use MS Word functionality.

- **Glossary:** An ordered list of symbols and abbreviations with expansions of any contractions.

- **List of Figures:** A **list of all figures, tables and images** (photographs/diagrams) present in the document.

1.0 Introduction

This will clearly state the rationale and objectives of the research and contain much of the same information present in the proposal (e.g., problem definition, scope, rationale, aims and objectives).

1.1 Problem Definition

A statement of the problem, with its significance and origin. If applicable, make reference to the company or industry that led to the project definition.

1.2 Scope

This section identifies the boundaries of the project, what was included and what was excluded from the final project. This should be justified and underpinned by research.

1.3 Rationale

Why has the topic been chosen? This may be because of lack of research in the area, to shed more ideas and opinion, in response to a request, (e.g., from a company, organisation or relevant current issue). What benefits can be identified from completing the project? This should be more than personal interest—you should be able to identify a company, organisation or other defined group that will benefit from the work.

1.4 Project Aims and Objectives

There should be a brief and precise statement of overall **aim—**what is intended to be attained? There should follow a list, using bullet points, of **objectives—**the completion of which will lead to the attainment of the aim(s). The objectives are developed from the aim and can be viewed as incremental stages in the attainment of the aim(s). Bloom's Taxonomy is useful in writing these objectives (see Moodle site).

1.5 Background Information

A further section of **background information** will depend on the topic area of the project, but could include hypotheses and theory, which are to be tested in the course of undertaking the project. This is an optional subsection but may be useful in defining the contextual information.

2.0 Literature Review

This should be derived from the literature review report. It will likely have been updated throughout the year, including additional information of relevance arising through project completion and supervisor feedback.

3.0 Method and Implementation

This section describes the development of the artefact, including design and implementation. This should be derived from your previous design and methods report. This should be an updated version, which reflects the progress made in the implementation along with feedback from your supervisor.

Remember that success of the project depends upon careful selection of appropriate method (e.g., design, model). A good method increases the validity and reliability of the outcomes. Depending on the type of project, it should cover the choice of apparatus, equipment, and software utilised. It should be possible for another researcher to repeat any experimental or research aspects of the project and expect to obtain the same data.

In practice this section can be quite large and may often be broken into a number of additional sections. All details should be clearly presented. For practical, experimental and technical projects, there may be sections for **calculations and analysis** for parameterisation or model tuning as needed.

4.0 Evaluation

This section should provide an evaluation of the artefact and overall project. This will express ideas in answer any research question. Depending on the evaluation chosen, a variety of possible layouts may result. Nonetheless, it is good practice to consider the evaluation section to be divided into two subsections based on the **experimental design and the outcomes**. The outcomes will be presented in the final dissertation submission.

The **experimental design** of your evaluation will include various subsections possibly including:

1. **Evaluation/Experimental methodology:** Here you describe the selected approach to evaluating your design, as well as the motivation for the approach. If this is a standard way of measuring particular phenomena, then it can be motivated through citation.

2. **Evaluation metrics:** which defines the specific metrics being used to assess success**.**

3. **Systems under analysis** or **Baseline systems:** The designs being tested apart from the one proposed in the method section. Note that these may also be variants of the proposed approach.

4. **Dataset:** A collection of data that is used to provide reliable consistency in comparative assessments across systems. Depending on your chosen project this may or may not be relevant.

The evaluation outcomes will include various subsections including:

1. **Results:** Here you will describe the detailed output of the metrics presented. Which trends appear? Which design performed best across which evaluations? If you have tables or figures that show the performance of your design (and possibly others) refer to these in the text as you explain the output. You may also wish to provide exemplar outputs of the design, which demonstrate the performance of your system, alongside a discussion of the result in the text.

2. **Discussion:** The results from the previous subsection are here explained with consideration to the context of the project. This is the area in which you can confirm similarity or difference between trends that appear in your research with that of others that you have discussed in your literature review. You may also hypothesize why you believe certain outputs/phenomena have occurred. This is a deeper analysis in which you piece apart the results to determine the underlying causes of the recorded output.

For business and management related projects, the presentation of findings may be integrated within discussion sections. Limitations of the chosen methods should be identified and ways to overcome them suggested. If compromises have to be accepted, for example in time and cost. Such limitations and problems should be identified together with how they are to be overcome and/or the compromises that will have had to be made.

Depending on the nature of the project, and particularly with certain business topics for which the main outcomes are recommendations on various management related aspects, the results and discussion chapters may be integrated within chapter(s) of findings covering the relevant project objectives. In this case this chapter could be entitled Recommendations.

5.0 Conclusions

The conclusions should be a short summary of the important results and findings arising from the results and discussion. It is important to ensure that the conclusions address the original project objectives and reflect the main discussion. You should not include any new information or discussion in this section.

6.0 Recommendations for Further Work

Many projects follow on from previous work and owing to time constraints and the generation of ideas whilst undertaking the work, lead on to the possibility of further work. These recommendations should be summarised briefly.

7.0 References

It is essential that you reference and cite your work correctly. You should ensure all aspects of the project are underpinned by appropriate research cited in the body of the report. Full, correct and appropriate referencing of all sources used in undertaking the project is an essential requirement of a good report and necessary to avoid allegations of plagiarism. Harvard referencing must be used.

Use of, and reference to, a selection of relevant texts, journals and appropriate internet sources should enhance your work, reinforce the validity of your results and findings and demonstrate that you are familiar with accepted knowledge and thinking in the subject area. Reference sources should be selected to be comprehensive, appropriate and current. They should be well integrated with the text and cited in accordance with the University's standard (Harvard) method.

The library iCity site provides extensive referencing information: https://icity.bcu.ac.uk/library-and-learning-resources/centre-for-academic-success/Referencing/Harvard-Referencing.

NB: Any use of sources that are not cited or cited incorrectly, may lead to allegations of plagiarism.

8.0 Bibliography

A bibliography is a list of relevant source texts you have used to undertake the project but not directly cited in the report, in Harvard format.

9.0 Appendices

Appendices, which should have short titles, are separate documents appended at the end of the report. Only include appendices if they are necessary to explain particular details to understand the main report.

You should include a copy of your Gantt chart in the appendix.

9 Assessment A4: Presentation Video and Viva (15%)

9.1 Learning Outcomes

This assessment contributes towards the learning outcome:

1. Assemble and organise information to successfully communicate the results and findings of the project.

For this assessment you are required to:

- Produce a video presentation (10 minutes maximum, MP4 format);
- Undertake a viva with your supervisors discussing the development and results of the project.

9.2 Presentation Video

The objective of the video is to showcase what you have done for your project. A good starting point is the project abstract which should explain the aims, objectives and overall approach; however, you should focus on demonstrating the artefacts produced. This is not a rerun of the academic project report but a public presentation of the key features of your project and its outputs. Think what you would wish to present if you were showing a future employer what you had undertaken for your project. This is a good opportunity to sell yourself and your work.

9.3 Viva

You must arrange a viva with your supervisor and second marker within two weeks of the video submission date. The viva will be 15 minutes in duration. This session will allow your supervisors to review the work you have submitted with you and discuss any issues and recommendations. You will be asked questions about the project and given the opportunity to discuss key issues and to demonstrate your understanding of the project and its context.

You also may be invited to participate in the annual InnovationFest, in which projects and other work are showcased to industry. While the videos produced for this assessment may be showcased as part of InnovationFest this has no connection with the academic project marks. InnovationFest may have separate requirements and prizes offered.

9.4 Use of the Video

Although formally assessed by your primary technical supervisor and second academic supervisor, the videos may also be made public. External examiners, academic staff, industrialists, students and other members of the public will be able to view the videos to see the range of project produced. If your project has specific intellectual property issues that would prevent public presentation you should ensure your supervisor is aware or this and include information at the start of the video that it is not for general public availability.

10 Submission of work

The specific dates of submissions are shown in Moodle. All written submissions will be submitted by upload in Moodle and should be PDF format documents. **The deadline is always 12 midday**.

10.1 Submission Formats

1. **Reports:** PDF format.

2. **Presentations:** PowerPoint (PPT) or PDF formats in landscape orientation suitable for projection.

3. **Dissertation report** (including all appendices): single PDF file <40MB.

4. **Video:** MP4 format.

5. **Optional digital artefacts:** This may include developed software or video where physical artefacts have been created. Video evidence should be provided here.

6. **Library waiver form:** You will be expected to submit a library waiver form to allow the project to be made available in the University digital library. This identifies any copyright material that needs to be removed from the published version unless explicit permissions have been granted by the copyright holder.

All work is submitted electronically, and you must ensure that you securely retain final copies of all work submitted in an electronic form should there be any problems with accessing your submitted work. Unavailability or failure of computing equipment is not seen as exceptional circumstances, and as such cannot be part of any claim for extensions.

Throughout the development of your project you should ensure that you create regular backups of work you create. Keep your backups safe.

10.2 Project Assessment

Assessment is made against the published criteria for each element (see Assessment Guides on Moodle).

Assessment is undertaken by the supervisory team using academic judgement. The assessment marking categorisation and criteria for each item as outlined in the following pages. Upon completion of all assessment marking at the end of the year, a moderation process takes place, which may recommend modification of marks to achieve consistency of the assessment standard. The final mark for the project is calculated as the weighted marks for each assessment element as:

FINAL MARK = (A1 * 0.10) + (A2 * 0.25) + (A3 * 0.50) + (A4 * 0.15)

Re-assessment opportunities will be offered in line with university regulations where a final mark is less than 39.5%.

11 Appendices

11.1 Dissertation Style and Conventions

The report should be written in your own words and should not contain extended extracts from the work of others. It is possible to use direct quotes, but these must not account for more than 10% of your report. Direct quotes should be identified by using inverted commas and should be appropriately referenced. Additional resources to assist you with referencing can be found on the intranet homepage under Info Links.

The Faculty standard for degree project reports is similar to papers in technical/professional journals. Examples can be found by referring to journals in your field of study.

Producing a readable account requires a logical structure to lead the reader from one discussion point to the next and through from one section/chapter to the next. It also requires that care be taken in spelling, punctuation and grammar. Any significant errors are liable to cause a reader to suspect that the content of the report may also be flawed.

The language for the report should be straightforward jargon-free English, written in conventional style using the conventional third person past tense, and readable by someone familiar with the general subject area, although not an expert in the specific topic.

The following conventions should be used, and care should be taken to maintain a consistent style throughout the document.

11.1.1 Fonts, Paragraphs and Line Spacing

Aim to maintain a consistent approach throughout. Use **Arial font size 11**. Type to a left-hand margin that is 35 mm wide to allow for binding. Use 1.5 line spacing between lines and double spacing between paragraphs. Do not indent at the start of a paragraph.

11.1.2 Mathematical Symbols

Mathematical symbols and equations are best entered using a package (e.g., Equation Editor). Equations should be centred and numbered, with the numbers presented in parentheses in the right-hand margin. Additionally, all variables should be discussed in the text.

11.1.3 Figure Captions and Table Headings

A consistent style should be used as follows:

When figures are referred to in the text they should written as: Figure 3.1 (i.e., with a space between Figure and the subsequent numbers), with the 3 denoting the chapter, and 1 denoting the number of the figure within the chapter. The word “Figure’’ should be written out completely (e.g., do not use “Fig”) in all instances of the word. As demonstrated in Figure 13.1, figure captions should appear centred below the figure, with the caption in lower case and an initial capital for first word and proper nouns only.

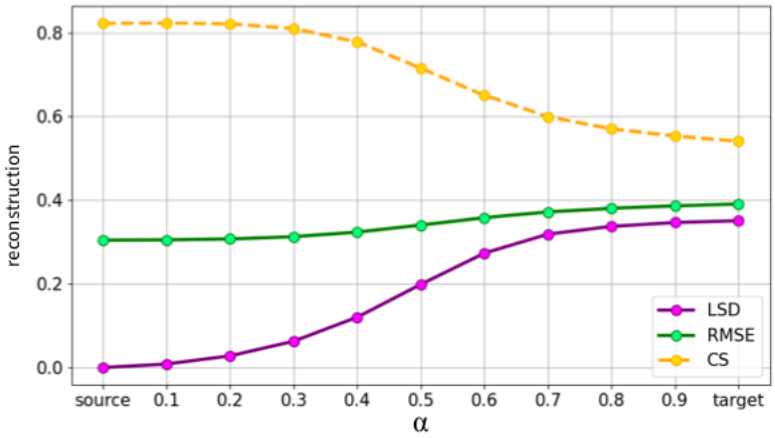

Figure 13.1: Reconstruction scores for interpolations between source and target rhythmic patterns. The results are calculated as a mean of 11000 transformations per each interpolated value of mixing parameter α.

When tables are referred to in text they should be written as: Table 13.1, (i.e., with a space between Table and the number subsequent numbers. Table headings should appear below the table. The table heading should be typed in the following way:

	VAE	WAE-MMD	AAE-ISO	AAE-GM
LSD	34.26	34.23	34.28	34.37
RMSE	0.39	0.38	0.38	0.38
CS	0.67	0.84	0.84	0.82

Table 13.1: Reconstruction scores (`LSD`, `RMSE`, `CS`) for three baseline models (`VAE`, `WAE-MMD`, `AAE-ISO`) and the proposed `AAE-GM` approach (Tomczak et al., 2020).

Additionally, if you are incorporating a figure or table from another source, you **must cite** the source as in the Table 13.1. Both tables and figures must have associated discussion in the text—they should not appear without reference, nor should they only be explained in the caption.

11.1.4 Text Headings

Headings throughout the report should be consistent as follows:

Main sections and major headings should appear with initial capitals for first words and proper nouns. Leave a space of two lines above such headings and one below.

Section headings should be lower case with capital letters for the first letter of the first word and placed at the left-hand margin. Leave a space of two lines above such headings and one below.

Subsection headings can be in italics, leaving a space above and below the heading.

11.1.5 Pagination

Starting on the Introduction page, pages should be numbered using decimal numerals (e.g., 1, 2, 3, 4). Pages prior to the Introduction page should have lower-case Roman numerals (e.g., i, ii, iii, iv).

11.2 Project Moderation Process and General Criteria

Two assessors will independently mark the major elements of assessment. On completion of assessment, there is a moderation process to ensure projects are of an appropriate standard. A sample of project deliverables will be reviewed by external examiners. Smaller elements of assessment will be verified by a second assessor. Refer to assessment and reassessment briefs for detailed criteria for individual assessments.

Mark 80% and above: Evidence of much work beyond what that is normally expected leading to achievement of demanding objectives. The report demonstrates inventiveness and ability to analyse complex theory/concepts and relate them to practice. Content builds on knowledge/skills from higher level course modules, with depth in areas relevant to the degree title. There is extensive use of a range of relevant sources, which are correctly referenced through the text. Interpretation and analysis of findings is complete, and alternative approaches and application to other domains are considered. Report closely follows conventions with no shortcomings in structure, style or language.

Mark 70–79%: Evidence of much work of the highest quality leading to achievement of demanding objectives. The report demonstrates inventiveness and ability to analyse complex theory/concepts and relate them to practice. Content builds on knowledge/skills from higher level course modules, with depth in areas relevant to the degree title. There is extensive use of relevant sources, which are referenced through the text. Interpretation and analysis of findings is full, and alternative approaches and wider issues are considered. Report closely follows conventions with no major shortcomings in structure, style or language.

Mark 60–69%: Evidence of much good quality work, competently undertaken, and leading to achievement of demanding objectives, but not demonstrating the highest intellectual calibre associated with first class honours. The report demonstrates methodical care and competence in solving problems and in the treatment of information and results. Content involves knowledge/skills from course modules, with depth in areas relevant to the degree title. There is evidence of extensive research, but the benefit to the work, and in general the analysis and consideration of wider issues, is not fully explored. The report closely follows conventions with no major shortcomings in structure, style or language.

Mark 50–59%: Evidence of generally competent work leading to achievement of appropriate, but not fully challenging, objectives. The report demonstrates ability to solve relevant problems and handle data competently. Content relates to course modules but does not demonstrate the depth associated with higher classification. There is evidence of research, but with only limited consideration. Analysis may be narrow and with only limited consideration of wider issues. The report generally follows conventions but may suffer from some shortcomings.

Mark 40–49%: There is evidence of adequate ability and sufficient effort towards achievement of undemanding, but appropriate, objectives. There is demonstration of

a reasonable quantity of relevant work, but without the investigative background, depth, or analysis associated with higher classifications. There is evidence of some research, but the analysis is limited, and wider issues are not explored. However, there is evidence of ability to manipulate relevant data in a manner, and with comments, demonstrating an adequate level of understanding for the award. The report contains necessary major sections but may suffer from significant shortcomings.