RESEARCH ASSIGNMENT GUIDE

For Undergraduate Thesis

DEPARTMENT OF CHEMISTRY
FACULTY OF SCIENCE AND MATHEMATICS
DIPONEGORO UNIVERSITY
SEMARANG
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FOREWORD

Taking into account the national standards of Indonesian strata 1 education through KKNI level 6 as stated in Presidential Decree no. 8 of 2012, then as one of the stages of implementing the achievement of graduate competencies, the Department of Chemistry designed a Research Assignment course. This course is taken as a compulsory subject for undergraduate students in Chemistry at the Department of Chemistry at the end of the study period. The Research Assignment course is designed in two successive courses, Research Assignment I (TR I) and Research Assignment II (TR II), each of which has a load of 3 credits.

Research Assignment II (TR II) is a follow-up course for Research Assignment I which is inseparable to provide students' abilities through a scientific approach based on concepts and principles of chemistry. Through this approach, students will be able to solve problems accurately and be able to construct new knowledge, communicate and document the results of scientific studies. Research assignments II are flexibly designed to be completed by students without having to complete a 16-week academic semester. Students can even take it in a few weeks while still paying attention to process standards.

To ensure the quality standards of graduates, output standards and process standards for Research Tasks, this Research Assignment Handbook was prepared to serve as a guide for students and supervisors as well as stakeholders in the implementation of research, reporting and process documentation systems at the Chemistry Department, FSM Diponegoro University. As a revised edition of the previous guide, it is hoped that it will be easier to understand. This guide certainly needs to be improved to become more communicative and more perfect.

Compiler

CHAPTER I

PRELIMINARY

I.1 Definition

Research Task/assignment (TR) is a course with a special design and different from other subjects, which is expected to give students the ability (called research assignment students) in contributing to solving scientific problems and in society. TR students begin by identifying problems relevant to chemistry through a scientific approach based on the concepts and principles of chemistry. Students learn how to solve these problems using scientific procedures by formulating problems, preparing research plans (designs), conducting research, observing, processing and analyzing, and communicating research results. Communication of the results is done through written and oral scientific works in the form of theses and seminars. Students are expected to have the basic ability to apply knowledge and a sufficient baseline to continue their studies. Research assignment students in implementing problem-solving designs join one of the research groups or partners inside or outside Undip. The process of carrying out research tasks is realized in two terms to facilitate process monitoring in monitoring and evaluation. The implementation of Research Tasks is divided into Research Assignment I [AKM 210570 (3 credits/VII)] and Research Assignment II [AKM 21580 (3 credits/VIII)].

Students who take the TR I Course are expected to be able to obtain learning outcomes:

No.	Code	Graduate Learning Outcomes
1.	S9	Demonstrate an attitude of being responsible for work in their field of expertise independently
2.	KU1	Able to apply logical, critical, systematic, and innovative thinking, in the context of the development or implementation of science and technology
3.	KU2	Able to demonstrate independent, quality, and measurable performance.
4.	KK1	Able to produce the right conclusions based on the interpretation of the chemical analysis that has been done.
5.	KK2	Able to solve science and technology problems in general and simple chemical fields such as identification, analysis, isolation, transformation, and synthesis of micro-molecules through the application of knowledge of structure, properties, kinetics, and energetics of molecules and chemical systems, with analytical and synthesis methods in the field specific chemistry, as well as the application of relevant technologies.
6.	KK3	Able to analyze several alternative solutions in the field of chemical analysis and surrounding studies and present analysis conclusions for making the right decisions.
7.	PP2	Mastering complete operational knowledge about functions, how to operate research supporting chemical instruments, and data analysis in line with research objectives and hypotheses

Learning Outcomes of TR I (CPMK) Courses: Students are able to rationalize (C4) scientific methods in solving (C4) and evaluate (C5) empirically based problems and can construct (P4) develop/modify (A4) new systems/designs, new methods, or validate (C5) previous methods so that they can accounted for.

Students who take the TR II Course are expected to be able to obtain graduate learning outcomes:

No.	Code	Graduate Learning Outcomes
1.	**S9**	Demonstrate an attitude of being responsible for work in their field of expertise independently
2.	**KU1**	Able to apply logical, critical, systematic, and innovative thinking, in the context of the development or implementation of science and technology
3.	**KU2**	Able to demonstrate independent, quality, and measurable performance.
4.	**KU4**	Able to compile a scientific description of the results of the study in the form of a thesis or final project report and upload it on the college website.
5.	**KU5**	Able to make decisions on a regular basis in the context of solving problems in their area of expertise, based on the results of analysis of information and data
6.	**KU6**	Able to maintain and develop work networks with supervisors, colleagues, colleagues both inside and outside the institution
7.	**KU9**	Able to document, store, secure, and retrieve data to ensure validity and prevent plagiarism
8	**KK1**	Able to produce the right conclusions based on the interpretation of the chemical analysis that has been done.
9	**KK2**	Able to solve science and technology problems in general and simple chemical fields such as identification, analysis, isolation, transformation, and synthesis of micro-molecules through the application of knowledge of structure, properties, kinetics, and energetics of molecules and chemical systems, with analytical and synthesis methods in the field specific chemistry, as well as the application of relevant technologies.
10	**KK3**	Able to analyze several alternative solutions in the field of chemical analysis and surrounding studies and present analysis conclusions for making the right decisions.
11	**PP2**	Mastering complete operational knowledge about functions, how to operate research supporting chemical instruments, and data analysis in line with research objectives and hypotheses

Learning Outcomes of TR I (CPMK) Courses: Students are able reconstruct (P4 and C6) studies and defend (A4) scientific arguments on problems that have been evaluated (C5) and proven (C5) solutions in the field of chemistry and are able to convert (C6) into valid designs in real applications and scientific chemistry.

I.2 Status of Research Assignment (I and II) in Curriculum Structure

In the curriculum structure of the Department of Chemistry, TR is designed to be integrated with the Integrated Chemistry Practicum course (PKT) which is presented in semester VI. This integration is designed to be in the realm of

habituation/conditioning of atmospheric systems researching and improving laboratory engineering skills/competencies.

CHAPTER II

TERMS AND PROCEDURE FOR TAKING RESEARCH TASKS (ASSINGMENT/TR)

II.1 Conditions for taking TR

Students can take TR courses if they meet academic requirements to ensure the smooth process of TR and student studies. Generally, students take TR courses at the beginning of semester VII.

1. **Research Task I (TR I)**
   Taking Research Task/Assignment I can be carried out if students have taken and/have a minimum of 110 credits of lectures, GPA > 2.75, with a maximum D value of 2 courses, have basic laboratory competencies (passed PKT), have TOEFL (SEU) scores or have taken TOEFL (SEU) exam

2. **Research Task II (TR II)**
   Students can take the Research Assignment II course after completing Research Assignment I (passing the TR I course), not having D and E grades, having a TOEFL (SEU) score of at least 400.

II.2 Procedure of TR I

Research Assignment I (TR I) is the first part of the Research Assignment course which provides students with the ability to develop research plans which include literature studies, methodological preparation based on preliminary research studies. The output of the Research Assignment course I is the Research Assignment Report I with contents such as a thesis (CHAPTER I-VI and bibliography) and further research plans. Research Assignment Report I is required to refer to at least the four latest international journals (last 5 years).

Students follow TR I with system procedures (with a summary of the procedures presented in the appendix):

1. Students fill out the TR I registration form by writing down academic data including the Integrated Chemistry Practicum laboratory (which has been taken in the previous semester).
2. Students submit the TR I registration form (attached with complete documents) and a PKT certificate from the PKT supervisor
3. The Department (Research Task Coordinator) groups students based on student PKT laboratories and the available quota in each laboratory (1 lecturer can be a maximum of 1 supervisor for 6 students).

4. The department (research task coordinator) verifies the academic data of students taking Research Assignment Course I
5. The results of the grouping are then submitted to each head of the KBK (Skills Field Group)
6. The chairman of the KBK through the KBK meeting determines the supervisors I and II.
7. The head of the KBK submits a list of supervisors I and II which are then recapitulated and submitted to the department
8. Students fill out IRS (Study Plan Fields) with the Research Assignment I course
9. The Department announces the list of student supervisors for Research Assignment I
10. Students consult with supervisors I and II to carry out Research Task I (research topics are determined by the supervisor based on the research road map of each supervisor)
11. Students prepare outlines and conduct seminars in the laboratory.
12. Students carry out research
13. Students hold TR I development seminars in the laboratory
14. Students prepare a research assignment report I as part of the requirements for graduation from research assignment I
15. The Supervisor submits the assessment form to the TR/Department coordinator

II.3 Procedure TR II

Research Task II (TR II) is the second part of the Research Assignment course. This course gives students the ability at the end of the study period to write research results in thesis format and communicate research results through scientific writing in the form of thesis and orally (seminars and research assignment exams/thesis exams).

Students who take the Research Assignment II course are required to compile a Research Assignment II Report in the form of a Thesis. Research Assignment Report II (Thesis) is required to refer to a minimum of four latest international journals (last 5 years). To assess or evaluate a student's ability to complete TR II, after finishing compiling a thesis, a feasibility seminar (exam) will be held, and a Research Task II exam/thesis exam. TR II students follow the following system procedure (flowchart is presented in the appendix):

1. Students fill out IRS Research Task II
2. Students fill out the Research Task II registration form and complete other required documents.
3. Students submit the TRII registration form and other required documents to the Department's administration section
4. Students carry out/continue research in the laboratory continuing TR I
5. Student prepares research assignment report II
6. Students carry out the thesis feasibility test in the laboratory
7. Students register and take the thesis exam

CHAPTER III

LABORATORY AND SUPERVISOR

III.1 Laboratory Determination

The research laboratories of TR I and II were assigned randomly by taking into account the quota and workload of the lecturers. Briefly, the determination is made in the following order:

1. Students register in the department by filling in the laboratory options according to the PKT
2. Department (cq TR Coordinator) recapitulates registration data TR
3. Department (cq TR Coordinator) establishes laboratories
4. The department forwards the data to the laboratory for appointment of supervisors

III.2 Determination of Supervisor

The research assignment supervisor is determined by the procedure

1. The KBK (laboratory) coordinator facilitates staff meetings.
2. The staff meeting determines the number of guidance students per lecturer based on the real conditions of the current semester.
3. The determination of the supervisor is based on the agreement of the laboratory staff meeting (taking into account the maximum quota of 6 students per lecturer as supervisor I, and 6 students as supervisor II)
4. Supervisor Composition
    a. Supervisor: Supervisor I and II

       If the supervisor is absent, the continuity of the mentoring is regulated by the laboratory or department
    b. Supervisor III (if needed) is determined by the research institution (outside Undip)

III.3 Main Duties and Functions of Supervisor

a. Supervisor Duties I:
    1. Directing student research plans
    2. Provide a review of the student's research plan
    3. Provide technical guidance, oversee the work of TR students
    4. Reviewing drafts of student scientific reports / articles in the realm of research substance and report writing according to the guidelines

5. Strengthen scientific motivation and attitude

b. Supervisor's Task II: Assisting the supervisor's task

CHAPTER IV

RESEARCH PROCESS STANDARD

Research assignments for Chemistry Study Program students must have a depth and breadth of substance coverage that is equivalent to the requirements of the KKNI and the understanding of the Indonesian Chemical Association. In addition, research task research should have a high value of originality in problem solving design. Quotation of Presidential Decree no. 8 of 2012 related to the IQF are as follows:

LEVEL	DESCRIPTION DESCRIPTION
6 (S-1)	Able to apply their field of expertise and utilize science, technology, and/or art in their field in problem solving and able to adapt to the situation at hand.
	Mastering the theoretical concepts of certain fields of knowledge in general and the theoretical concepts of special sections in the field of knowledge in depth, and able to formulate procedural problem solving.
	Able to make the right decisions based on analysis of information and data, and able to provide guidance in choosing various alternative solutions independently and in groups.
	Responsible for own work and can be given responsibility for the achievement of the organization's work.

TR research can be in the form of repetition of previous work. In such a status, the TR document must explicitly state that the research being carried out has the status of verification/validation. Studies that require validation are recommended for statistical testing. Meanwhile, the adequacy of data takes into account the type of research and the depth of study

IV.1 Quality Assurance of Research Assignment Process and Documents

Thesis as a TR II report format and soft skills problem solving in the field of chemistry has been standardized in the quality standards of the Department of Chemistry. To ensure the achievement of graduate quality standards and outputs, during the taking of TR (I and II) students are accompanied by a supervisor and all TR processes are escorted in a quality assurance system in a structured format. This TR process control includes

a. Guidance standards (discussion and frequency of mentoring),

b. Work document system (logbook),
c. outline seminars,
d. Seminar progress report (TR development),
e. Eligibility seminar, and
f. Research assignment exam.

Guidance (TR I and II) Students are conducted on a weekly, bi-weekly, monthly and semester basis. Guidance can be carried out in a laboratory (supervisor accompanies work in the laboratory), consultative, assignment or discussion.

Logbook contains all primary records of research work and consultative notes on a daily, weekly or incidental basis by including the date of activity and known (signed) by the supervisor (i or II).

Outline Seminar is carried out in the second month of taking TR I (September/March). This seminar was conducted at the KBK (laboratory) level and was attended by all TR students in their respective fields, research students in other fields, 2 reviewers and staff from related fields. This mandatory event presents presentations of each research design for socialization and obtaining input for improving the quality of student research. TR students are required to attend every academic seminar event (outline or otherwise). The number of student attendance at the seminar must be greater than 2/3 the number of research students in the field.

Progress seminar (progress report) analogous to the outline seminar but differs in the availability of provisional data that have been obtained and discussed.

Eligibility exams/seminars refer to the following procedure.

1. The head of KBK appoints 2 reviewers
2. The head of the KBK sets the date of the eligibility test
3. The eligibility test must be attended by a supervisor, 2 reviewers and TR students in the laboratory (must meet the minimum number of attending a feasibility seminar)
4. The eligibility exam session lasts for a minimum of (10 + 2 x 10 + 5) minutes.
5. Supervisors and reviewers measure the adequacy of research data, the breadth and depth of coverage, confirm the suitability of the draft with environmental regulations, and assess students' basic abilities in the field of general chemistry and chemistry related to research substances and write in the assessment form
6. Criteria for data adequacy, breadth and depth of coverage must refer to the standard understanding of at least level 6 KKNI and HKI

The feasibility exam forum makes conclusions that are feasible or not feasible on the draft and students to advance on the research assignment exam (thesis)

Thesis Exam. Examination of research assignments is a scientific event verification and validation of student research assignments held as a student graduation session. The TR exam is conducted in private, attended by supervisors and examiners with activity reporting conducted openly/online. Research assignment

exams can be conducted offline or online with the same document and assessment standards, except in the case of media. Offline exams/examinations are conducted in the department's courtroom, and online are conducted on the media*Microsoft Teams* menus [*Meeting*]. The online research assignment exams are governed by separate guidelines that are inseparable from this guide.The assessment rubric includes writing, presentation, and scientific understanding skills, understanding for thesis and related knowledge. Students can be declared to have passed the exam if they have met the minimum standards. Students' graduation status is determined through graduation after passing all courses, submitting reports (thesis), and compiling drafts of research articles. Determination of post-examination graduation is carried out by the examiner team. In the online session, the determination of student graduation is carried out online at the university's SIAP which can be accessed by stakeholders and for the benefit of the university's judiciary.

CHAPTER V

THESIS WRITING GUIDANCE

V.1 Research Outline

Research outline consists of the beginning, the main part and the end. Outline manuscript is typed/printed 2-3 pages (excluding cover and validation page) with 1.5 spacing pattern and Times New Roman font, on A4 size paper, 80 g/m2.

V.1.1 Initial Part

The initial section of the outline includes a title page and an endorsement page.

V.1.1.1 Title Page

The title page contains: Title, University logo, student name and number, agency name, time of submission.

a. **Research Title** made briefly, clearly and correctly shows the problem to be studied and does not open up opportunities for various interpretations and is not more than 20 words.
b. **Diponegoro University Logo** (black) with a height of 4.71 cm and a width of 4.04 cm, (as presented below).

c. **Name** and Student Identification Number (NIM) is written in full, not abbreviated.
d. **Agency name** is the Department of Chemistry, Faculty of Science and Mathematics, Diponegoro University, Semarang.
e. **Application time** indicated by writing the month and year (under the word "Semarang")

(Layout and format of the outline title page can be found in appendix 3)

V.1.1.2 Authentication Page

This page contains the approval of Supervisor I and Supervisor II complete with signature and date of approval. The layout and format of the outline approval page is in appendix 4.

V.1.2 Main Section

The main part of the research outline contains: introduction, problem formulation, research objectives, research benefits, literature review, research methods, research schedule and estimated research costs. The research outline must refer to (adapt / cite) at least 4 international journals in the last 5 years.

1. Introduction

The introduction contains the background and status or authenticity of the research.

a. **Background** contains an explanation of the reasons both theoretical and empirical behind that the problems raised in the research proposal are considered interesting, important and need to be researched.
b. **Research status or authenticity**put forward by showing that the research is categorized as verification (repeating previous research to validate) or new. If the problem faced has never been solved by previous researchers, it must be stated clearly that the proposed design (research) differs from previous research.

2. Problem Formulation

Describe the formulation of the problem to be studied using a logical approach or theoretical concept to answer the problem to be studied, the hypothesis or conjecture to be proven.

3. Research Objectives

In this section, the specific (measurable) goals to be achieved are written. The purpose of research is not the same as that of research or rewriting experimental work.

4. Research Method

The research method includes a description of: materials, tools, research paths, variables and data to be collected and analysis of the results.

a. Materials and tools used for research are clearly stated and mention their respective specifications.
b. The research path contains a (quite) detailed description of how to carry out research and collect data.
c. The variables to be studied and the data to be collected are clearly described.
d. The analysis of the results includes a description of the model and how to analyze the results.

5. Bibliography

The bibliography only contains the literature referred to in the research outline and is arranged in alphabetical order by the last name of the first author. Books and magazines/journals are not distinguished, except in writing to the right, namely:

a. **Book**: author's name, year of publication, book title, volume, issue to, page number referred to, name of publisher and city of publisher.
b. **Magazine/journal**: author's name, year of publication, title of article, name of magazine/journal with official abbreviations, volume and number of publications and pages referred to. (An example of writing a bibliography is in the appendix)

2. Attachment

In the appendix there is a description or information needed on the implementation of the research, work diagrams, etc. required. The appendix also contains the TR flow chart (TR Research Roadmap) and the justification for TR I and TR II work limits.

V.II Research Task Reports I and II

The research report of Research Task I and Research Task II (thesis) consists of: the beginning, the main part and the end with a broader content.

V.II.1 Initial Part

The initial section includes the front cover page, title page and endorsement page, foreword (preface), table of contents, list of tables, list of figures, list of attachments and summary.

1. Front Cover Page

The front cover page contains: the title of the thesis, the logo of Diponegoro University, the name and number of the student, the name of the institution and the year of completion of the thesis.

a. **thesis title** made as short as possible, as described in the research proposal.
b. **Diponegoro University Logo** with a size (height x width) 4.71 x 4.04 cm.
c. **Name** and Student Number is written in full, not abbreviated. The number is listed below the name.
d. **Agency name** is the Department of Chemistry, Faculty of Science and Mathematics, Diponegoro University, Semarang.
e. **Year of completion of thesis**is the year of the undergraduate examination and is placed under Semarang. (the layout and format of the title page is presented in the appendix)

2. Title Page

The title page contains the same text as the front cover page, but is typed on white paper.

3. Authentication Page

This page contains the endorsement of Supervisor I, Supervisor II (and supervisor III, IF ANY) as well as the signature and date of approval of the Head of Department (an example of the approval page is in the appendix).

4. Preface

The preface contains a description of the purpose of completing the thesis writing and thanks to the parties directly involved in the completion of the thesis and student studies. In the preface there is no explanation of things that are scientific in nature but the language used is the official language (formal).

5. Table of Contents

The table of contents is intended to provide a comprehensive picture of the contents of the thesis, as a guide to the position of the page for readers who want to go directly to/view/read a particular chapter or sub-chapter. The table of contents lists the order of title, subheading and subheading accompanied by their respective page numbers.

6. Tables

If there are many tables in the thesis, it is necessary to have a list of tables containing the order of table titles along with page numbers.

7. List of Images

The image list contains image titles and page numbers.

8. List of Attachments

Analogous to a list of tables and a list of figures, a list of attachments is made if the thesis is equipped with many attachments, the contents of the list are the order, the title of the attachment, and the page number.

9. Summary

The summary is written in 2 languages, namely Indonesian and English. The summary contains a brief but complete description of the background, research objectives, research methods and results. The summary consists of 3 paragraphs, the first paragraph contains the background and objectives of the research, the second paragraph contains the methodology and the third paragraph contains the results and conclusions. The summary should be no more than 1 page long.

B. Main Section

The main part of the thesis contains chapters: introduction, literature review, research methods, results and discussion, as well as conclusions and suggestions.

1. Introduction

The introduction contains: background, originality and research objectives.

a. **Background**almost the same as in the research outline and may have been expanded. Therefore, in the background of the thesis there is also the originality of the research, the formulation of the problem and the expected benefits.
b. **Research purposes** also the same as those presented in the research outline.

2. Literature Review

The literature review contains the main supporting theories in problem solving and additional information collected during conducting the research. The description in the literature review is directed to develop a framework or concept that will be used in research.

3. Research Method

In the research method or method there is a detailed description of: materials, tools, and working methods.

a. **material** The specifications used must be stated in full for each, such as the origin of the material, physical properties, and chemical formula of the material. This needs to be done as a completeness of the study specifications and so that other researchers who will refer do not take wrong steps or misinterpret.
b. **Tool** used to carry out the research, the type, brand, and if necessary, with pictures.
c. **Procedure** which contains a fairly detailed description of how to conduct research and collect data.

4. Results and Discussion

This chapter contains the results of research and discussion in an integrated manner or not divided into its own subtitles.

a. **Research result** presented in the form of lists, graphs, photos or other forms and placed in the discussion so that it is easier for readers to follow the description.
b. **Discussion**about the results obtained in the form of theoretical explanations, either qualitatively, quantitatively or statistically. In addition, the results of the study can also be compared with similar previous results.

5. Conclusion

Conclusions and suggestions should be stated separately.

a. **Conclusion** is a short and precise statement that is described from the results of research and discussion.
b. **Suggestion** Based on the experience and considerations of the author, it is addressed to researchers in similar fields who wish to continue or develop research that has been completed.

C. Final Part

The final section includes bibliography and appendices

1. Bibliography

The bibliography is arranged as in the research outline.

2. Attachment

Attachments are used to place data or other information that serves to complete the description that has been presented in the main part of the thesis. In the TR I report, the appendix also contains the TR flow scheme (TR Research Roadmap) and justification for TR I and TR II work limits.

V.II.2. PROCEDURE FOR WRITING RESEARCH ASSIGNMENT REPORT I AND II

Writing procedures include: Materials and sizes, typing, numbering, list of pictures, language and writing names.

A. Material and Size

Materials and sizes include: manuscript, cover, cover color, writing on the cover and size.

1. Manuscript

Manuscripts are written and printed on HVS A4 (21 cm x 29.7) 80 g/m2 paper and are not double-sided.

2. Cover

Cover made of buffalo paper or the like and covered with plastic (soft cover). The text printed on the cover is the same as that on the title page as per the layout and format in attachment 5.

3. Cover Color

Chemistry Department student thesis cover color is gray **young** (as the color in the following box).

4. Size

The size of the manuscript is: 21.0 cm x 29.7 cm.

B. Typing

In typing, set the typeface, numbers and units, line spacing, border, space filling, new paragraphs, sentence beginnings, titles and subtitles, downward detailing and symmetrical layout.

1. Font

a. Manuscripts are typed in Times New Roman font size 12, for all manuscripts the same typeface must be used. Italics or square letters are not permitted.
b. Italics are only used for foreign terms.

2. Notation, Numbers and Units

a. The notation used in the formula/equation is italicized as in international scientific agreement, for example the magnitude of the force is denoted as F written as F (italics), absorbance is denoted as A instead of A, transmittance as T instead of T, diffusion coefficient as D instead of D, etc.
b. Numbers are typed with numbers, except at the beginning of sentences, for example 10 g of material is written as ten grams of material.
c. Decimal numbers are marked with a comma instead of a period, for example the mass of NaCl is 50.5 g instead of 50.5 g except in the summary.
d. Units are expressed by official abbreviations without dots, for example m, g, kg, cal, L, mL.

3. Line Spacing

The distance between 2 lines is set in 2 spaces except for summaries, titles, names of lists (tables) and pictures that are more than 1 line and the bibliography is typed with a space of 1.

4. Border

Typing limits measured from the edge of the paper are as follows:

a. Top edge : 4 cm
b. Bottom edge : 3 cm
c. Left side : 4 cm
d. Right edge : 3 cm

5. Space Filling

The space contained in the manuscript page must be filled in completely, meaning that typing must be from the left edge to the right edge and no space is wasted, unless you are going to start with a new paragraph, equation, list (table), picture, subtitle or other thing. -special thing.

6. New Paragraph

The new paragraph starts at a distance of 1.24 cm from the left border (not 6 characters or 6 beats).

7. Sentence Beginning

Numbers, symbols or chemical formulas that start a sentence must be spelled, for example: 10 g of NaOH is written ten grams of sodium hydroxide.

8. Title, Subtitle, Sub-Subtitle and so on

a. **Title** must be written in capital letters and arranged symmetrically, with a distance of 4 cm from the top edge without ending with a dot.
b. **Subtitle** written starting with the left margin, all words starting with a capital letter, except for conjunctions and prepositions, without ending with a period. The first sentence after the subtitle begins with a new paragraph.
c. **Subtitled Child** written starting with the left margin, all words starting with a capital letter, except for conjunctions and prepositions, without ending with a period. The first sentence after the sub-heading begins with a new paragraph.
d. **Subtitles** written starting at a distance of 1.24 cm from the left edge of the margin. The first sentence after the sub-heading begins with a new paragraph. (Examples of writing titles, subtitles, sub-headings, etc. are presented in appendix 7)

9. Details down

If in the writing of the manuscript there are details that must be arranged downwards, use a numbering system in sequence with numbers or letters according to the degree of detail. The use of hyphens (-) or other marks (item marks) placed in front of the details is not permitted.

10. Symmetrical Layout

Figures, tables (lists), equations, titles are written symmetrically to the left and right edges of typing (margins).

C. Numbering

This section is divided into page numbering, tables (lists), figures and equations.

1. Page

a. The first part of the report, from the title page to the summary, is numbered with small Roman numerals at the bottom of the page.
b. The main and final sections, from chapter I to the last page, use Arabic numerals (1, 2, 3...) as page numbers.
c. Page numbers are placed at the top right unless there is a title or chapter at the top of the page. For such pages the number is written in the bottom-middle.
d. Page numbers are typed at a distance of 3 cm from the right edge and 1.5 cm from the top-right edge or bottom-center edge

2. Table (List)

Tables (lists) are numbered sequentially with Arabic numerals after Roman numerals indicating the location of the table in a particular chapter (I.1, I.2, I.3, etc.). The word "Table I.1 (as an example)" is printed in bold, by writing Table I.1: ..... (write the title of the table).

3. Pictures

Figures are presented with a numbering system of Arabic numerals after the Roman numerals that indicate the chapter, for example Figure IV.1, IV.2, and so on.

4. Equation

The serial number of equations in the form of mathematical formulas, chemical reactions and others is written with Arabic numerals in brackets and near the right edge.

D. Tables (Lists and Figures)

1. Table (List)

a. The table number (list) followed by the title is placed symmetrically above the table (list) without ending with a period. If the title is more than 1 line, then the second line and so on are written starting just below the title name.

   Example:

   Table I.1: Textile and batik industry wastewater quality standards based on Regional Regulation of Central Java Province no. 10 year 2004

   (Note the symmetrical position of the table title to the margins, the beginning of the second line and the end of the title that does not end with a period)
b. Tables (lists) should not be cut off unless the table is long so it is impossible to write on one page. On the advanced page of the table (list), the number (list) and the word "**continued"**, without the table title are listed.

c. The table columns are named and kept so that the separation between one another is quite clear.
d. If the table (list) is wider than the width of the paper, so it must be made elongated, the top of the table must be placed to the left of the paper.
e. Above or below the table (list) a boundary line is attached, so that it is separated from the main description of the thesis.
f. The table (list) is typed symmetrically with respect to the margins.
g. Tables (lists) that are more than 2 pages or must be folded are placed in the appendix.

2. Pictures

a. Charts, schematics, graphs, maps, photographs, and drawings of molecular structures are called drawings (undifferentiated).
b. The image number indicates the order and location of the images in the thesis, followed by the title/name of the image placed symmetrically below the image (list), without ending with a period.

   Example:

   Figure IV.1 The curve of the relationship between changes in the conductivity against the concentration of the electrolyte solution

c. Images cannot be cropped and split in two pages
d. Image captions are written in the vacant places in the image and not on other pages.
e. The image size (width and height) is set to fit the space reasonably.
f. The scale on the graph must be made so that it is easy to use for interpolation or extrapolation.
g. The location of the image and the number and name of the image are set symmetrically to the margins (except the second line and so on, the name/title of the image, see the example above).

E. Language

1. The language used

The main language used is standard Indonesian (there are subjects, predicates, and to make it more perfect, objects and descriptions are added). Thesis in English is also welcomed.

2. Sentence Form

Sentences may not display the first person and the second person (I, I, we, we, you and others), but are made as passive sentences and/or not imperative sentences. In the introduction or thanks, the word I is replaced with the author.

3. Terms

a. The terms used are Indonesian terms or those that have been Indonesianized.
b. If forced to use foreign terms, it is written in italics.

4. Common mistakes

a. Connecting words, such as so and while, should not be used to start a sentence.
b. The preposition, for example: at, is often used inappropriately, placed in front of the subject (this spoils the sentence structure).
c. The words where, which, and others that are similar and from are often inappropriate in use to replace the function of words in English such as where and of. In Indonesian this form is not standard and should not be used. Use another word that is more appropriate.
d. The prefixes "ke- and di-" must be distinguished from the prepositions "ke and di"
e. Other punctuation marks and other writing methods must be used appropriately as stipulated in the General Guidelines for Enhanced Indonesian Spelling (EYD).

F. Writing Name

Writing the name of the author referred to in the description, bibliography, name with more than one word, name followed by abbreviation and degree of scholarship.

1. The name of the author who referred to in the description

The author referred to in the description is only mentioned by the last name, and if there are more than 2 authors, only the last name of the first author is listed followed by et al. , consider the following example

a. According to Calvin (1978).....
b. Gasoline can be made from methanol (Meisel et al., 1976) ...

Example (b) is a quote from a journal written by 4 people, namely Meisel, S.L., McCullough, J.P., Leckthaler, C.H., and Weisz, P.B.

2. Author's Name in Bibliography

In the bibliography, all authors must be listed (not only the first author is added et al.).

Example:

Meisel, S.L., McCulllough, J.P., Leckthaler, C.H., and Weisz, P.B., 1976, ...(followed by paper title),.....

Not only: Meisel, S.L. et al., 1976,.....

3. The author's name is more than one word or more

Writing method: last name followed by a comma, first name abbreviation, middle name and so on, all of which are given a period.

Example:

a. Donald Fitzgerald Other written: Other, D.F.
b. Keith J. Laidler written: Laidler, K.J.

4. Name followed by abbreviation

It is considered that the abbreviation becomes one with the syllable that is in front of it.

Example:

a. Williams DR written: Williams, D.R.

5. Bachelor degree

Bachelor degrees may not be listed.

CHAPTER VI

STANDARDS OF ASSESSMENT AND EXAMINATION

VI.1 Assessment Standards

a. Evaluation Seminar Outline and Progress

1. The evaluation of the outline/development seminar was carried out by 2 reviewers.
2. The assessment includes aspects of presentation, substance, methodology
3. The evaluation of the outline/development seminar follows the assessment grid and indicators with a certain weight
4. The appraiser signs the form and minutes of the seminar outline/development
5. The assessment form is compiled by the supervisor and the cc is submitted to the TR Coordinator
6. The weight of the outline/development seminar score is 5% TR I . value

b. TR I Assessment

Research Assignment Assessment conducted by supervisor I, supervisor II, and reviewers I and II. Assessment components include outlines, proposal/outline seminars, research implementation (preparation of tools, materials, and preparations), data collection, interpretation of data analysis funds, report drafts, development seminars and TR I report documents.

c. TR II Assessment

Research Task Assessment II Penilaian conducted by supervisor I, supervisor II, and examiners I, II, and III. The components of the Research Task II assessment include thesis documents (language, format and substance), Presentation (communication design of ideas, scientific language and attitudes), discussion (Mastery of material, analytical skills, supporting mastery)

VI.I TR Examination Procedure

TR students can take/register for the TR exam if they have completed all mandatory courses with a minimum number of 141 credits with a GPA > 2.00 (paragraph 5 article 32 Perak 2017), without D and E grades. Students already have a certificate of eligibility for a thesis draft list (issued by the Chairman of the KBK), submit a thesis draft signed by the supervisor in a yellow stopmap (3 + number of supervisors + 1), submit a collection of academic scores (signed by the student and

guardian lecturer), submit a free letter of receipt of tools and materials from all laboratories in Department of Chemistry (and other institutions if using facilities at the institution, submit a copy of TOEFL certificate of at least 400 (SEU)

The TR Coordinator receives the TR examination registrant data. The TR Coordinator drafts the TR examination examiners by considering: Feasibility examination reviewers, staff expertise, distribution of TR testing burdens in the graduation period and annually (on the test distribution matrix). Next, the TR coordinator proposes the day and date of the session as well as the examiner for the TR session to the head of study program/head of department at the earliest H+1 registration, before D-8 TR session and ends with the issuance of a test assignment letter (invitation to test) by the head of the department.

VI.2 Examination Standards

Examiner and Presence. Examiners consist of 3 lecturers (1 person is prioritized from related fields and reviewers). The examination is led by the chairman of the session (deputy department). For the continuation of the examination, the examiner must be present. If the supervisor I is unable to give a mandate to the supervisor II. Examiners who have been assigned with a letter of assignment/invitation to test are NOT ALLOWED to refuse/not willing to test without reason. Refusal/unwillingness to test can be accepted if the staff is carrying out other official duties as determined by a letter of assignment from the head of the department/secretary or higher officials, other mandatory academic and institutional reasons (research/devotion), other compelling interests, or due to an accident (self/family). Unwillingness to test must be submitted to the department or TR coordinator a maximum of H-3 (before) the TR session.

Exam Schedule. The TR session is allocated on working days Thursday throughout the semester, (unless incidentally in conjunction with other mandatory agendas). The TR session MAY be scheduled on another day, during the lecture break period.

dress code. Examiners wear civilian clothes (tie) / batik / adjust, and students dress in black and white with ties, female students adjust (and wear long skirts).

Exam Protocol. The exam starts as scheduled, with a tolerance of 15 minutes, unless there is confirmation. The chairman of the session/deputy department is the head of the department/secretary or assigned staff. Session Formation:

1. Session Formation: principle of the examination committee: head of department/secretary (*ex officio*) or other assigned staff, Session secretary: supervisor II, Examiner: examiner 1, examiner 2, examiner 3
2. Terms and Conditions:
    a. Supervisor I in the examination does not test, but asked confirmatory (allowed), delivered a preview and direction
    b. Process Sequence: Examiner 1, followed by Examiner 2, and Examiner 3

c. Supervisor II submits the session resume and documents the event
d. Closed meeting session, the examiner discusses PASS/FAIL with the value category set first, then the examiner writes the score
e. After passing the examination, the student revises the draft and completes the entire process max. 1 month
f. If within 1 month the student does not complete the process, then the result of the examination is CANCELED and the student is obliged to repeat the examination
g. If the meeting decides that the student DOES NOT PASS: SCHEDULE The repair/re-examination session is agreed internally and the examiner communicates the agreement to the departmental secretariat for further documentation of the process

VI.3 Poster Seminar

The increase in the academic atmosphere of the Department of Chemistry related to TR is the dissemination of information on student research results through poster seminars. This seminar is organized by the student association under the responsibility of the department. Students obtain a certificate of having carried out a poster seminar, to complete the requirements for obtaining a Graduate Certificate.

CHAPTER VII

ADDITIONAL RULES

1. The exam process is documented in the minutes of the exam by the study program/department
2. Minutes of the assessment become departmental documents, supervisors, examiners and faculty academic documents
3. The exam process must be finalized within a maximum of 1 month
4. The final documents of the student TR report are thesis, thesis CD, formal journal articles, publication posters.
5. Posters are published at poster seminar sessions organized by the department and HMK
6. Other documents submitted to the department and supervisor

VII.2 Intelectual Property Rights (IPR)

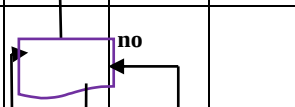
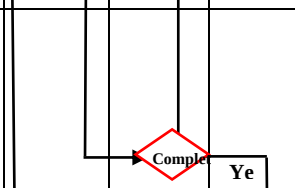
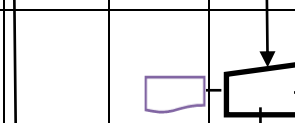
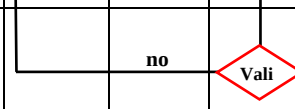
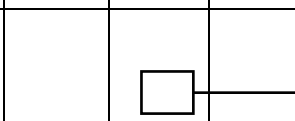
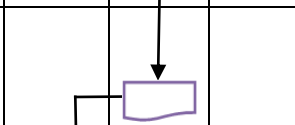
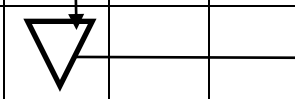
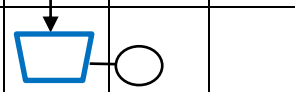
On the mentoring process, then the supervising lecturer is entitled to the IPR of the student's thesis publication work, if:

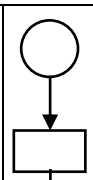
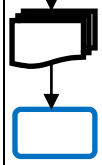
1. Themes, problems and main ideas of problem solving and design are the property of the supervisor
2. **Funding** is borne by the supervisor
3. Analysis of research data and writing of research reports are the result of intensive discussions between students and supervisors

The above roles are outlined in a quantitative justification table. Therefore, on this IPR, the supervisor has the right to publish the results of the research while still including the name of the student as the second author. For this condition, the thesis must provide a special page for the acknowledgment of intellectual property rights.

Attachment

Appendix 1: Research Task Flowchart I

No	Activities	Involved Parties						Wak that	Document
		Mhs	Dept.	chord. TR	KBK	Pemb. Academic	Pemb. TR		
1	TR system socialization							June (Week I)	
2	Students fill out the TR I . form							June	Form TR I, Academic Transcript, Recommendation Letter from Pembb. CCP
3	The student returns the registration documents to the department							June (III)-July (III)	Form TR I, Transcript of grades (up to smt 5), Recommendation Letter from Pembb. CCP
4	The Department (Coord. TR) groups students according to their lab. CCP							July (III)	TR I student data (per laboratory)
5	chord. TR performs data verification							July (IV)-Aug. (I)	Online transcript
6	The department submits the grouping results to the head of the laboratory							Early Aug.	Register students TR I
7	The head of the KBK determines the supervisor I and II							Early Aug.	
8	The head of the KBK submits a list of supervisors I and II TR I t							Early Aug.	List of pembb. I and II
9	Announcement of supervisors I and II TR I							Early Aug.	Government Announcement. I and II
10	Students consult with supervisors I and II							Second Sunday of Aug.	*Draft* outline
11	Students take part in a research outline seminar in the laboratory							September	

12	Students carry out development seminars (progress report)							December	outlines, TRI laps TRI value (from pemb I and II)
13	Students submit research outlines and research assignment reports I to the department							December	outlines, TRI laps TRI value (from pemb I and II)

Appendix 2: TR II Process Flow

No.	Activities	Involved Parties						Wak Tu	Doku Men
		Mhs	Dept.	chor d. TR	La bs.	Super visor	Pemb b Akad.		
1	Students fill out IRS Research Task II							Semester VII	KRS, KHS, Form TR II
2	Students fill out the research assignment registration form II and complete other required documents.							1 week	a. Research Task II Registration Form b. FC IRS c. Work Permit in the Lab.
3	Students submit the TR II registration form and other required documents							According to department schedule	Form TR II
4	Students doing research in the laboratory							3 months	Work Permit in the Laboratory Logbook
5	Student prepares research assignment report II							1 month	Thesis Draft
6	Research Assignment II Feasibility Examination Seminar in the laboratory	Not Gradu						According to the lab schedule.	Research Assignment Exam Eligibility Form
7	Research Assignment Examination II [Thesis]	YES Done						According to department schedule	

Appendix 3: Layout and format of research outline title page

.....TITLE OF RESEARCH(space 1) .....
....
.....(3 lines)

RESEARCH OUTLINE

Submitted by:
.....
NIM 240301xxxxxxxxx

Department of Chemistry
Faculty of Science and Mathematics
Diponegoro University
Month, year

Appendix 4: Layout and format of outline approval page (space 1)

RESEARCH OUTLINE APPROVAL

1. a. Research Title :.....
   .....
   .....
   b. Knowledge field : .....

2. Researcher
   a. Full name : .....
   b. Gender : .....
   c. NIM : .....
   d. Faculty/Department : FSM/CHEMISTRY

3. Research Location : Laboratory …….
4. When Research Outside the Department of Chemistry
   a. Institution Name : .....
   b. Address : .....
5. Research Length : .....
6. Seminar Date : .....

Semarang, ...

Agree

Supervisor I,	Supervisor II,
.....	.....
NIP	NIP

Knowing,

TR Coordinator,	Chairperson of KBK
.....	.....
NIP	NIP

Appendix 5: *Layout* and format of the title page of Research Assignment I

.....TITLE OF RESEARCH(space 1) .....
....
.....(3 lines)

RESEARCH TASK I REPORT

by:
.....
NIM 240301xxxxxxxxx

Department of Chemistry
Faculty of Science and Mathematics
Diponegoro University
Year

Appendix 6: *Layout* and the format of the ratification page of the Research Assignment Report I (space 1)

APPROVAL
Research Assignment I Report

Research Title : ....
..... ……
.... (space 1)

Name : .....
NIM : 240301xxxxxxxxx

It has been approved and deserves to be continued on Research Task II.

Semarang, ...

Agreed,
TR Coordinator,

Supervisor,

Didik Setiyo Widodo, S.Si., M.Si.
NIP 19700521 199903 1 001

Xxxxxxx Xxxxxxxxxxxxxx
NIP

(Note:
If the research task supervisor is 2 supervisors I on the left, supervisor II on the right and the TR Coord is at the bottom, middle)

Appendix 7: Layout and format of the title page of Research Task II/Thesis (space 1)

.....THESIS TITLE..... .....
....
.....

THESIS

Arranged to fulfill one of the requirements
to reach a bachelor's degree

by:
.....
NIM 240301xxxxxx

Department of Chemistry
Faculty of Science and Mathematics
Diponegoro University
Year

Appendix 8: *Layout* and the format of the Research Assignment Report II/thesis validation page (space 1)

APPROVAL PAGE

Thesis Title : .....
.....
.... (space 1)

Name : .....
NIM : 240301xxxxxxxxxx

Has been examined and declared to have passed the undergraduate examination on .....

Semarang, ...

Head of the Department of Chemistry,

Dr. Dwi Hudiyanti, M.Sc.
NIP 19650622 198903 2 001

Supervisor,

Xxxxxxx Xxxxxxxxxxxxxx
NIP

(Note:
1. If there is a second supervisor, then the supervisor I on the left, supervisor II on the right, and the head of the department below, symmetrical)
2. In the thesis draft, to register for the feasibility seminar, the statement "Has been examined and declared to have passed the undergraduate examination on ..... is replaced with "Approved for advancement in the eligibility seminar"
3. **In the script draft,** to register for the Research Assignment exam, the statement "Has been tested and declared to have passed the undergraduate examination dated ..... adjusted to "Approved and eligible to be submitted to the Research Assignment examination

Appendix 9: Example of how to refer library resources

The appointment of library sources in the description can be done as follows:

1. Author's name at the beginning of the sentence

Skoog (1985) mentions that quantitative measurements of certain metal ions are carried out at specific wavelengths called resonance lines, λ.

2. Author's name in the middle of the sentence

Determination of boron, as l ii cid, as has been done by Dyrssen et al. (1972) by complexing boron with curcumin in sulfuric acid-acetic acid medium.

3. Author's name at the end of the sentence

The use of an autoclave sterilizer can have a good or bad effect on growth, depending on the sugar used in the medium (Supraptopo, 1979).

4. References with 2 authors

If there are 2 authors, both must be mentioned.

Evans and Woodbury (2005) have carried out the reduction of the group β-diketone electrochemically in 50% water-ethanol medium yields a pinakol dimer compound.

5. References with more than 2 authors

If there are more than 2 authors, only the last name of the first author is listed, followed by et al.

According to Couper et al. (1990) the electrosynthetic process hasgood selectivity and performance, and is influenced by several parameters, including electrode potential, concentration of electroactive species, acidity and electrode material.

6. Refers to more than 2 consecutive references

a. If the author's name is included in the text, all sources are mentioned:

   According to Maki (1985), Yoshida et al. (1992), Okafor (1981), and Shintani et al. (1991) structural studiesβ-Diketone is done for complexation purposes in chemical analysis and further reaction studies.

b. If the author is not included in the description, then a semicolon is placed between the sources:

   Structure study β-diketone is used for complexation purposes in chemical analysis and further reaction studies (Maki, 1985); (Yoshida et al., 1992); (Okafor, 1981); and (Shintani et al., 1991).

Appendix 10: Example bibliography

BIBLIOGRAPHY

Bajus, M, Vesely, V., Leclercq, PA, and Rijks, JA, 1979a, Steam Craking of Hydrocarbons, 1. Pyrolysis of Heptane, Ind. eng. Chem, Prod. Res. Dev., 18, 30-37

Bajus, M, Vesely, V., Leclercq, PA, and Rijks, JA, 1979b, Steam Cracking of Hydrocarbons, 2. Pyrolysis of Methylcyclohexane, Ind. eng. Chem, Prod. Res. Dev., 18, 135-142

Bachtiar, I. and Widodo, DS 2015,Electrodecolorization of Textile Factory Liquid Waste in the Semarang Region with PbO2/Pb Electrodes, Journal of Science and Application Chemistry, 18 (3), 85-90, DOI: *https://doi.org/10.14710/jksa.18.3.85-90*

Riegel, RE, 1949, Indusexamination Chemistry, 5th ed., 317-322, Reinhold Publishing Corporation, New York

Appendix 9. Examples of writing titles, subtitles and others.

CHAPTER II
LITERATURE REVIEW

II.1 Tautomer

The first sentence after the subtitle is written as a new paragraph. ....

II.1.1 Tautomerism on System β-diketone

The first sentence after the subtitle begins with a new paragraph. ....

II.1.1.1 Reduction Reaction in System β-diketone

First sentence ....

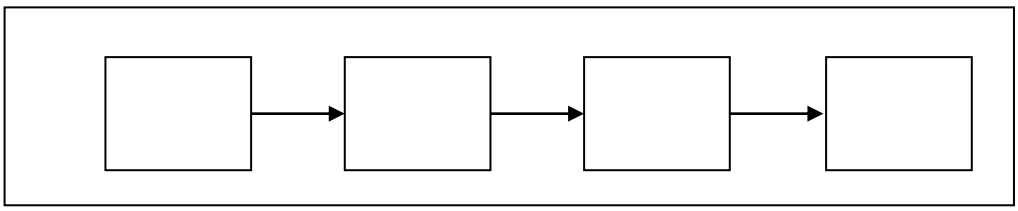
Example of how to write a table:

E, capital letter

Table II.1: Effect of temperature on the conductivity of the electrolyte solution during the dilution process

Temperature, ^{0}C	**type conductivity, Ω^{-1}.cm-1**
20	..... (space 1)
25	.....
30	.....
35	.....

How to Present Images:

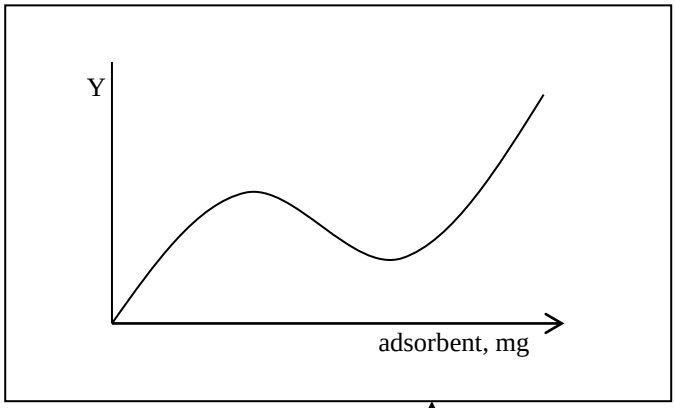


2.5

Figure IV.1 Schematic arrangement of equipment for the isolation process from plant bark

S, capital letter

How to Write Graphics:



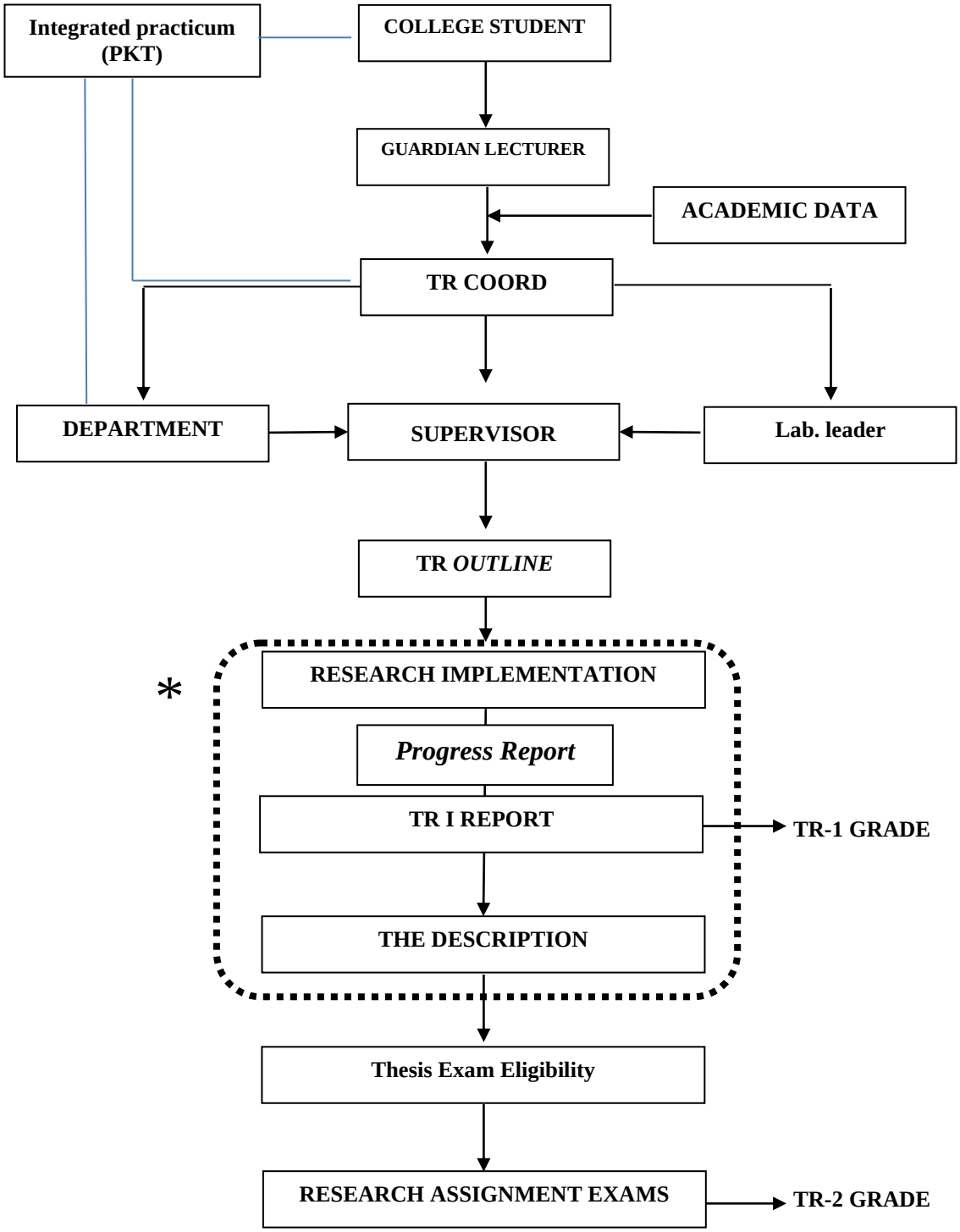
2.5 spaces

Figure IV.2 The effect of the amount of adsorbent on the ability to reduce concentration of Cr(VI) ion in waste sample

1 space

capital letter

Appendix 10. Procedure manual for taking Research Assignments courses



* *TR 1* *After completing the Research Assignment Outline and having a seminar in the laboratory, students immediately complete the TR I report in at least 1 semester.*

TR 2 *After TR I is finished, the student will complete the TR II report (Thesis)*