

UNDERGRADUATE THESIS GUIDEBOOK



**BACHELOR OF PHYSICS PROGRAM
DEPARTMENT OF PHYSICS
FACULTY OF SCIENCE AND MATHEMATICS,
UNIVERSITAS
DIPONEGORO 2020**

FOREWORD

The Bachelor of Physics Program, Department of Physics, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang, compiled a guidebook to assist students in preparing, implementing, and completing their thesis. This guidebook summarizes the preparation of thesis reports and the rules for their implementation.

It is hoped that the guidelines can meet the needs of students of the Bachelor of Physics Program, in completing their studies. Nevertheless, this book still needs to be refined and updated to reflect advances in science, especially in physics.

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Drafting Team

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CHAPTER I

INTRODUCTION

The Department of Physics, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang, offers a Bachelor of Physics (S1) program. In an effort to qualify university graduates in Indonesia, the government has issued Presidential Regulation No. 08 of 2012 concerning the Indonesian National Qualifications Framework (KKNI) and its Attachments, which are a reference in the preparation of the learning outcomes of graduates from each level of education nationally, and the Presidential Regulation of the Minister of Education and Culture No. 73 of 2013. The issuance of Presidential Regulation No. 08 of 2012 and PT Law No. 12 of 2012, Article 29, paragraphs (1), (2), and (3), has impacted the curriculum and its management in each program.

In essence, a thesis is an academic activity designed to train students in the independence and scientific responsibility of prospective scientists, encompassing the selection of topics, the preparation of research plans, the implementation of research, the evaluation of research results, and the writing of reports. During the implementation of thesis activities, students are guided by up to two supervisors. This research activity ended with the writing of the research results in the form of a "Thesis," which was evaluated by a team of examiners appointed by the study program manager.

The thesis required by the Bachelor of Physics Program, has an activity weight of 6 credits, so the selection of titles, depth, and breadth of research activities must be adjusted accordingly.

1.1 Thesis Registration Requirements

To facilitate these activities, the following are the requirements for thesis registration, to be carried out by students, submitted to the Coordinator of the Interest Group (KBM). The requirements are as follows:

1. Thesis is a course that can be taken after students complete courses of at least 120 (one hundred and twenty) credits and complete the prerequisite courses for this, as evidenced by submitting a Transcript of Grades that has been signed by the Academic Supervisor.

2. Have taken the Thesis Course listed on the Study Plan Fill (IRS) as evidenced by *the IRS* printout.
3. The willingness of the thesis supervisor is limited to a maximum of two people listed in the thesis control book.
4. Submit a proposal that has been approved by the thesis supervisor.
5. The duration of the thesis starts from the date of the proposal exam to a minimum of 3 months, as outlined in the thesis control book.
6. If, within a period of 6 months, there is no progress on the report from the supervisor, then the KBM Coordinator can determine a new supervisor and title.
7. If, within a period of 6 months, you have not been able to complete the thesis and get a recommendation from the supervisor, then the duration of the thesis can be extended for a maximum of 6 months.

1.2 Thesis Exam Requirements

To facilitate these activities, the following are the requirements for registering for the thesis exam conducted by students with the Thesis Coordinator.

1. Have met the course credit load required by the faculty of at least 138 credits, with all compulsory and elective courses having passed according to the Field of Interest Group (KBM), with a minimum GPA of 2.00, as evidenced by a transcript of grades that has been approved by the Academic Supervisor.
2. Currently taking a thesis course listed in the Study Plan Fill (IRS) as evidenced by *an IRS* printout.
3. Submit evidence that you have carried out a seminar on the results, with proof that the thesis draft has been signed by the Thesis Supervisor and is worthy of testing. Students who carry out their thesis at institutions outside Universitas Diponegoro are required to attach a certificate of completion of their research.
4. Make a statement free from plagiarism of the final project or thesis, signed with a stamp of Rp. 10,000,-
5. Single tuition payment slip (UKT) that has been approved by the bank.
6. The TOEFL score is at least 450, recognized by Universitas Diponegoro.
7. Free to borrow from the laboratory.

8. Submit the thesis handbook.
9. Submit a draft thesis that has been signed by the supervisor as many as the number of supervisors and examiners.

1.3 Implementation of Thesis Exam

1. The thesis exam is carried out at least 3 working days after registration with the Thesis Coordinator.
2. The thesis exam is carried out for a maximum of 2 hours, consisting of presentations and discussions or questions and answers led by the chairman of the session (Supervisor).
3. The exam is attended by 3 - 4 people, consisting of supervisors and examiners.
4. The duration of the completion of minor revisions is a maximum of 1 month, and the major revisions are submitted by the testing team for a maximum of 3 months. If the revision exceeds the specified time, it will be evaluated by the Bachelor of Physics Program.
5. If they do not pass, the re-exam time is handed over to the supervisor and examiner team for a maximum of 6 months, and the implementation of the re-exam is coordinated with the Thesis Coordinator. If it exceeds the specified time, it will be evaluated by the Bachelor of Physics Program.
6. Students are allowed not to take the thesis exam and are entitled to get an A grade with the following conditions:
 - a. The results of the thesis were published in an international journal indexed by Scopus, Thomson Reuters, or a national journal accredited by Dikti as the first author.
 - b. The results of the thesis were published at the Scopus-indexed international conference with a paper that was published as the first author.
 - c. The results of the PIMNAS PKMP and PKMKC champions (either bronze, silver, or gold medals) with schemes and topics relevant to the thesis.
7. In the event that students are free of thesis exams, they are required to make a thesis and be corrected by the examiner team.

CHAPTER II

SYSTEMATICS OF THESIS PROPOSAL WRITING

The proposal is a refinement of the pre-proposal, which the Supervisor has deemed feasible, and includes a complete research proposal submitted as a guide for implementing the research. The proposal consists of: (1) the Initial Part, (2) the Introduction Part, (3) the Trunk Part, and (4) the Final Part.

2.1 Initial Parts

The initial section includes the front cover page, endorsement page, introduction, table of contents, table list (if any), list of images (if any), list of attachments (if any), meaning of symbols and abbreviations (if required), abstract (in Indonesian), and abstract (in English).

2.1.1 Front cover page

The cover page contains the title, the thesis's purpose, the Universitas Diponegoro emblem, the student's name and number, the intended institution, and the date of completion.

- a The title, made as brief as possible, is clear, indicates exactly the problem to be studied, and does not open up opportunities for various interpretations according to what is described in the research results.
- b The purpose of the thesis is to meet some of the requirements to obtain a Bachelor of Physics degree in the Physics Study Program, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang.
- c Emblem of Universitas Diponegoro, 5.5 cm high and 4.5 cm wide.
- d The student's name, written in full, must not be abbreviated, and under the name is the student number.
- e The Institution, namely the Program Study Physics, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang.
- f The submission time, which is the time after the thesis is tested, is indicated by writing the month and year under Semarang.

An example of a cover page is presented in Appendix A.1.

2.1.2 Verification Page

The endorsement page contains the supervisor's endorsement and the date of the Head of the Physics Study Program, Faculty of Science and Mathematics, Universitas Diponegoro's signature. An example of the Verification Page is shown in Appendix A.2.

2.1.3 Foreword

The preface contains the message that the writer wants to convey. The preface contains a brief description of the thesis's purpose, explanations, and a section of thanks. Closed with: Semarang, date, month, year; and the author's signature.

2.2 Introduction

The introductory part of the thesis proposal contains the Background, Research Objectives, and Benefits of the Research.

2.2.1 Background

Explain the reasons why the problems presented are considered interesting, important, and need to be researched. Background and problem writing is presented in the form of a chronologically ordered description that leads directly to the formulation of the problem. In the background, brief descriptions of previous research can be included to strengthen the rationale, provide a systematic overview of the research results presented in the literature, and connect them to the research problem being addressed. The facts presented are referred to as far as possible from the original source, following the method of citing the names of the years in ordinary parentheses. Citations not from the original source should only be done under forced circumstances (the original source is very difficult to find). If necessary, this section may contain hypotheses or conjectures in general.

2.2.2 Research Objectives

The purpose of the research provides a specific explanation of the objectives to be achieved.

2.2.3 Research Benefits

The benefits of research are to provide explanations for its development or its application.

2.3 Trunk Parts

The body contains the underlying elements of the theme studied, including the Theoretical Basis, Research Methods, and Research Schedule.

2.3.1 Theoretical Basis

This section contains the definitions and characteristics necessary for discussion in the following chapters. The Theory Basis contains the theories that underlie the conduct of research. If there is a regional study, it can be included in the Theory Basis.

2.3.2 Research Methods

The research method includes a brief description of the research materials and tools, the research process, the variables and data to be collected, and the data analysis method.

- a. Research materials or samples can be in the form of populations or samples. The material must be clearly stated by mentioning its properties and specifications.
- b. The tools used to carry out the research must be clearly described and, if necessary, can be accompanied by plans, drawings, or charts with adequate descriptions.
- c. The research procedure contains a detailed description of the method of conducting research, which includes data collection, processing, and analysis.
- d. The System Design (if any) to be created, and the system requirements include functional requirements, non-functional requirements of the system. System design includes system architecture, process, procedural, data, and *user interface design*.

2.3.3 Research schedule

The research schedule should be presented in the form of a table description that contains:

- a The stages of research
- b Details of activities at each stage
- c Time required for each stage

2.3 The Final Section

The final section consists of the Bibliography and Appendix.

2.3.1 Bibliography

The bibliography contains only the literature cited in the study, arranged alphabetically by first author. The order in which it was written was:

- a. Book: name (main or family) of the author, abbreviation of the name (not main or family) of the author, year of publication, title (*italicized*) of the book, edition or print, name of the publisher, city of publication. It is possible that the name (the name of the author and/or the name of the publisher) is the name of an institution or agency.
- b. Journal: name (main or family) of the author, abbreviation of the author's name (not main or family), year of publication, title of paper, name of the journal (written in italics), volume, number, page number referenced. An example is shown in Appendix 3.
- c. Thesis/thesis/dissertation: name (main or family) of the author, abbreviation of name (not main or family) of the author, year of publication, title of paper, thesis/thesis/dissertation word (written in italics), name of study program, name of department, name of faculty, name of university.
- d. If the source of the library is taken from the internet, then the order of the author is: the author's first name or family or the name of the agency, the abbreviation of the author's first name, year of publication, title of the article, *website address* (written in full along with *folders*, date and time when accessing).

2.3.2 Attachment

Attachments (if any) may be used to describe data or other information that is too detailed or too long to be included in the main section, so that it is included in the appendix.

CHAPTER III

SYSTEMATICS OF THESIS WRITING

The thesis submitted to the Department of Physics, Faculty of Science and Mathematics, is written in good, correct Indonesian. The thesis systematics consists of **(1)** the initial part, **(2)** the introduction, **(3)** the torso, and **(4)** the end.

3.1 Initial Parts

The initial section includes the front cover page, title page, endorsement page, Introduction, Table of Contents, Table List (if applicable), List of Images (if applicable), List of Attachments (if applicable), Meaning of Symbols and Abbreviations (if required), Abstract (in Indonesian), and *Abstract* (in English).

3.1.1 Front cover page

The cover page contains the title, the thesis's purpose, the Universitas Diponegoro emblem, the student's name and number, the intended institution, and the date of completion.

- a. The title, made as brief as possible, is clear, indicates exactly the problem to be studied, and does not open up opportunities for various interpretations according to what is described in the research results.
- b. The purpose of the thesis is to meet some of the requirements to obtain a Bachelor of Physics degree in the Physics Study Program, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang.
- c. Emblem of Universitas Diponegoro, 5.5 cm high, 4.5 cm wide.
- d. The student's name, written in full, must not be abbreviated, and under the name is the student's number.
- e. Institution, yaitu Program Study Physics, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang.
- f. The submission time, which is the time after the thesis is tested, is indicated by writing the month and year under Semarang.

An example of a cover page is presented in Appendix B.1.

3.1.2 Title page

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

3.1.3 Thesis Exam Approval Page

The Thesis Exam approval page contains a statement from the supervisor confirming that the student has conducted the Thesis Results Seminar, thereby making the Thesis Exam feasible and approved. This page is also signed by all supervisors.

An example of the Final Project Exam approval page is presented in Appendix B.2.

3.1.4 Originality Statement Page

The originality statement page is a page in the thesis statement of authenticity for the student concerned, detailing various originality limitations at the S1 level, and is corroborated by a 6000 rupiah stamp signed by the student concerned. Only one thesis book was affixed with the original stamp for submission to the Department of Physics, while the supervisor used a photocopy of the stamp.

An example of a statement of originality page is presented in Appendix B.3.

3.1.5 Verification Page

The endorsement page contains the endorsements of the supervisor and the Examiner Team, along with the endorsement date, and is signed by the Head of the Physics Study Program, Faculty of Science and Mathematics, Universitas Diponegoro.

An example of an endorsement page is presented in Appendix B.4.

3.1.6 Statement of Approval Page for Thesis Publication for Academic Purposes

This page grants Non-exclusive Royalty-Free Rights for the scientific work of the student concerned and for the existing devices to Universitas Diponegoro.

An example of such a page is presented in Appendix B.5.

3.1.7 Foreword

The preface contains the message that the writer wants to convey. In it, there is no need to reveal scientific details. The preface contains a brief description of the thesis's purpose, explanations, and a section of thanks. Closed with: Semarang, date, month, year; and the author's signature.

An example of such a page is presented in Appendix C.1.

3.1.8 Table of Contents

The Table of Contents is intended to provide a comprehensive overview of the thesis and to serve as a guide for readers who want to see a chapter or a subtitle. In the Table of Contents, the order of the title, subheadings, and subtitles is indicated by the page number.

An example of such a page is presented in Appendix C.2.

3.1.9 List of Tables

If there are many tables in the thesis, it is necessary to make a Table List that contains the order of numbers and the title of the table, along with the page number.

An example of such a page is presented in Appendix C.3.

3.1.10 List of Images

If there are many pictures in the thesis, it is necessary to make a List of Pictures that contains the sequence of numbers and the title of the image, along with the page number.

An example of such a page is presented in Appendix C.4.

3.1.11 List of Attachments

If there are many attachments in the thesis, it is necessary to make an Appendix List that contains the order of the number and title of the attachment, along with the page number.

An example of such a page is presented in Appendix C.5.

3.1.12 Meaning of Emblems and Abbreviations

The meaning of symbols and abbreviations is in the form of a list of symbols and abbreviations used in the thesis, accompanied by their meanings and units. Symbols and units should follow

symbols and abbreviations that are commonly used in the field of physics. The unit system used is SI.

An example of such a page is presented in Appendix C.6.

3.1.13 Abstract and *Abstract*

Abstracts are written in Indonesian, while *Abstracts* are written in English. The content is a brief but complete description of the research objectives, methods, and research results. The purpose of the research is derived from the research objectives in the introduction, the research method from the research process, and the results from the conclusions. Abstracts consist of one paragraph and one space with a maximum of 300 words. The abstract and the text are written on separate pages.

Examples of such pages are presented in appendices C.7 and C.8.

3.2 Introduction

The introductory part of the thesis contains three points, namely:

1. Background

The Background provides an explanation of the reasons for the problems presented, which are considered interesting and important and warrant further research. Background and problem writing is presented in the form of a chronologically ordered description that leads directly to the formulation of the problem. In the background of the problem, a literature review can be included, namely, studies conducted by previous researchers. If necessary, this section may contain hypotheses or conjectures in general. The background does not end with the objective, because the research's purpose is found in the next subchapter.

2. Purpose

The purpose of the research provides a specific explanation of the objectives to be achieved. The purpose of the research conveyed can be presented in paragraphs or as main points.

3. Benefit

Research benefits are the outcomes of research that explain the benefits of research development or its application.

3.3 Trunk Parts

The body contains sections on conducting research, including: Basic Theory, Research Methods, Research Results, Discussion, and others, with the number of chapters determined by the thesis's theme. There are five types of thesis themes: experiments, design, surveys, theoretical studies, and a mix of themes. The following are examples of chapter arrangements for the torso.

For theoretical or experimental themes, the order of the chapters is as follows:

1. Theoretical basis
2. Research Methods
3. Results and Discussion
4. Conclusions and Suggestions

For the Design theme, the order of the chapters is as follows:

1. Theoretical Basis
2. Design and Implementation
3. Testing and Analysis
4. Conclusions and Suggestions

For mixed themes, the arrangement of chapters can be a mixture of various themes. The key is consistency between the chapter title and the content. For example, if the scope includes the design of a survey tool, the chapter structure can be: theoretical basis, methods, design and implementation, results and discussion, and conclusions and suggestions.

The Basis of Theory contains a theoretical description that underlies the research theme. The basis of the theory should be drawn from standard textbooks that have been proven true. The basis of the theory can also include information from previous research presented in the literature and relate it to the research problem (especially in theoretical studies). The facts presented are referred to as far as possible from the original source by following the method of citing the names of the years in ordinary parentheses. For theoretical studies, this section may contain more focused or specific hypotheses.

The research method includes a brief description of the research materials and tools, as well as the research procedures. The arrangement of the equipment, as well as the variables and data to be collected, can be included

as part of the procedure or standalone. The description of the research method is more specific and complete than that in the research proposal.

Results and discussion are the most important part of the thesis, because this section contains all scientific findings obtained as research data. This section is expected to provide a scientific explanation that can logically explain the reason for obtaining these results. In this section, the researcher systematically compiles and presents rational arguments based on the scientific information obtained in the research, especially information relevant to the research problem. Discussions of the research results obtained can be presented in the form of theoretical descriptions, both qualitatively and quantitatively. In its implementation, this section can be used to compare the results of ongoing research with those reported by previous researchers. Scientifically, research results can take the form of new findings or improvements, affirmations, or rejections of interpretations of a scientific phenomenon by previous researchers. To clarify the presentation, the results of the research are presented in tables, curves, graphs, photos, or other forms, as needed, in a complete and clear manner, including units, experimental conditions, and other details. It is necessary to try to ensure that, when reading the results of this research in this format, the reader does not need to look for related information in the discussion.

The conclusion is brief and clear, summarizing the research results in accordance with the research objectives. The conclusion can be conveyed in a paragraph or as a main point. Whatever form it takes, it is important to remain consistent with the research's purpose. When needed, suggestions are used to convey possible issues for further research.

System Design and Implementation includes system architecture design, process design, procedural design, data design, and user interface design. This design is prepared based on a system needs analysis, including both functional and non-functional system needs. Design includes hardware and software design. The system implementation is reported in detail, following the design and using the specified components, tools, or programming language. Implementation is a further elaboration (details and experience) of the design.

Testing and Analysis is a stage that ensures the design has been implemented in accordance with the specified requirements and has functioned logically and correctly. This test works like a "Results and Discussion" in the experiment.

3.4 The Final Section

The final part of the thesis is the Bibliography and Appendices.

3.4.1 Bibliography

The bibliography contains only the literature cited in the study, arranged alphabetically by first author. The order in which it was written was:

- a. Book: name (main or family) of the author, abbreviation of the author's name (not main or family), year of publication, title (italicized) of the book, edition or print, name of the publisher, city of publication. It is possible that the name (the name of the author and/or the name of the publisher) is the name of an institution or agency.
- b. Journal: name (main or family) of the author, abbreviation of the name (not main or family) of the author, year of publication, title of the paper, name of the journal (written in italics), volume, number, number of pages referenced. An example is shown in Appendix 3.
- c. Thesis/thesis/dissertation: name (main or family) of the author, abbreviation of name (not main or family) of the author, year of publication, title of paper, thesis/thesis/dissertation word (written in italics), name of study program, name of department, name of faculty, name of university.
- d. If the source of the library is taken from the Internet, then the order of the author is: the author's main name or family or the name of the agency, the abbreviation of the author's first name, year of publication, title of the article, *website address* (written in full along with *folders*, date and time when accessing).

3.4.2 Attachment

Appendices (if any) may be used to describe data or other information that, due to their nature, are too detailed or too long to fit in the main section, so they are included in the appendix. If there is more than one attachment, they can be listed as attachment A, attachment B, attachment C, and so on, with each attachment title on a new page.

CHAPTER IV

WRITING CONDITIONS

This section contains guidelines related to the procedure for writing final project research proposals at the Physics Study Program, Faculty of Science and Mathematics, Universitas Diponegoro. The things discussed in this chapter include: general provisions about the materials and languages used, typing techniques, numbering methods, bibliography, presentation of tables and pictures, bibliography writing, footnotes, and citations.

The general provisions for writing a manuscript are as follows:

1. The manuscript must be printed (not allowed to go back and forth) on 80 g/m² HVS paper, A4 size (21 cm x 29.7 cm), and neatly bound using a grey *soft cover laminating* (SCL) cover.
Example attached.
2. The manuscript is prepared in standard Indonesian, in accordance with the provisions of **the General Guidelines for Indonesian Spelling**.
3. All sentences are written using standard grammar. It is not allowed to use people pronouns (except in the preface only). When using foreign or regional terms, the term must be written in italics or underlined consistently. The term 'absorption' must be used carefully. If it has not been standardized and is not very commonly used, you should use the original term.
4. Between one definition or theorem and another, it is best to use sentences and connecting paragraphs so that the flow of the manuscript becomes clear. Avoid writing that only lists definitions, theorems, and others.

The following grammar provisions need to be considered in writing a manuscript:

1. It is not permissible to use the words "we", "us", "author" (other than in the introduction), "you", "you", and so on, which are direct pronouns. This must be taken seriously because textbooks use the word "we" a lot to make readers feel comfortable reading (the rules for making a textbook are like that; it's different from a final project report).
2. It is not permissible to use the word "where" except to state the sentence of the place question. The translation of the words "where", "when", and "of" in English is not always

be the words "where", "when", and "from" in Indonesian, but must be translated or interpreted appropriately, according to standard Indonesian.

3. Conjunctions, such as "then", "until", and "whereas", should not be used as the beginning of a sentence.
4. It should be noted that writing "to" and "in" as prefixes should be distinguished from writing "to" and "in" as prepositions.
5. Sentence decapitation must be done carefully, in accordance with the correct rules of Indonesian writing.
6. Use descriptive sentences, do not command sentences (often occur in research procedures), for example: use the sentence "salt solution is put in Elmeyer's pumpkin and then stirred", do not "put salt solution in Elmeyer's pumpkin and then mix". Another example: use the sentence "the illustration in Figure 2.5 is an explanation of the case mentioned earlier", not "for more details, see the illustration in Figure 2.5".
7. The number that begins a sentence must be spelled, for example: Ten newtons.
8. Symbols or formulas should not be at the beginning of a sentence.
9. Punctuation and sentence writing follow **the General Guidelines for Indonesian Spelling**.

4.1 Script Typing

Typing is done with a computer. Below are explained the writing rules for: typeface, line spacing, borders, space filling, new paragraphs, numbers and units, chapter and subchapter titles, downward detailing, and symmetrical location.

4.1.1 Typeface

The rules for typefaces are as follows:

- a. The report manuscript is typed by a computer using the Times New Roman typeface size 12pt, and for all manuscripts, the same type must be used, both for tables and figures.
- b. Italics are used to mark terms in foreign languages.

- c. Other special letters (such as bold or italics, underlined) can be used for specific purposes, such as statements in definitions, theorems, consequences, etc. An example of the presentation of definitions and theorems is given in Appendix D.1.
- d. Symbols that cannot be typed must be neatly written using black ink.

4.1.2 Line spacing

The spacing between two lines is typed at a distance of 1.5 spaces, except for the table of contents, abstracts, direct quotes, table titles, image titles, and bibliographies typed at a distance of 1 space. Formulas are typed with spacing as needed.

4.1.3 Edge limits

Reviewed from the edge of the paper, the typographical edge limit is set as follows:

- a. Top edge and left edge: 4 cm
- b. Bottom edge and right edge: 3 cm

4.1.4 Room filling

The space on the manuscript page is filled as much as possible. Typing starts from the left edge boundary except for new paragraphs, equations, lists, images, headings, or special things.

4.1.5 New paragraph

The new line starts 1.25 cm from the left edge of the type.

4.1.6 Numbers and units

Numbers and units follow the following rules:

- a. Numbers are typed with numbers, except at the beginning of sentences.
- b. Decimal numbers are marked with a comma, not with a period.
- c. The unit is expressed by its official abbreviation without a dot behind it, e.g., 10 kg, 70 cm.

4.1.7 Chapter Titles, Sub Chapters, and Sub Sub Chapters

The title of the sub-chapter only extends to the sub-sub-chapter with the following rules:

- a. Chapter titles are written entirely in capital letters, typed in bold at 14pt, and arranged to be symmetrical, with a distance of 4 cm from the top edge without ending with a period.
- b. Sub chapter titles are printed in bold size 12 pt without ending with periods. All words begin with capital letters, except for the conjunction and the preposition. The first sentence after the title of the sub-chapter begins with a new paragraph. The title of the sub-chapter, if it is more than one line, is written in one space.
- c. The title of Sub Sub Babmeasure 12 pt is printed in bold, typed starting from the left edge border, and printed in bold; only the first word begins with a capital letter, without ending with a period. The first sentence after the title of the sub-chapter begins with a new paragraph.

4.1.8 Details down

When writing the manuscript, if there are details that must be arranged, they can be ordered by numbers or letters according to the degree of detail. Cannot use *bullets*.

4.1.9 Symmetrical layout

Images, tables, and their titles or captions are placed symmetrically along the left and right edges of the text.

4.2 Numbering

This section describes the procedures for numbering pages, chapters, and subchapters, tables and figures, definitions and theorems, and mathematical equations and chemical reactions.

4.2.1 Page numbering

The rules for page numbering are as follows:

- a. The beginning of the thesis, numbered pages with small Roman numerals placed at the bottom of the center symmetrically.
- b. The introduction, the torso section, the results and discussion section, the conclusion section, and the final part of the thesis are numbered using Arabic numerals. For pages that contain chapter titles, the page number is placed at the bottom symmetrically; on the next pages, at the top right.

4.2.2 Numbering of Chapters, Sub-Chapters, and Sub-Sub-Chapters

The rules for numbering subchapters are as follows:

- a. Chapter numbers are written in Upper Roman letters.
- b. The Sub Chapter number is written with Arabic numerals according to the Chapter number, followed by the sequential number of the Sub Chapter.
- c. The Sub Sub Chapter number is written with Arabic numerals according to the Sub Chapter number, followed by the sequential number of the Sub Sub Chapter.
- d. It is not allowed to write more than Sub Sub Chapters

4.2.3 Numbering tables and figures

The table or figure is numbered sequentially with Arabic numerals according to the chapter number, followed by the sequence number of the table or figure. The table title is placed on top of the table, while the image title is placed at the bottom of the image (As per Appendices D2 and D3).

4.2.4 Numbering of definitions, theorems, consequences, lemmas, and examples

Definition numbers, theorems, consequences, lemmas, and examples are written with Arabic numerals as a unit according to the sequence number of chapters or sub-chapters. An example of the numbering of definitions and theorems is shown in Appendix D.1.

4.2.5 Numbering of Mathematical Equations or Chemical Reactions

The number of mathematical equations or chemical reactions is written in Arabic numerals according to the chapter number, followed by the equations or reactions in sequence. The number is typed in parentheses (...) and placed at the right edge of the border. Mathematical equations are written in the middle between the left and right bounds. If the number of equations is large enough, then numbering can be used according to the sub-chapter, followed by the order of the equation. It is written in equations in word processing software.

Example:

$$T(x + y) = T(x) + T(y) \quad (3.1)$$

The numbering of mathematical equations or chemical reactions contained in the attachment is adjusted to the attachment number, for example, for the equation contained in attachment B is written as:

Example:

$$T(x + y) = T(x) + T(y) \quad (\text{B.10})$$

4.3 Bibliography

Reference to literature citations is carried out with the Harvard System. For merging libraries with two authors' names, the first author's name and the second author's name are used. For literature with more than two authors' names, the first author's name is used, followed by et al.

Example:

a. Single author:

Himpunan A is a subset of \mathbf{R}^n compact if and only if (Ross, 2004).

Ross (2004) states According

to Ross (2004)

b. Author two:

If the equilibrium point of the system, then (Nayfeh dan Balachandra, 1995)

Brauer and Castillo-Chavez (2001) stated that

c. Authors more than two people:

If there is a Liapunov function that ... so(Hirsch et al, 1999)

Nagle et al. (2004) state that

4.4 Presentation of Tables and Figures

It should be noted that the presentation of tables and figures must contain all the necessary information completely and clearly, so that the reader does not need to look for that information from the description of the manuscript. If the text description is considered necessary to refer to a certain table or figure, it is enough to include the number of the table or figure.

4.4.1 Table presentation

Table titles are written briefly but clearly, and placed on top of the table, without ending with periods, and written in bold. The first letter in the first word of the title is capitalized, and the next word is lowercase. If the table title spans more than one line, it must be written with a single space.

In principle, tables should not be decapitated. If the table is large enough, the font size can be reduced if needed, but it must still be easy to read. If the table is forced to be truncated, the next page of the table lists the table number, and the word (continued) appears without a title. If the table is to be made in a horizontal (*landscape*) orientation, the top of the table should be on the left. Tables that are more than 2 pages long or require folding are placed in attachments.

If the table is quoted from a reference, then a citation is written at the end of the heading. With the exception of tables that modify some data from various sources, the citation is indicated by a symbol on the data, and at the bottom of the table is written the intended reference. An example of a table is presented in Appendix D.2.

4.4.2 Image presentation

Drawings in the thesis include: flowcharts, graphs, maps, photographs, and work diagrams. The presentation of images in the preparation of a thesis manuscript follows the following provisions.

The image title is placed below it, without a period. The first letter in the first word of the title is capitalized, and the next word is lowercase. If the title of the image is more than one line, it must be written in one space. Image captions are written in the blank areas of the image, not on other pages. If the image is presented as wide as the paper's height, the top of the image is placed on the left.

For images that consist of several parts, the sequence description using (a), (b), and so on, is covered in the image title section. All images must be arranged on the same page. For color images, they should be color-printed or set with contrasting coloring.

If the image is quoted from a reference, then the citation is written in the last part of the image title. For images sourced from the internet, the resolution and sharpness should be considered.

For images derived from the scanning results, please ensure the resolution and sharpness are appropriate. If needed, the *scan* results can be supplemented with specific text. An example of a picture is presented in Appendix D.3.

4.5 Bibliography Writing

It should be noted that the literature included in the bibliography is the literature that is actually referred to in the thesis. Bibliographies are written in a single space. Between one library and the next, a space of 1.5 spaces is provided. The first row is left flat, and the next row is jutting inwards. An example of a Bibliography page is listed in the Appendix

D. 4. The bibliography only contains the literature referred to in the study, arranged alphabetically by the name of the first author. The order in which it was written was:

- a. Book: author's name (main or surname), abbreviation of author's first name, year of publication, title (*italicized*), book, edition or print, publisher's name, city of publication. It is possible that the name (the name of the author and/or the name of the publisher) is the name of an institution or agency.
- b. Journal: author's name (main or family), abbreviation of author's first name, year of publication, title of paper, journal name (*italicized*), volume, number, page number referenced. An example is shown in Appendix 3.
- c. Thesis/thesis/dissertation: name (main or family) of the author, abbreviation of the author's first name, year of publication, title of the paper, thesis/thesis/dissertation word (*italicized*), name of the study program, name of the department, name of the faculty, name of the university.
- d. Not a, b, or c, but is information of the same quality as a, b, or c, and the source is taken from the internet, so the order of writing is: the author's name (main or family), the author's first name, year of publication, title of paper, *website address*.

APPENDIX A

PROPOSAL

Appendix A.1. Thesis Proposal cover page format

THESIS PROPOSAL

...HEADING...



Compiled by:

..... (STUDENT'S NAME).....
..... (NIM).....

**BACHELOR OF PHYSICS PROGRAM
DEPARTMENT OF PHYSICS
FACULTY OF SCIENCE AND
MATHEMATICS, UNIVERSITAS
DIPONEGORO SEMARANG**

.... Months, Years....

Appendix A.2. Thesis Proposal endorsement page

**THESIS PROPOSAL
ENDORSEMENT PAGE**

(title)

Compiled by:

(Student's Name)
(NIM)

**It has been tested in the Thesis Proposal Seminar
on ... *(Seminar Date)***
And it is stated that it can be continued for Thesis research

Guidance Team

Supervisor I

Supervisor II

NIP

(.....)

NIP

(.....)

**This Thesis proposal has been accepted as one of the
requirements to conduct research in order to prepare a Thesis
Date ...**

Head of the Bachelor of Physics Program

*(Name of Head of Physics Study
Program) (NIP. Head of the
Bachelor of Physics Program)*

APPENDIX B

THE BEGINNING PAGE OF

THE THESIS

Appendix B.1. Thesis Cover Page Format

THESIS TITLE

Undergraduate Thesis

To fulfill one of the requirements to achieve a Bachelor's degree (S-1) as a Bachelor of Science in the Bachelor of Physics Program



Compiled by:

..... (STUDENT'S NAME).....
..... (STUDENT'S NUMBER).....

**BACHELOR OF PHYSICS
DEPARTMENT OF PHYSICS
FACULTY OF SCIENCE AND MATHEMATICS
UNIVERSITAS DIPONEGORO
SEMARANG**

.... Months, Years....

Appendix B.2. Thesis Exam Approval Format

THESIS EXAM APPROVAL

The undersigned is the Supervisor from:

Students :
NIM :
Study Programs/Faculty : Bachelor of Physics/Science and Mathematics
Thesis Title :

Declare that the students has carried out the Thesis Results Seminar so that they agree and are eligible to carry out the Thesis Exam.

Semarang, date, month, year

Supervisor I

Supervisor II

(.....)

(.)

NIP

NIP

Appendix B.3. Format of Originality Statement.

STATEMENT OF ORIGINALITY

I hereby declare that in this thesis, there are no works that have ever been submitted to obtain an academic degree at a university, and to the best of my knowledge, there are also no works or opinions that have ever been written or published by others, unless they are referred to in writing in this manuscript and mentioned in the bibliography.

Semarang.....

10000 stamp and Student Name

signature

NIM.....

Appendix B.4. Thesis confirmation page

THESIS CONFIRMATION PAGE

(title)

Compiled by:

(Student's Name)

(NIM)

**Has been examined and declared passed by the
Examiner Team On ... *(Final Project Exam)***

Supervisory and Examiner

Supervisor I

Supervisor II

NIP (.....)

(.....)
NIP

Examiner I

Tester II

NIP (.....)

(.....)
NIP

**This undergraduate thesis has been accepted as one of
the requirements to obtain a Bachelor of Science (S.Si)
degree
Date...**

*(Name of Head of Physics Study
Program) (NIP. Head of the
Bachelor of Physics Program)*

**STATEMENT OF CONSENT
PUBLICATION OF THESIS FOR ACADEMIC PURPOSES**

As an academic community of Universitas Diponegoro, I hereby sign the following:

Name :
NIM :
Courses :
Departemen :
Faculty :
Type of Work :

For the sake of scientific development, I agree to grant Universitas Diponegoro Non-exclusive Royalty-Free Rights for my scientific work entitled:

.....
.....

Along with existing devices. With this Non-Exclusive Royalty-free Right, the Bachelor of Physics Program, Department of Physics, Faculty of Science and Mathematics, Universitas Diponegoro has the right to store, transfer media or format, manage in the form of a database, maintain, and publish my thesis as long as it includes my name as the author or creator and as the owner of the Copyright.

Made in Semarang
On the Date, **Month, Year (example)**
Starting 10,000 Stamp and signature

Name
NIM.

APPENDIX C

THESIS COMPLETENESS

Appendix C.1. Example of a Preface

FOREWORD

All praise and gratitude to the presence of Allah SWT who always bestows His grace and gifts, so that the author can complete the thesis entitled ".....". This thesis was prepared as one of the requirements for the Bachelor of Science degree in the Bachelor of Physics Program, Department of Physics, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang.

On this occasion, the author does not forget to thank the parties who have guided, provided assistance, direction, and advice in the preparation of this Thesis to (*Functional and played a direct role*):

1. Supervisor 1
2. Supervisor 2
3. Tester 1
4. Tester 2
5. Friends of Physics 2012, who always support and encourage the writer
6. All parties who have helped until the completion of this Thesis Project that the author cannot mention one by one.

Finally, the author apologizes for the many shortcomings in the preparation of this Thesis. Therefore, constructive suggestions and criticisms are highly expected to improve and develop this Thesis in a better direction. Hopefully, everything in this Thesis will benefit all of us now and in the future. Hopefully, the effort to prepare this thesis will bring the pleasure of Allah SWT. Amen.

Semarang, the month of

the year, Writer

Appendix C.2. Table of Contents Example

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Appendix C.6. Examples of Symbols and Abbreviations

MEANING OF EMBLEMS AND ABBREVIATIONS

1. B : Polarization angle change ($^{\circ}$)
2. α : Swivel angle type ($^{\circ}/\text{dm}(\text{g/mL})$)
3. E : Electric field (V)
4. E_x : Electric field on the axis x
5. E_y : Electric field on the axis y
6. ℓ : Optical trajectory length (cm)
7. B : Medan Magnet
8. EM : Electromagnet
9. θ : Angular change ($^{\circ}$)
10. λ : Wavelength
11. C : Concentration (%)
12. I : Intensity (Cd)
13. I_0 : Initial intensity (Cd)
14. H : Hydrogen
15. C : Carbon
16. O : Oxygen
17. v_l : Speed through active optical material to the left
18. v_r : Speed passes through active optical material to the right
19. ALB : Free Fatty Acids
20. FTIR : *Fourier Transformation Infrared*

Appendix C.7. Abstract Examples

ABSTRACT

The parameters of the cooking oil quality test according to SNI include several aspects, each with its own method. Both these parameters and methods cannot be done simultaneously, take a long time, and are relatively expensive. In this study, active optical parameters are proposed as an alternative parameter for the quality of cooking oil that has undergone several treatments. The sample tested was palm oil, and its active optical properties were measured by changes in polarization angles. The light source used is a 100W incandescent lamp. The sample condition is divided into four parts: new oil, old oil, consumable oil, and expired oil. The sample container was a cuvette with an optical path length of 1-5 cm. The results showed that the active optical properties of the oil changed linearly with the length of the optical trajectory, but not linearly with the oil concentration. These active optical properties parameters are sufficient to indicate the quality of palm cooking oil. Good oil quality is indicated by a smaller rotation angle than in oil of poor quality. This is in accordance with the validation results for the free fatty acid (ALB) test. In the future, this method will provide accurate, complete information from the standard quality parameters used, and it can be applied to other types of oils.

Keywords: Optical properties, oil fry oil, polarization.

Appendix C.8. Abstract Example

ABSTRACT

According to Indonesian National Standards, the quality test parameters for cooking oil include many aspects, each with its own methods. Both the parameter and methods can't be done simultaneously. It takes a long time and is quite expensive. This paper proposes that the active optic parameter is an alternative indicator of cooking oil that has undergone certain treatments. The tested sample is palm oil, and its active optical properties are measured by changes in the polarization angle. The light source used in this experiment is a 100-watt fluorescent lamp. The sample condition is divided into some parts: the new ones, the old ones, the after-use ones, and the expired ones. A place to put the sample, called a cuvette, with the various optical tracks, started from 1 to 5 cm. The experiment showed that the active optical properties change linearly with the length of the optical path; however, they are not linear with oil concentration. The parameter for active optical properties is sufficient to assess the quality of palm oil. The swivel angle of the form, indicating the quality of the oil, is smaller than that of oil with poor quality. This is in accordance with the validation result of the Free Fatty Acid (FFA) test. In the future, this method can provide accurate information and fully meet the parameters of the quality standards used today; furthermore, it can be applied to other forms of oil.

Keywords: *Optical properties, the quality of palm oil, natural polarization.*

APPENDIX D

PRESENTATION

Appendix D.1. Example of presentation of definitions and theorems

Definition 2.1: A known V and W vector space over the field F . Mapping $T: V \rightarrow W$ is said to be *linear*, if for every $x, y \in V$ dan $\alpha \in F$ occur

- i. $T(x + y) = T(x) + T(y)$ dan
- ii. $T(\alpha x) = \alpha T(x)$

Theorem 2.2. It is known that V and W are *norm spaces* over the field F . If V is dimensioned to, then any linear mapping from V to W is continuous.

Appendix D.2. Example of table presentation.

Example 1:

Table 4.1 Laplace Transform of Multiple Functions

No.	$F(t)$	$f(s) = \mathbf{L}\{F(t)\}$
1	1	$\frac{1}{s}, s > 0$
2	t^n	$\frac{n!}{s^{n+1}}, s > 0$
3	e^{at}	$\frac{1}{s-a}, s > a$
4	$\sin at$	$\frac{a}{s^2 + a^2}, s > 0$
5	$\cos at$	$\frac{s}{s^2 + a^2}, s > 0$
6	$\sinh at$	$\frac{a}{s^2 - a^2}, s > a $
7	$\cosh at$	$\frac{s}{s^2 - a^2}, s > a $

Example 2:

Table 5.4 Results of porosimetric analysis of clay with variations in pressure and temperature parameters

Sample	Surface area specific, m^2/g	Volume pori total, $\times 10^{-3} \text{ mL/g}$
Montmorillonite	69.71	50.70
Akchida Fe-Mantamrillani	126.49	107.90

Appendix D.3. Example of presentation of Research Flow Diagram, Research tool diagram, and image

Example 1:

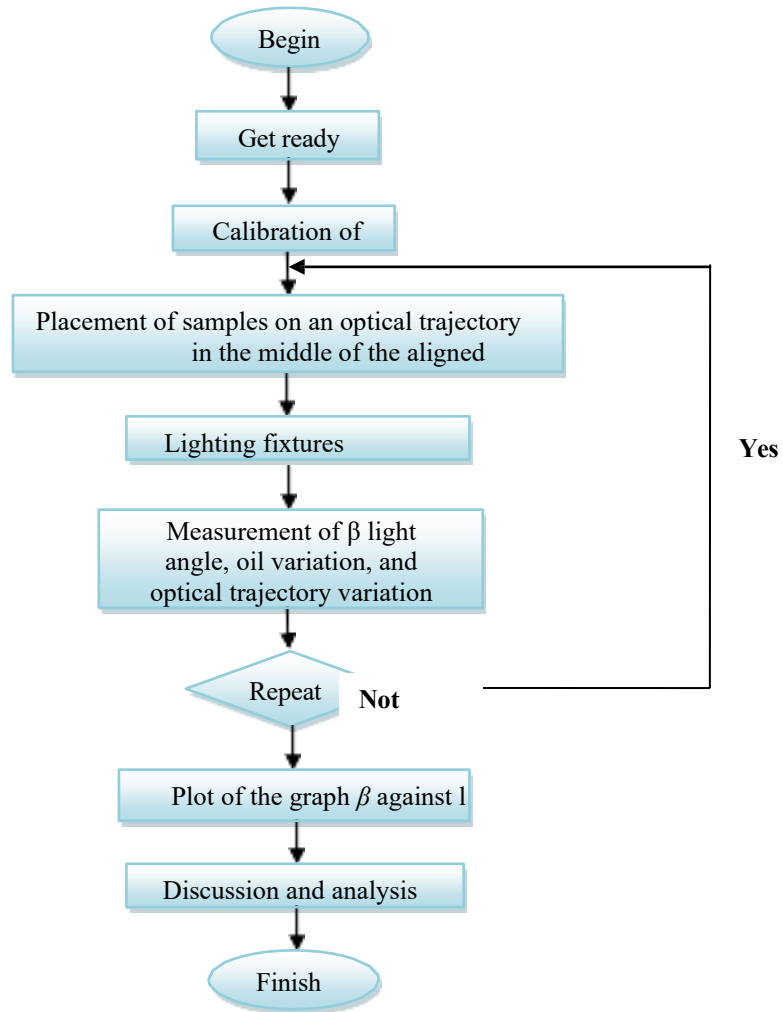


Figure 3.1 Research flow chart

Example 2:

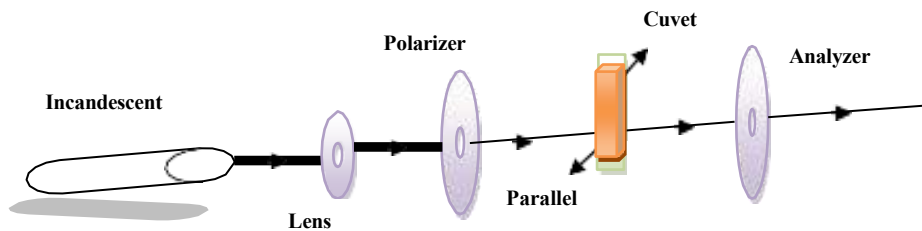


Figure 3.2 Diagram of the research tool

Example 3:

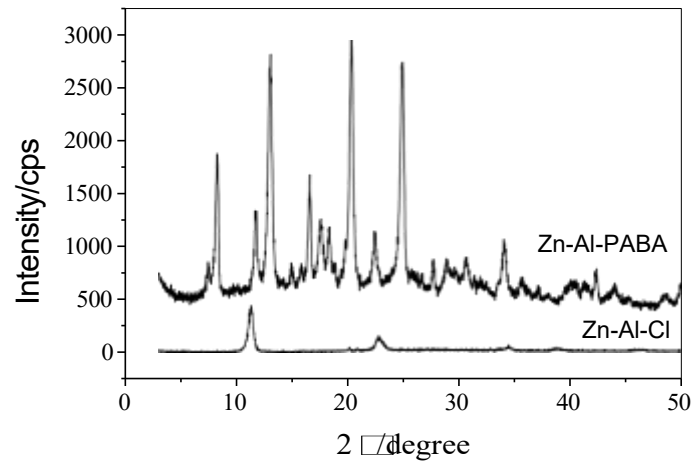


Figure 3.5 X-ray diffraction of HGT Zn-Al-PAB crystals performed at room temperature and hydrothermal conditions compared to Zn-Al-Cl

Appendix D.4. Example bibliography

BIBLIOGRAPHY

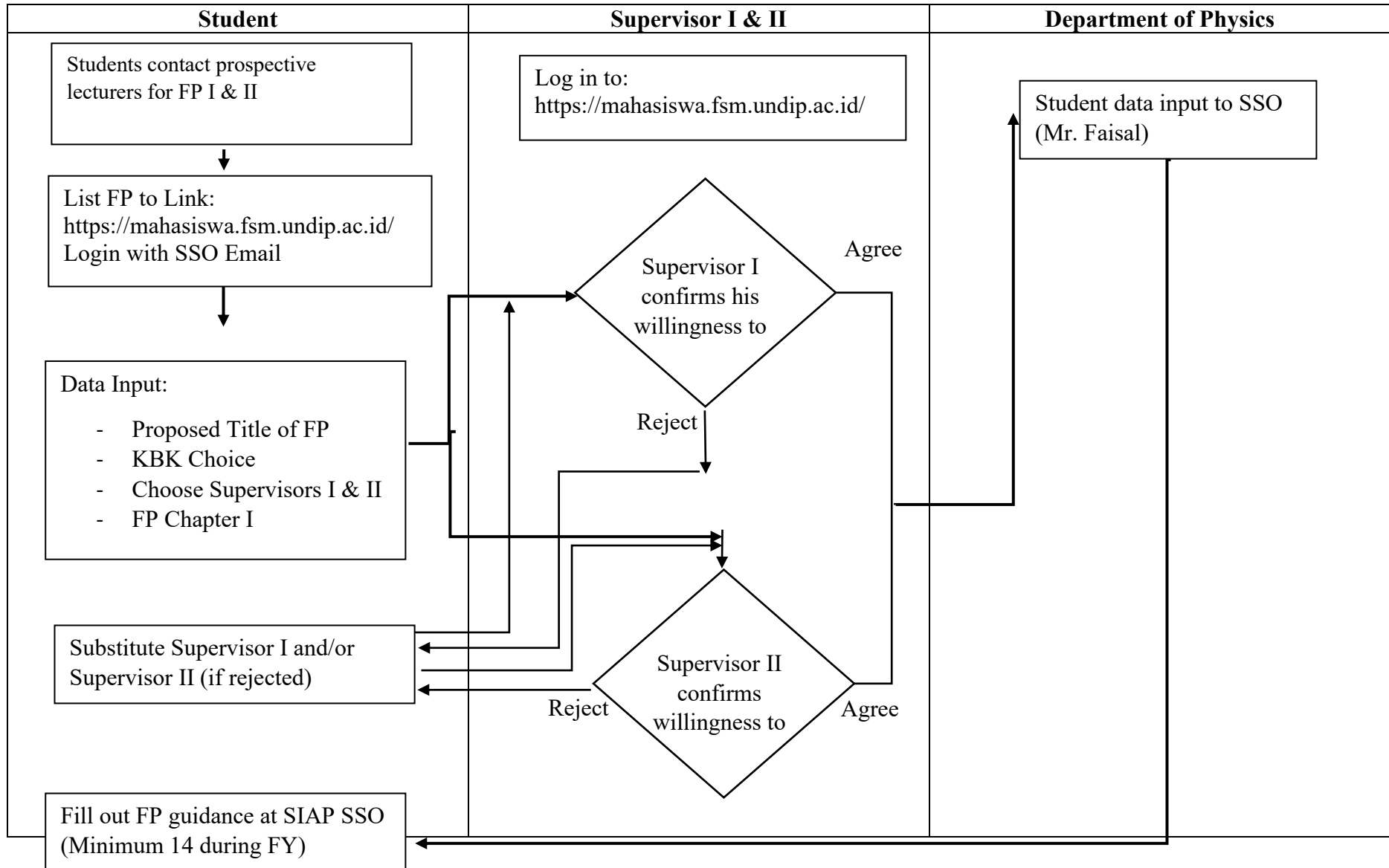
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Final Project (FP) registration flow



Final Project (FP) Exam registration flow

