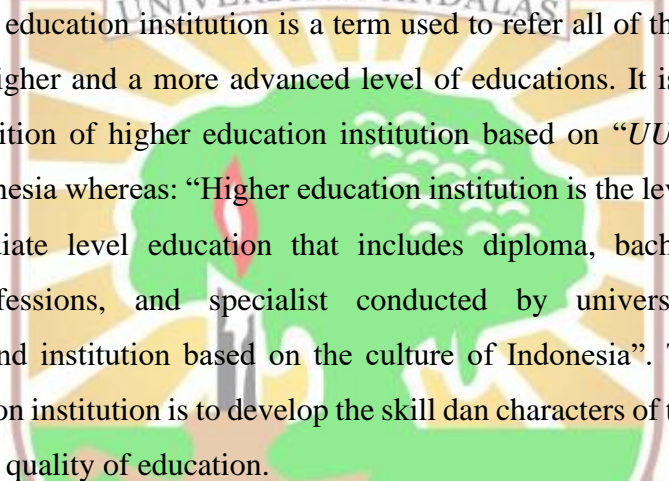


# CHAPTER I

## INTRODUCTION

The chapter contains explanation the about background for research, the problem formulation, objective for the research, constraints, and writing systematic for the research.

### 1.1 Background

The logo of Universitas Andalas is a circular emblem. At the top, a banner reads "UNIVERSITAS ANDALAS". The center features a green tree with a red flame-like shape at its base. Below the tree, a banner reads "KEDJAJAAN ANDALAS". The entire emblem is set against a yellow and green background.

Higher education institution is a term used to refer all of the organizations that provide higher and a more advanced level of educations. It is in accordance with the definition of higher education institution based on “*UU No. 12 Tahun 2012*” in Indonesia whereas: “Higher education institution is the level of education after intermediate level education that includes diploma, bachelor, magister, doctoral, professions, and specialist conducted by university, academic, polytechnic, and institution based on the culture of Indonesia”. The purpose of higher education institution is to develop the skill dan characters of the students and to improve the quality of education.

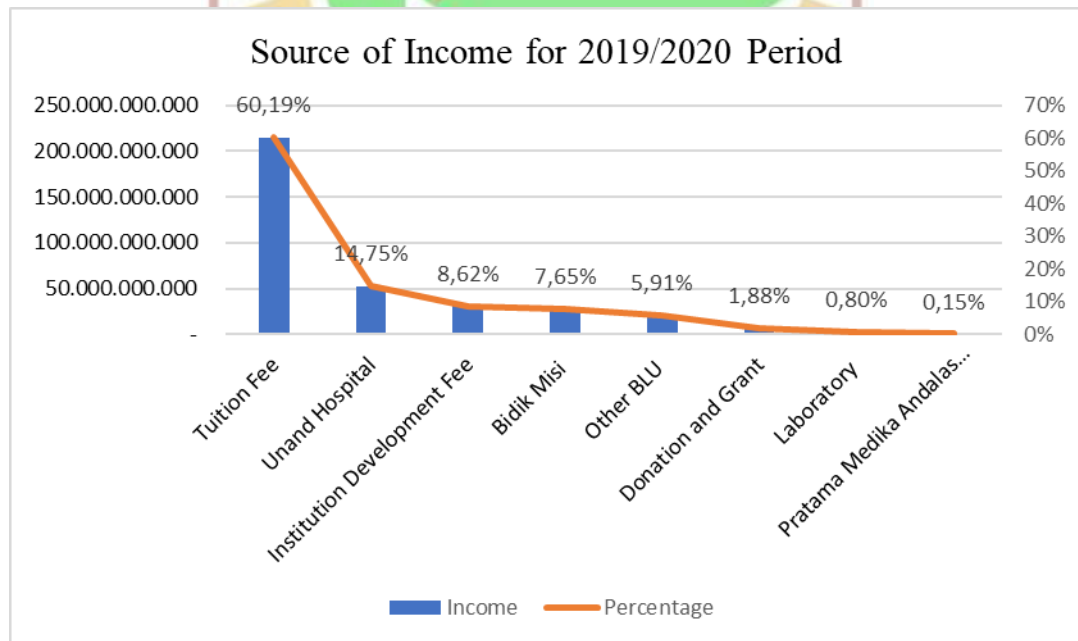
Universitas Andalas is one of the higher education institution in form of Public University in Indonesia. This university is located in Padang, Indonesia. There is a total of fifteen faculties operating in Universitas Andalas. Each year, the university held admission for the new students. this admission involves all of the faculties in Universitas Andalas. The university provide limited amount of quota for every departments.

The selection for the admission of the new students is divided into three main phases. These phases included SNMPTN, SBMPTN, and SIMA. SNMPTN is reserved for student that managed to pass the academic requirements. While the SBMPTN is reserved for student who undergo test for the admission held by the

ministry of the education. While SIMA is reserved for student who undergo test for the admission held by the related university.

The students that managed to pass the enrollment process then registered in the system to determine the tuition fee (UKT) based on several levels. UKT (*Uang Kuliah Tunggal*) is a tuition fee need to be paid by all of the enrolled student of the university based on their economic capability.

According to Financial Report for Universitas Andalas published in April 30<sup>th</sup> 2021, income from the tuition fee contributed to at least 60% of the total income for the university. The income from the tuition alone managed to cover at least 35% of total expenditure spent by the university in 2019/2020 period. **Figure 1.1** shows the comparison of the income from tuition and other source income in Universitas Andalas in 2019/2020 period.



**Figure 1.1** The Income Contribution For Universitas Andalas in 2019/2020 Period

The amount of tuition fee need to be paid itself is determined by standard education cost (BKT). Table shows the comparison between tuition fee (UKT) needs to be paid by students in each departments. **Table 1.1** shows the tuition fee

and standard education cost for Universitas Andalas on 2022 in accordance with “Keputusan Rektor Universitas Andalas No. 406/KPT/R/PTN-BH/UNAND/2022”.

**Table 1.1** Tuition Fee and Standard Education Cost for Each Department in Universitas Andalas on 2022

No	Program Studi	BKT	UKT/Semester						
			Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
1	Hukum	7.362.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.700.000	3.000.000
2	Agroteknologi	11.042.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	3.000.000	3.300.000
3	Agribisnis	10.056.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	3.000.000	3.300.000
4	Ilmu Tanah	10.056.000	500.000	1.000.000	1.600.000	2.000.000	2.500.000	3.000.000	3.300.000
5	Agroteknologi	10.193.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	3.000.000	3.300.000
6	Proteksi Tanaman	10.056.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	3.000.000	3.300.000
7	Penyuluhan Pertanian	10.056.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	3.000.000	3.300.000
8	Kedokteran	25.388.000	500.000	1.000.000	3.300.000	5.500.000	7.700.000	10.000.000	12.000.000
9	Psikologi	10.873.000	500.000	1.000.000	2.500.000	3.750.000	5.100.000	6.400.000	7.700.000
10	Kebidanan	16.988.000	500.000	1.000.000	2.600.000	4.000.000	5.400.000	6.800.000	8.300.000
11	Ilmu Biomedica	16.988.000	500.000	1.000.000	2.600.000	4.000.000	5.400.000	6.800.000	8.300.000
12	Kimia	11.326.000	500.000	1.000.000	2.000.000	2.750.000	3.500.000	4.200.000	5.000.000
13	Biologi	11.779.000	500.000	1.000.000	2.000.000	2.750.000	3.500.000	4.200.000	5.000.000
14	Matematika	10.056.000	500.000	1.000.000	2.000.000	2.750.000	3.500.000	4.200.000	5.000.000
15	Fisika	11.326.000	500.000	1.000.000	2.000.000	2.750.000	3.500.000	4.200.000	5.000.000
16	Ekonomi	9.202.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.700.000	3.000.000
17	Manajemen	7.362.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.700.000	3.000.000
18	Akuntansi	9.570.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.700.000	3.000.000
19	Ekonomi, Kampus Payakumbuh	8.834.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.700.000	3.000.000
20	Manajemen, Kampus Payakumbuh	6.795.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.700.000	3.000.000
21	Peternakan	11.042.000	500.000	1.000.000	1.600.000	2.000.000	2.500.000	3.000.000	3.300.000
22	Peternakan, Kampus Payakumbuh	10.193.000	500.000	1.000.000	1.600.000	2.000.000	2.500.000	2.750.000	3.300.000
23	Sejarah	7.362.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	2.750.000	3.000.000
24	Sastra Indonesia	8.140.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	2.750.000	3.000.000
25	Sastra Inggris	8.140.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	2.750.000	3.000.000
26	Sastra Minangkabau	8.140.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	2.750.000	3.000.000
27	Sastra Jepang	7.815.000	500.000	1.000.000	1.500.000	2.000.000	2.500.000	2.750.000	3.000.000
28	Sosiologi	7.362.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.750.000	3.000.000
29	Antropologi Sosial	7.362.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.750.000	3.000.000
30	Ilmu Politik	7.079.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.750.000	3.000.000
31	Administrasi Publik	7.079.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.750.000	3.000.000
32	Hubungan Internasional	7.079.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.750.000	3.000.000
33	Ilmu Komunikasi	7.079.000	500.000	1.000.000	1.500.000	2.000.000	2.300.000	2.750.000	3.000.000
34	Teknik Mesin	13.251.000	500.000	1.000.000	2.000.000	2.750.000	3.300.000	4.200.000	4.750.000
35	Teknik Sipil	11.789.000	500.000	1.000.000	2.000.000	2.750.000	3.300.000	4.200.000	4.750.000

**Table 1.1** Tuition Fee and Standard Education Cost for Each Department in Universitas Andalas on 2022 (Continued)

No	Program Studi	BKT	UKT/Semester						
			Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
36	Teknik Industri	10.649.000	500.000	1.000.000	2.000.000	2.750.000	3.300.000	4.200.000	4.750.000
37	Teknik Lingkungan	11.335.000	500.000	1.000.000	2.000.000	2.750.000	3.300.000	4.200.000	4.750.000
38	Teknik Elektro	11.335.000	500.000	1.000.000	2.000.000	2.750.000	3.300.000	4.200.000	4.750.000
39	Farmasi	18.404.000	500.000	1.000.000	2.100.000	3.100.000	4.100.000	5.100.000	6.100.000
40	Teknik Pertanian dan Biosistem	10.618.000	500.000	1.000.000	1.750.000	2.500.000	3.250.000	3.750.000	4.500.000
41	Teknologi Hasil Pertanian	10.618.000	500.000	1.000.000	1.750.000	2.500.000	3.250.000	3.750.000	4.500.000
42	Teknologi Industri Pertanian	10.618.000	500.000	1.000.000	1.650.000	2.500.000	3.250.000	3.750.000	4.500.000
43	Kesehatan Masyarakat	11.326.000	500.000	1.000.000	2.500.000	3.750.000	5.100.000	6.400.000	7.700.000
44	Gizi	10.873.000	500.000	1.000.000	2.500.000	3.750.000	5.100.000	6.400.000	7.700.000
45	Keperawatan	17.696.000	500.000	1.000.000	1.750.000	2.500.000	3.100.000	3.800.000	4.400.000
46	Kedokteran Gigi	23.435.000	500.000	1.000.000	3.300.000	5.500.000	7.700.000	10.000.000	12.000.000
47	Teknik Komputer	9.654.000	500.000	1.000.000	2.000.000	3.000.000	3.750.000	4.750.000	5.500.000
48	Sistem Informasi	10.223.000	500.000	1.000.000	2.000.000	3.000.000	3.750.000	4.750.000	5.500.000
49	Informatika	10.223.000	500.000	1.000.000	2.000.000	3.000.000	3.750.000	4.750.000	5.500.000

Based on **Table 1.1**, there are two types of fees needs to be considered. The first one is a fee needs to be paid by students called UKT, and the second one is a fee needs to be covered by university. The students that managed to pass the enrollment process from SNMPTN and SBMPTN then registered in the system to determine the tuition fee based on several level. The lowest is level one while the highest is level 7. To determine the level, the newly enrolled students are assessed based on their economic capability to pay the tuition fee. There are no level of tuition fee applied for SIMA enrolled students. Students enrolled from SIMA also subjected to pay Institution Fee (*Pengembangan Institusi*). **Table 1.2** shows the tuition fee for SIMA in accordance with “*Keputusan Rektor Universitas Andalas No. 407/KPT/R/PTN-BH/UNAND/2022*”.

**Table 1.2** Tuition Fee for SIMA Enrolled Student for Universitas Andalas in 2022

No	Program Studi	SPP	Pengembangan Institusi
1	Hukum	Rp 5.500.000	Rp 15.000.000
2	Agroteknologi	Rp 6.000.000	Rp 12.000.000
3	Agribisnis	Rp 6.000.000	Rp 12.000.000
4	Ilmu Tanah	Rp 6.000.000	Rp 12.000.000
5	Agroekoteknologi	Rp 6.000.000	Rp 12.000.000
6	Proteksi Tanaman	Rp 6.000.000	Rp 12.000.000
7	Penyuluhan Pertanian	Rp 6.000.000	Rp 12.000.000

**Table 1.2** Tuition Fee for SIMA Enrolled Student for Universitas Andalas in 2022  
(Continued)

No	Program Studi	SPP	Pengembangan Institusi
8	Kedokteran	Rp 14.500.000	Rp 100.000.000
9	Psikologi	Rp 8.000.000	Rp 15.000.000
10	Kebidanan	Rp 8.500.000	Rp 15.000.000
11	Ilmu Biomedica	Rp 8.500.000	Rp 15.000.000
12	Kimia	Rp 7.500.000	Rp 12.000.000
13	Biologi	Rp 7.500.000	Rp 12.000.000
14	Matematika	Rp 7.500.000	Rp 12.000.000
15	Fisika	Rp 7.500.000	Rp 12.000.000
16	Ekonomi	Rp 6.000.000	Rp 15.000.000
17	Manajemen	Rp 6.000.000	Rp 15.000.000
18	Akuntansi	Rp 6.000.000	Rp 15.000.000
19	Ekonomi, Kampus Payakumbuh	Rp 6.000.000	Rp 12.000.000
20	Manajemen, Kampus Payakumbuh	Rp 6.000.000	Rp 12.000.000
21	Peternakan	Rp 6.000.000	Rp 12.000.000
22	Peternakan, Kampus Payakumbuh	Rp 6.000.000	Rp 10.000.000
23	Sejarah	Rp 5.500.000	Rp 15.000.000
24	Sastra Indonesia	Rp 5.500.000	Rp 15.000.000
25	Sastra Inggris	Rp 5.500.000	Rp 15.000.000
26	Sastra Minangkabau	Rp 5.500.000	Rp 15.000.000
27	Sastra Jepang	Rp 5.500.000	Rp 15.000.000
28	Sosiologi	Rp 5.500.000	Rp 20.000.000
29	Antropologi Sosial	Rp 5.500.000	Rp 15.000.000
30	Ilmu Politik	Rp 5.500.000	Rp 20.000.000
31	Administrasi Publik	Rp 5.500.000	Rp 25.000.000
32	Hubungan Internasional	Rp 5.500.000	Rp 30.000.000
33	Ilmu Komunikasi	Rp 5.500.000	Rp 30.000.000
34	Teknik Mesin	Rp 7.500.000	Rp 30.000.000
35	Teknik Sipil	Rp 7.500.000	Rp 20.000.000
36	Teknik Industri	Rp 7.500.000	Rp 30.000.000
37	Teknik Lingkungan	Rp 7.500.000	Rp 30.000.000
38	Teknik Elektro	Rp 7.500.000	Rp 25.000.000
39	Farmasi	Rp 10.000.000	Rp 25.000.000
40	Teknik Pertanian dan Biosistem	Rp 7.500.000	Rp 12.000.000
41	Teknologi Hasil Pertanian	Rp 7.500.000	Rp 12.000.000
42	Teknologi Industri Pertanian	Rp 7.500.000	Rp 12.000.000
43	Kesehatan Masyarakat	Rp 7.700.000	Rp 15.000.000
44	Gizi	Rp 7.700.000	Rp 15.000.000
45	Keperawatan	Rp 7.700.000	Rp 25.000.000
46	Kedokteran Gigi	Rp 14.500.000	Rp 175.000.000
47	Teknik Komputer	Rp 7.500.000	Rp 20.000.000
48	Sistem Informasi	Rp 7.500.000	Rp 20.000.000

**Table 1.2** Tuition Fee for SIMA Enrolled Student for Universitas Andalas in 2022  
(Continued)

No	Program Studi	SPP	Pengembangan Institusi
49	Informatika	Rp 7.500.000	Rp 20.000.000

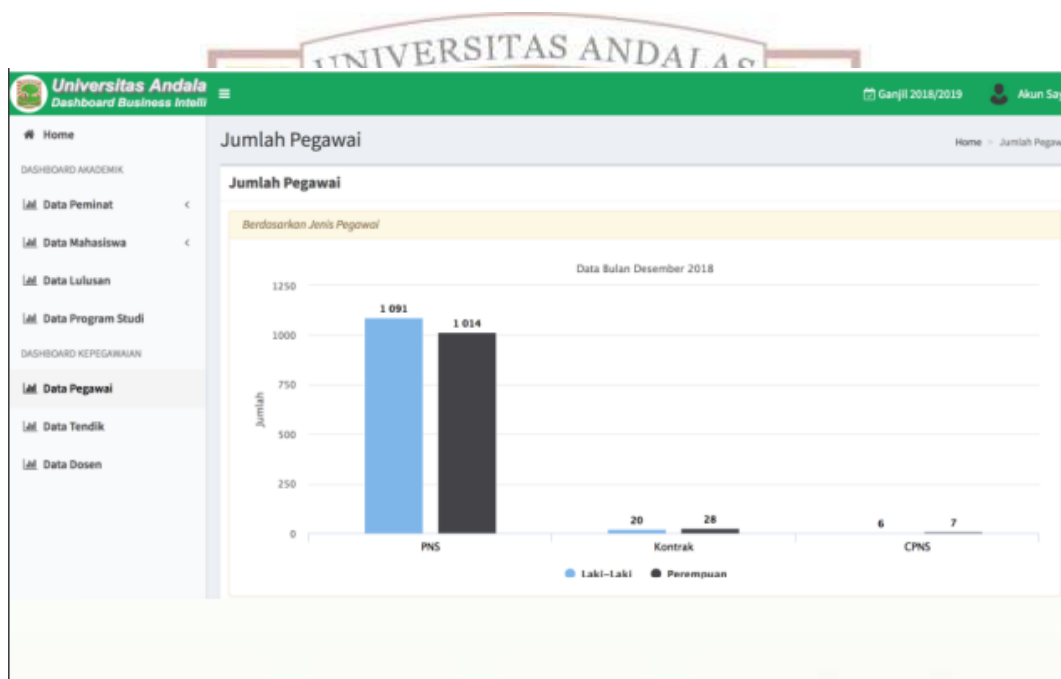
**Table 1.1** and **Table 1.2** shows that there are several types of payment and tuition needs to be considered including UKT, BKT, and PI. To help support the students that are unable to pay the tuition fee, the government and university provide several support including lowering the tuition fee level and provide economical support in form of KIP-K (*Kartu Indonesia Pintar – Kuliah*). The tuition fee would also be lowered especially in a situation where there are time of crisis or disaster, for example during the Covid-19 Pandemic where the university decide to open the application to lower the tuition due to the pandemic condition. Another form of support is by providing the KIP-K whereas the recipient of the KIP-K won't needs to pay for the tuition fee.

Based on the interview that have been held with Mr. Handy Rahmat Tryadi as Staff of Data Collection in LPTIK, all of data regarding the students tuition fee and registration are stored in several operational database. SIREG (*Sistem Registrasi*) is used to store and manage the data regarding students information and registration, while system for UKT is used to store the data related to tuition fee information including transaction and invoice for the tuition fee. There are also another system used to store the academic information including invoice and payment called SIA (*Sistem Informasi Akademik*) that are operated and separated by seventeen faculties in Universitas Andalas. The database haven't been integrated and need to be migrated from the database to retrieve particular data and information. These could increase the risk making the data prone to error and taking much longer time to retrieve the data.

Further interview conducted with Mr. Suhanda as the Director of Financial Affair and Mrs. Azaria Griselda as the Head of Accounting for Universitas Andalas also shown that it took too much time to process the data into useful visualization while there are request to report the visualization quickly. The current method to

process the data into information in form of visualization is by manually process the data by using Microsoft Excel. This method is proven to be inefficient way to process the data because the data needs to be processed one by one and prone to mistake and miscalculation if manually processed.

The university also have provide a website dedicated for business intelligence purpose addressed in <http://bi.unand.ac.id/>. But the website only provide information regarding new students and employees in the university. **Figure 1.2** shows the website for BI server.



**Figure 1.2** Interface for BI website in Universitas Andalas

Information regarding income from the tuition also needs to be shown as a source for business intelligence because the income from the tuition fee alone contributed to at least 60% of the total income for Universitas Andalas in 2019/2020 alone. Thus making it important for university to have a system that is capable of supporting the analysis process for the tuition fee to support decision making process so the decision taken by the university become more data-driven.

More information such as the comparison between income from tuition fee and the expenditure spent from standard education cost also needs to be shown so

the margin of parity between tuition fee and standard education cost can be determined. This also an important aspects needs to be considered as the margin between income from tuition fee and standard education cost haven't been analyzed even though the expenditure for standard education for each students is much higher than the tuition fee itself as shown in **Table 1.1**. Showing these information will help the decision maker to determine on how to cover the deficit from the standard education cost more measurable and accordingly.

Based on the explanation above, it can be shown that the university lacked the system to support the decision making process regarding the information related to tuition fee and it's comparison with standard education cost. There are also still no integration regarding the data related to tuition fee. In order to help solve the issues, it is important to design an integrated system that capable of supporting decision making process. This is where data warehouse come in handy because data warehouse can improve the analytic capability that support the decision making process especially related to tuition fee and the comparison with standard education cost in Universitas Andalas.

## **1.2 Problem Formulation**

Based on the previously mentioned background, the problem formulation for this research is how to design a systems capable of supporting decision making process related to financial aspect of tuition fee and capable of showing the margin of parity between the income from tuition fee and expenditure from standard education cost for Universitas Andalas to help improve the university's decision making process related to the tuition fee.



### 1.3 Research Objectives

The objectives for this research is to design a data warehouse to integrate the information related to financial aspect of tuition fee for Universitas Andalas and the reporting dashboard containing the results from the analysis regarding the financial aspects for the tuition fee and also capable of showing the margin of parity between the income from tuition fee and expenditure from standard education cost in Universitas Andalas.

### 1.4 Research Scopes

The scopes for this research are as follows.

1. The research will focus on tuition fee and standard education cost for bachelor undergraduate students in all departments and faculties in Universitas Andalas
2. The data used for this research are operational database of SIA, SIREG, and SIUKT and also additional data related to tuition fee and standard education cost obtained from the period of 2017-2021.

### 1.5 Outline of Report

The outline for the report are as follows.

## CHAPTER I INTRODUCTION

The first chapter contains the introduction of the research including the background of the research, problem formulation, research objectives, constraints, and writing systematic for the reports.

## **CHAPTER II LITERATURE REVIEW**

Chapter two contains theoretical explanation related to the focus of the report. In this chapter the subjects mainly focused are data warehouse, ETL, schema and other supporting subjects.

## **CHAPTER III RESEARCH METHODOLOGY**

Research Methodology shows an explanation of how the research will be conducted. This included problem formulation, research objectives, data collection, data processing, and analysis.

## **CHAPTER IV SYSTEM DESIGN**

This chapter contains process of designing the Data Warehouse and Report by using Kimball nine step method.

## **CHAPTER V ANALYSIS**

Analysis shows the analytical based on the data that have been processed including design of the data warehouse and report.

## **CHAPTER VI CONCLUSION**

This chapter shows the conclusion of the research and recommendation based on the evaluation for current and future research.

