

SCHOOL OF ENGINEERING & PHYSICAL SCIENCES



MSc Critical Analysis and Research Preparation
B81EZ - Course Handbook

Semester: 2

Dubai Lectures:

Every Monday: At 7 PM – in Classroom 6.30 and (6.29)

Course Leader: Dr Mutasim Nour

Lecturer availability:

Office hours on Mondays 5 -6.30pm: Appointment via e-mail

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The course is taught in Semester diet 2 Study Period

Course Name	Critical Analysis and Research Preparation	
Course Code	B81EZ	
Course Leader	Dr Mutasim Nour (Mutasim.nour@hw.ac.uk)	
Version	100	
Department	School of Engineering and Physical Sciences (General)	
Stage	11	
Credit	15	
Pass Mark	50	
Course Level	Postgraduate	
Course Type	A	
Assessment Type	<i>Assessments Methods</i>	Weighting (%)
	Continuous Assessment	100

1. Learning Outcomes - Subject Mastery

Understanding, Knowledge, and Cognitive Skills

For the core science/engineering area that is the subject of the project preparation work, the student should demonstrate:

- A knowledge and an understanding of the subject's scope, terminology, and conventions
- A critical understanding of the subject's principal theories, principles, and concepts, and certain specialist topics within these
- An extensive, detailed, and critical knowledge and understanding that is informed by developments at the forefront of the subject
- A critical awareness of current issues in the subject
- Apply critical analysis, evaluation, and synthesis to issues that are at the forefront of informed by developments at the forefront of a subject/discipline.
- Identify, conceptualize, and define new and abstract problems and issues.
- Develop original and creative responses to problems and issues.
- Critically review, consolidate, and extend knowledge, skills practices, and thinking in a subject/discipline.
- Deal with complex issues and make judgments relevant to the design of research in the absence of complete or consistent data/information.

Scholarship, Enquiry, and Research (Research-Informed Learning)

For the core science/engineering area that is the subject of the project preparation work, the student should demonstrate the ability to:

- Apply a range of standard and specialized research inquiry techniques, evidenced by a detailed literature review of the relevant subject area

- Plan a significant project of research, investigation, or development, as evidenced in a written project proposal and plan
- The Module will use Microsoft's MS Project to illustrate how software packages can be used to support the successful planning and management of projects.
- Demonstrate originality or creativity in interpreting prior work on the subject and applying this to the design of his / her research project

Learning Outcomes - Personal Abilities

Industrial, Commercial & Professional Practice

The student should,

- Deal with complex professional issues and make informed judgments on issues not addressed by current professionals and/or practices.
- Demonstrate an awareness of the application of his / her work in an industrial and/or commercial context

Autonomy, Accountability & Working with Others

The student should,

- Exercise substantial autonomy and initiative in planning and managing his / her research
- Take responsibility for his / her work and interaction with others
- Take responsibility for accessing and using a significant range of resources including literature, electronic documents, and software / computational resources.
- Demonstrate initiative by making an identifiable contribution to planning his / her research
- Exercise critical reflection on his/ her own and others' roles and responsibilities.

Communication, Numeracy & ICT

The student should be able to use a range of advanced and specialized skills as appropriate to the subject of the project preparation work, including:

- Written communication in the form of a project proposal, literature review, and detailed project plan
- Dialogue with other students, researchers, and academic staff
- Making effective use of software to prepare written work and collect and/or manipulate data.
- Undertake critical evaluations of a wide range of written, numerical, and graphical information

Course Aim

To prepare students for carrying out an extended SQCF Level 11 research or development project in a science or engineering program by developing their skills in critical thinking, research planning and management, academic writing, experimental design, and data handling.

2.0 Learning Process

Teaching Method: The course is comprised of the standard 150 hours of student effort distributed as follows:

- 10 x 2-hour lectures, which will include participative teamwork, case studies, presentations, class discussion, and feedback
- Students will support learning by reading journals and academic texts. Class notes and relevant additional materials are included in the CANVAS online learning resource that supports this course.

Syllabus:

Why critical analysis & thinking Lecture on the importance of Critical analysis & thinking in UK higher education

Research Literature Philosophy

Why is your project or dissertation important? Why use historical data in research and Data gathering methods?

Academic skills for reading, writing, and research

Preparation for writing the Portfolio submission; critical evaluation, critical reading, and writing, perfecting citation and referencing skills including,

Background research

Carrying out a literature review; electronic bibliographic databases; online journals; using the library; how to reference other work

Data analysis and presentation

Statistical techniques including regression and error analysis; recommended software; examples of good and bad practice; effective presentation of data

Time Management

Preparing for review meetings; communication skills; reviewing and evaluating your progress and results; keeping a record of your progress

Planning and managing a research/development project

Defining measurable and realistic aims; planning the structure of your project; time management; defining a reporting/review schedule; milestone setting; writing a Gantt chart

Microsoft Project Application

A brief overview of MSP application and relevant exercises – a tool to assist students in planning their research project (MSc Dissertation)

Health & Safety Risk assessment

This is a legal requirement in the UK. Teaching and research activities must have a current risk assessment, made available to all who might be affected

Timetable

Semester 2

Week	Lecture time	Venue	Topic	Lecturer
1 15/01/24	19:00 – 22:00	6.30	<input type="checkbox"/> Introduction to the course <input type="checkbox"/> Assessment briefing <input type="checkbox"/> Citing, Referencing, Plagiarism, Canvas, Turnitin,	MN
2 22/01/24	19:00 – 22:00	6.30	<input type="checkbox"/> Time Management <input type="checkbox"/> Why critical analysis?	MN
3 29/01/24	19:00 – 22:00	6.30	<input type="checkbox"/> Taking Ownership of Critical thinking in an academic context <input type="checkbox"/> What is critical writing? <input type="checkbox"/> The “Park” Group exercise <input type="checkbox"/> The “Park” solution – Class discussion	MN
4 05/02/24	19:00 – 22:00	6.30	<input type="checkbox"/> Literature Searching & the literature review <input type="checkbox"/> The Philosophy and nature of research	MN

5 12/02/24	19:00 – 22:00	6.30	<input type="checkbox"/> Creating an annotated bibliography to support writing a literature review <input type="checkbox"/> Annotated bibliography -- Class discussion	MN
6 19/02/24		CONSOLIDATION WEEK		
7 26/02/24	19:00 – 22:00	6.30	<input type="checkbox"/> Data analysis and presentation	MN/OS
8 04/03/24	19:00 – 22:00	6.30	<input type="checkbox"/> Risk, Health & Safety <input type="checkbox"/> Research Methods – Course Portfolio: Background research	MN
9 11/03/24	19:00 – 22:00	6.30	<input type="checkbox"/> Research Project Management: Planning & Gantt Charts: MS Project Application	MN

MSc- B81EZ - Critical Analysis and Research Preparation Assessment

Introduction:

The MSc – B81EZ mandatory course aims to prepare you for carrying out an extended Masters-level research or development project in a science or engineering program. In the course, you will develop skills in critical thinking, research planning and management, academic writing, experimental design, data handling, and analysis as a base for your MSc dissertation.

Those students who fail this course will not be qualified to proceed to the MSc dissertation.

At the beginning of Semester 2:

- Students in Edinburgh have chosen a preferred project title from a list that was circulated at the end of Semester 1. Additionally, some students may have chosen an industrial-based project as an alternative with a nominated academic & Industrial Supervisor. If you have not received confirmation by the end of Week 2 contact your MSc Course Director for details of your project title and your allocated supervisor.
- In parallel with this, during the first weeks of Semester 2, students attend a series of two-hour online sessions (Tuesdays) covering the taught component of the course.
- During weeks 10 – 12 inclusive, Edinburgh students will have an opportunity to discuss a draft of their project proposal and literature review with an Academic Writing consultant.
- These sessions will equip students with the skills and information they will need to complete the assessment, which takes the form of a **portfolio** of work (**100% allocation**) that is marked and moderated by academic Supervisors.

Assessment

Assessment Method

1. **Dissertation Project portfolio submission (100%)** – For a detailed marking sheet, please refer to the end of this document.

You will be assessed on a portfolio of work that is **marked by your project supervisor**. The portfolio comprises:

- a) A project proposal
 - b) A diagrammatic work plan (**Gantt chart**)
 - c) A literature reviews
- These components will be assessed against the metrics laid out below.

Project Portfolio guidelines

The total word count for all three elements below of the Project Portfolio is 3,500 (+/- 10%) words

The purpose of the project portfolio is to justify and plan a proposed research project. It is recommended that the research proposal produced during B81EZ is used for your dissertation, but it is not mandatory. The portfolio is not physically carrying out research, but a plan on previous research that surrounds your chosen subject area. To plan your project, you will use Critical Analysis and Research Preparation to equip you for your dissertation. The project portfolio will be carried out before completing your dissertation. Writing the portfolio and looking at previous research in the field will be invaluable when writing your dissertation in semester three.

a. Project proposal (worth 30% of the final grade) = 1000 words including the Project work plan below

The project proposal explains the following aspects of the project:

- its context
- its novelty
- the aims of the project
- the main work-packages
- the expected outcomes
- the risks anticipated
- the resources required
- the beneficiaries of the work

b. Project work plan (worth 15% of the final grade)

Software Applications

The students must use Microsoft's MS Project or a similar application to illustrate how software packages can be used to support the successful planning and management of projects.

MS Project Guidelines, Material, and Computer Lab exercises can be accessed on Canvas

This is a one-page diagrammatic work plan following the appropriate format of a “**Microsoft Office Project Gantt chart view and supplement information in the text** (” to present and include:

- Project Name
- Anticipated start /finish dates and durations
- Activities for Course B81EZ background Research from January to the end of March and activities for B51MD dissertation execution work from May to the end of August
- Dependencies between the tasks, activities, and work-packages
- A break for the Easter holidays and second-semester exams
- Full project activities during the summer and final dissertation submission
- Milestones/deliverables in the project
- **And** Supplement information to back up the complete plan such as:
 - Various resources type (if any)
 - Cost (if any)

c. Project literature review (worth 55% of the final grade) = 2500 words

Students are expected to carry out a literature review.

The report includes a literature review that justifies the theoretical or experimental methods, and the techniques used are appropriate to the challenge to successfully carry out the research proposed for the MSc.

You need to consider if computer programs may be needed for theoretical analysis, if these programs are available in the University, or if you need to seek support from your supervisor, etc.

The project portfolio will answer the following questions:

- The aims of the project
- What must be discovered?
- What is going to be measured?
- What is going to be investigated?
- What are the objectives of the project?
- How will you achieve these aims and what facilities would be required?

The full marking sheet used by your supervisor to assess and moderate your project portfolio is included at the end of this document.

B81EZ Project Portfolio Submission Guidelines

- **Portfolio submission deadline:** via “TURNITIN” on Canvas
The Time/ date will be announced during the course.
- Adhere to the deadline and submit the final portfolio via “Turnitin” on Canvas
- Consider B81EZ Assessment Sheet weighting guidelines on Canvas.
- Complete the B81EZ Portfolio Front cover sheet on Canvas. A sample is available on Canvas.
- Marks will be deducted for any late submissions.
- There is no need for a printed version.
- Any extension passes the final deadline can only be granted to students who produce a medical certificate as proof to support the extension two weeks before the submission deadline.

For Resources, Reference books & Microsoft Project Application material: Refer to Canvas

Points to note:

- The report must be clear and concise throughout. It must discuss specific points and remain focussed on the point. The significance of the material included should be clear and no needless material should be included.
- All sections requested in the guidelines must be included.
- All submitted work must be the student's work, and other people's work must be appropriately acknowledged in-text citation and a reference page should be provided at the end of the report and before the appendices.
- The report must be written in 12-point Times Roman, or Arial font and Pages must have page numbers. You must use appendices for sample calculations, figures and minutes of group meetings, and any other supplementary information.
- Appendices must be used sensibly and not just to trickster the word limit. i.e., not as a means of extending the word limit. The title page, table of contents, reference list, and appendices, do not count toward the word count. Students are reminded that all submitted work must be the student's work, and other people's work must be appropriately acknowledged. See section 7.3 of the Course Handbook for the consequences of academic misconduct.

Illegal use – In-text similarity without citation & reference.

Students are reminded that all submitted work must be the student's work, and other people's work must be appropriately acknowledged to eradicate the consequences of academic misconduct In line with University Policy,

Late Submissions.

Any work submitted after the set date and time will automatically have a penalty applied. The penalty is a reduction of 30% of the mark awarded. Submission will be accepted up to five working days after the submission deadline - your work will be marked, the late penalty applied, and you will receive feedback. Coursework submitted after five working days will be awarded NO grade and you will not be entitled to feedback.

Extensions. No extensions for coursework are permitted unless an extension is given to the whole class (in exceptional circumstances). The course leader cannot grant individual extensions. If you foresee having issues submitting by the deadline, please contact your tutor and apply for Mitigating Circumstances (MC) – Please use the link below:

[Mitigating circumstances - Heriot-Watt University \(hw.ac.uk\)](https://www.hw.ac.uk/mitigating-circumstances)

Heriot-Watt University Submission policy

- The following university-wide policy is intended to ensure equity and fairness for all students. No individual extensions are permitted under any circumstances. A Standard 30% deduction from the mark awarded (maximum of five working days). For example, if the awarded mark for coursework is 65, and is submitted late, then the following deduction will be applied: $65 \times 0.7 = 45.5$ The Mark for that piece of coursework would be 45.5
- Work submitted after 5 days will receive a mark of no grade.
- Students who have experienced mitigating circumstances (MC) that have resulted in late submission should submit an MC form. This can be found at:
<https://www.hw.ac.uk/students/studies/examinations/mitigating-circumstances.htm>
- An MC form should be submitted asap.

EPS MSc Course B81EZ Marking Sheet

Comments MUST be added by Academic Supervisor for each given mark

PROJECT TITLE

MSc Programme.....

Student Name & Matriculation Number

Supervisor Name.....

Final Mark..... %

1- Project Proposal (30% total weighting (approx. 1,000 words which include the word count for the work plan))

Please assess the project proposal against each of the following criteria. Students have been asked for a 1,125-word document dealing explicitly with each of the criteria shown below.

	Mark / 10
1- Context <i>How well was the project placed in the context of previous work?</i>	
2- Novelty <i>How well was the novelty of the project expressed?</i>	
3- Objectives <i>Were the aims of the project clearly expressed? Were they specific and measurable? Were they realistic? Were adequate timescales referred to?</i>	
4- Work Packages <i>Were tangible work packages (activities and steps) defined that would be used to achieve the aims of the project?</i>	
5- Resources <i>Were the resources needed for the project well-defined? Were they in place already? Was there a statement of the planning needed to put the necessary resources in place?</i>	
6- Associated risks <i>Were the risks which might affect the success of the project defined? Were measures suggested to mitigate these?</i>	
7- Expected outcomes <i>Was the anticipated result of the project clearly defined? Were sensible interim milestones identified?</i>	
8- Beneficiaries <i>Was it made clear who would benefit from the work carried out in the project?</i>	
Sub-Total 1	80

2- Work Plan (15% total weighting)

Please assess the project work plan against each of the following criteria. Students **have been asked for a diagrammatic work plan** following the format of a Gantt chart and any supplement information in the text dealing explicitly with the criteria below.

	Mark / 10
1- Work-Packages <i>Are work packages clearly expressed? Do the work packages in the work plan match those in the project proposal?</i>	
2- Timescale	

<i>Are the work packages in the right chronological order? Has sufficient time been allocated to each work package?</i>	
3- Task Dependencies <i>Is it clear which work packages must be completed before others can begin? Have all the necessary dependencies been considered? Are these effectively illustrated by the plan?</i>	
4- Project Milestones and Deliverables <i>Are milestones and deliverables clearly expressed? Do they match those in the project proposal? Are they indicated in a sensible chronological order?</i>	
5- Health and Safety / Ethical aspects <i>Were the Health and Safety risks addressed? Were measures suggested to mitigate these? Were ethical considerations addressed if appropriate?</i>	
Sub-Total 2	50
Comments: (Please complete to justify your marks above)	

3 - Literature Review (55% total weighting, approx. 2500 words)

Please assess the literature review against each of the following criteria. Students have been asked for a 2500-word report containing fully referenced and critically evaluated descriptions of the prior work in the subject and assessed explicitly on the criteria below.

	Mark / 10
1- Context <i>Has sufficient evidence been presented of the previous work on the subject?</i>	
2- Significance <i>Is the significance of the previous work clearly stated and critically evaluated in terms of its contribution to the subject and its wider impact?</i>	
3- Relevance <i>Are the cited sources and the discussion relating to these relevant to the project?</i>	

<p>4- Methodologies</p> <p><i>Have sufficient methodologies been explored in the review to place the proposed methodology in its context?</i></p>	
<p>5- Logical progression and argument</p> <p><i>Does the review clearly explain and justify the stated aims and objectives and the chosen methodology?</i></p>	
<p>6- Structure of the report</p> <p><i>Is the report's structure adequate to usefully convey the important information?</i></p>	
<p>7- Presentation Quality</p> <p><i>Does the report meet publication standards in terms of English usage, use of tables and figures to underpin the argument in the text, and general level of presentation and layout?</i></p>	
<p>8- Referencing and bibliography</p> <p><i>Are sources adequately and properly referenced in the text and figure/table captions? Is the bibliography adequately formatted following a generally recognized referencing convention?</i></p>	
<p>9- Length</p> <p><i>Is the length of the review within the range and appropriate to the material presented (not too many irrelevant words but enough relevant words)?</i></p>	
<p>10- Originality</p> <p><i>Is the content of the report the work of the student? Has the student avoided copying blocks of text or figures verbatim from other sources? (Marks should be deducted for excessive use of others' published work, even if the use is attributed)</i></p>	
<p>Sub-Total 3</p>	<p>100</p>
<p>Comments: (Please complete to justify your marks above)</p>	

Final Mark

Please calculate the weighted sum of the marks from the three separate components to give a total.

Sub-Total 1 (maximum 80) =		80 x 30/80 =	
Sub-Total 2 (maximum 50) =		50 x 15/50 =	
Sub-Total 3 (maximum 100) =		100 x 55/100 =	
Grand Total out of 100			

Signed		Date/...../...
Print Name			

Comments (Formative feedback)

If you feel any other comments are necessary, for example mitigating circumstances that may have influenced your marking, please provide details below.

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Marking Scheme

<p>90-100 > truly exceptional work. The report should essentially be faultless – superbly organized and presented and lucid. The project objectives should have been challenging and these should have been fully achieved. There should be evidence of original thinking by the student. Project outcomes (results) should have been comprehensively reported, carefully tested, rigorously evaluated, and critically analyzed. A complete lack of technical misunderstandings or confusion. Evidence of extraordinary level of effort and volume of work. The report should be of publishable quality, in terms of technical content, at a peer-reviewed national conference.</p>
<p>80-89> Outstanding work. Full achievement of demanding objectives. Evidence of original thought. The report should be very well organized, presented, and written. Few, if any, technical errors, or misunderstandings. Evidence of a very substantial volume of work of high quality. The literature review should contain a critical analysis of relevant sources, not just a list.</p>
<p>70-79 > Excellent work, undoubtedly of distinction (first-class) level. Reasonably demanding objectives fulfilled. The report should be very well organized, presented, and written. No</p>

significant technical errors or misunderstandings. Evidence of a substantial volume of quality work.

60-69 Very good work. Substantial achievement of reasonably demanding objectives. The report should be well organized and presented and written. Few technical errors or misunderstandings. Evidence of a good volume of quality work.

55-59 > Good work. Project objectives need not be very demanding but have been achieved to a reasonable standard. The organization and presentation of the report should be clear. There may be some weaknesses, omissions, signs of misunderstanding, or technical errors but students should demonstrate a sound overall grasp of the topic under consideration. There may be room for improvement in some areas.

50-54 > Satisfactory work. The report should indicate a basic understanding of the technical content of the project and be presented reasonably clearly but may not have gone beyond this. There may be signs of confusion and misunderstanding, and technical errors in the report. There should be evidence of a reasonable volume of work towards the project objectives and the final report must represent a development of the interim report. Room for improvement may exist in several areas.

40-49 > Pass level work. The report should provide evidence that there has been work towards achieving the project objectives and be presented reasonably clearly. However, the report may contain significant technical errors, misunderstandings, or confusion and/or may be lacking in content and/or may not provide evidence of a satisfactory volume of work achieved and/or may not provide evidence of significant progress concerning the interim report.

0-39 > Poor work. The report may contain some correct and relevant material, but may suggest a lack of understanding or confusion regarding the technical content of the project and/or an unacceptably low volume of work carried out and/or unacceptably poor, e.g., lacking in volume, or confusing, presentation