



**UNIVERSITI
MALAYA**

**SII3010
GEOLOGY RESEARCH PROJECT
HANDBOOK**

**BACHELOR OF SCIENCE IN APPLIED GEOLOGY
ACADEMIC SESSION 2023/2024**

**DEPARTMENT OF GEOLOGY
FACULTY OF SCIENCE
UNIVERSITI MALAYA**

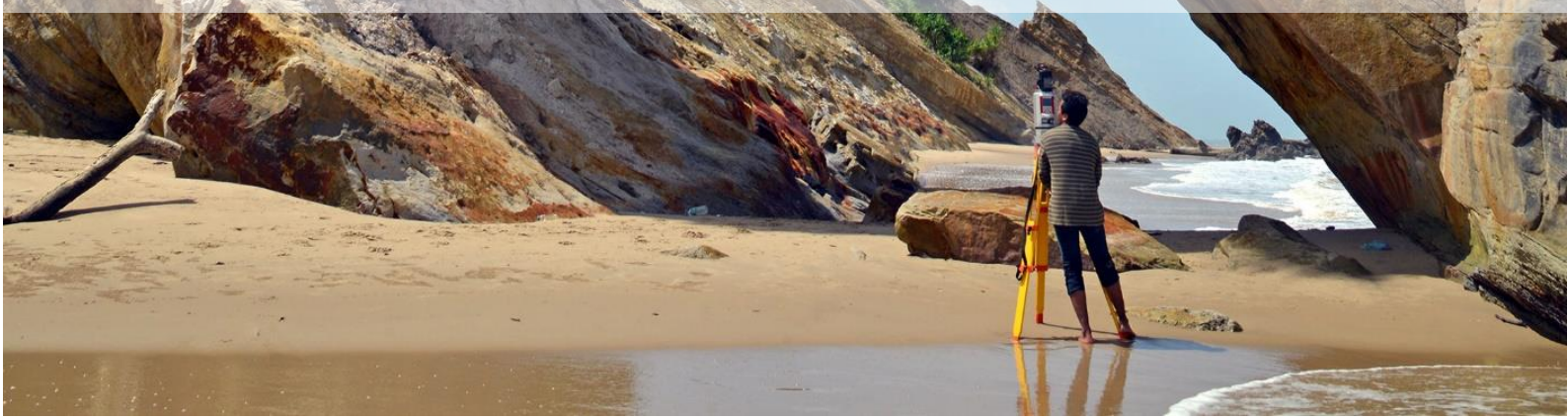


TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 COURSE LEARNING OUTCOMES	1
1.2 COURSE SYNOPSIS	1
1.3 CATEGORY AND SCOPE OF PROJECT	1
1.3.1 Category A: Field-based Project	1
1.3.2 Category B: Applied Project	2
1.3.3 Category C: Laboratory-based Project	2
1.3.4 Category D: Capstone Project	2
1.4 PROJECT DURATION	2
1.5 ASSESSMENT AND TIMELINE	3
2.0 ROLE AND RESPONSIBILITIES	4
2.1 STUDENT	4
2.2 COURSE COORDINATOR	4
2.3 SUPERVISOR	5
2.4 EXAMINER	6
2.5 LABORATORY STAFF	6
3.0 CONTENT AND LAYOUT	7
3.1 CONTENT	7
3.1.1 RESEARCH PROPOSAL	7
3.1.2 THESIS	7
3.1.3 REFERENCES	8
3.2 LAYOUT FORMAT	9
3.2.1 Page Size	9
3.2.2 Font and Alignment	9
3.2.3 Spacing and Margin	9
3.2.4 Page Numbering	9
3.2.5 Thesis Cover Page	9
3.2.6 Title Page	10
3.2.7 Declaration	10
3.2.8 Abstract	10
3.2.9 Acknowledgements	10
3.2.10 Table of Contents	10
3.2.11 List of Figures	10
3.2.12 List of Tables	11
3.2.13 List of Symbols and Abbreviations	11
3.2.14 List of Appendices	11
3.2.15 Main Body (Chapter 1, Chapter 2, ...)	11
3.2.16 References	11
3.2.17 Figures	12
3.2.18 Tables	12
3.2.19 Equations	12

4.0	PLAGIARISM AND THE USE OF GENERATIVE AI	13
5.0	ASSESSMENT	14
5.1	RESEARCH PROPOSAL	14
5.2	INITIAL VIVA	14
5.3	ORAL PRESENTATION	15
5.4	THESIS	15
5.5	FINAL VIVA	15
6.0	FINAL SUBMISSION AND CATALOGING OF SAMPLES	16
6.1	FINAL SUBMISSION OF THESIS	16
6.2	SUBMISSION OF SAMPLES FOR CATALOGING	16
6.3	REMOVAL AND DISPOSAL OF SAMPLES	16

APPENDICES

Appendix 1:	Laboratory Analysis Application Form
Appendix 2:	Thesis Cover
Appendix 3:	Title Page
Appendix 4:	Declaration Page
Appendix 5:	Abstract
Appendix 6:	Abstrak
Appendix 7:	Acknowledgements
Appendix 8:	Table of Contents
Appendix 9:	List of Figures
Appendix 10:	List of Tables
Appendix 11:	List of Symbols and Abbreviations
Appendix 12:	List of Appendices
Appendix 13:	Main Body
Appendix 14:	References
Appendix 15:	Research Proposal Assessment Form
Appendix 16:	Initial Viva Assessment Form
Appendix 17:	Presentation Assessment Form
Appendix 18:	Thesis Assessment Form
Appendix 19:	Final Viva Assessment Form
Appendix 20:	Research Proposal Evaluation Rubrics
Appendix 21:	Initial Viva Evaluation Rubrics
Appendix 22:	Presentation Evaluation Rubrics
Appendix 23:	Thesis Evaluation Rubrics
Appendix 24:	Final Viva Evaluation Rubrics

DEPARTMENT OF GEOLOGY, UNIVERSITI MALAYA

SII3010 - GEOLOGY RESEARCH PROJECT HANDBOOK

1.0 INTRODUCTION

The Geology Research Project (SII3010) course is a compulsory Core Course and a partial requirement in awarding the Bachelor of Science in Applied Geology. The Geology Research Project is an eight (8) credit progressive course conducted over two semesters. This course usually involves a fieldwork component, followed by laboratory work, data analysis and interpretation, and writing. Students are encouraged to choose a project covering geological topics that is in line with their personal interest.

1.1 COURSE LEARNING OUTCOMES

At the end of the course, students are able to:

1. Propose an independent research project that encompasses field and/or laboratory studies.
2. Coordinate field data collection and/or laboratory work independently and responsibly.
3. Present geological research professionally, both orally and in writing

1.2 COURSE SYPNOSIS

Some 3 weeks of fieldwork in a specified area followed by laboratory studies and submission of a report containing a geological map and cross-section as well as relevant illustrations and literature reviews. Prior to fieldwork, a research proposal has to be submitted and approved. In some cases, there can be laboratory-based studies on a specific geological problem or topic. Results of the field and/or laboratory studies and interpretation will be presented at an initial viva and seminar, as well as defended at a final viva.

1.3 CATEGORY AND SCOPE OF PROJECT

The Project chosen for the course can be one of the four categories listed below.

1.3.1 Category A: Field-based Project

The research involves geological fieldwork of a selected area, followed by laboratory analyses of field data and samples. Two to four weeks of fieldwork are needed in order to prepare a field geological map that shows the different geological units (formations, lithologies or soil types) in the study area at a scale of, or larger than, 1:25,000. A study area of 25 km² or larger is recommended. A digital of the geological map with standard symbols has to be prepared on geographical information (GIS) or graphic software. There must be at least one geological cross-section that spans the entire area. During the field mapping, all observed geological features, sketches and measurements of geological structures, as well as list of samples collected with details of the sample locations, have to be recorded in a field note book or a digital mapping application.

1.3.2 Category B: Applied Project

The research project is conducted to address specific geology related problems using one or more techniques, such as geophysical survey, geochemical analysis and GIS modelling. It involves fieldwork to gather geological data and samples and to conduct field tests or surveys, followed by analysis and interpretation of the results. The size of the field area is generally smaller and the fieldwork duration shorter, than the Field-based Project. A field geological map at a scale of, or larger than, 1:25,000 should be prepared to show the geological units and the sampling or survey points. A digital map with standard symbols has to be prepared on GIS or graphic software. All observed geological and related features, sketches, measurements and list of samples collected with details of the sample or survey locations, have to be recorded in a field note book or a digital mapping application.

1.3.3 Category C: Laboratory-based Project

The research is conducted research based on laboratory work on secondary samples or secondary data on a specific topic. The work to be under-taken will depend upon the aims of the research. The work that will be carried out has to be first discussed with, and approved by, the Supervisor and Course Coordinator. These projects generally involve significantly more literature review, data analysis and interpretation than a project with fieldwork. One or more digital geological maps and cross section or stratigraphic column should be prepared using information from previous work.

1.3.4 Category D: Capstone Project

The research addresses geology-related problems faced by the community or industry. It involves engaging with the community or industry, collection of data and samples from the field for analysis. The work that will be carried out has to be first discussed with, and approved by, the Supervisor and Course Coordinator. Fieldwork is generally needed in order to prepare a field geological map that shows the different geological units and the issue involved (such as landslides) in the study. A digital map with standard symbols has to be prepared on GIS or graphic software. All observed geological and related features, sketches, measurements and list of samples collected with details of the sample locations, have to be recorded in a field note book or a digital mapping application. There should be records on the information collected from the community or industry (such as survey forms or interview transcripts).

1.4 PROJECT DURATION

The Research Project will involve two successive Semesters. It is recommended that students register this course in Semesters 2 of their third year and Semester 1 of their fourth year. This option provides longer time for fieldwork and laboratory analysis during the session break.

Students can also register in Semester 1 and Semester 2 of their fourth year, but the duration of the break between semesters 1 and 2 is considerably shorter.

1.5 ASSESSMENT AND TIMELINE

The Geology Research Project (SII3010) course is evaluated through 100% continuous assessment, which comprised of the five (5) components (**Table 1.1**). The assessment timeline is shown in Table **1.2**.

Table 1.1: Assessment components and the weightages of the Geology Research Project course.

No.	Component	Weightage (%)
1	Research Proposal	10
2	Initial Viva	10
3	Oral Presentation	20
4	Thesis	50
5	Final Viva	10

Table 1.2: Assessments timeline of the Geology Research Project course.

No.	Component	Project Duration	
		Sem 2 (Year 3) & Sem 1 (Year 4)	Sem 1 (Year 4) & Sem 2 (Year 4)
1	Research Proposal	Friday, Week 5 Sem 2 (Year 3)	Friday, Week 5 Sem 1 (Year 4)
2	Initial Viva	Friday, Week 1 Sem 1 (Year 4)	Friday, Week 3 Sem 2 (Year 4)
3	Oral Presentation	Friday, Weeks 10-12 Sem 1 (Year 4)	Friday, Weeks 10-12 Sem 2 (Year 4)
4	Thesis	Friday, Week 13 Sem 1 (Year 4)	Friday, Week 13 Sem 2 (Year 4)
5	Final Viva	Revision Week Sem 1 (Year 4)	Revision Week Sem 2 (Year 4)

2.0 ROLE AND RESPONSIBILITIES

This section outlines the main roles and responsibilities related to the running of the Geology Research Project (SII3010) course, for students, course coordinator, supervisors, examiners and laboratory staff.

2.1 STUDENT

The main roles of the students are to plan, implement and complete the research project within the timeline with the guidance from their supervisor.

The responsibilities of the students are as follow:

- a) Students are encouraged to decide and propose a research topic to potential supervisor.
- b) Students shall discuss and get the supervisor's consent regarding the area, objectives and scope of research.
- c) Students shall meet regularly with the supervisor at least once every two weeks. The time of consultation shall be discussed and agreed by the supervisor.
- d) Students shall record every meeting and discussions with the supervisor in a log book that will be examined during the viva.
- e) Students should establish a good working relationship continuously with their supervisor.
- f) The student should plan the project schedule and submit the research proposal and thesis within the submission deadline.
- g) Students shall obtain approval from the supervisor and laboratory supervisor before submitting samples for laboratory analysis. Students can analyze up to 10 samples for free using the form in **Appendix 1** (except Petroleum Geology Laboratory: 5 samples; Micro-CT Laboratory: 2 samples; and thin section: students can make their own thin sections for free). Students wishing to analyze more samples should either pay for the services or obtain an exemption from the Head of Department using the Booking Form available at the respective laboratory.
- h) Students shall obtain approval from the supervisor to obtain samples or to conduct data or information collection from any external party or secondary sources.
- i) Students should keep informed supervisor and course coordinator, if any problem is raised interrupting their research work.
- j) Students are solely responsible for the content, writing of research proposal and thesis, viva and oral presentation.
- k) Students shall make necessary corrections to their thesis after the final viva. The final thesis shall be submitted to the department not later than two weeks after the date of final viva.

2.2 COURSE COORDINATOR

The main roles of the course coordinator are to coordinate and manage of the Geology Research Project (SII3010) course.

The responsibilities of the course coordinator are as follows:

- a) Course coordinator shall acquire the list of students enrolled in the Geology Research Project (SII3010) course through Spectrum or MAYA system.

- b) Course coordinator shall conduct briefing on the guidelines and requirements to all students enrolled in course in the first week of the first registered semester.
- c) Course coordinator shall compile a list of title of research projects and their supervisors from the students.
- d) Course coordinator shall prepare a schedule for initial viva, presentation and final viva, and deadlines for submission of research proposal and thesis.
- e) Course coordinator shall appoint a chairperson for each oral presentation (seminar) session.
- f) Course coordinator shall collect and evaluate research proposal submitted by the students.
- g) Course coordinator shall appoint two examiners for each student.
- h) Course coordinator shall collect the digital thesis from the students and distribute them to the supervisors and examiners.
- i) Course coordinator shall compile marks from supervisors and examiners, and enter the final marks in the MAYA system.
- j) Course coordinator shall collect the digital copies of the final corrected thesis from the students and archive them with the course files in the department's computer.

2.3 SUPERVISOR

The main roles of the supervisor are to supervise, guide and train the students towards their planning, implementation and completion the research project.

The responsibilities of the supervisor are as follows:

- a) Supervisor shall provide a working title of the research project to the students.
- b) Supervisor shall explain the objectives and scope of research project to the students.
- c) Supervisor should ensure that the student's research activities are planned and conducted according to the specified time frame.
- d) Supervisor is responsible for providing relevant and adequate guidance, academic support and motivation to the students to enable the candidate to carry out research in the field and laboratory, and writing.
- e) Awareness regarding the implication of academic breach of conduct, plagiarism and misuse of generative AI must be explained clearly to the students.
- f) Supervisor shall meet regularly with the students at least once every two weeks.
- g) Supervisor should ensure that work safety rules are followed during the research and are carried out in accordance with the safety handbook of Universiti Malaya.
- h) Supervisor should ensure that only a reasonable number of relevant samples are submitted for laboratory analysis by the student.
- i) Determination of final title of research shall be made between the supervisor and student before the initial viva.
- j) Supervisors should provide constructive and critical comments on candidates' research proposal and thesis drafts within a reasonable time.
- k) Supervisors should ensure that the students submit their research proposal, thesis and final corrected thesis on time.

2.4 EXAMINER

The main role of the examiner is to evaluate performance of the students in conducting, presenting and communicating in writing and orally, the research project.

The responsibilities of the examiner are as follows:

- a) Examiners shall evaluate the performance of the students during the initial viva, presentation and final viva.
- b) Examiners shall evaluate the thesis and suggest corrections to the students.
- c) Marks of all evaluations shall be submitted by the examiners to the course coordinator within a reasonable time.
- d) All evaluations shall be made using the evaluation forms and rubrics in Section 5.

2.5 LABORATORY STAFF

The main role of the laboratory staff is to assist students in laboratory work.

The responsibilities of laboratory staff (Science Officer and Assistant Science Officer) are as follows:

- a) Laboratory staff shall assist students in conducting experimental and analytical work in the laboratory.
- b) Laboratory staff should advice and assist students in sample preparation and the operation of testing and analytical equipment and related facilities.
- c) Laboratory staff should ensure that samples submitted for laboratory analysis are approved by the project supervisor and/or laboratory supervisor using the form in **Appendix 1**. The approved laboratory analysis application form should be filed in the respective laboratory by the laboratory staff in charge.

3.0 CONTENT AND LAYOUT

The general structure of the content and the suggested format of the layout of research proposal and thesis are described in this section.

3.1 CONTENT

This section provides a guide on the general structure and content of the research proposal and thesis, and the format of citation and references. The research proposal and research report shall be written in English or Bahasa Malaysia.

3.1.1 RESEARCH PROPOSAL

The research proposal will introduce the study area or topic of research and describe the objectives of the study and the methodology to be adopted. The proposal should not exceed 3,000 words. Two examples of the general structure of research proposal are shown in **Table 3.1** below.

Table 3.1: Examples of general structure of research proposal.

Preliminary	
Title Page Table of Contents List of Figures	Title Page Table of Contents List of Figures
Main Body	
Introduction Objectives Study Area Literature Review Methodology Project Schedule Summary References	Introduction Problem Statement Objectives Study Area Literature Review Methodology Project Schedule Expected Outcomes References

3.1.2 THESIS

The thesis follows traditional monograph structure. The thesis should not exceed 25,000 words, excluding text in figures, tables and references. Thesis exceeding 25,000 words needs to be approved by the supervisor and course coordinator. Two examples of the general structure of thesis are shown in **Table 3.2**.

Table 3.2: Examples of general structure of thesis.

Preliminary	
Title Page	Title Page
Declaration	Declaration
Abstract	Abstract
Abstrak	Abstrak
Acknowledgements	Acknowledgements
Table of Contents	Table of Contents
List of Figures	List of Figures
List of Tables	List of Tables
List of Symbols and Abbreviations	List of Symbols and Abbreviations
List of Appendices	List of Appendices
Main Body	
Chapter 1: Introduction	Chapter 1: Introduction
Chapter 2: Literature Review	Chapter 2: Literature Review
Chapter 3: Methodology	Chapter 3: Methodology
Chapter 4: Geological Setting	Chapter 4: General Geology
Chapter 5: Petrography	Chapter 5: Sedimentology
Chapter 6: Geochemistry	Chapter 6: Geological History
Chapter 7: Discussion	Chapter 7: Discussion and Conclusion
Chapter 8: Conclusion	References
References	
Supplementary	
Appendix	Appendix

3.1.3 REFERENCES

When information from other sources is used in the research proposal and thesis, the sources of information have to be cited in the text and the references listed in the References section. The references should be written consistently in the American Psychological Association (APA) format. Reference citations in text require information on the last name of the author, and the year of publication, as follows:

- According the Ali and Ahmad (2023) the limestone and schist in the Kinta Valley are deformed.
- The limestone and schist in the Kinta Valley are deformed (Ali and Ahmad, 2023).

When there are three or more authors, cite the last name of the first author followed by *et al.*, and the year of publication (Ali *et al.*, 2023).

Please refer to the University of Malaya Library APA Formatting and Style Guide. The guide can be downloaded at UM Library website (<https://umlibguides.um.edu.my/c.php?g=939660>).

3.2 LAYOUT FORMAT

This section provides guidance on the general format of the layout of the thesis. The research proposal should be formatted similarly. Students are encouraged to use the Microsoft Word template provided by the Department of Geology.

3.2.1 Page Size

The thesis shall be prepared in A4 page size (210 × 297 mm). A thesis in the digital format as a single PDF file shall be submitted for examination. The layout of the digital thesis and final printed thesis must be the same as specified in this section. The final thesis should be printed, single-sided, on high quality white A4 paper. Maps larger than A4 are allowed and they must be folded neatly and placed in a pocket attached to the back page of the printed thesis.

3.2.2 Font and Alignment

Text must be typed using font type Times New Roman, font size 12 points (except for text inside tables and figures) and justified, using Microsoft Word or similar word-processing software. Texts in a language that is different from the language of the thesis and species names must be typed in *italics*.

Titles of chapter should be typed with capital letters and centered. Each chapter must begin on a new page. Titles of headings and sub-headings should be typed in sentence case and bold without underline.

3.2.3 Spacing and Margin

The body of the text should be typed with double spacing. Single-spacing is only permitted in tables, captions and references.

Apart from the cover page, all page margins should be 4 cm or 1.57 inch on the left, and 2 cm or 0.79 inch for the top, right and bottom margins. Tables and figures must fit into the above margins, but they can be arranged in the landscape format, if necessary. The page margins for the cover page should be 4 cm or 1.57 inch on the top, left, and right and 5 cm or 1.97 inch for the bottom margins.

3.2.4 Page Numbering

All page numbers should be printed 1 cm from the bottom edge of the page and aligned to the right. Font type must be Times New Roman with a font size of 10 points. Roman numerals (i, ii, iii, ...) should be used in the Preliminary Section, and Arabic numerals (1, 2, 3, ...) are used on the pages of the Main Body (starting with the Introduction page) and Supplementary Section. Please note that the Title Page is not numbered.

3.2.5 Thesis Cover Page

The thesis cover page and should include:

- (a) The research project title
- (b) Name of the student
- (c) Submission statement
- (c) Name of Department, Faculty and University
- (d) The year of submission

All text must be in capital letters in Times New Roman font size 14, at 1.15 line spacing and centered. An example of the title page is shown in **Appendix 2**.

3.2.6 Title Page

The title page is the first page after the front cover and should include:

- (a) Logo of Universiti Malaya
- (b) The research project title
- (c) Submission statement
- (d) Name and registration number of the student
- (e) Name of the supervisor
- (f) Name of Department, Faculty and University
- (g) The semester and session of submission.

All text must be in capital letters in Times New Roman font size 14, at 1.15 line spacing and centered. An example of the title page is shown in **Appendix 3**.

3.2.7 Declaration

The declaration must be completed by the student and signed by the student's supervisor or course coordinator. The original signed form must be included in all copies of the final thesis. An example of the declaration is shown in **Appendix 4**.

3.2.8 Abstract

An abstract is a short summary of the research project, which briefly describe the problem statement, objectives, methodology, results, conclusion and the significance of the research. An abstract must not exceed 500 words, typed in a single paragraph with double-spacing, and should not cite any references. A maximum of five (5) keywords should also be listed below the abstract. There should be an abstract in Bahasa Malaysia (Abstrak) after the English abstract page, formatted similarly. An example of the abstract and abstrak pages are shown in **Appendices 5 and 6**, respectively.

3.2.9 Acknowledgements

The acknowledgement conveys message of appreciation to those who have been involved and provided their assistance directly or indirectly in the research project. This is optional and should not exceed one page (see **Appendix 7**).

3.2.10 Table of Contents

The Table of Contents lists the chapters, headings and sub-headings together with their page numbers aligned to the right, following the format below. The Sub-heading should be indented below the Heading (Appendix 8). The numbering system should provide a clear idea of the relationship between chapters and headings in a hierarchical manner.

3.2.11 List of Figures

This list contains the figure number, captions of figures, together with their page numbers aligned to the right. For example, figures in Chapter 1 are numbered sequentially: Figure 1.1, Figure 1.2 and so on, and figures in Chapter 2 are numbered: Figure 2.1, Figure 2.2 and so on (**Appendix 9**).

3.2.12 List of Tables

This list contains the table number, captions of tables, together with their page numbers aligned to the right. For example, figures in Chapter 1 are numbered sequentially: Table 1.1, Table 1.2 and so on, and tables in Chapter 2 are numbered: Table 2.1, Table 2.2 and so on (**Appendix 10**).

3.2.13 List of Symbols and Abbreviations

The symbols, abbreviations and terminology used in the thesis are listed here in alphabetical order (**Appendix 11**).

3.2.14 List of Appendices

This list is optional and contains the titles of appendices placed in the thesis numbered sequentially (**Appendix 12**).

3.2.15 Main Body (Chapter 1, Chapter 2, ...)

The main text in the thesis must be organized in the following manner:

- a) Text must be arranged in titled chapters.
- b) The chapter titles must reflect the content of the chapter.
- c) Every chapter must begin on a new page.
- d) Chapters can be divided into sub-chapters with corresponding sub-titles (headings).
- e) Headings and sub-headings must be numbered.
- f) The maximum level of division is four (i.e. up to 1.2.3.4)

There is no restriction on the total number of chapters in a thesis. The number of chapters differs according to the topic of study. Please refer to **Appendix 13** for example of the main body format.

3.2.16 References

The references should be written in APA format. Each reference should be written in single spacing format and a single line should be inserted between references. The list of references must be arranged in alphabetical order and the entries should not be numbered. The list must also have a hanging indentation of 1.27 cm or 0.5 inch as shown in the example below and **Appendix 14**.

Brooks, J. D., Gould, K., & Smith, J. (1969). Isoprenoid hydrocarbons in coal and petroleum. *Nature* **222**, 257–259.

Burton, C. K. (1973). Mesozoic. In D. J. Gobbett and C. S. Hutchison (Eds.), *Geology of the Malay Peninsula*. Wiley-Interscience, New York, pp. 97-141.

Kezdi, A. (1979). *Stabilized Earth Roads*. Akademiai Kiado, Budapest, Hungary, 110 p.

Please refer to the University of Malaya Library APA Formatting and Style Guide (<https://umlibguides.um.edu.my/c.php?g=939660>).

3.2.17 Figures

Figures include diagrams, images, maps, photographs, photomicrographs, stratigraphic logs, sketches, graphs and charts. The figures must be good quality and text in the figure must be legible. All figures should be cited in the text and numbered consecutively according to the chapter number. The figure must be inserted not more than three pages after it was first referred to in the text. Do not insert figures before they are cited in the text.

All figures must be accompanied by a caption placed below the figure. The caption should be informative and self-explanatory. All abbreviations and symbols must be explained within the figure or in the caption. The captions must be printed using Times New Roman, bold and font size 12. The caption should be centered if it fits within one line, and justified with a hanging indent of 1.27 cm or 0.5 inch if it occupies more than one line (see example in **Appendix 13**).

Make sure that the figures are not distorted by locking their aspect ratio. Photomicrographs, maps, photographs of specimens and plates of fossils must be accompanied by a scale bar. Please do not use magnification factor or ratio (i.e. 5X or 1:200). There must be a suitable object that can be used as a scale (such as a geological hammer) for outcrop photographs. In addition to scale, maps must have a legible legend, graticule (longitude and latitude) and North arrow.

Students are responsible for obtaining permission to use any figures that are protected by copyright. Please do not use figures or images downloaded from the internet without appropriate permission. Apart from your original figures, the source of all figures used should be cited.

3.2.18 Tables

Tables should be inserted in editable format using the Insert Table function in Microsoft Word or other word processing software, and not as images. All tables should be referred to in the text and numbered consecutively according to the chapter number. The table must be inserted not more than three pages after it was first cited in the text. Do not insert tables before they are referred to in the text.

All tables must be accompanied by a caption placed above the table. The captions must be typed using Times New Roman, bold and font size 12. The caption should be centered if it fits within one line, and justified with a hanging indent of 1.27 cm or 0.5 inch if it occupies more than one line (see example in **Appendix 13**).

3.2.19 Equations

Equations and mathematical expressions should be inserted between the text. Number the equations using consecutive numbers and refer to them in the text as (**Equation 1**) etc. The equations should be inserted using the Equation Editor in Microsoft Word or other word processing software. An example of equation is shown below:

$$\text{Sorting} = (\phi_{84} - \phi_{16} / 4) + (\phi_{95} - \phi_5 / 6.6) \quad (\text{Equation 1})$$

4.0 PLAGIARISM AND THE USE OF GENERATIVE AI

All Universiti Malaya students are expected have high academic integrity and stay away from plagiarism. Plagiarism is defined as the use of original work, ideas or actual texts or figures created by others, without acknowledging the original source. Hence, failure to acknowledge the work of others in their work intentionally or unintentionally is an act of plagiarism and may be subjected to disciplinary action under the Universiti Malaya (Discipline of Students) Rules 1999.

Even though the use of generative artificial intelligence (AI) applications such as ChatGPT, Jasper and Bard for research is not prohibited, any content or findings that use the AI technology must be clearly stated as such in the footnote of the pages involved. Students are required to ensure the correctness of the content and to protect others' intellectual property rights. It is prudent to check the original sources to verify that the AI generated contents are correct and cite the sources.

If generative AI application is used to edit your original text such as checking and correcting spelling and grammar and rephrasing to improve clarity and quality of the text, it also needs to be stated in the acknowledgement page.

The usage of Turnitin is highly recommended. Turnitin is an online web-based plagiarism and generative AI detection application, which detects the similarity of one's work with other sources, and detects work generated by AI. In general, both the similarity index and AI generated text percentages of the thesis should not be more than 25%. All students are required to submit a Turnitin Report when they submit their thesis.

5.0 ASSESSMENT

The course coordinator will appoint 2 examiners for each project. The final marks for each component shall be the average marks from all the assessors. The evaluators involved in the five components of the Geology Research Project course is listed in **Table 5.1**.

Table 5.1: Assessors involved in the assessment of the five components of the Geology Research Project course.

No.	Component and Weightage	Assessor
1	Research Proposal (10%)	Course Coordinator
2	Initial Viva (10%)	Supervisor and 2 Examiners
3	Oral Presentation (20%)	All academic staff
4	Project Report (50%)	Supervisor and 2 Examiners
5	Final Viva (10%)	Supervisor and 2 Examiners

5.1 RESEARCH PROPOSAL

The Research Proposals are submitted to and evaluated by the course coordinator. The proposal is submitted as a single PDF file. Evaluation shall be carried out by the course coordinator using the form in **Appendix 15**.

5.2 INITIAL VIVA

Project students must attend an Initial Viva to be evaluated on their progress. All students are required to complete the draft of the first three chapters of their thesis (Chapter 1: Introduction, Chapter 2: Literature Review, and Chapter 3: Methodology) before the initial viva. These three chapters will be evaluated during the initial viva. Students may prepare a short slide presentation for the initial viva.

For projects involving geological fieldwork, the field note book and field geological map will be checked and evaluated during the Initial Viva. A traverse map that shows the sites of field observations, measurements and surveys as well as locations of samples will also have to be presented.

For projects based on secondary data or samples, all materials collected by the student in the course of the Project, including the results of laboratory analyses and secondary data will be checked and evaluated during the Initial Viva. For projects involving engagement with the community or industry, records of the engagement such as survey form and transcript of interviews will be evaluated.

Assessment shall be carried out by the supervisor and examiners using the form in **Appendix 16**.

5.3 ORAL PRESENTATION

Project students are required to participate in an oral presentation (seminar) during which they will present details of their study. Materials that will be presented have to be determined after discussion with the supervisor. The presentation session for each student is 20 minutes, consisting of 15 minutes for oral presentation and 5 minutes for a question and answer session.

The oral presentation shall be evaluated by all academic staff present during the seminar using the form in **Appendix 17**.

5.4 THESIS

A draft framework of the thesis, including the Title, Chapters and Headings to be written, has to be prepared and discussed with the supervisor before the initial viva. Students are encouraged to submit their draft chapters as soon as possible for checking by their supervisor. The thesis should be prepared following the suggested content and layout format in Section 3.

The thesis shall be submitted to the course coordinator as a single PDF file on, or before, the submission deadline. The submission deadline is the last working day of Week 13 of the second semester of registration (P2). For late submission, a deduction of 0.5 mark will be made for every day after the submission deadline.

Assessment shall be carried out by the supervisor and examiners using the form in **Appendix 18**.

5.5 FINAL VIVA

A final viva will be carried out after the thesis has been submitted during the revision week (week 15). The final viva provides an opportunity to the students to explain and defend their work. It also gives the examiners the opportunity to seek explanation on any issues in the thesis in detail.

The final viva shall be carried out by the supervisor and examiners and evaluated using the form in **Appendix 19**.

6.0 FINAL SUBMISSION AND CATALOGING OF SAMPLES

6.1 FINAL SUBMISSION OF THESIS

Students may have to carry out corrections to their thesis if requested to do so by their supervisor or examiners during the final viva.

Two (2) comb-bound copies with soft covers, as well as one unbound copy of the corrected thesis, printed single-sided, on high quality white A4 paper, have to be resubmitted to the Department through the Supervisor who will check and confirm that the corrections have been made.

A digital copy of the corrected final thesis in a single PDF file shall be submitted to the course coordinator for archival purposes.

6.2 SUBMISSION OF SAMPLES FOR CATALOGING

Samples and thin sections considered by the Supervisor to be worth keeping can be registered in the Departmental Collection after the final viva. Samples registered with the Department will be cataloged with a sequential registration number. The total number of samples, including thin-sections that can be registered should not exceed 20. The samples shall be submitted to the Department of Geology (Dr. Arindam Chakraborty).

6.3 REMOVAL AND DISPOSAL OF SAMPLES

Students are required to have all other samples removed from the Department within two week of the resubmission of their thesis. The samples should be disposed properly into the waste bin for rock and soil at the basement.

DEPARTMENT OF GEOLOGY UNIVERSITI MALAYA

LABORATORY ANALYSIS APPLICATION FORM FOR THE COURSE SII3010 - GEOLOGY RESEARCH PROJECT		
Name		
Registration Number		
Project Title		
Laboratory		
Equipment		
Type of Analysis		
No.	Sample Code	Description of Sample / Analysis
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Applicant:		Approval by Supervisor:
Signature		Signature
Name:		Name and Stamp:
Date:		Date:
Approval by Laboratory Supervisor or Head of Department		Verification by Laboratory Staff:
Signature		Signature
Cop Nama dan Jawatan:		Name :
Date:		Analysis Date:
Please use different form for different laboratory and analysis. Students can analyze up to 10 samples for free (except Petroleum Geology Laboratory: 5 samples; Micro-CT Laboratory: 2 samples). Students wishing to analyze more samples should either pay for the services or obtain an exemption from the Head of Department using the Booking Form available at the respective laboratory.		

Appendix 2: Thesis Cover

GENERAL GEOLOGY OF THE HULU KELANG AREA
WITH EMPHASIS ON STRUCTURAL GEOLOGY

Thesis Title

Student's Name

ALI AHMAD BIN ABDULLAH

Submission
Statement

SII3010 GEOLOGY RESEARCH PROJECT THESIS
SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
BACHELOR OF SCIENCE IN APPLIED GEOLOGY

Department's
Address

DEPARTMENT OF GEOLOGY
FACULTY OF SCIENCE
UNIVERSITI MALAYA
KUALA LUMPUR

Year of Submission

2025

Thesis Cover

Font: Times News Roman
Size: 14 points
Line spacing: 1.15
Alignment: Center
Page number: None
Top, left & right margin: 4 cm
Bottom margin: 5 cm

UM Logo



**UNIVERSITI
MALAYA**

Thesis Title

**GENERAL GEOLOGY OF THE HULU KELANG AREA WITH
EMPHASIS ON STRUCTURAL GEOLOGY**

Submission
Statement

**SII3010 GEOLOGY RESEARCH PROJECT THESIS
SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
BACHELOR OF SCIENCE IN APPLIED GEOLOGY**

Student's Name and
Registration Number

BY

**ALI AHMAD BIN ABDULLAH
123456789**

Supervisor's Name

**SUPERVISOR
DR. ABDULLAH ALI**

Department's
Address

**DEPARTMENT OF GEOLOGY
FACULTY OF SCIENCE
UNIVERSITI MALAYA
KUALA LUMPUR**

Semester of
Registration

**SEMESTER 2 2023/2024
AND SEMESTER 1 2024/2025**

**Title Page
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Size: 14 points
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Alignment: Center
Page number: None**

ORIGINAL LITERARY WORK DECLARATION

Name of Candidate: ALI AHMAD BIN ABDULLAH
(I.C/Passport No: 123456-78-1234)

Matric No: 123456789

Name of Degree: BACHELOR OF SCIENCE IN APPLIED GEOLOGY

Title of Thesis (“this Work”): GENERAL GEOLOGY OF THE HULU KELANG
AREA WITH EMPHASIS ON STRUCTURAL GEOLOGY

I do solemnly and sincerely declare that:

- (1) I am the sole author/writer of this Work;
- (2) This Work is original;
- (3) Any use of any work in which copyright exists was done by way of fair dealing and for permitted purposes and any excerpt or extract from, or reference to or reproduction of any copyright work has been disclosed expressly and sufficiently and the title of the Work and its authorship have been acknowledged in this Work;
- (4) I do not have any actual knowledge nor do I ought reasonably to know that the making of this work constitutes an infringement of any copyright work;
- (5) I am fully aware that if in the course of making this Work I have infringed any copyright whether intentionally or otherwise, I may be subject to legal action or any other action as may be determined by UM.

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Candidate’s Signature

Date: 17 January 2025

Subscribed and solemnly declared before,

XXXXXXXXXXXXXX

Witness’s Signature

Date: 17 January 2025

Name: DR. ABDULLAH ALI

Designation: SENIOR LECTURER

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cm; left– 4 cm

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**GENERAL GEOLOGY OF THE HULU KELANG AREA WITH EMPHASIS
ON STRUCTURAL GEOLOGY**

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ABSTRACT

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Keywords: Kuala Lumpur, structural geology, Hawthornden Formation

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iii

**GEOLOGI AM KAWASAN HULU KELANG DENGAN PENEKANAN
TERHADAP GEOLOGI STRUKTUR**

ABSTRAK

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Kata kunci: Kuala Lumpur, geologi struktur, Formasi Hawthornden

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ACKNOWLEDGEMENTS

I would like to express my deepest gratitude goes to my supervisor, Dr. Abdullah Ali who have been a fully supportive and patient mentor throughout the completion of this thesis.

Also, it is a greatly pleasure to express the deepest gratitude towards Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Viverra accumsan in nisl nisi scelerisque eu. Mi eget mauris pharetra et ultrices neque ornare aenean. Quis commodo odio aenean sed adipiscing. Et tortor consequat id porta. Faucibus pulvinar elementum integer enim neque volutpat ac tincidunt. Tempor orci eu lobortis elementum. Commodo sed egestas egestas fringilla phasellus faucibus scelerisque.

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TABLE OF CONTENTS

ORIGINAL LITERARY WORK DECLARATION ii

ABSTRACT ii

ABSTRAK iii

ACKNOWLEDGEMENTS iv

TABLE OF CONTENT v

LIST OF FIGURES vii

LIST OF TABLES ix

LIST OF SYMBOLS AND ABBREVIATIONS x

LIST OF APPENDICES xi

CHAPTER 1: INTRODUCTION 1

1.1 Background 1

1.2 Problem Statement 2

1.3 Objectives 2

1.4 Study area 3

1.4.1 Location and Accessibility 3

1.4.2 Topography and Drainage 3

1.4.3 Geology 4

1.4.4 Climate 4

1.5 Significance of Research 4

1.6 Organisation of Thesis 5

CHAPTER 2: LITERATURE REVIEW 6

2.1 Regional Geology and Tectonics 9

2.2 Geomorphology 10

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2.3	Stratigraphy	11
2.4	Metamorphism and Deformation	12
CHAPTER 3: METHODOLOGY		15
3.1	Introduction	16
3.2	Desk study	17
	3.2.1 Preparation of Base Map	17
	3.2.2 Aerial Photograph Study	18
3.3	Fieldwork	18
	3.2.1 Geological Mapping	19
	3.2.2 Sampling	20
	3.2.3 Stratigraphic Logging	21
CHAPTER 4: GENERAL GEOLOGY		25
4.1	Introduction	23
4.2	Dinding Schist	24
	4.2.1 Distribution	24
	4.2.2 Petrography	25
	4.2.2.1 Mesoscopic Description	25
	4.2.2.2 Microscopic Description	26
4.3	Hawthornden Schist	27
CHAPTER 5:		
CHAPTER 6: CONCLUSIONS		80
REFERENCES		85
APPENDICES		90

At least TWO entry in each subtopic

Maximum 4 levels of subtopic

LIST OF FIGURES

Align using Right Tab at 15 cm with dotted leader

Align using Left Tab

Figure 1.1: Location of the study area 6

Figure 1.2: Geological map of Hulu Kelang 7

Figure 1.3: A geological cross section across A-A' in Figure 1.2..... 8

Figure 2.1: Tectonic setting of Peninsular Malaysia during the Triassic 17

Figure 2.2: Simplified stratigraphic column 24

Figure 2.3: Map showing the geomorphological units 27

Figure 3.1: Flowchart showing the work flow of the study 39

Figure 3.2: Traverse and sample location map..... 43

Figure 3.2: Diagram showing the sequence of sample preparation based on
procedures by Smith (1990) 45

Hanging indent if more than 1 line

LIST OF TABLES

Align using Right Tab at 15 cm with dotted leader

Align using Left Tab

Table 3.1:	List of aerial photographs studied	6
Table 3.2:	List of samples collected and their locations	7
Table 4.1:	Summary of mineral contents of rock samples.....	8
Table 4.2:	Major element contents of granite samples	17
Table 4.3:	List of minerals and their percentages calculated from the geochemical contents using the CIPW norm	25

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LIST OF SYMBOLS AND ABBREVIATIONS

SYMBOLS

°	Degrees
µm	Micrometre (10^{-6} metre)
cm	Centimetre (10^{-2} metre)
km	Kilometre (10^3 metre)
Ma	Mega annum (10^6 years)
Pa	Pascal

ABBREVIATIONS

DEM	Digital Elevation Model
NDVI	Normalized Difference Vegetation Index
GIS	Geographic Information Systems
REE	Rare Earth Elements
XRD	X-ray powder diffraction
XRF	X-ray fluorescence

LIST OF APPENDICES

Appendix 1: Procedure for sample digestion for ICP OES analysis 100

Appendix 2: Results of ICP OES analysis 101

Appendix 3: XRD diffractograms of rock samples 105

CHAPTER 1: INTRODUCTION

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1.1 Background

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This Geology Research Project thesis submitted in partial fulfilment of the requirements for the degree of Bachelor of Science in Applied Geology at the Department of Geology, Faculty of Science Universiti Malaya. The title of the project is “general geology of the Hulu Kelang area with emphasis on structural geology”.

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1.2 Problem Statement

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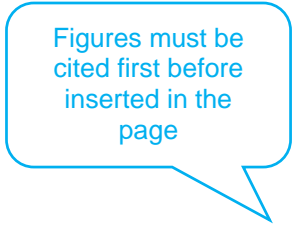
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1.3 Objectives

Following are the objectives for the study:

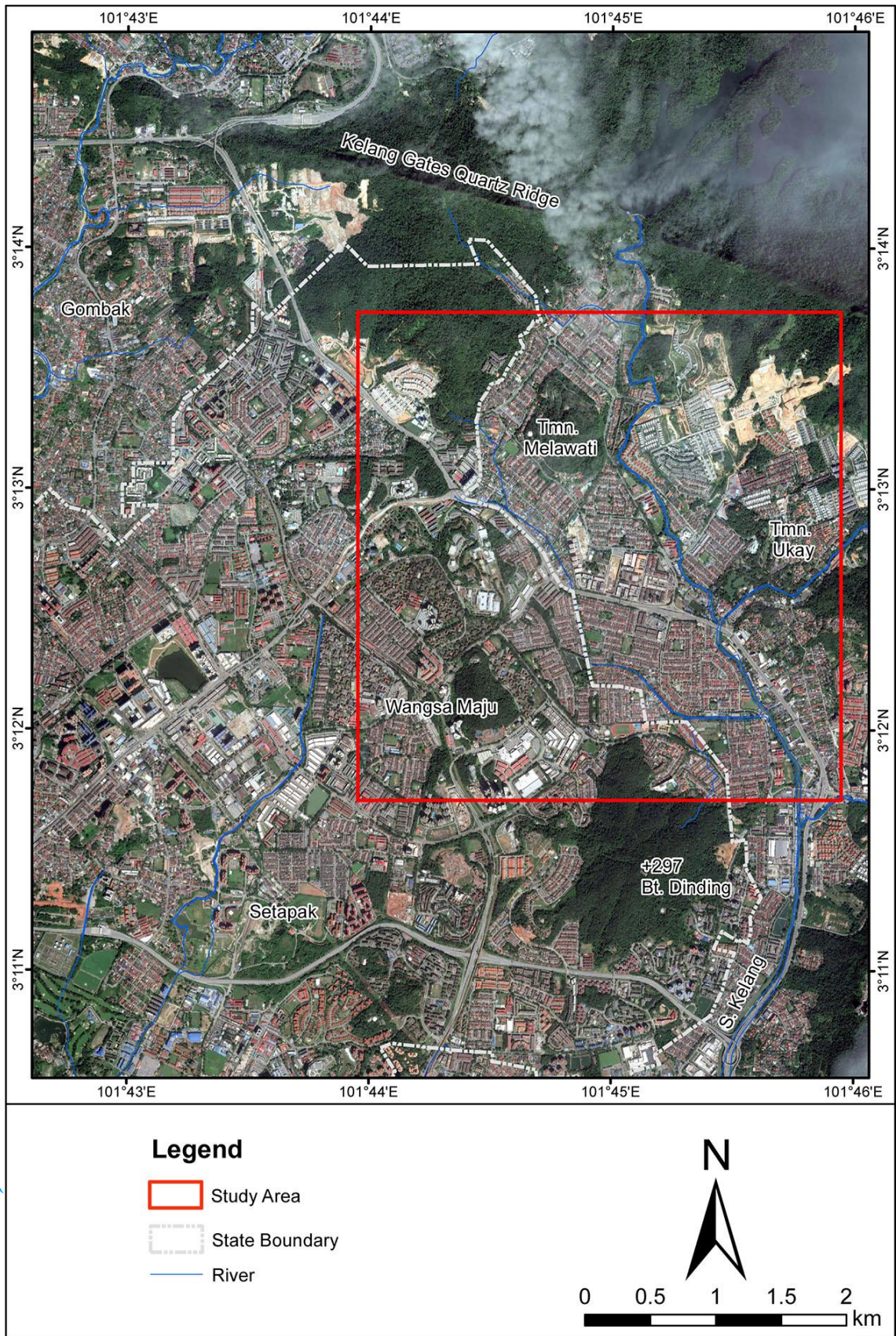
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1.3 Study area

The Hulu Kelang area is located to the immediate east of Kuala Lumpur (**Figure 1.1**). It is bounded by latitude 3°15' to 3°17' and longitude 101°3' to 101°6'. Erat nam at lectus urna dui convallis convallis tellus. Ut faucibus pulvinar elementum integer enim neque volutpat ac tincidunt. Pellentesque dignissim enim sit amet venenatis urna. Vel eros donec ac odio tempor orci. Egestas congue quisque egestas diam. Orci sagittis eu volutpat odio facilisis mauris sit. Nibh venenatis cras sed felis eget velit. Enim neque volutpat ac tincidunt vitae semper. Massa sed elementum tempus egestas sed sed risus pretium. Nibh venenatis cras sed felis. Habitasse platea dictumst quisque sagittis purus. Cras ornare arcu dui vivamus arcu.



Figures and tables must be cited in earlier pages first before appearing

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Figure 1.1: Satellite imagery of northeast Kelang Valley showing the location of the study area in Hulu Kelang (source: Google Earth, 2020).

Caption below the figure. Single line spacing. Justified with a hanging indent of 1.27 cm or 0.5 inch

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CHAPTER 2: LITERATURE REVIEW

2.1 Regional Geology and Tectonics

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For three or more authors, cite the last name of the first author followed by et al.

Tables must be cited first before appearing in the page

1 line spacing

Caption above the table. Centered if one line only.

Table 2.1: Example of a table in Chapter 2.

Heading 1	Heading 2	Heading 3	Heading 4
Text 1a	Text 2a	Text 3a	Text 4a
Text 1b	Text 2b	Text 3b	Text 4b
Text 1c	Text 4c	Text 4c	Text 4c

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¹ ChatGPT has been used to generate the part of the content in Section 2.1.

REFERENCES

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Abdullah, I., Jantan, A., Jasin, B., Samsudin, A. R., and Said, U. (1989). Amount of displacement along the Bok Bak Fault: Estimation by using the lithofacies equivalence, *Warta Geologi*, **14**(5), 255-262

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Syed, S. A. (1996). The extension of the Bok Bak fault in Northwest Peninsular Malaysia : location and implications. *Sains Malaysiana*, **25**(3), 115-130.

Appendix 15: Research Proposal Assessment Form

	<p>JABATAN GEOLOGI UNIVERSITI MALAYA SII3010 GEOLOGY RESEARCH PROJECT RESEARCH PROPOSAL ASSESSMENT FORM</p>
---	--

Name: _____ Matric No.: _____

Project Title: _____

	Criteria	Rating	Weightage	Marks
1	Introduction	5	0.3	1.5
2	Literature review	5	0.4	2
3	Objectives	5	0.3	1.5
4	Methodology and schedule	5	0.4	2
5	References	5	0.2	1
6	Writing skills, mechanical aspects and presentation	5	0.4	2
Total Marks				10

Description	Very Poor	Poor	Moderate	Good	Excellent
Rating	1	2	3	4	5
Please refer to the Research Proposal Evaluation Rubrics for the criteria of rating					


Recommendation and comments: _____

Name of Assessor: _____

Signature: _____

Date: _____

Appendix 16: Initial Viva Assessment Form

	<p>JABATAN GEOLOGI UNIVERSITI MALAYA SII3010 GEOLOGY RESEARCH PROJECT INITIAL VIVA ASSESSMENT FORM</p>
---	--

Name: _____ Matric No.: _____

Project Title: _____

	Criteria	Rating	Weightage	Marks
1	Preparation & eye-contact	5	0.4	2
2	Questions and progress	5	0.6	3
3	Field map and data OR secondary data	5	0.4	2
4	Drafts of Chapters 1, 2 and 3	5	0.6	3
Total Marks				10

Description	Very Poor	Poor	Moderate	Good	Excellent
Rating	1	2	3	4	5
Please refer to the Initial Viva Evaluation Rubrics for the criteria of rating					


Recommendation and comments: _____

Name of Assessor: _____

Signature: _____

Date: _____

Appendix 17: Presentation Assessment Form

	<p>JABATAN GEOLOGI UNIVERSITI MALAYA SII3010 GEOLOGY RESEARCH PROJECT PRESENTATION ASSESSMENT FORM</p>
---	---

Name: _____ Matric No.: _____

Project Title: _____

Criteria	Rating	Weightage	Marks
1 Knowledge of the subject	5	0.6	3
2 Background, objectives and literature review	5	0.8	4
3 Results, discussion and conclusion	5	0.8	4
4 Contents, presentation and graphics	5	0.8	4
5 Preparedness, attitude and professionalism	5	0.4	2
6 Answering and communication skills	5	0.6	3
Total Marks			20

Description	Very Poor	Poor	Moderate	Good	Excellent
Rating	1	2	3	4	5
Please refer to the Presentation Evaluation Rubrics for the criteria of rating					


Recommendation and comments: _____

Name of Assessor: _____

Signature: _____

Date: _____

Appendix 18: Thesis Assessment Form

	<p>JABATAN GEOLOGI UNIVERSITI MALAYA SII3010 GEOLOGY RESEARCH PROJECT THESIS ASSESSMENT FORM</p>
---	---

Name: _____ Matric No.: _____

Project Title: _____

	Criteria	Rating	Weightage	Marks
1	Title and Abstract	5	0.4	2
2	Introduction and Objectives	5	0.8	4
3	Literature review	5	1	5
4	Methodology	5	1.4	7
5	Results, Analysis and Discussion	5	2	10
6	Conclusion	5	1	5
7	References	5	1	5
8	Geological and related maps OR secondary data	5	0.6	3
9	Organization, Contents and Layout	5	0.8	4
10	Writing skills, mechanical aspects and presentation	5	1	5
Total Marks				50

Description	Very Poor	Poor	Moderate	Good	Excellent
Rating	1	2	3	4	5
Please refer to the Thesis Evaluation Rubrics for the criteria of rating					


Recommendation and comments: _____

Name of Assessor: _____

Signature: _____

Date: _____

Appendix 19: Final Viva Assessment Form

	<p>JABATAN GEOLOGI UNIVERSITI MALAYA SII3010 GEOLOGY RESEARCH PROJECT FINAL VIVA ASSESSMENT FORM</p>
---	---

Name: _____ Matric No.: _____

Project Title: _____

	Criteria	Rating	Weightage	Marks
1	Preparation & eye-contact	5	0.2	1
2	Knowledge of the topic	5	1.2	6
3	Response to questions	5	0.4	2
4	Information management and life-long learning	5	0.2	1
Total Marks				10

Description	Very Poor	Poor	Moderate	Good	Excellent
Rating	1	2	3	4	5
Please refer to the Final Viva Evaluation Rubrics for the criteria of rating					

Recommendation and comments: _____

Name of Assessor: _____

Signature: _____

Date: _____


Appendix 20: Research Proposal Evaluation Rubrics



JABATAN GEOLOGI UNIVERSITI MALAYA
SII3010 GEOLOGY RESEARCH PROJECT
RESEARCH PROPOSAL EVALUATION RUBRICS


No	Rating & Criteria	Very Poor (Rating: 1)	Poor (Rating: 2)	Moderate (Rating: 3)	Good (Rating: 4)	Very Good (Rating: 5)
1	Introduction	No background, research topic, study area, problem statement or research question.	Incomplete background, research topic and study area. No problem statement or research question.	The background, research topic and study area are adequate. Problem statement or research questions are not clear.	The background, research topic, study area, problem statement or research questions are adequate described.	The background, research topic, study area and problem statement or research question 5ns are well elaborated.
2	Literature review	Literature review is absent or incomplete with no references	The literature review covers some aspects of the research. The references cited are insufficient or irrelevant.	The literature review covers some aspects of the research. Only some relevant and up-to-date references are cited.	The literature review covers almost all aspects of the research. Most relevant and up-to-date references are cited.	The literature review critically review all aspects of the research with relevant and up-to-date references.
3	Objectives	No or incomplete objectives	The objectives are not clear and may not be achievable	The objectives are fairly clear and probably achievable	The objectives are clear and achievable	The objectives are clear, well defined, significant and achievable
4	Methodology and schedule	There is no method of study and no Gantt chart, flowchart or schedule	The methodology is poorly written and the schedule is poorly planned.	The methodology is somewhat adequate and a Gantt chart is present.	The methodology is adequate and there is a flowchart. The schedule is planned in a Gantt chart.	The method of study is well elaborated and the workflow in the flowchart is clear. The schedule is well planned in a Gantt chart.
5	References	No references	Many references are not cited and not listed. Style used is not consistent	Some references are not cited and not listed. Style used is not consistent	Most references cited are listed. APA style is used.	All references cited are listed. APA style is used consistently.
6	Writing skills, mechanical aspects and presentation	Poorly written with many spelling, grammatical and mechanical mistakes. The contents are incomplete. Poor presentation.	Poorly written with some spelling, grammatical and mechanical mistakes. The contents are mostly complete. Poor presentation.	Proposal is fairly written and has few spelling, grammatical and mechanical mistakes. The contents are complete. Presentation acceptable.	Proposal is well written with very little or no spelling, grammatical and mechanical mistakes. The contents are complete and adequately presented.	Proposal is well written and succinct and checked with no mechanical mistakes. The contents are complete and well presented.

Appendix 21: Initial Viva Evaluation Rubrics

	<p>JABATAN GEOLOGI UNIVERSITI MALAYA SII3010 GEOLOGY RESEARCH PROJECT INITIAL VIVA EVALUATION RUBRICS</p>
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No	Rating & Criteria	Very Poor (Rating: 1)	Poor (Rating: 2)	Moderate (Rating: 3)	Good (Rating: 4)	Very Good (Rating: 5)
1	Preparation & eye-contact	Student is nervous and without any eye contact with the examiner	Student makes some eye contact but looks away most of the time	Student makes frequent eye contacts and at ease with the examiner	Student at ease with the examiner and maintain eye contact most of the time	Student is confident and maintain eye contact most of the time
2	Questions and progress	Student cannot answer questions and shows little or no work done for the research project.	Student is able to answer some simple questions and there is some progress on the research project	Student is able to answer most of questions and the progress of the research project is satisfactory	Student is at ease with the topic and able to answer the questions and the progress of the research project is satisfactory	Student is able to answer clearly with explanation and elaboration, and the research project is progressing as planned.
3	Field map and data OR secondary data	No field map or data OR no secondary data	Field map has little or no information collected from the field, and very little information is recorded in the field notebook OR collection of secondary data is incomplete	Field map has some information from the field and the records in the field notebook are incomplete OR collection of secondary data is complete but no data verification is done.	Field map has sufficient information from the field and the records in the field notebook are adequate OR collection of secondary data is complete and data verification is partially done.	Field map is well annotated with information from the field and the records in the field notebook are clear and described in detail OR collection of secondary data is complete and data verification is complete.
4	Drafts of Chapters 1, 2 and 3	No outlines or drafts of Chapters 1, 2 and 3.	Drafts of Chapters 1, 2 and 3 are incomplete.	Drafts of Chapters 1, 2 and 3 are largely complete but are poorly written and are not in the proper format.	Drafts of Chapters 1, 2 and 3 are complete with relevant references and figures. There are minor errors in grammar and format.	Drafts of Chapters 1, 2 and 3 are complete and well written with relevant references and figures, and properly formatted.

Appendix 22: Presentation Evaluation Rubrics

	<p>JABATAN GEOLOGI UNIVERSITI MALAYA SII3010 GEOLOGY RESEARCH PROJECT PRESENTATION EVALUATION RUBRICS</p>
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No	Rating & Criteria	Very Poor (Rating: 1)	Poor (Rating: 2)	Moderate (Rating: 3)	Good (Rating: 4)	Very Good (Rating: 5)
1	Knowledge of the subject	Student does not have grasp of the topic. Many statements are incorrect and unsupported.	Student has some grasp of the topic. Some statements are incorrect and/or unsupported.	Student is uncomfortable with the topic, leaving out details and presents inaccurate information	Student is at ease with the topic and presents accurate information	Student demonstrates full grasp of the topic presenting complete and accurate information
2	Background, objectives and literature review	Insufficient background and no objectives. Information presented is not from literature and not related to topic.	The background and objectives are not clear. Information presented poorly related to the topic and only few references used.	The background and objectives are fairly clear. Student uses some information from literature related to the topic.	The background and objectives are clear. Student uses available information of the topic from literature and well summarized.	The background and objectives are clear and well defined. Student uses available information from literature and discuss critically the topic..
3	Results, discussion and conclusion	No or very little results. No discussion and/or conclusion	Results incomplete and poorly interpreted. No discussion. Inconsistent conclusion.	Sufficient results but inadequately interpreted. Discussion and conclusion are poorly supported by evidences	Good results and interpretation. Discussion and conclusion are concise and supported by evidences.	Excellent results and interpretation. Discussion and conclusion concise and supported by evidences
4	Contents, presentation and graphics	Presentation has no graphic and slides not legible or distracting and student does not explain the slides properly	Presentation uses graphics but slides not well designed or not clear and student does not explain the slides properly	Slides illustrated with support of graphics but and student does not fully explain the slides properly	Presentation well organized, well supported by illustration but some slides are not explained clearly	Presentation well organized, well supported by illustration and explained clearly in a timely manner
5	Preparedness, attitude and professionalism	Student is poorly prepared for the presentation and nervous and read from the slides without any eye contact	Student makes some eye contacts but read from notes most of the time. Student fails captures the attention of the audience.	Student makes frequent eye contacts but read from notes most of the time, and sometimes captures the attention of the audience.	Student looks at the audience most of the time but frequently reads from notes, and captures the attention of the audience most of the times.	Student is confident and looks at the audience most of the time. Student delivers the presentation professionally and captures the attention of the audience
6	Answering and communication skills	Student cannot answer questions about the presentation or topic	Student is able to answer some simple questions on the presentation or topic but lacks confidence and clarity	Student is able to answer most of questions on the presentation or topic but lacks confidence and clarity	Student is at ease with the topic and able to answer the questions confidently but fails to elaborate	Student is able to answer clearly and confidently with explanation and elaboration

Appendix 23: Thesis Evaluation Rubrics



JABATAN GEOLOGI UNIVERSITI MALAYA
SII3010 GEOLOGY RESEARCH PROJECT
THESIS EVALUATION RUBRICS

No	Rating & Criteria	Very Poor (Rating: 1)	Poor (Rating: 2)	Moderate (Rating: 3)	Good (Rating: 4)	Very Good (Rating: 5)
1	Title and Abstract	Title poorly reflects the content of the thesis. No or incomplete abstract.	Title reflects the content of the thesis but it is too long or has grammatical errors. Several key information such as background, objectives, methodology, results, conclusion and significance is absent in the abstract.	Title reflects the content of the thesis. Most key information including background, objectives, methodology, results, conclusion and significance is summarized in the abstract.	Title reflects the content of the thesis accurately. All key information including background, objectives, methodology, results, conclusion and significance is summarized in the abstract.	Title reflects the content of the thesis accurately and concisely. All key information including background, objectives, methodology, results, conclusion and significance is summarized succinctly in the abstract.
2	Introduction and Objectives	No background, research topic, study area, problem statement or research question. No or poorly written objectives.	Incomplete background, research topic and study area. No problem statement or research question. Objectives are not well defined and only partially related to the research project.	The background, research topic and study area are adequate. Problem statement or research questions are not clear. Objectives are fairly well written and most are related to the research project.	The background, research topic, study area, problem statement or research questions are adequate described. Objectives are fairly well written and related to the research project.	The background, research topic, study area and problem statement or research questions are well elaborated. The objectives are clear and concise, and related to the research carried out.
3	Literature review	Literature review is absent or incomplete with no references	The literature review covers some aspects of the research. The references cited are insufficient or irrelevant.	The literature review covers some aspects of the research. Only some relevant and up-to-date references are cited.	The literature review covers almost all aspects of the research. Most relevant and up-to-date references are cited.	The literature review critically review all aspects of the research with relevant and up-to-date references.
4	Methodology	Fails to provide research methodology or framework, and procedure for sampling and sample preparation, analysis and instrumentation.	Research methodology or framework, and procedure for sampling and sample preparation, analysis and instrumentation are briefly stated, ambiguous and incomplete.	Research methodology or framework, and procedure for sampling and sample preparation, analysis and instrumentation are briefly stated.	Research methodology or framework, and procedure for sampling and sample preparation, analysis and instrumentation are adequately stated.	Research methodology or framework, and procedure for sampling and sample preparation, analysis and instrumentation are described in detail clearly. Quality control measures are in place.
5	Results, Analysis and Discussion	Does not present results of the data	Results are simply stated without any analysis or interpretation. Poor quality	Results are presented objectively and well organized. Quality of data	Results are presented objectively and well organized. Good quality of	Results are presented objectively and well organized. Excellent quality

		collection. No discussion.	of data. No or very poor discussion on the findings.	is acceptable. Analysis, and interpretation are limited to certain results. Discussion on the findings is trivial.	data. All results are analysed and interpreted. Discussion of the findings is adequate.	of data. Rigorous data analysis and interpretation. Findings are critically discussed.
6	Conclusion	Conclusion is not clear and incomplete. Link between the conclusion and results is absent.	Conclusion is often unclear and not succinct. The conclusion only summarises some of the results. Student shows little understanding of the topic of research.	Conclusion is mostly clear, succinct, and complete. Link between the conclusion and results is adequate but the relationship with the objectives is not clear. Student shows adequate understanding of the topic of research.	Conclusion is clear, succinct, and complete. Conclusion is clearly based on the results. The objectives are mostly achieved. Student shows good understanding of the topic of research.	Conclusion is clear, succinct, and complete. Conclusion is clearly based on the results, and all the objectives are achieved. Student shows thorough understanding and the significance of the topic of research.
7	References	No or very few references.	Many references are not cited and not listed. Style used is not consistent.	Some references are not cited and not listed. Style used is not consistent.	Most references cited are listed. APA style is used with minor errors.	All references cited are listed. APA style is used consistently.
8	Geological and related maps OR secondary data	No geological map OR secondary data used is not clearly stated.	Geological map taken from secondary source without modification OR secondary data used is merely stated and/or listed.	Geological map is modified from secondary source without additional field information OR secondary data used is stated and/or listed with simple data verification.	Geological map prepared from field and secondary data and is well presented OR secondary data used is stated and/or listed with adequate data verification or validation.	Geological map prepared from field and secondary data is informative and is well presented OR secondary data has been rigorously verified or validated.
9	Organization, Contents and Layout	Thesis is disorganized and poorly structured, or the flow of information is confusing. The thesis layout does not conform with the suggested format.	Thesis organization is mostly adequate or organization is fairly logical. The flow of information is arranged poorly. The thesis layout does not conform with the suggested format.	Thesis organization is adequate or has a logical organization. The flow of information is acceptable. The thesis layout partly conform with the suggested format.	Thesis is organized, and all required information is presented. The flow of information is good. The thesis layout largely conform with the suggested format.	Thesis is well-organized and structured. All required information is presented. Demonstrates logical sequencing of information. The thesis layout fully conform with the suggested format.
10	Writing skills, mechanical aspects and presentation	Poorly written with many spelling, grammatical and mechanical mistakes. The contents are incomplete. Poor presentation.	Poorly written with some spelling, grammatical and mechanical mistakes. The contents are mostly complete. Poor presentation.	Thesis is fairly written and has few spelling, grammatical and mechanical mistakes. Presentation is acceptable.	Thesis is well written with very little or no spelling, grammatical and mechanical mistakes. The thesis is adequately and clearly presented.	Proposal is well written and succinct and checked with no mechanical mistakes. The thesis is presented clearly, succinctly, and creatively.

Appendix 24: Final Viva Evaluation Rubrics



JABATAN GEOLOGI UNIVERSITI MALAYA
SII3010 GEOLOGY RESEARCH PROJECT
FINAL VIVA EVALUATION RUBRICS

No	Rating & Criteria	Very Poor (Rating: 1)	Poor (Rating: 2)	Moderate (Rating: 3)	Good (Rating: 4)	Very Good (Rating: 5)
1	Preparation & eye-contact	Student is nervous and without any eye contact with the examiner	Student makes some eye contact but looks away most of the time	Student makes frequent eye contacts and at ease with the examiner	Student at ease with the examiner and maintain eye contact most of the time	Student is confident and maintain eye contact most of the time
2	Knowledge of the topic	Demonstrated little or no knowledge of the subject matter. Not able to explain the main points of the topic in the thesis.	Demonstrated some knowledge of the subject matter. The main points of the topic were presented but overall knowledge lacks depth.	Demonstrated basic knowledge of the subject matter. The main points of the topic were presented and overall knowledge fair.	Demonstrated good knowledge of the subject matter. The topic is presented in-depth and with ease.	Demonstrated a comprehensive knowledge of the subject matter. The topic is clearly understood, and information is presented convincingly and effortlessly.
3	Response to questions	Student cannot answer questions about the research.	Student answer questions by referring to the thesis. Does not provide any further information or clarification.	Student answer most of the questions and refers to the thesis occasionally, and provide some additional information upon request though there may be some hesitancy in response.	Student is able to answer all questions and is able to elaborate on information related to the questions most of the time.	Student is able to answer all questions without hesitancy and is able to elaborate on information related to the questions.
4	Information management and life-long learning	Student shows no interest in the project and no skills in managing information obtained during the project.	Student is able to answer some simple questions on the project. Student is able to plan and manage some of the information obtained during the project and not interested in improving knowledge, skills and competences.	Student is able to answer most of questions on the project. Student is able to plan and manage most information obtained during the project and somewhat interested in improving knowledge, skills and competences.	Student is at ease with the topic and able to answer the questions. Student is able to plan and manage information obtained during the project and interested in improving knowledge, skills and competences.	Student is able to answer clearly with explanation and elaboration. Student is able to plan and manage information obtained during the project and shows desire in improving knowledge, skills and competences.