

**BUILD COMPUTER-BASED ACADEMIC MANAGEMENT INFORMATION
SYSTEM AT UNIVERSITAS DARUL 'ULUM**

THESIS

**Submitted to International Program
Faculty of Industrial Technology in Partial Fulfillment of
the Requirements for the degree of Sarjana Teknik Industri at
Universitas Islam Indonesia**



By

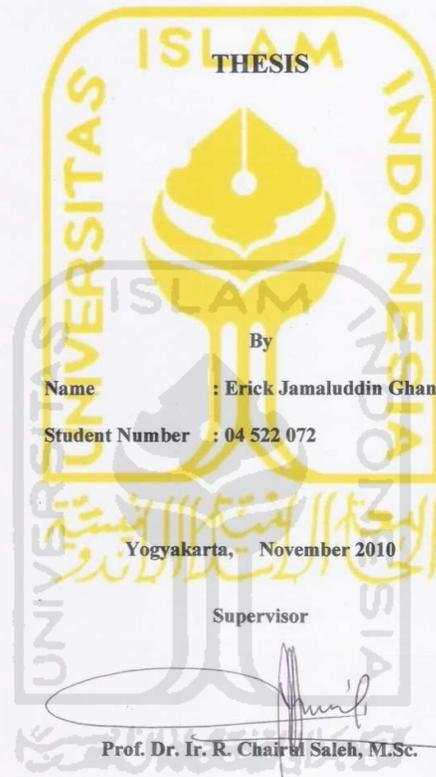
**Name : Erick Jamaluddin Ghani
Student Number : 04 522 072**

**INTERNATIONAL PROGRAM
DEPARTMENT OF INDUSTRIAL ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
UNIVERSITAS ISLAM INDONESIA
JOGJAKARTA**

2010

THESIS APPROVAL OF SUPERVISOR

BUILD COMPUTER-BASED ACADEMIC MANAGEMENT INFORMATION
SYSTEM AT UNIVERSITAS DARUL 'ULUM



THESIS APPROVAL OF EXAMINATION COMMITTEE

BUILD COMPUTER-BASED ACADEMIC MANAGEMENT INFORMATION
SYSTEM AT UNIVERSITAS DARUL 'ULUM

THESIS

By
Name : Erick Jamaluddin Ghani
Student Number : 04 522 072

Was defended in front of Examination Committee in Partial Fulfillment of the
Requirements for the degree of Sarjana Teknik Industri
Fakultas Teknologi Industri Universitas Islam Indonesia
Yogyakarta, 3 December 2010

Examination Committee

Prof. Dr. Ir. R. Chairul Saleh, M.Sc
Chair

Irving Vitra Paputungan ST., M.Sc
Member I

Drs. Imam Djati Widodo, M.Sc
Member II

Accepted by,
Head of Industrial Engineering Department
Faculty of Industrial Technology
Universitas Islam Indonesia

Drs. HM Ibnu Mastur, MSIE



SURAT KETERANGAN

Nomor: 87 /M/Undar/II/2010

Assalamu'alaikum War. Wab.

Yang bertanda tangan di bawah ini :

Nama : Drs. H. Ali Sukamtono, MSi
NPP : 880 301 034
Jabatan : Pembantu Rektor I
Universitas Darul 'Ulum Jombang
Alamat : Jl. Merdeka 29 A Jombang

Menerangkan bahwa

Nama : Erick Jamaluddin Ghani
Tempat / Tgl. Lahir : Cilacap, 2 Juli 1986
NIM : 04522072
Fakultas /Jurusan : Teknologi Industri / Teknik Industri International Program
Alamat : Jl. Riamdonan No. 83 Gumilir Cilacap Utara
Cilacap Jawa Tengah
Universitas : Universitas Islam Indonesia
Alamat : Jl. Kaliurang 14,5 Yogyakarta
Keterangan : Yang bersangkutan telah melakukan Penelitian tentang Sistem Informasi Akademik di Universitas Darul 'Ulum mulai tanggal 3 Agustus 2009 s/d. 23 Pebruari 2010. Dengan Pendamping Penelitian : Dwi Ajiatmo, ST., MT/Pembantu Dekan I F. Teknik Undar Jombang.

Demikian surat keterangan ini dibuat, untuk dipergunakan sebagaimana mestinya.

Wassalmu'alikum War. Wab.

Jombang, 24 Pebruari 2010



Drs. H. Ali Sukamtono, M.Si

NPP. 880 301 034

DEDICATION

I dedicate this final project to my father Hasan Abdullah, my mom Suprapti, my sister Mina Nusanti. Thanks to always pray for me..



MOTTO

إِلَّا لَكَبِيرَةٌ وَإِنَّهَا وَالصَّلَاةِ بِالصَّبْرِ وَأَسْتَعِينُوا

الْحَشِيعِينَ عَلَى

Jadikanlah sabar dan shalat sebagai penolongmu. Dan sesungguhnya yang demikian itu sungguh berat, kecuali bagi orang – orang yang khusyuk
(Q.s. al-Baqarah : 45)

قُلْنَا لَا تَخَفْ إِنَّكَ أَنْتَ الْأَعْلَى

Janganlah kamu takut, sesungguhnya kamulah yang paling unggul
(Q.s. Thaha : 68)

فَإِنَّ مَعَ الْعُسْرِ يُسْرًا إِنَّ مَعَ الْعُسْرِ يُسْرًا

Karena sesungguhnya sesudah kesulitan itu ada kemudahan, sesungguhnya sesudah kesulitan itu ada kemudahan
(Q.s.al-Insyirah : 5-6)

ACKNOWLEDGMENTS



Assalamualaikum Wr. Wb.

I would like to express profound gratitude to Allah SWT and Rasulullah SAW. Thanks to my parent, Hasan Abdullah and Suprapti for their love and care throughout my life. I also wish thank to my Sister Mina Nusanti for moral support and continuous encouragement during my study.

I am very thankful to Ir. Gumbolo Hadi Susanto, M.Sc as a Dean of Industrial Technology Faculty, to Drs. H.M Ibnu Mastur, MSIE as Head of Industrial Engineering Department and also to my supervisor Prof. Dr. Ir. R. Chairul Saleh, M.Sc., who guided me about the direction of my thesis from the beginning. Moreover, I am grateful for the cooperation of Universitas Darul 'Ulum by allowing me to conduct the research. I really appreciate the kindness and hospitality of Mr. Aji and Mr. Syamsul, and I also would like to acknowledge all of Universitas Darul 'Ulum crews who willing to help me answer all my questions without hesitation.

Finally, I wish to express my appreciation to all my friends. Thanks for all IP FIT students for unforgettable memories, Adhi for the true friendship and partnership, Dodo for BIG help, Deddy and Uky for assist to accomplish the project.

Wassalamualaikum Wr.Wb.

Yogyakarta, December 2010

Author

ABSTRACT

Universitas Darul 'Ulum as an educational institution that involves so many academic activities in there, including new student admission and academic administration. Where, with many of the data involved in these processes, various provide information problems will be arise.

It is become important to built a computer-based academic management information system, as a substitute for the old system (paper-based information system), to solve that problem. This computer-based information system has a purpose to help provide better of providing information process for these academic processes, so that indirectly it will also improve the quality of Universitas Darul 'Ulum itself. The development is done by analysis of the current system which includes analysis of management process, problem analysis, and analysis of the system requirements. After that, designing of system started from process design, database design, ERD design, and designing of user interface. In this case, the new information system is built by using Microsoft Visual Basic 6.0 for the user interface and Microsoft SQL Server 2005 Express for the database.

The result of that's design is a new computer-based information system that can assist the university in providing better information.

Key Words: Information System, Academic Management Information System, Computer-based Information System, MIS Design, Database, ERD, User Interface, Microsoft Visual Basic 6.0, SQL Server 2005 Express

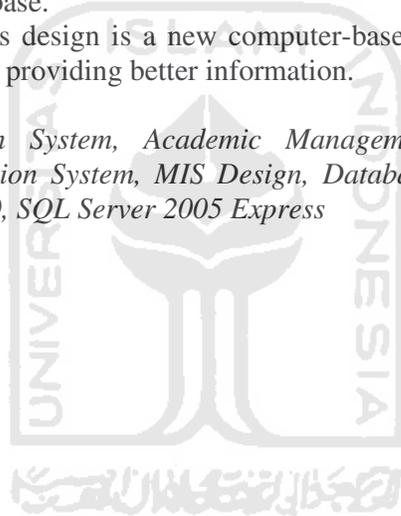


TABLE OF CONTENT

COVER	i
APPROVAL PAGE OF SUPERVISOR	ii
APPROVAL PAGE OF EXAMINER COMMITTEE	iii
APPROVAL LETTER FROM UNIVERSITAS DARUL ‘ULUM.....	iv
DEDICATION.....	v
MOTTO	vi
ACKNOWLEDGMENTS	vii
ABSTRACT	viii
TABLE OF CONTENT	ix
LIST OF TABLES	xi
LIST OF PICTURES	xii
CHAPTER I INTRODUCTION	
1.1 Background	1
1.2 Problem Formulation	3
1.3 Problem Boundary	3
1.4 Purpose of Research	3
1.5 Research Advantages.....	4
1.6 Outline of Thesis	5
CHAPTER II LITERATURE REVIEW	
2.1 Previous Research	6
2.2 Theoretical Review	7
2.2.1 Management Information System	7
2.2.2 Academic MIS.....	14
2.2.3 Computer Based Information System.....	15
2.2.4 System Life Cycle.....	17
CHAPTER III RESEARCH METHOD	
3.1 Research Object	21
3.2 Model Development	21

3.3 Research Flowchart	24
3.3.1 Problem Identification	25
3.3.2 Problem Formulation.....	25
3.3.3 Determine the Objectives.....	25
3.3.4 Literature Review.....	25
3.3.5 Data Collecting	26
3.3.6 Current System Analysis	26
3.3.7 New System Design	27
3.3.8 DFD Design.....	27
3.3.9 Database Design	27
3.3.10 ERD Design.....	27
3.3.11 User Interface Design	27

CHAPTER IV DATA COLLECTING AND PROCESSING

4.1 Data Collection.....	30
4.1.1 Institution Description	30
4.1.2 Vision and Mission	30
4.1.3 Facilities.....	31
4.1.4 Organization Structure.....	32
4.1.5 Current Academic Activities Description.....	33
4.1.6 Business Process.....	36
4.1.7 Problem Analysis.....	43
4.1.8 Recommended Analysis.....	45
4.2 Data Processing	45
4.2.1 Data Flow Diagram.....	45
4.2.2 Database Design.....	57
4.2.3 User Interface Design.....	66

CHAPTER V DISCUSSION

CHAPTER VI CONCLUSION AND SUGGESTION

6.1 Conclusion	84
6.2 Suggestion	85

References

Appendices

LIST OF TABLES

Table 4.1	Attributes of Problem Analysis Table.....	44
Table 4.2	Attributes of Faculty Table.....	58
Table 4.3	Attributes of Department Table.....	59
Table 4.4	Attributes of Courses Table	59
Table 4.5	Attributes of Employee Table.....	59
Table 4.6	Attributes of Schedule Table	60
Table 4.7	Attributes of Student Table	60
Table 4.8	Attributes of Key In Table.....	61
Table 4.9	Attributes of Year Table.....	61
Table 4.10	Faculty Database Column.....	63
Table 4.11	Department Database Column	63
Table 4.12	Courses Database Column	63
Table 4.13	Employee Database Column.....	63
Table 4.14	Schedule Database Column.....	64
Table 4.15	Student Database Column.....	64
Table 4.16	Key In Database Column.....	65
Table 4.17	Year Database Column.....	65

LIST OF FIGURES

Figure 2.1	Component Information System.....	12
Figure 2.2	Model of Management Information System.....	13
Figure 2.3	System Lifecycle	17
Figure 3.1	Research Flowchart.....	24
Figure 4.1	Academic Activities	35
Figure 4.2	Flow of Student Registration Process.....	37
Figure 4.3	Flow of Student Presences Process.....	40
Figure 4.4	Flow of Print Out KRS.....	41
Figure 4.5	Context Diagram.....	46
Figure 4.6	DFD Level 0.....	48
Figure 4.7	DFD Level 1 Data Management.....	49
Figure 4.8	DFD Level 1 Data Academic.....	50
Figure 4.9	DFD Level 2 Course Schedule Input.....	53
Picture 4.10	DFD Level 2 Key In Input.....	55
Figure 4.11	DFD Level 2 Grade Input.....	56
Figure 4.12	DFD Level Presences Input.....	57
Figure 4.13	ERD.....	62
Figure 4.14	Login.....	67
Figure 4.15	Main Menu Interface.....	68
Figure 4.16	Form Entry Course Schedule.....	69
Figure 4.17	Form Course Schedule Print Out.....	71
Figure 4.18	Form Key In.....	73
Figure 4.19	Form Entry Presences and Grade.....	75
Figure 4.20	Print Out Presences and Grade Report.....	76
Figure 4.21	Form Academic Data.....	77
Figure 4.22	Form Academic Data.....	78
Figure 4.23	Form Academic Data.....	79
Figure 4.24	Form Academic Data.....	80
Figure 4.25	Print Out KHS Semester Report.....	81
Figure 4.26	Print Out KHS Cumulative Report.....	81

CHAPTER I

INTRODUCTION

1.1 Background

In the globalization era, information technology has been increasing rapidly. With the advances of computer and information, today people are no longer difficult to obtain information. Information is not limited by space and time because it can be obtained by "one finger".

Universitas Darul 'Ulum is a national private university, which establishes and grows up from the environment of Islamic scientific tradition pesantren Darul' Ulum Rejoso. As an educational institution in general, there are various kinds of academic activities. To support those activities, an information system is highly required. This information system basically provides the information that will be needed in the academic administration process. As an educational institution, the university is required to provide good service, both in the lecture or academic administration processes, whereas both of which are the main activities in an educational institution.

As happened at the Universitas Darul 'Ulum, the processes of administration sometimes become an obstacle when there are any irregularities in the data related to the lectures/academic, whether the data of students, lecturer, subjects, and grades. It could happen because the data collection process is still using a manual or commonly referred to as paper based. This process allows the data that has been stored, becomes easily scattered and difficulties might appear in searching the data that will be needed.

To overcome the existing administration problems, it is desirable to build a computer-based information system. Basically people can build an information system

without a computer. But the fact is that computer ability which can make information system be realized more efficiently. Computer-based information system is a system to integrate human - machines that utilize the computer hardware and software, procedures and databases aimed to provide information that supports the operation, management and decision-making functions (Teguh, 2004). It will allow the department, that responsible for the collection, processing and the documentation of data requirements, to access information efficiently without spending a lot of space for storage and much time in the searching process. Basically the function of an information system is to facilitate and accelerate the process of providing good and accurate information and the computer which has added one or two dimensions, such as speed, accuracy and increased volume of data that enables consideration of alternatives for make it the decision (Tata Sutabri, 2005). Hence, this Information System will be able to improve the quality of the Universitas Darul 'Ulum itself.

This is the background of the computer-based information system development at the Universitas Darul 'Ulum Jombang. This research is purposed to help the University in processing and providing information related to the operations of the university administration.

1.2 Problem Formulation

Based on the background, the problem can be formulated as follows:

1. How to build computer-based academic management information system at Universitas Darul 'Ulum?
2. Could the computer-based academic management information system affect the performance of academic process at Universitas Darul 'Ulum?

1.3 Problem Boundary

To focus the research in achieving the objective, the research needs to be limited in certain aspect. Those problem boundaries can be defined as follows:

1. The research conducted at the Universitas Darul 'Ulum
2. Academic Management Information System Design start from the scope of the system until the architecture design and not discussing on coding process.
3. Academic Management at the Universitas Darul 'Ulum assumed unchanged during research.

1.4 Research Objectives

The objective of this research is to solve University problem in managing their data and process it into desired information by built the academic information system using Visual Basic 6.0 and SQL Server 2005 Express. New Information System will be developed in order to make those processes running effectively and efficiently.

1.5 Research Advantages

Academic Information System application is expected to be utilized:

1. As reference material for the development of academic management information system for the university.
2. Preparation of databases for data management
3. To facilitate an access to academic data quickly and efficiently
4. Assisting the Universitas Darul 'Ulum in improving the quality of service to students

1.6 Outline of Thesis

The research outline will be arranged as follows:

CHAPTER I INTRODUCTION

Contains of short study for backgrounds, problems formulation, problem limitation, research objective, research advantages, object of research and outlines of thesis

CHAPTER II LITERATURE REVIEW

This chapter gives brief information about previous researches done by other researchers. This chapter also describes theoretical background and any related concept supporting the research.

CHAPTER III RESEARCH METHOD

This chapter provides information about the research object, model development, and the workflow of the research itself. A flowchart

will be provided to show the steps which have to be through by the researcher in order to solve the research problem.

CHAPTER IV DATA COLLECTING AND PROCESSING

This chapter contains the data collected that will be used to solve the problem. This chapter also describes how the problem solving will be done.

CHAPTER V DISCUSSION

This chapter discusses about the result of data processing done in previous chapter. Analysis toward the result will be done to measure how far the research has solved the problem that has been formulated in problem formulation.

CHAPTER VI CONCLUSION AND RECOMMENDATION

This chapter provides the final result of the research, answering the problem formulation. Several possibility of next improvement will also be recommended as the base of next research.

REFERERENCES

APPENDICES

CHAPTER II

LITERATURE REVIEW

2.1 Previous Research

Jogyakarta, Universitas Islam Indonesia, Faculty of Industrial Technology, Department of Industrial Engineering in “ Academic Management Information System Design in Senior High School’ is a thesis that research done in SMA Negeri 1 Purworejo (Rizki Triana Putri, 2008). This thesis proposed a methodology for academic business process improvement in SMA Negeri 1 Purworejo institution of education by designing information system.

SMA Negeri 1 Purworejo is an education institution which involves many activities inside. As an education institution, the school force to support best service in academic process with best practice. Administration process which involve such as new student registration, finance administration process, and academic administration process. Furthermore, the academic activity faced some problem regarding efficient of time such as lateness to provide information of academic report.

The steps designing the information system start with modeling system using Data Flow Diagram and the database was designed by using Relational Database Management System. Then the User is built to ease in using application program. The outputs of the information system are reports in monitor screen view and printing. The validation showed that the information system designed can support the process improvements.

2.2 Theoretical Review

2.2.1 Management Information System

In studying management information systems, there is any several sub material that will be discussed which is the basic concept of management information system. The basic concepts are an information system, information system components, management, and understanding of management information systems itself.

2.2.1.1 Information System

A system is a group of elements that are integrated with the common purpose of achieving an objective (McLeod, 1998). O'Brien (1997) also defines system as a group of interrelated components working together toward a common goal by accepting inputs and producing outputs in an organized transformation process. While defining the system by Tata Sutabri (2005) in a simple way, a system can be defined as a collection or a set of elements, components, or a variable that is organized, interacting, interdependent and integrated with one another

According to Raymond (1996) information is data has become an important form for the user and has a real value and usefulness for the decision making process in the current or future. According to McLeod (1998), information is a processed data, or meaningful data. While, the data consists of Facts and figures that are relatively meaningless to the user. The Transformation of data into information is formed by an information processor. Information is data that has been processed so that useful for decision-making process (Wing, 2004).

Buckingham et al. (1987) define Information System as a system which assembles, stores, processes, and delivers information relevant to an organization (or to a society), in such a way that the information is accessible and useful to those who wish to use it, including managers, staff, clients and citizens. Also, in addition to supporting decision-making, information systems help workers and managers to analyze complex problems, to develop new products and to integrate the various modules and departments. According to O'Brien (1997), people have relied on information system to communicate with each other using a variety of physical devices (hardware), information processing instructions (software), communications channels (networks), and stored data (data resources) since the dawn of civilization. Information system can also be defined as a technically as a set of interrelated components that collect, process, store and disseminate information to support decision making, control, analysis, and visualization in an organization.

The value of the information was contributed by the dimensions of the information itself. McLeod (1998) divides the information into four basic dimensions, which are:

1. Relevancy

Information has relevancy when it pertains specifically to the problem at hand. The manager should be able to select needed information without wading through a volume of information on other subjects.

2. Accuracy

Ideally, all information should be accurate, but features that contribute to system accuracy add to the cost. For this reason, managers are forced to settle for less than perfect accuracy. Applications involving money, such as payroll, billing, and accounts receivable, seek 100 percent accuracy. Other

applications, such as long-range economic forecast and statistical reports, often can be just useful when the data contains a few errors.

3. Timeliness

Information should be available for problem solving before crisis situations develop or opportunities are lost. The manager should be able to obtain information that describes what is happening now in addition to what happened in the past.

4. Completeness

The manager should be able to obtain information that presents a complete picture of a problem or a solution. However, systems should not drown the manager in a sea of information. The term information overload suggests the harm that can come from too much information. The manager should be able to determine the amount of detail that is needed.

2.2.1.2 Information System Components

Components of information system basically divides into two, that are:

a. Information System Resources

This information system tool consists of five main tools that are:

1) People Resources

Human required for operation in all information systems. Human resource is divided into two; there are the users of information systems and as a designer of information systems.

2) Hardware Resources

The hardware includes all the physical equipment (e.g. computers) and materials used in processing information.

3) Software Resources

The software includes all of the instructions for processing information, either in a computer program or a procedure that must be carried out by humans.

4) Data Resources

Data is the raw material in the information system. Data is a valuable source of information because the data can be processed to be useful information.

5) Network

Network is important for operational success in modern organizations and for companies that implement computer-based information system.

b. Information System Activities

Information system activities are divided into five, there are:

1) Input of Data Resources

Data about business transactions and other business activities should be collected and prepared for data input process that includes the process of storing and editing. Users can enter transaction data through multiple media, such as paper or media is inserted directly into the computer.

2) Processing of Data into Information

Data can usually be manipulated in various ways, such as a summation, partition, data selection, and grouping. Activities in the processing of these data are the data processing, analysis, and manipulate data in order to change the data into a user's information required for.

3) Output of Information Products

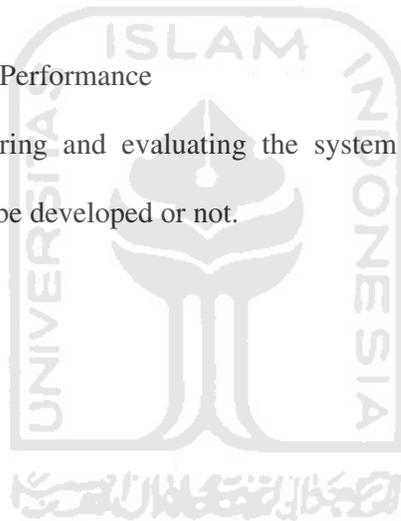
Information can be delivered in various forms to the user and should always be available to them. The purpose of the information system is to produce output for the user. The output can be displayed in various forms, such as video, paper documents, forms, reports, lists, and graphs.

4) Storage of Data Resources

Storage is fundamental in information systems. Storage is an activity in the information system where data and information maintained on a regular basis to be used in future.

5) Control of System Performance

Control is monitoring and evaluating the system to determine the current system, it's needed to be developed or not.



Components of information systems according to James A. O'Brien can be described as follows:

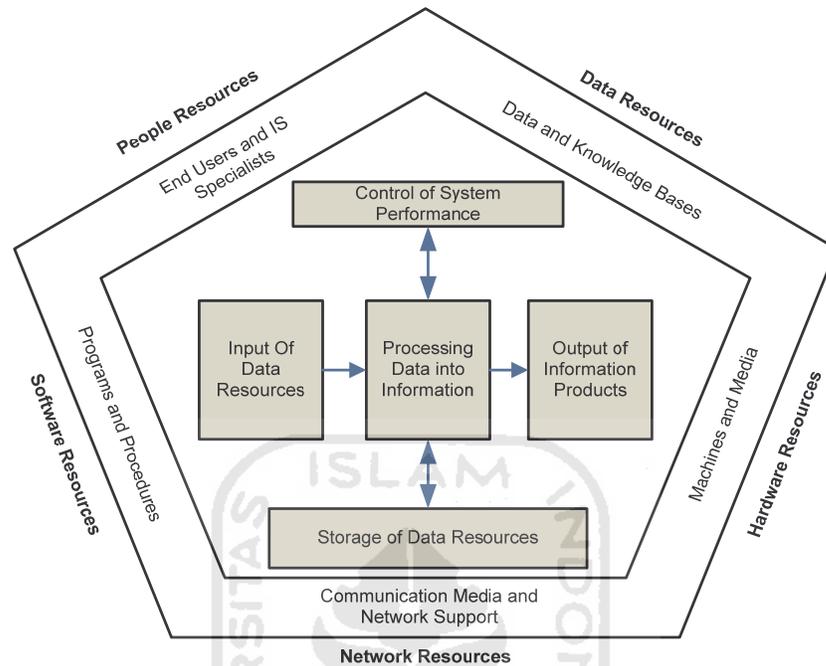


Figure 2.1 Component Information System

(Source : James A. O'Brien, 1997)

2.2.1.3 Management

Management can be defined as the process of utilizing the various resources available to achieve a goal. Management is also intended as a power system in an organization for people to perform work. Generally, the available resources in management include the human, material, and capital.

In an effort to utilize resources management, the managers will do three kinds of management processes, including:

1. Plan
2. Control (includes organizing, mobilization, and coordination)
3. Decision making

2.2.1.4 Management Information System

Information system itself is a computer-based system that makes information available to users with similar needs (McLeod, 1998). This model can be depicted as follows:

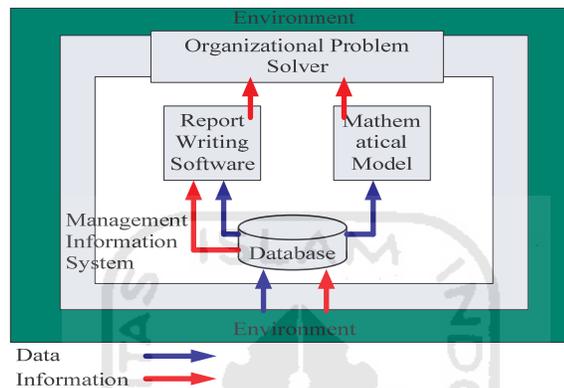


Figure 2.2 Model of Management Information System

(Source: McLeod, 1998)

Gregory M. Scott (1986), in the book *Principles of Management Information Systems* expressed understanding of management information system is a collection of the interactions of information systems that provides information neither for managerial and operating requirements. And According to Tata Sutabri (2005), management information system is an information system which, besides doing all the transaction processing required by an organization, also provide support and processing information for management functions and decision making process.

The role of information systems in management activities is to provide information to support decision-making process by management. The information is being used to help make decisions viewed from the origin, coming from outside the

organization (external). The task of information system is to provide information that is internal. In order to resulting information system is more striking and useful information for management then must be analyzed to determine information needs for each level of management.

2.2.2 Academic Management Information System

Academic management information system is a system which integrated between human (user) with hardware and software to provide information to support operating system, management, and functions decision making in institution of education. These systems integrate of administration, information, and academic procedure into computerized system which can use at anytime. Academic management information system of university is administration information system that made to help and simplify the lecturers and staffs to documented, data proceeding, and data report more efficient, automatic and real time.

Academic management information system of university designed for increase human resource potential because the human resource usually faced some administration problems in their system of academic activity. Furthermore, academic management information system have other function to academic world which are give challenge to education field for provide earlier preparation of technology understanding and study pattern displacement.

2.2.3 Computer Based Information System (CBIS)

2.2.3.1 Definition

Computer based information system is an integrated system, the human - engine system that utilizes hardware and computer software, procedures and databases aimed to provide information that supports the operation, management and decision-making functions within an organization.

Computer based system means that the computer plays a major operational system. (Teguh, 2004). Meanwhile, according to Tata Sutabri (2005) CBIS is a management information system consisting of human, hardware, software, data and organizations procedures interact with each other to provide data and information in right time to the inside or outside of the organization that competent. Thus, system designers must understand the knowledge about computers and information processing.

Technically, the implementation of computer-based management information system includes several phase, there are:

1. Input,

Tools input function provides the raw data into computer system.

2. Processing,

In processing, the data obtained from the input process, and then processed by the CPU according to the instructions given by the software.

3. Output.

The information generated from processing then supplied to the output device, when the computer performs its function drain output devices, use and store data in electronic space called memory.

4. Storage (Memory)

2.2.3.2 Benefits of using computer in the Management Information System

Computer in the management information system (MIS) is formulated as electronic data processing equipment, capable of receiving input and output, has a high speed, high accuracy, and can store instructions to solve the problem.

According to Tata Sutabri (2005) the use of computers in a new MIS will be effective and efficient if:

- The volume of data processed in large quantities
- The data processing requires a complex calculation
- Repetitive of data processing
- Require fast processing
- Requires a good file, so it will be easy to find out the data required
- Requires high level of accuracy

From the information above then we can help us to infer the value of information that can be generated from the use of computers in a management information system, there are:

1. Availability, it means can get information that in previously unobtainable.
2. Timelines, information that is generated by computer can be obtained in a fast and precise period.
3. Accuracy, information that is generated by the computer more secure of accuracy.
4. Completeness, information that is generated by computer is more complete and clear.
5. PRESENTATION, information that is generated from the process computer can be presented according to user taste (user interface).

And based on Teguh (2004) the use of computers in the information system has some advantages as follows:

- a) The Quick Process
- b) High accuracy level of information
- c) Efficiency of human resources
- d) Easy to interacting with users
- e) The improvement value of information

2.2.4 System Life Cycle

System Life Cycle (SLC) is the evolutionary process followed in implementing the system or subsystem of computer-based information (McLeod, 1996). SLC consists of a series of tasks which closely follow the steps system approach. Because the tasks follow a regular pattern, and performed by top-down, SLC is often referred to as the waterfall approach for the development and use of the system. (McLeod, 1996)

In some respects, each subsystem of the computer-based information system is like a living organism. It is born, it grows and matures, it functions, and eventually it dies (McLeod, 1998). System Life Cycle (SLC) can be described as follow:

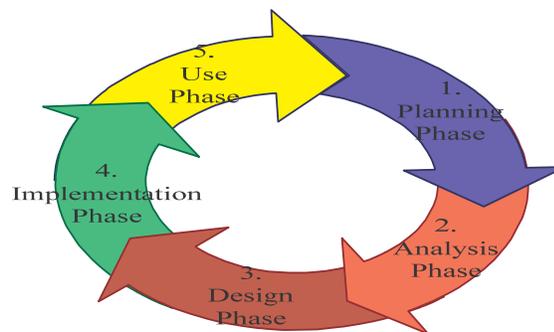


Figure 2.3 System Lifecycle

(Source: McLeod, 1998)

System life cycle consists of five phases. The first four phases of planning, analysis, design and implementation - are intended for development. The fifth phase is intended for use.

A. Planning Phase

Development of a computer-based information system should receive same degree as any major project. Management invests time in planning will pay dividends later in the lifecycle. Here are the steps of planning phase:

- (1) Recognize the Problem
- (2) Define the Problem
- (3) Set System Objective
- (4) Identify System Constraints
- (5) Conduct Feasibility Study
- (6) Prepare a System Study Proposal
- (7) Approve or Disapprove the Study Project
- (8) Establish a Control Mechanism

B. Analysis Phase

With planning completed and the control mechanism in place, the project team turns to analysis of the existing system. System analysis is the study of an existing system for the purpose of designing a new or improved system. The steps are:

- (1) Announce the System Study
- (2) Organize the Project Team
- (3) Define Information Needs

- (4) Define System Performance Criteria
- (5) Prepare the Design Proposal
- (6) Approve or Disapprove the Design Project

C. Design Phase

With an understanding of the existing system and the requirements for the new system, the project team can address the design of the new system. System design is the determination of the processes and the data which will be required by the new system. When the system is computer-based, the design can include a specification of the types of equipment to be used.

The steps of the design phase are shown as follow:

- (1) Prepare a Detailed System Design
- (2) Identify Alternative System Configurations
- (3) Evaluate Alternative System Configuration
- (4) Select the Best Configuration
- (5) Prepare the Implementation Proposal
- (6) Approve or Disapprove the System Implementation

D. Implementation Phase

Implementation is the acquisition and integration of the physical and conceptual resources that produce a working system. Here are the steps of implementation phase:

- (1) Plan the Implementation
- (2) Announce the Implementation
- (3) Obtain the Hardware Resources

- (4) Obtain the Software Resources
- (5) Prepare the Database
- (6) Prepare the Physical Facilities
- (7) Educate the Participants and Users
- (8) Prepare the Cutover Proposal
- (9) Approve or Disapprove Cutover to the New System
- (10) Cutover to the New System

E. Use Phase

The use phase is the last element of the cycle, which lasts until it is time to scrap or redesign the system. Redesign requires that the cycle be repeated.

The steps of the use phase are shown as follow:

- (1) Use the System
- (2) Audit the System
- (3) Maintain the System
- (4) Prepare Reengineering Proposal
- (5) Approve or Disapprove the Reengineering of the System

CHAPTER III

RESEARCH METHOD

This chapter discusses about the research object and explains the model developed to illustrate the system being redesigned. The steps of the research will also be illustrated in research flowchart. All sub chapters will be explained as follows:

3.1 Research Object

This research is focused to solve the data management and data academic problem at Universitas Darul 'Ulum. This problem solving will be done by transferring from paper-based information system into computer-based Information System. The objective is to make the data management process running more effectively and efficiently, so it makes easy to manage the data academic.

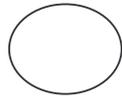
3.2 Model Development

To model the company system, Context Diagram and Data Flow Diagram (DFD) are developed. The Context Diagram is used to model the general process of the systems. The DFD itself is used to model the detail processes. The detail of the process on the DFD will also be modeled by the lower level DFD.

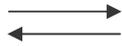
a) The symbols used in developing the DFD are:



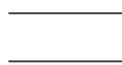
Environmental Elements: This symbol represents the origin or the destination of data.



Processes: This symbol represents the data processing or transformation.



Data Flows: This symbol represents the flow of the data.



Data Store: This symbol represents the data storage process.

b) **Technique to create Data Flow Diagram**

The steps for making a data flow diagram, as follows:

1. Context Diagram

This diagram is used to describe the source and destination of data to be processed or in other words the diagram is used to describe the general system of the whole system.

The Context Diagram positions the system in an environmental context (McLeod Jr. and Schell, 2004). The diagram consists of a single process symbol that represents the entire system. It shows the data flow leading to and from the terminators.

2. Zero Diagram

This diagram is made to describe the stage of the process from the context diagram, on more detailed explanation.

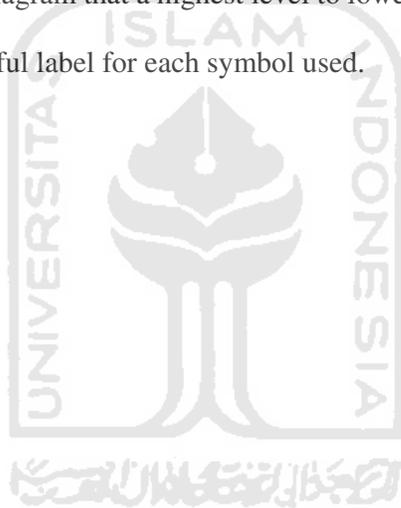
3. Detail Diagram

This diagram is used to describe more detail about the data flow from the stage of the process in zero diagrams.

c) Steps to make Data Flow Diagram

The steps in making the data flow diagram are divided into three stages or levels of DFD construction, as follows:

- 1) Starting from a general or higher level then described or explained until more detail or lower levels, better known by the term top-down analysis.
- 2) Describe the process that occurs in the data flow diagram as detailed as possible until can't described again.
- 3) Keep the consistency of the process that occurs in the data flow diagram, starting from the diagram that a highest level to lowest level diagrams.
- 4) Provide a meaningful label for each symbol used.



3.3 Research Flowchart

This flowchart represents the main steps taken by the researcher to build the information system:

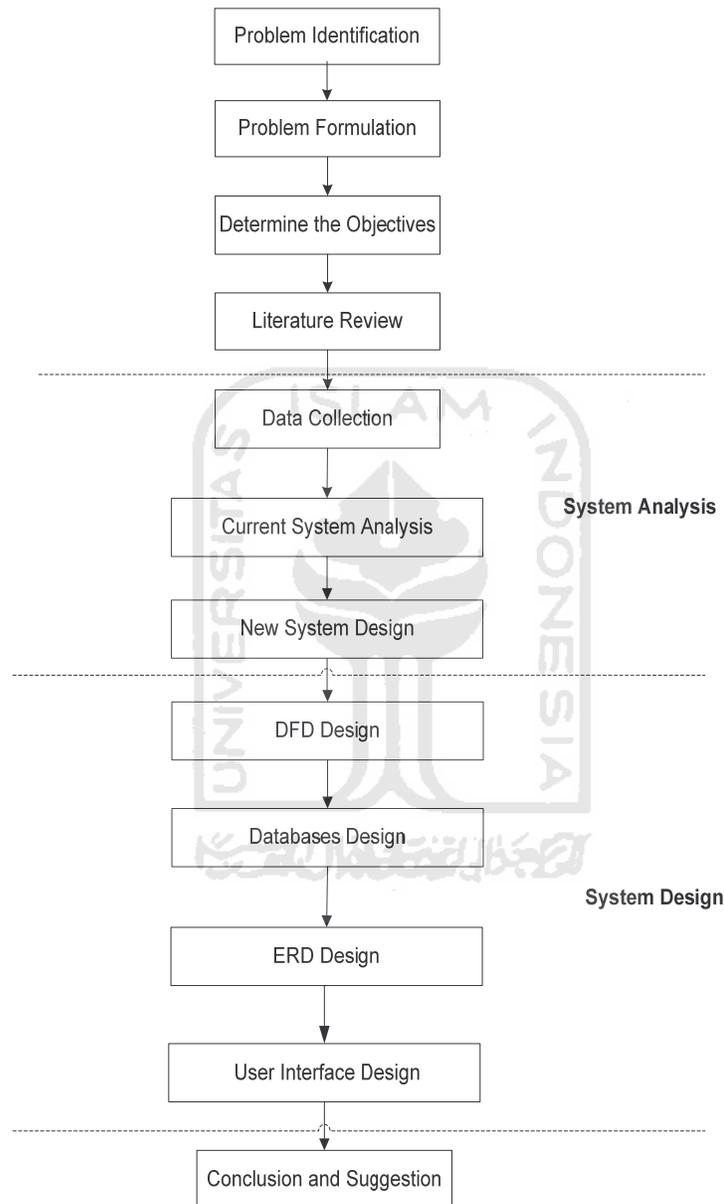


Figure 3.1 Research Flowchart

3.3.1 Problems Identification

This step is a first step in the research process that will be make identification of processes that occurs at the university. The identification process includes an initial investigation of the flow of information and types of data, both types of data are used as input data or data being output for department that concerned with this educational institution.

3.3.2 Problem Formulation

In this step, review the system to be studied is to observe and explore more deeply and explore the existing problems on the systems currently running. Problem formulation is an important step in this research, because this step is needed to define what the system needs to be built.

3.3.3 Determine the Objectives

Determining the objectives is a way to achieve the desired system. Based on the problem formulation that was created in the previous step, this step is used to clarify the framework about what is that will became the target of this research. Determine the objective process also assist researchers in determining the steps that will be pursued in research.

3.3.4 Literature Review

Literature review is needed to theoretical and conceptual studies for researchers to obtain references to support in solving problems.

This literature includes studies of:

1. Management Information System

The study of management information system includes studies on:

a. Information System

- b. Information System Components
- c. Management
- d. Management Information System

2. Management Information System

This study purpose to study the meaning of Academic Management Information System

3. Computer Based Information System

This study purposes to learn the meaning, benefits and advantages of developing a computer-based information system, where it's became the main subject of research.

4. System Life Cycle

System used in the development and usage of Computer Based Information Systems.

3.3.5 Data Collecting

In this step require data collecting process to better know about the system was studied. From the data was collected will be obtained information about the current system. The data and information can be obtained through:

1. Interview method
2. Observation directly into academic activities at the university

3.3.6 Current System Analysis

After collecting data by analysis of the running system, then we can know and understand how the system is currently running. We can see by observing the documents of existing systems at the university such as paper work flow charts, the system flowchart and organizational structure.

3.3.7 New System Design

While doing analyze the current system, indirectly it will be visible the weaknesses in this system, so in that time, it could be make a new system design, which is purpose to identify what is still lacking from the system and needs to be changes, and then do corrective actions. At this steps, always keep on focus to the problem and research purposes.

3.3.8 DFD design

In the designing process will be arranged to DFD (data flow diagram) based on management activities that occurred at the university.

3.3.9 Database design

The database is a collection of data related to each other. The database is an important component in information systems. Database design is based on the activity that occurs in DFD.

3.3.10 ERD design

ERD design is done after the table of databases is formed. ERD design is intended to describe the relationship between tables.

3.3.11 User Interface Design

At this steps the design of an interface program that is created, with the purpose that users will be easily to understand (user friendly) and fast in data processing to become information.

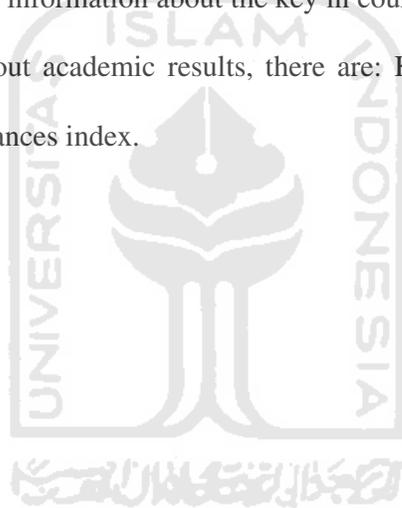
There are 2 steps taken by the author in designing the user interface:

- Designing the Data Input

After the database is formed, then the next step is creating the pages for data input. This page was made with the principle of enabling user to make data input process, the sample of input page is created, there are: lecturer input page, student input pages and pages of courses inputs.

- Designing the Data Output

The next step is to designing the output data. Output data includes information about the course schedule, information about the key in courses, information about the mark and information about academic results, there are: KHS semester, cumulative and the results of performances index.



CHAPTER IV

DATA COLLECTING AND PROCESSING

4.1 Data Collecting

In designing information system will require the planning stages to obtain a complete description of the institution concerned. Planning is done by the organization planning studies, including: organizational structure, description of the current system, the detection problem, identification of the SIM cycles running today and the information systems requirements analysis.

4.1.1 Institution Description

Universitas Darul 'Ulum is a national private university, which establishes and grows up from the environment of Islamic scientific tradition pesantren Darul' Ulum Rejoso, Jombang. Pondok Pesantren Darul 'Ulum is a traditional institution that organizes activities of teaching and education about whole life, according to Islam.

4.1.2 Vision and Mission

Universitas Darul 'Ulum has a vision and mission as follows:

With the support of the Ulama and the nation public figure Universitas Darul 'Ulum want to actively participate in the intellectual life of the nation and freed from backwardness of Indonesia. With educational programs held at the Universitas Darul 'Ulum there is for making a professionals people, who can thinking and working skillfully with the academic degree of bachelor's which has its own advantages that is as a bachelor that has 'keimanan' and 'ketaqwaan' and also can handle the world technology, such as the slogan that has been proclaimed by the founder of Universitas

Darul 'Ulum, DR. K.H. Musta'in Romly, bachelor's of degree that **“Berotak London dan Berhati Masjidil Haram”**.

4.1.3 Facilities

To support the vision and mission that stated, Universitas Darul 'Ulum have some facilities, mentioned below:

A. Faculties in Universitas Darul 'Ulum

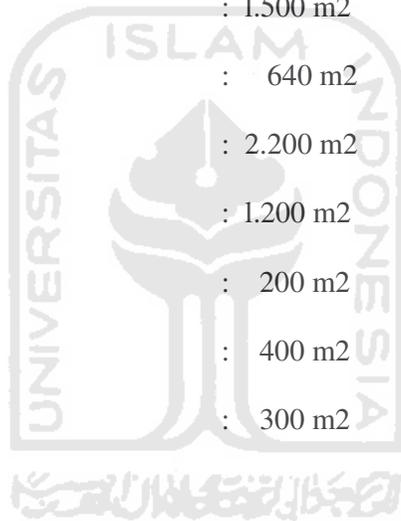
In chances for national educational exertion, so they had evaluation to all program study in private university. Then the faculties in Universitas Darul 'Ulum mention below:

1. Faculty of Law
2. Faculty of Social and Politic
3. Faculty of Islamic Religion
4. Faculty of Teachership and Educational Study
5. Faculty of Technique
6. Faculty of Economy
7. Faculty of Psychology
8. Faculty of Agriculture
9. Diploma III
10. PROGRAM PASCASARJANA (S2)

B. Sarana dan prasarana UNIVERSITAS DARUL 'ULUM

Universitas Darul 'Ulum at 1992 has been completed some facilities, such as:

1. Land area : 21.000.000 m² (21 Ha)
2. Number of Office (building) contains of:
 - a. College Room of 8 undergraduate,
Diploma and master : 12.750 m²
 - b. Administration Room : 1.302 m²
 - c. Auditorium : 2.500 m²
 - d. Aula : 1.500 m²
 - e. Discussion Room : 640 m²
 - f. Library : 2.200 m²
 - g. Laboratory : 1.200 m²
 - h. Mushola room : 200 m²
 - i. Mosque : 400 m²
 - j. Guest Room : 300 m²



4.1.4 Organization Structure

Universitas Darul 'Ulum contains as stated below:

- (1) Foundation.
- (2) Head of University (Rector) and Assistants.
- (3) Senate of University.
- (4) Fakultas dan Program Diploma:
 1. Faculty of Law
 2. Faculty of Social and Political Study
 3. Faculty of Islamic Religion
 4. Faculty of Teachership and Educational Study

5. Faculty of Technique
 6. Faculty of Economy
 7. Faculty of Psychology
 8. Faculty of Agriculture
 9. Diploma III Computer
 10. PROGRAM PASCASARJANA (S2)
- (5) Lecturer.
 - (6) Research Institution.
 - (7) Pengabdian kepada Masyarakat Institution.
 - (8) Lembaga Pengembangan Pendidikan Agama (LEPPA).
 - (9) Biro of Academic Administration.
 - (10) Biro Finance Administration.
 - (11) Biro Public Administration.
 - (12) Biro Kemahasiswaan Administration.
 - (13) Biro Information System and Planning Administration.
 - (14) Unit Technical operation (Operator):
 1. Library;
 2. Computer Center;
 3. Etc.
 - (15) Penyantun Council.

4.1.5 Current Academic Activities Description

Current process academically activities:

1. In acceptance for new student, the admin (operator) try to input the data for the new student to data store master which used on academic activities, such as determine the lecturer guidance and also for determine the dozens, workers, courses and class rooms which involve in the process academic activities.

2. In each semester's period, any changes for the course that held in the academics activities.
3. Then for each course has scheduled by academics administration.
4. The students follow have a test in mid-term and last-term.
5. The results from the final of mid-term and last-term will be resumed for each student by lecturer and submitted to the academics administration.

The essence flow of academics activities analysis in Universitas Darul 'Ulum can sees in pictures below:



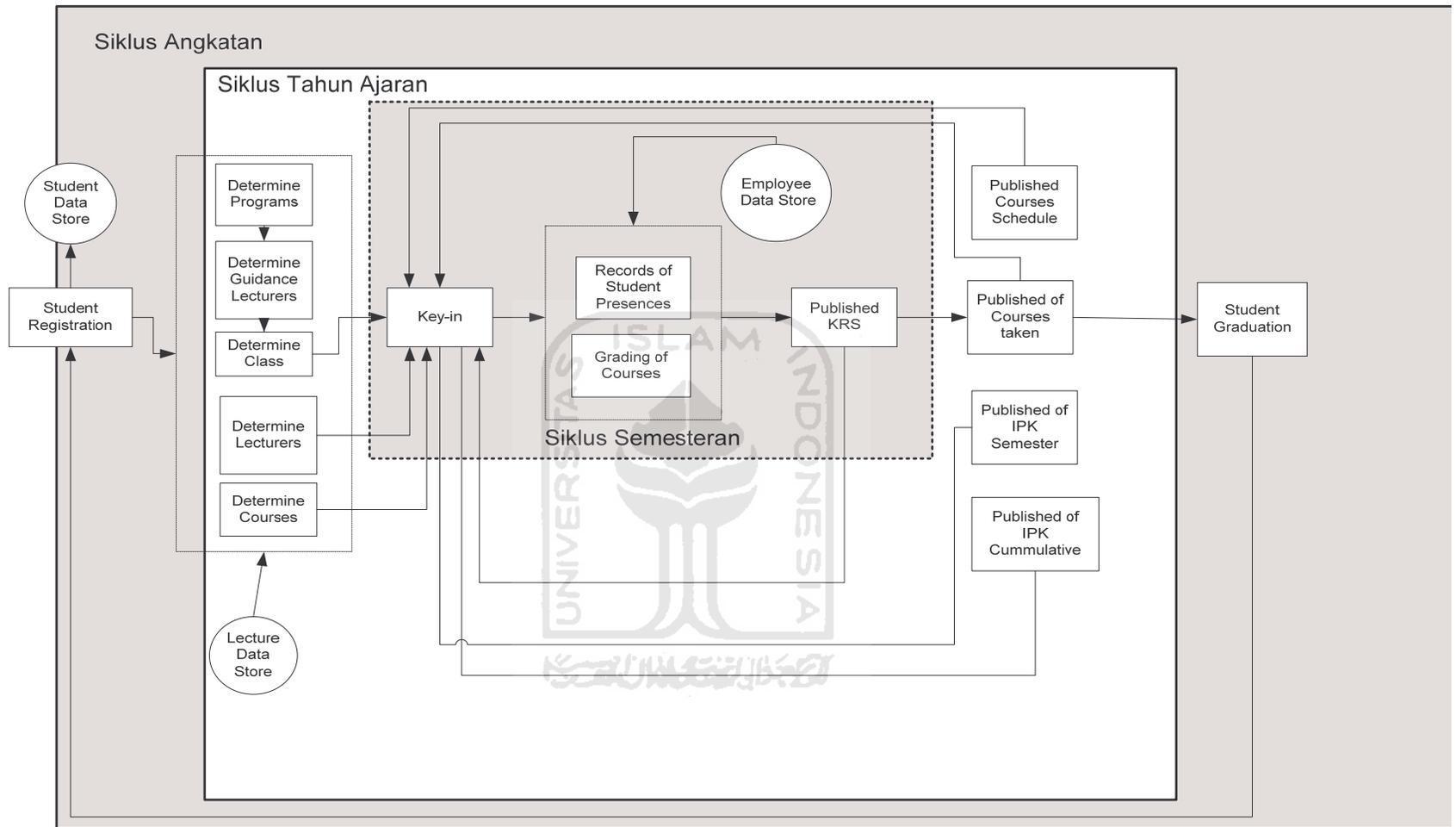


Figure 4.1 Academic Activities

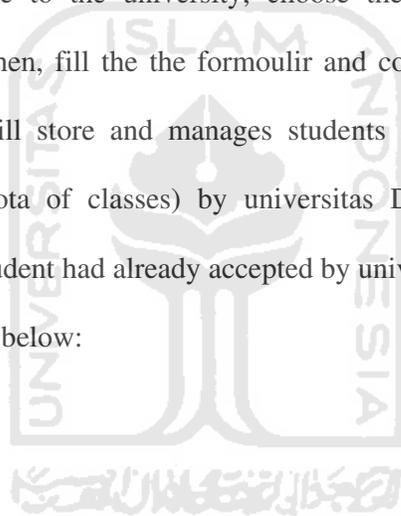
4.1.6 Business Process

In the picture above, that Universitas Darul 'Ulum have operational activities. Such as registrations, determine the guidance lecturers, courses, programs, lecturers, classes until student graduation which some of activities doing manually in their organization operations. And extended explanation from their activities, explained below:

1. Student Registration

New student come to the university, choose the programs offered. After choose one of them then, fill the the formoulir and completes the requirements. Next administrator will store and manages students data to fill the class that already provided (cuota of classes) by universitas Darul 'Ulum. In here the assumption that the student had already accepted by university.

The process described below:



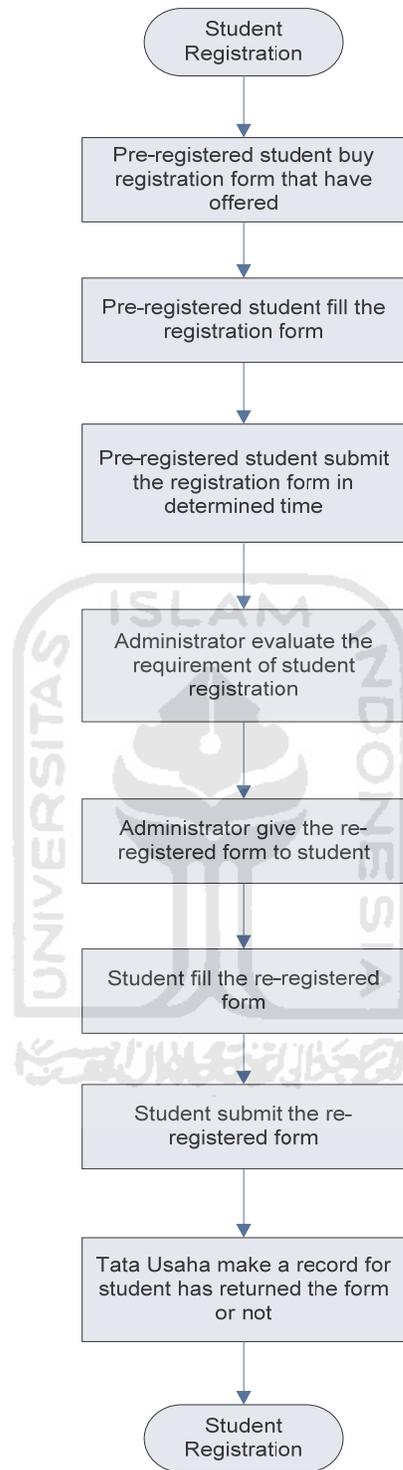


Figure 4.2 Flow of Student Registration Process

2. Determining Program

This process require for the student that have already accepted by University. The student choose one of the programs offered in university, then the academics administrator will records them for student registration one of the program in the university.

3. Determining Guidance Lecturer

The guidance lecturer will have determined after the student have been record in one of program at university. Each student will have one of guidance lecturer. And guidance lecturer has function to guide the student or consult about the student academics.

4. Determining of Class

The process of determination classes was determined when the student have choose in one of the programs offered. This process has called as a student allocation class. Then the policy from the university will provide unlimited classes of each programs offered in university. Student Allocation classes here, the student that had accepted in one of the programs, allocated for their class which have provided and each classes have different schedule of courses.

5. Determining Lecturer

Process of choosing lecturer of each courses should determined before process of key-in. This process requires setting up the process academics such as process print out of schedules.

6. Determining of Courses

This process to set up academic administration such as to support the curriculum in university to each programs offered.

7. Key-in process

This process is processing of the several processes of determining program, determining the guidance lecturer, determining of classes, determining lecturer and determining of courses. This process is to set up the preparation of study

learning for the student which has registered in the University. The set up preparation process is doing in each semester. Student determined every course that should take before the study learning begins with the amount of SKS have provide for them. Then courses which had taken by each student will be recorded by administrator.

8. Record of Student Presences

Study Learning Process

This process activated as schedules built. The schedules have made by programs administrator in each faculty of Universitas Darul 'Ulum.

The learning process run from Saturday until Thursday then Friday is empty from college activities (holiday), it is provides from 07.00 am until 04.00 pm. The schedule that had already put in each class have details courses scheduled, each courses have time limit. The time limit is related to capacity of each course, called as SKS, 1 SKS have limit time 45 minutes. Then at the middle and end of semester will held examination.

The student absence record process handles by administrator in one semester that are in the middle and final semester. Record of student presence has function that is to determine the requirement of grading. The policy that stated by University that is student which have present less than 75% will automatically given with D grade. And if student have present more than 75% will give the original grade from the lecturer. It means this process will affect on the student grading process.

Students presences functioned by administrator which manage each courses in one day in a paper sheet relate to the courses, and then resumed in the middle and end of semester. There are 2 type forms of presences that are allowance and present. In here presence has have a function to affecting grading in each courses but sometimes depend on the lecturer on that course.

The process will be describing with picture below:

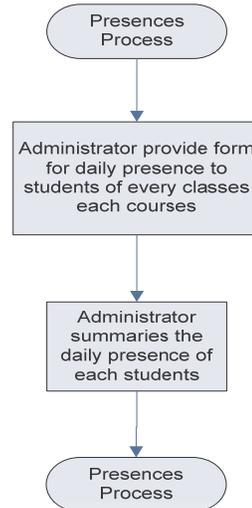


Figure 4.3 Flow of Student Presences Process

9. Grading of Courses

Grading process of each course taken by lecturer which store to administrator in middle and final semester. After the process of key in of courses, each of courses will have examination process. Furthermore the grading process will affect by mid-term and final-term examination results. Even the process finally be effecting absence process, which their organization have rule that the absence below 75% will automatic with C grade. The factors of grading divide into 2:

a. Mid-term examination

This grade are collection of process in learning activities with lecturer, such as assignments, homework and mid-term examination. The grade will managed to administrator for grading publishment.

b Final-term examination

This grade are the next step from mid-term examination. In here, contains of mid-term examination final result, assignment, homework, and final-term examination.

But, all of the process grading will be affected by absence from the rule requirement from the university. And formula for IPK:

A = 4.00, A- = 3.75, B = 3.00, B- = 2.75, B/A = 3.50, B+ = 3.25, C = 2.00,

C- = 1.75, C/B = 2.50, C+ = 2.25, D/C = 1.50, D+ = 1.25, D = 1.00

Then,

$$IPK = (\sum(\text{Credit of semester (SKS)} \times \text{Grade}) / \sum \text{Credit of semester (SKS)})$$

10. Published KRS

This process aimed for publishing the result of each semester for the student. In here administrator summarize result of grading on form of paper which published to student every semester. So, the student might find information of their specified skills that needed as they apply in one of the programs in university.

Print out KRS managed by academic administrator which printed out line of student's grade cumulative in the end of semesters. This KRS is the information of all the academic students' performance in each semester. The information will be given to students but after paid the tuition fee of all administrations that they have. This picture explains the steps of KRS published below:

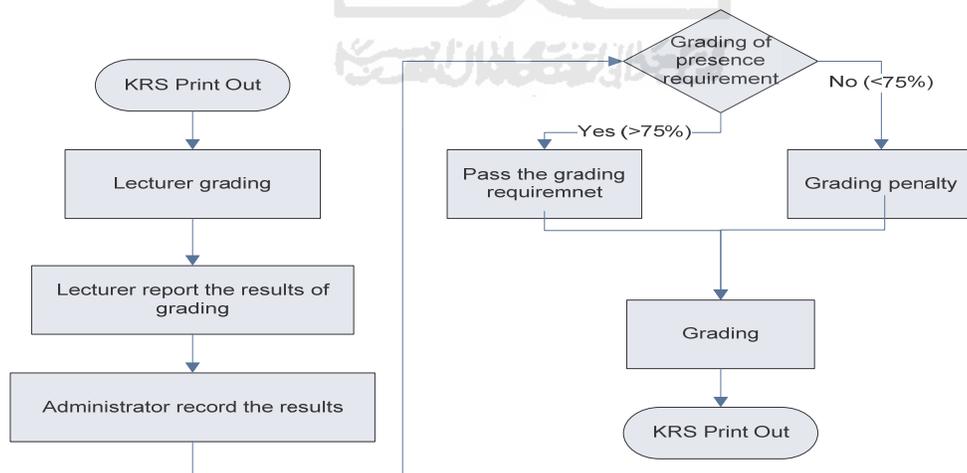


Figure 4.4 Flow of Print out KRS

11. Published courses schedule

Published courses schedule initially to set up of preparation the academics process such as study learning process which provide the courses should taken in the key-in process. This has function to inform courses involve in university.

12. Published of courses taken

This describes the result of key-in process, the information show the courses that have taken in one semester. So, this process has function to records the courses that have taken in the academics activities.

13. Published of IPK Semester

This process will summarize the result of academics activities in a semester. After lecturer submit the grade to administrator, then summarized to each student.

So, published of IPK semester will give the information result of academics activities from the course that had taken in a certain semester.

14. Published IPK cumulative

This process summarized from academics result of grading to the last semester which have taken in university by administrator. This activity gives information for level academics student.

15. Student graduation

This is the final process of student achieved their academics activities in university which taken for a certain years after they completed the final project and administration. This process held in programs of graduation ceremony. Finally, after graduate from university, they will record as an alumnus for university by administrator.

4.1.7 Problems Analysis

The main problem found in information systems at the Universitas Darul 'Ulum is the registration process, started from student registration, lecturer until course registration, it is still using paper based system, both in the registration process and about filling the relevant data. This is makes the process will be inefficient in terms of storage and data processing. Therefore, it's necessary to build databases and application programs to ease the process.



Activities	Descriptions	Mechanism	Information Needed	Problems	Causes	Solutions
<ul style="list-style-type: none"> - Registration process - Key In process - Lectures - Documentation (Given a mark for each student of each lectures) KHS Semester, KHS Kumulatif, dan Performance Index)	After Registered the personal data, the student making the key in process and taking courses until given a grade of each courses. This Process involve students, lecturer and administrators. Then this process requirment needed for data academics activities.	<ul style="list-style-type: none"> - The student that already taken the programs in any faculty, must be key in the courses, and arrange the courses schedule that offered in each department. - The lecturer arrange their schedule and giving a grade for each student - The administrator making a googd documentation, it will be important information for student and lecturers 	<ul style="list-style-type: none"> - Student data - Courses data - Lecturers data 	Losing students data and information about courses which have taken by student in key-in process.	<ul style="list-style-type: none"> 1.Lack of data integration in administration. 2.Bad system data records 	<ul style="list-style-type: none"> 1. Integrate between each data or information that related each other 2. Develops a good system data records. 3. Develops a good documentations. 4. Develops a good user interface 5. Use the computer based system

Table 4.1 Problem Analysis Table

4.1.8 Recommended Analysis

Based on descriptions and analysis that stated before, furthermore recommended analysis is need to improve the performance on the organization. And there are the recommended analysis:

1. New system development that can support the registration operation activities (data management).
2. New system development that can support the academical administration activities (data academic).

4.2 Analysis and Design (Data Processing)

In data processing, the steps will be taken is to map the model, making the process becomes more detailed by using Data Flow Diagrams, and designing the databases.

4.2.1 Data Flow Diagram

Data Flow Diagrams (DFD) is a tool commonly used to makes documentation the process in the system and suppress the functions in the system, how to use the stored information and transferring the information between functions within the system. While the context DFD is a data flow diagram which is shows the system as a process. The purpose is to provide a general view system and demonstrated a process that interacts with its environment.

4.2.1.1 Context Diagram

The design of this information system started from the most global form of context diagram. This context diagram will be lowered into a form that is more detail

on the the next level. Context academic information systems diagram of the Darul 'Ulum University can be illustrated through figure 4.5 Context Diagram.

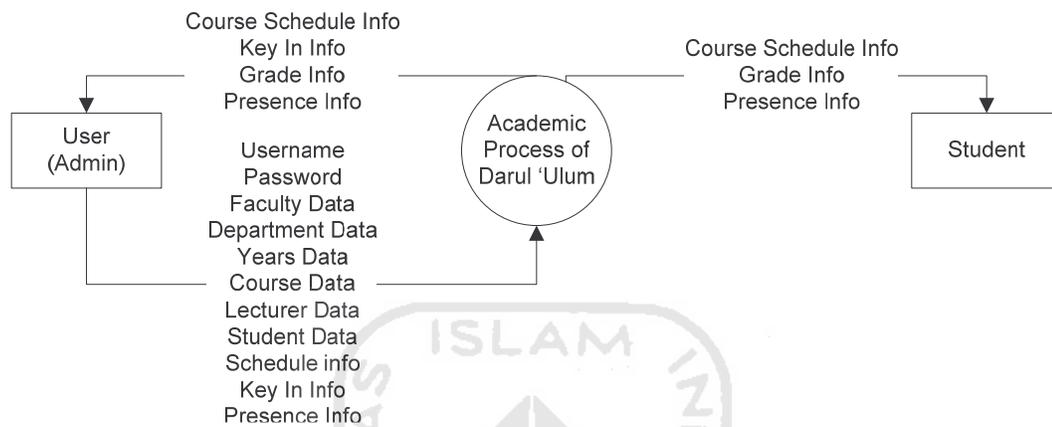


Figure 4.5 Context Diagram

In this picture, generally, there are two major entities that involve in the Academic MIS Universitas Darul 'Ulum. First is User, which held the role as an Administrator. The administrator is the only person who has the privileges to insert and edit the data. The second entity is Student, which only receiving information from the system related to their academic performance.

For an initial database, the flow of data sourced from data entered by the admin. The data include that is logged in username and password, faculty data, department data, course data, academic year data, lecturer data, and student data. This data is relatively not change, only student's data that require an update every new academic year. And by combining the data that already stored, admin can insert the course schedule data, key in data, mark data, and presence data. Those data will be processed by the system become an important information that will be provided back to the admin, and also for the student.

4.2.1.2 DFD Level 0

DFD Level 0 is the reduction process that's more detailed than the context diagram. In DFD level 0 there are two processes of academical administration. First is Data Management that require data input and data output. The data input have to store the data which are faculty data, department data, year data, lecturer data, student data and data course. Then data edit have action editing the data input processes. Second is the Data Academic that made some proses, there are course schedule input, key in input, grade input and presence input activities in academics management information system of Universitas Darul 'Ulum.

On the DFD Level 0 that depicted in picture 4.6, showed that operators who will be responsible for entering data into the system. The user (Admin) needs some information from academics data such as course schedule information, key in information, grade information, and presence information, from database provided, then user (Admin) need to input student data, lecturer data, department data, faculty data, course data, year data, grade information, presence information, schedule course information, key in information into academics data. This process updated with the new data input which stored into databases. In academics data could sent some information that needed by student that are course schedule information dan grade information.

There is that data flow in DFD level 0 :

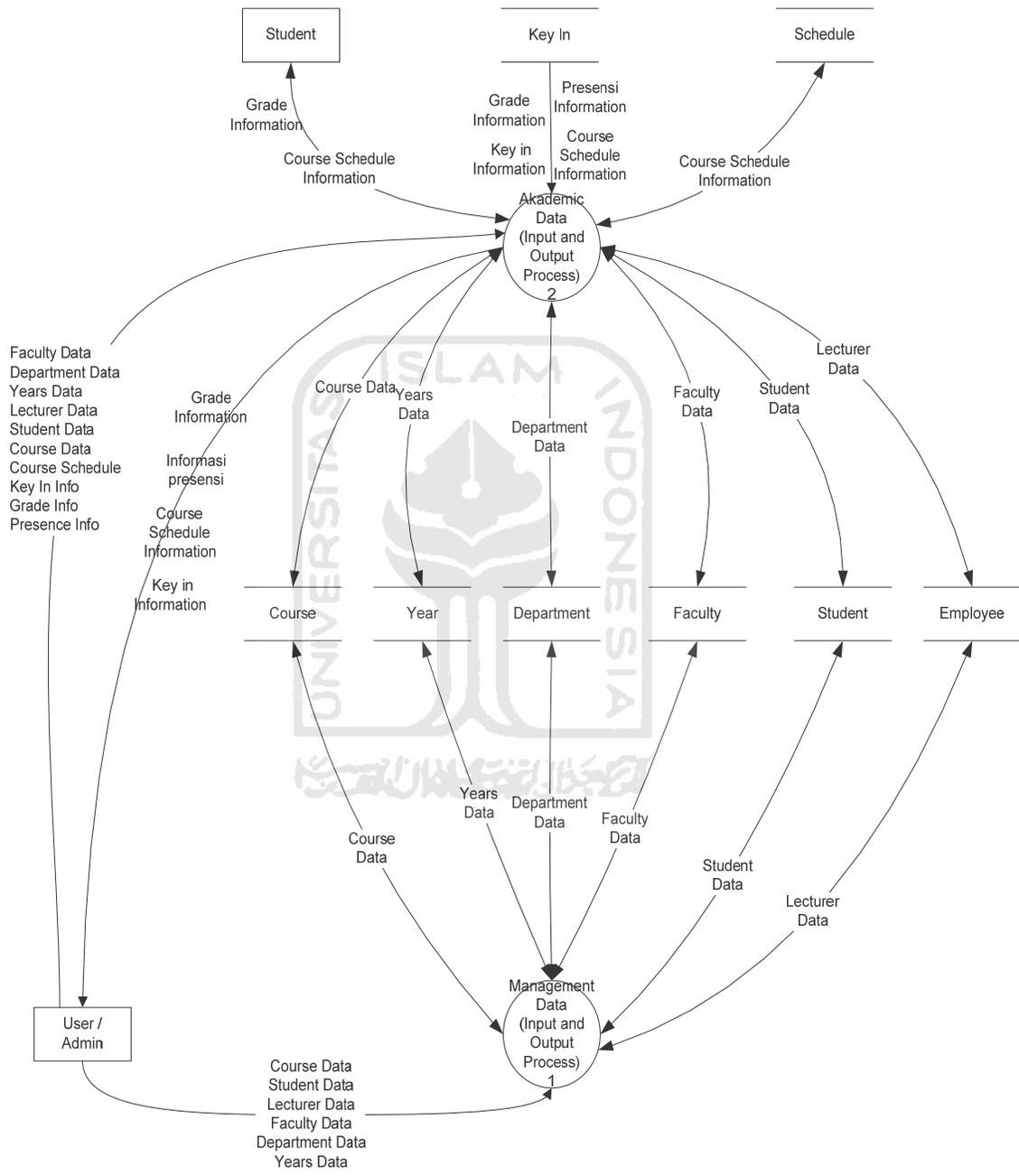


Figure 4.6 DFD Level 0

4.2.1.3 DFD Level 1 Proses Manajemen Data

From the DFD level 1 data management process there is a process of data input, including: input data student, input lecturer data, input course data, input department data, input faculty data, input years data. Where, the data that was entered earlier will become a source of information on the process of academic services (Academic Data).

In this data management process admin can perform updates on the database tables by adding, changing and deleting data.

Level 1 DFD Data Management Process can be seen in figure 4.7 DFD Level 1 Management Data

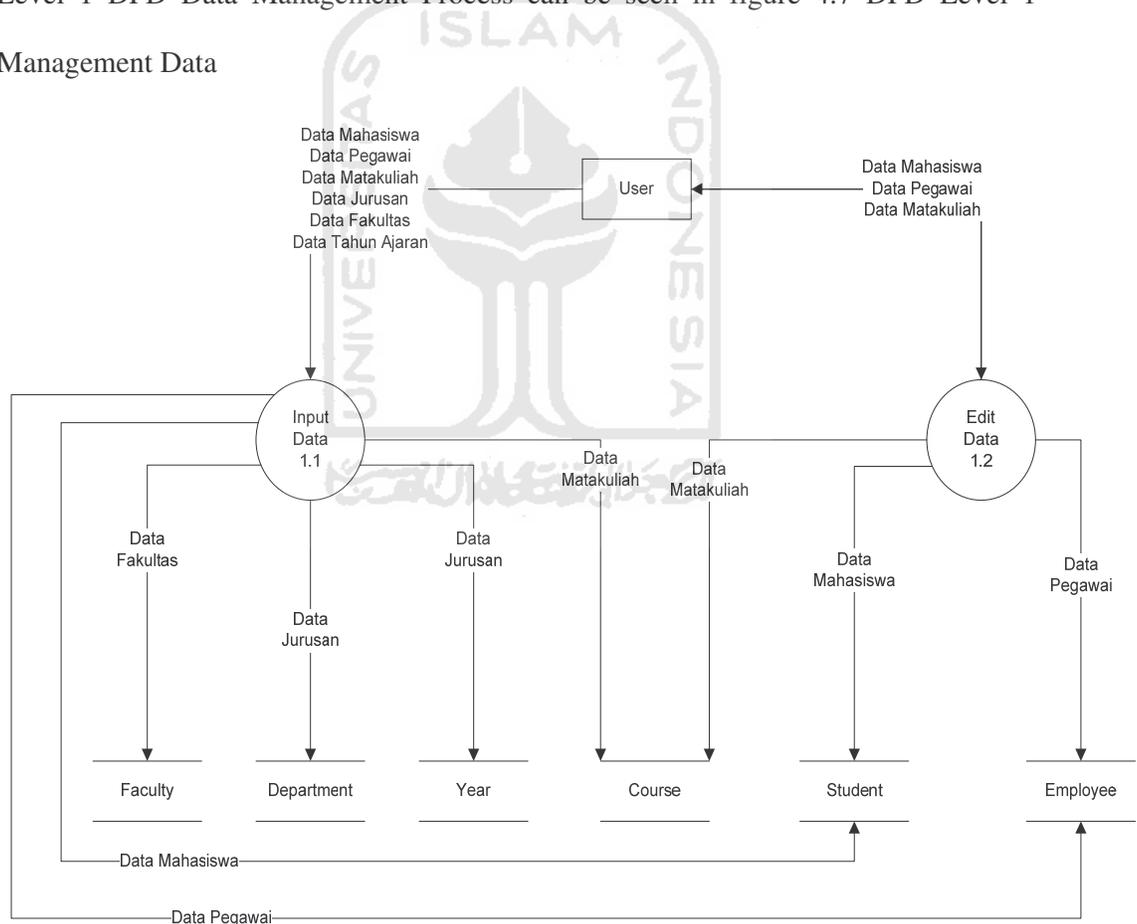


Figure 4.7 DFD level 1 Management Data

4.2.1.4 DFD level 1 Academic Service Process (Academic Data)

DFD Level-1 is a next simplifying of the DFD Level-0, as shown by figure 4.8 DFD Level 1 Academic Data

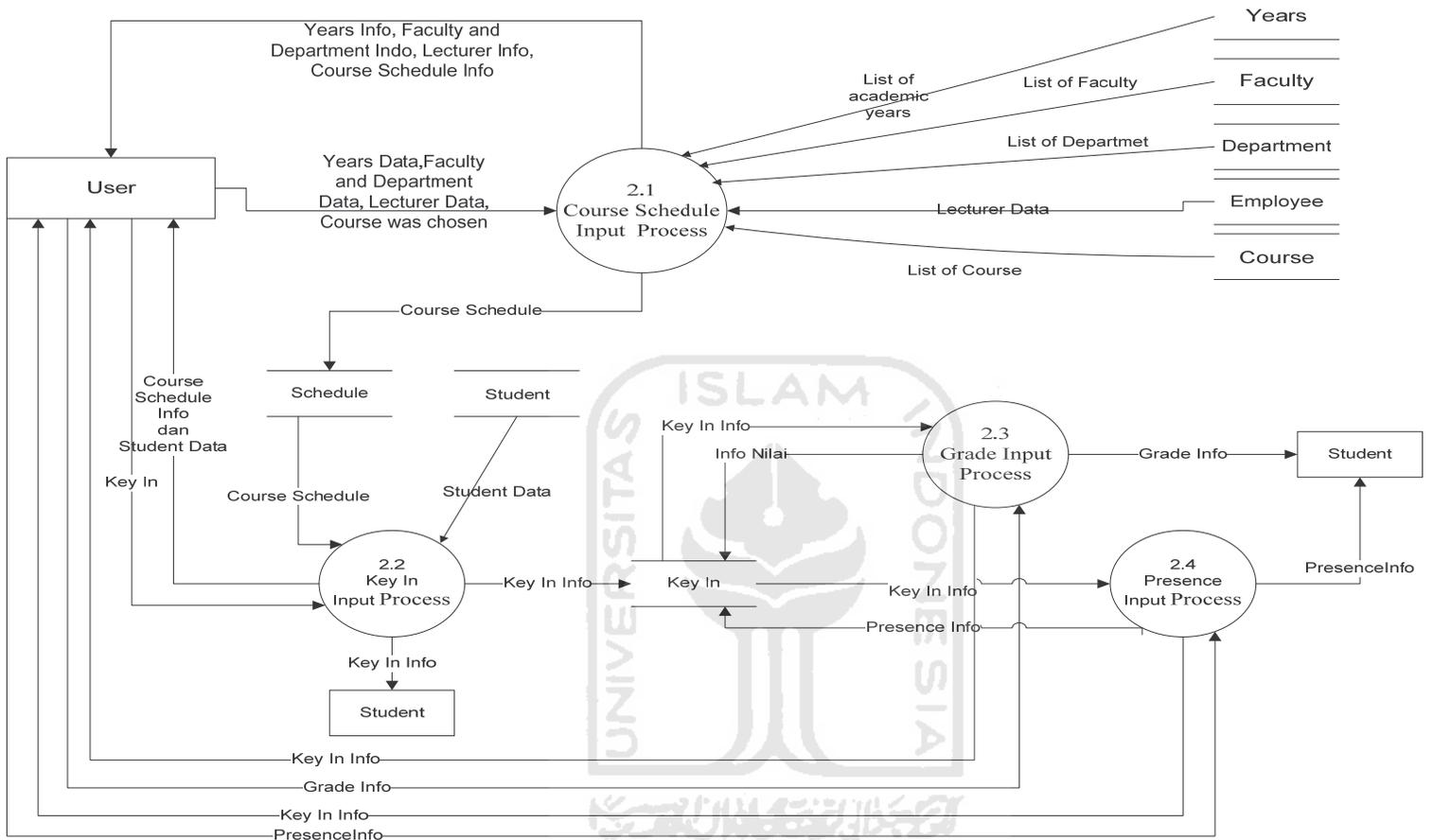


Figure 4.8 DFD Level 1 Academic Data

At DFD level 1 academic data has four input process activity, there are: course schedule input, key in input process, grade input process and presence input process. Where, every process that occur need information obtained from data input process conducted in the process of data management, there is information about the faculties, departments, academic years, lecturers, courses and information about student data.

Started from the courses schedule input, the operator searching the data, there is the searching process of faculty data, department data, the academic year data, lecturer data and course data. Then continue with the process of scheduling classes by determine the day, timing of the lectures, classes and classrooms. This process is done one by one per subject. The data entries have been complete will be stored in databases, schedule data store.

And then the second process is the input key in. Where, in this process, the admin searching the data, there is the searching process of faculty data, department data, the academic year data, semester data, course schedule data and student data. The data entries have been complete will be stored in databases, key in the data store.

Third process is the input value. In this input process, the operator searching the data, there is the searching process of faculty data, department data, the academic year data, data of the semester, course schedule data and student data. The operator is also tasked to conduct the input process and the presence data. To process the grade input and attendance is done each course per student. The data entries have been complete will be stored in databases, key in the data store.

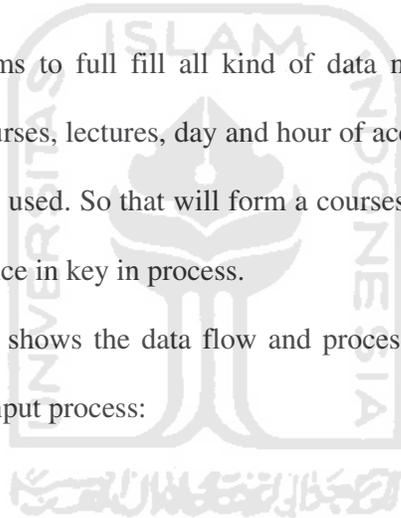
And the last process is the result process, where, on this process show to the operator or admin as an active user and to mahasiswa, information about KHS Semester, KHS Kumulatif and Index Prestasi.

4.2.1.5 DFD Level 2 Course Schedule Input

This DFD level 2 academic data is a translation from DFD level 1 academic data. In DFD level 2 describes the process of courses schedule input. Started from faculties data search process, searching departments and academic year data, courses data search process and lecturer data search process, then these data will be used by the admin on the course schedule input process, and will generate information about the courses schedule that required by admin and students. The courses schedule data will be stored in the schedule data store.

In this process aims to full fill all kind of data needed, ranging from data faculties, departments, courses, lectures, day and hour of accomplishing, kind of class, and classroom that will be used. So that will form a courses schedule that can later be used by students as guidance in key in process.

The picture below shows the data flow and processes that occur at the DFD level 2 courses schedule input process:



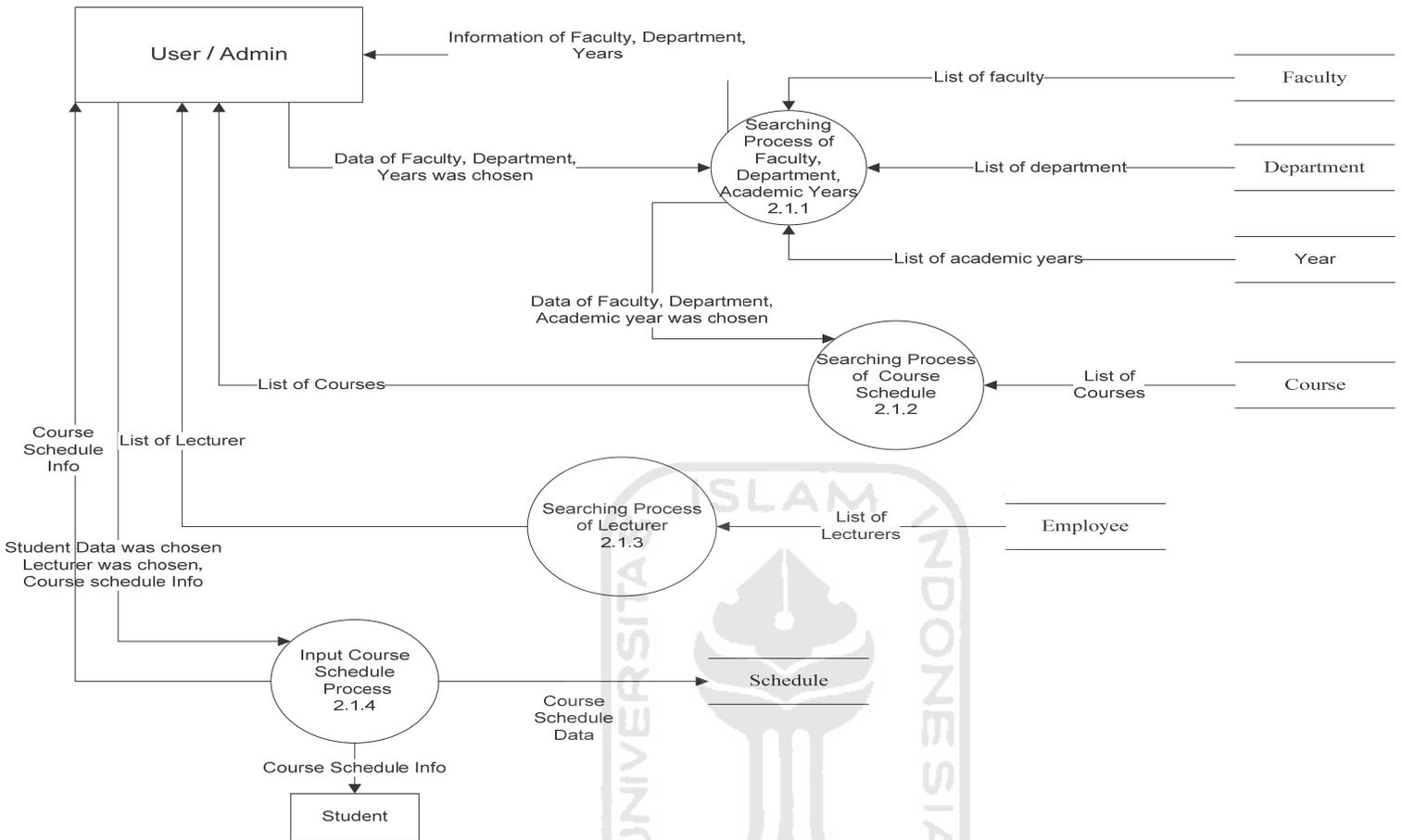


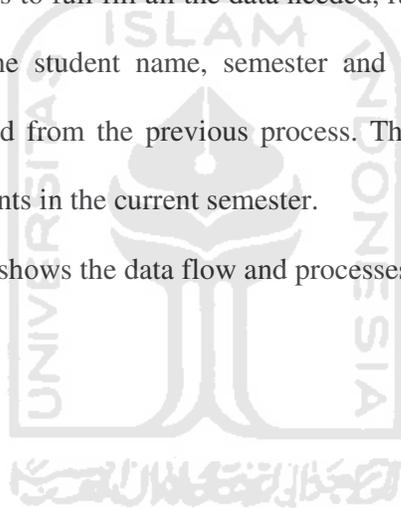
Figure 4.9 DFD Level 2 Course Schedule Input

4.2.1.6 DFD Level 2 Key In Input

This DFD level 2 academic data describes the key in input process. The results of the previous process, course schedule, will be used in key in input process. The process started from the searching the faculty data, searching department and academic year data, search courses schedule data and search student list, then the data will be used in key in input process, where, its will generate information about students who have been key in or selected the course schedules in that semester. Key in data will be stored in the key in data store.

In this process aims to full fill all the data needed, ranging from data faculties, departments, NIM and the student name, semester and courses to be taken. The courses schedules obtained from the previous process. This process will generate a courses schedule for students in the current semester.

The picture below shows the data flow and processes that occur at DFD level 2 key in input process:



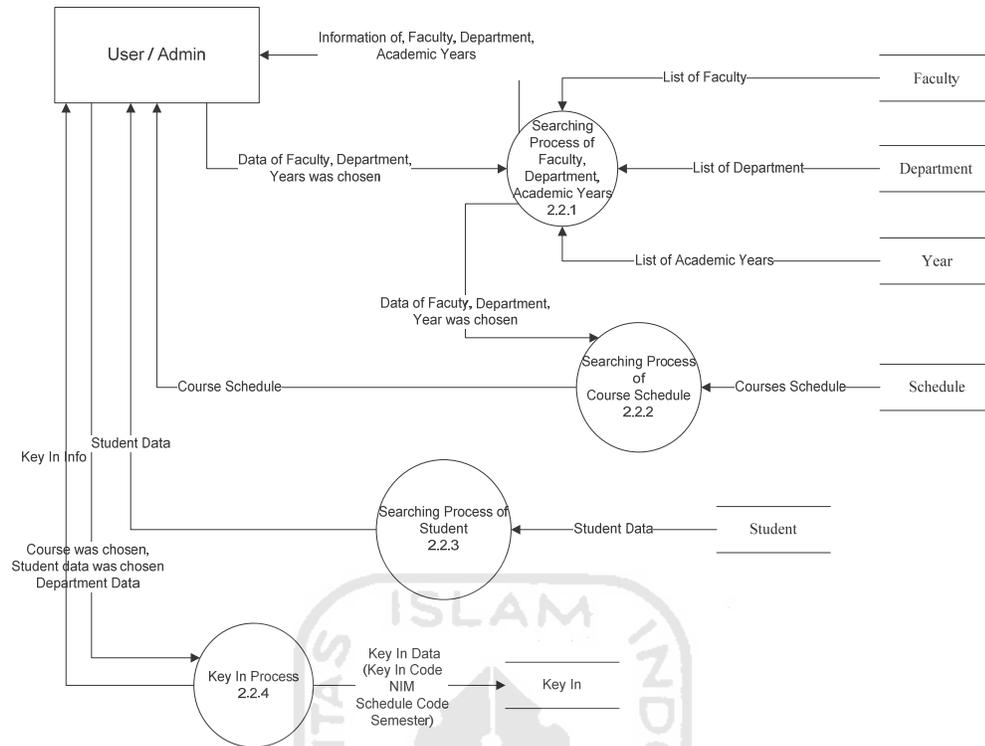


Figure 4.10 DFD Level 2 Key In Input

4.2.1.7 DFD Level 2 Grade Input

This DFD level 2 academic data describes about grade input. Started from the searching of faculties data, searching the departments and academic year data, search process of courses schedule and student list search process, then the data, by the admin, will be used in grade input process that will be generate the information about grade obtained by students based on subject taken and lecturer assessment. The grade data will be stored on the key in data store.

In this process the admin responsible to full fill the data about grade of each courses that student taken.

The picture below shows the data flow and processes that occur at DFD level 2 grade input process:

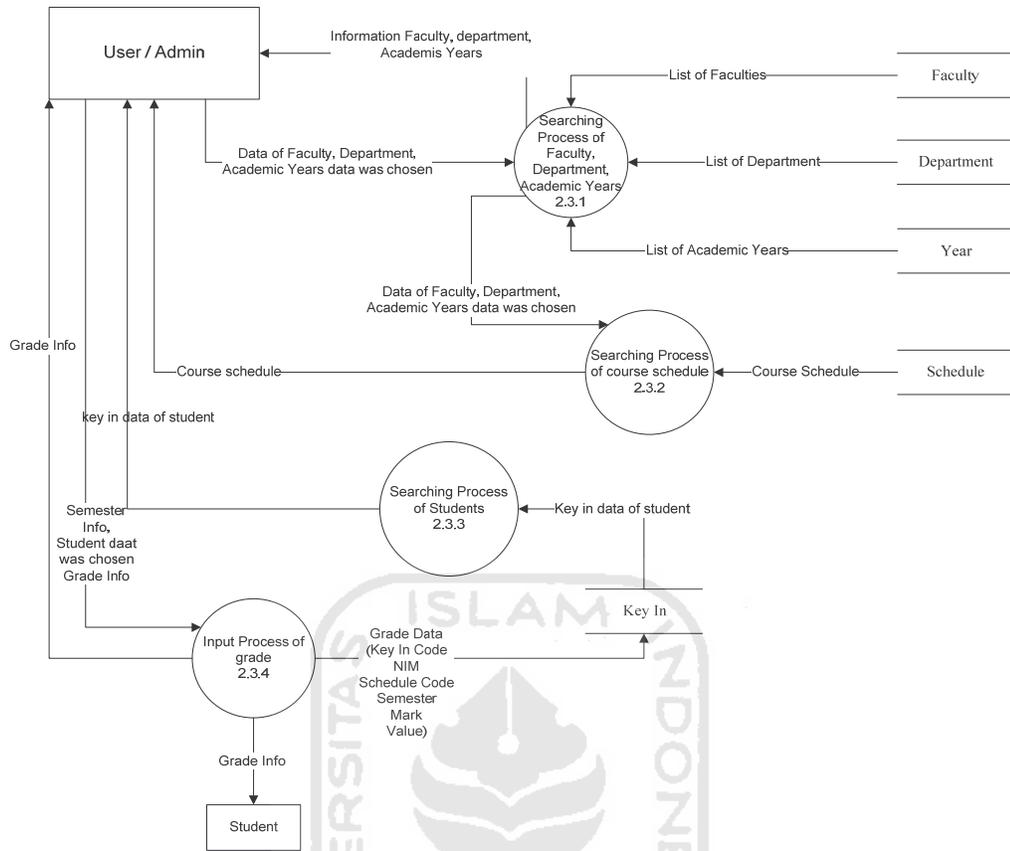


Figure 4.11 DFD Level 2 Grade Input

4.2.1.8 DFD Level 2 Presences Input

DFD level 2 academic data describes the presences input process. Started from the searching of faculties data, searching the departments and academic year data, search process of courses schedule and student list search process, then the data, by the admin, will be used in presences input process that will be generate the presences or attendant list information obtained by students based on subject taken and lecturer assessment. The student presence data will be stored on the key in data store

In this process the admin responsible to full fill the data about presence of student on each courses that student taken.

The figure below shows the flow of data and processes that occur at the level 2

DFD presences input process:

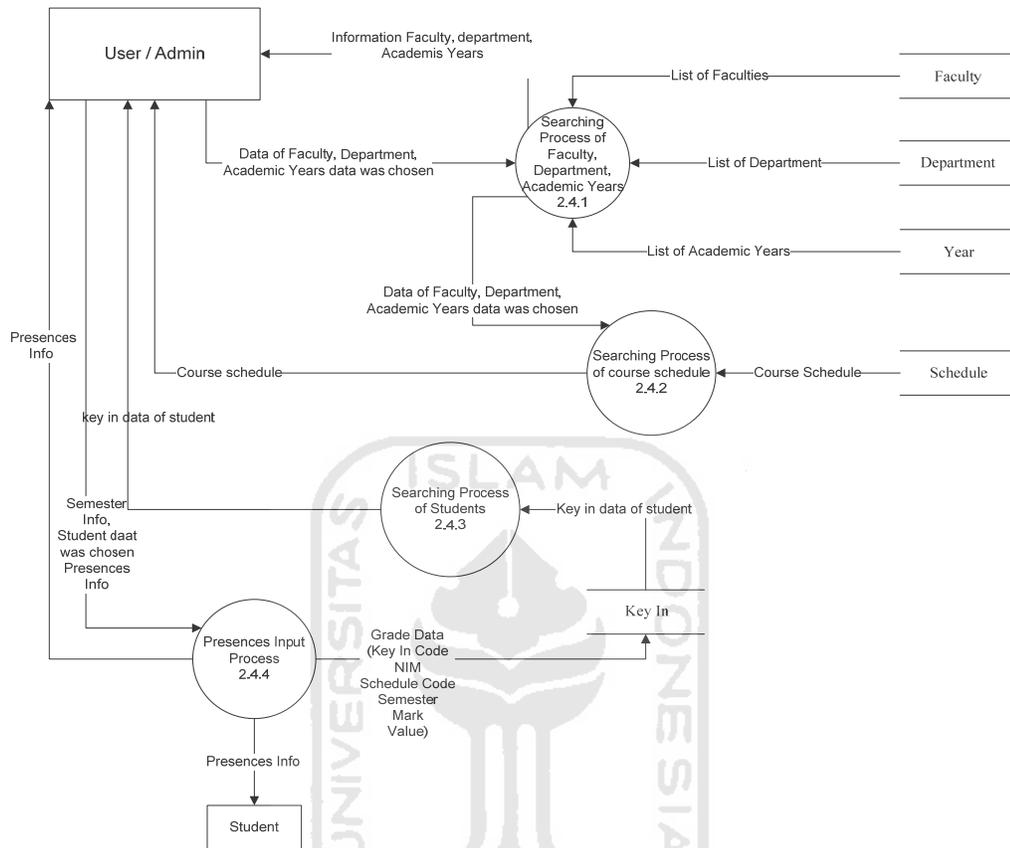


Figure 4.12 DFD Level 2 Presences Input

4.2.2 Database Design

The database is a very important component in information systems. The database serves as a data provider for information systems as well as data storage.

The first step in the process of database design is to determine the entities that are involved, which is obtained from the data store generated from data flow diagram design (DFD) process before. Data store which is in the DFD shows the data storage and serves to store or saving the information needed or the information that generated from academic SIM.

Following the identification of the entity that will be used:

- a. In the DFD level 1 process of academic services (academic data) there is any year, faculty, department, employee, course, student, schedule and key in data store.
- b. In the DFD level 2 course schedule input process contained faculty, department, year, course, employee and schedules data store.
- c. In the DFD level 2 key in input process contained faculty, department, year, schedule, student and key in data store.
- d. In the DFD level 2 grade input process contained faculty, department, year, schedule and key in data store.
- e. In the DFD level 2 presences input process faculty, department, year, schedule and key in data store.

The attributes of each entity that already exists on the DFD can be seen in the tables below:

1. Faculty Table

Faculty table used to store faculty data which provide faculty data. Structure of faculty table showed below in table 4.2:

Table 4.2 Attributes of Faculty Table

Faculty	FacultyCode*	FacultyName

2. Department Table

Department table used to store department data which provide department data. Structure of department table showed below in table 4.3:

Table 4.3 Attributes of Department Table

Department	FacultyCode**	DepartmentCode*	DepartmentName

3. Course Table

Course table used for to store course identity which represents the course data in paper form. Structure of course table showed below in table 4.4:

Table 4.4 Attributes of Courses Table

Course	CourseCode*	CourseName	Credit	Semester	FacultyCode**

DepartmentCode**

4. Employee Table

Employee table used for to store employee identity which represents the employee identity in paper form. Structure of employee table showed below in table 4.5:

Table 4.5 Attributes of Employee Table

NIP*	EmployeeName	Title	BirthDate	Gender	Address

FacultyCode**	DepartmentCode**	Position	Status

5. Schedule Table

Schedule table used for to store schedule data which represents the scheduled data in paper form. Structure of scheduled table showed below in table 4.6:

Table 4.6 Attributes of Schedule Table

Schedule	ScheduleCode*	CourseCode**	NIP**	ClassRoom	Class

Day	Time	Year**	FacultyCode**	DepartmentCode**

6. Student Table

Student table used for to store student identity which represents the student identity in paper form. Structure of student table showed below in table 4.7:

Table 4.7 Attributes of Student Table

Student	NIM*	StudentName	BirthDate	Gender	Religion	Address1	Address2

HighSchool	ParentName	ParentJob	ParentEducation	FacultyCode**

DepartmentCode**	Year**	NIP**

7. Key In Table

Key in table used for to store key in data which represents the key in data in paper form which show absences and grade of course in each student.

Structure of key in table showed below in table 4.8:

Table 4.8 Attributes of Key In Table

KeyIn	KeyInCode*	NIM**	ScheduleCode**	Semester	Mark	Value

Absence

8. Year Table

Year table used for to store year data which provide year data. Structure of year table showed below in table 4.9:

Table 4.9 Attributes of Year Table

Year	Year*

After the databases table was made, the next steps is linking the tables (entities) become interdependent relationship that usually we called as an ERD (Entity RelationshipDiagram).

Here are the relationships between tables are generated:

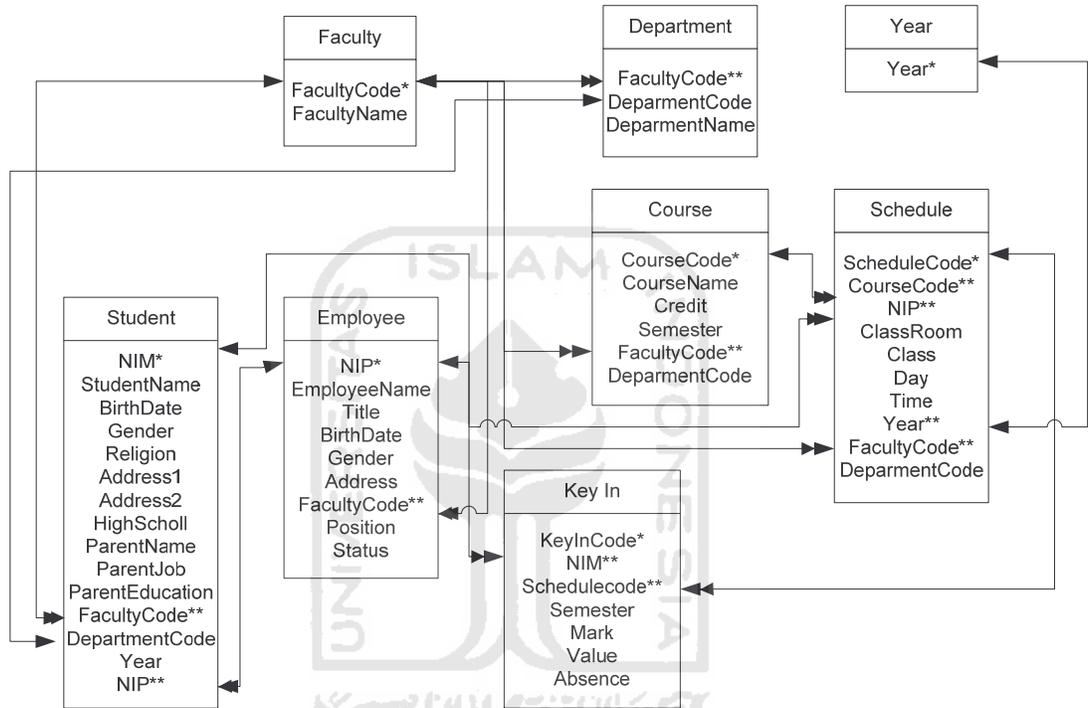


Figure 4.13 Entity Relationship Diagram

Keterangan:

1. * : Primary Key
2. ** : Foreign Key
3. → : one , →→ : many

There is a sample table description in the analysis and design of the Academic MIS:

Table 4.10 Faculty Database Column

Column Name	Data Type	Function
FacultyCode	Varchar(10)	<i>Primary key</i>
FacultyName	Varchar(50)	Record Faculty Name

Table 4.11 Department Database Column

Column Name	Data Type	Function
DepartmentCode	varchar(10)	<i>Primary key</i>
DepartmentName	varchar(50)	Record Department Name
FacultyCode	varchar(10)	<i>Foreign key</i>

Table 4.12 Course Database Column

Column Name	Data Type	Function
CourseCode	varchar(50)	<i>Primary key</i>
CourseName	varchar(100)	Record Course Name
Credit	decimal(18, 2)	Record Credit Data
Semester	varchar(10)	Record Semester Data
FacultyCode	varchar(10)	<i>Foreign key</i>
DepartmentCode	varchar(10)	<i>Foreign key</i>

Table 4.13 Employee Database Column

Column Name	Data Type	Function
NIP	varchar(50)	<i>Primary key</i>
EmployeeName	varchar(50)	Record Employee Name Data
Title	varchar(50)	Record Title of The Employee
BirthDate	varchar(50)	Record Birth Date of Employee Data
Gender	varchar(1)	Record Gender Data

Address	varchar(200)	Record Address of Employee
FacultyCode	varchar(10)	<i>Foreign key</i>
DepartmentCode	varchar(10)	<i>Foreign key</i>
Position	varchar(50)	Record position of Employee
Status	varchar(50)	Record Status of Employee

Table 4.14 Schedule Database Column

Column Name	Data Type	Function
ScheduleCode	varchar(10)	<i>Primary key</i>
CourseCode	varchar(10)	<i>Foreign key</i>
NIP	varchar(10)	<i>Foreign key</i>
Classroom	varchar(50)	Record Classroom Data
Class	varchar(10)	Record Class Data
Day	varchar(10)	Record Day Data
Time	varchar(50)	Record Time Data
Year	varchar(50)	<i>Foreign key</i>
FacultyCode	varchar(10)	<i>Foreign key</i>
DepartmentCode	varchar(10)	<i>Foreign key</i>

Table 4.15 Student Database Column

Column Name	Data Type	Function
NIM	varchar(50)	<i>Primary key</i>
StudentName	varchar(75)	Record Student Name Data
BirthDate	varchar(50)	Record Birth Date of Student Data
Gender	varchar(1)	Record Gender Data
Religion	varchar(50)	Record Religion Data
Address1	varchar(200)	Record Address1 of Student Data
Address2	varchar(200)	Record Address2 of Student Data
HighSchool	varchar(50)	Record HighSchool of Student Data
ParentName	varchar(50)	Record Parent Name Data
ParentJob	varchar(50)	Record Parent Job Data

ParentEducation	varchar(50)	Record Parent Education Data
FacultyCode	varchar(50)	<i>Foreign key</i>
DepartmentCode	varchar(50)	<i>Foreign key</i>
Year	varchar(50)	<i>Foreign key</i>
NIP	varchar(50)	<i>Foreign key</i>

Table 4.16 Key In Database Column

Column Name	Data Type	Function
KeyInCode	varchar(10)	<i>Primary key</i>
NIM	varchar(50)	<i>Foreign key</i>
ScheduleCode	varchar(10)	<i>Foreign key</i>
Semester	varchar(10)	Record Semester Data
Mark	varchar(10)	Record Mark Data
Value	decimal(18, 2)	Record Value Data
Absence	varchar(10)	Record Absence Data

Table 4.17 Year Database Column

Column Name	Data Type	Function
Year	Varchar(50)	<i>Primary key</i>

4.2.3 User Interface Design

Main Menu is one of the most important things in the user interface. This main menu will provide access to the major parts in the systems. Main menu in the information system designed to accommodate all activities that contained in the system. And according to the data flow of entry process to the usage data process, can be divided into seven main activities, there are:

1. Form Entry Lecturer Data
2. Form Entry Student Data
3. Form Entry Course List
4. Form Entry Course Schedule
5. Form Key In
6. Form Entry Presences and Grade
7. Form Entry Academic Data

Where, in any form has special function depend on the process but interrelated. For the security of MIS application itself, there any Log In systems equipped with a password. Where, the password should only be known by the Admin, who will take full responsibility for this application.

Form1

LOGIN ADMINISTRATOR

Password

OK

Keluar

Toggle Password Mode

Password Mode Off

Figure 4.14 Login

- Password = password field contents in accordance with the password used.
- Click OK when the password you enter is correct.
- EXIT button is used to exit from this system.
- Toggle mode password is used to set whether the toggle mode is ON or OFF mode

Example:

1. ON mode, password = ***, function to maintain the confidentiality of the password.
2. OFF mode, password = MIS

Based on the information that we had, the user interface design can be described as follows:



Figure 4.15 Main Page User Interface

Form input and output design

From a database design, data needed to be stored must be identified, so that form input interface designed to be as good as the form of output.

The design we can see below:

A. Form Entry Course Schedule

This form serves to entry and makes course schedules there's available at Universitas Darul 'Ulum. Where, the course schedule information will be used to complete the others form that contained in the system.

Kode	Nama Mata Kuliah
01	Fisika 1
03	Calculus 1
05	Aljabar Linear

Hari	Jam	Mata Kuliah	SKS	Kls	Ruang	Dosen
Senin	06.00	Fisika 1	2	A	1	Pak Aji

Figure 4.16 Form Entry Course Schedule

❖ Steps that must be done as follows:

First, select the Semester (odd or even), Academic Year, the Faculty and Department names that have been available, select one of Subjects from Course Table, then fill in each column, in accordance with the required information. Column need to be filled such as Lecturers, Day, Hour, Class, Classroom column. After make sure about input data, press SAVE button to save it.

➤ The results from data that already entered will appear at:

1. Course Schedule tables, bottom table.

2. SQL Server Databases

: ScheduleCode, CourseCode, LectureCode, Classroom, Class, Day, Time, Year,

FacultyCode, DepartmentCode

➤ The function of each button:



- = Used to store or saving the data that has been entered in each column, then it will be stored in the available databases (SQL Server). If, during the storage process failure occurs, it is because of one of the columns that have not been filled.

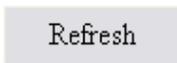


- = Used to delete subject data that are not needed, by selecting and pressing one of the names of subjects on the subjects table then press DELETE button.

• Where, will show up the question:

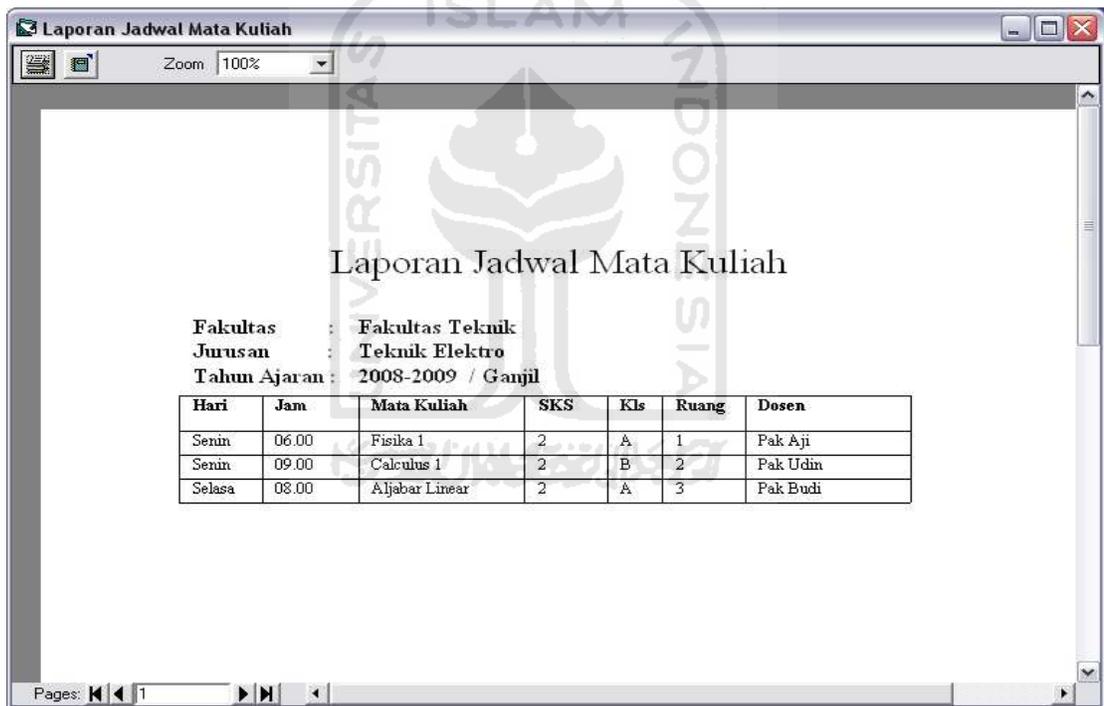
1. Yakin akan menghapus data ini..?? press YES for delete, NO for back into normal condition.
2. Menghapus data akan menghilangkan semua record tentang pegawai bersangkutan, lanjutkan..??
3. Data yang hilang sepenuhnya menjadi tanggung jawab Anda, apakah anda benar – benar yakin..??

-  = Used to editing or change the information already stored. By selecting one of student name, then click EDIT. After that you can change the data on Day, Hour, Class and Classroom column, once finished please press SAVE to store new data.

-  = Used to refresh the form

-  = Used to make a print out Course Schedule

Print out example:



Laporan Jadwal Mata Kuliah

Fakultas : Fakultas Teknik
Jurusan : Teknik Elektro
Tahun Ajaran : 2008-2009 / Ganjil

Hari	Jam	Mata Kuliah	SKS	Kls	Ruang	Dosen
Senin	06.00	Fisika 1	2	A	1	Pak Aji
Senin	09.00	Calculus 1	2	B	2	Pak Udin
Selasa	08.00	Aljabar Linear	2	A	3	Pak Eudi

Figure 4.17 Course Schedule print out

From the forms that you filled out before, you will get an informations about the Lecturer (Employee Table), Student (Student Table), List of Subjects (Subjects Table) that all in Data Management Process and Course Schedule (Course Schedule Table), where this information would be very usefull for the next academic administration, there are:

1. The taking course process by each student in each semester, in Form Key In
2. Entry Presences and grade of every subject taken in each semester, in Form Entry Presences and Grade
3. KHS Semester Results, Cumulative KHS, edit grade, and assessment of each student Performance Index.

First, begin by explaining about key in process in each semester (Form Key In), followed by sequence from the filled in presences process and giving a grade of each student for each subjects was taken in Form Entry Presences and Grade, until about the KHS Semester Results information, Cumulative KHS information, edit grade, and assessment of student Performance Index information.

B. Form Key In

This form serves to choose every subject to be taken in each semester by the students, so it will become a course schedule form for the student per-semester. Where, the information about course schedule that was taken will be used to support the Form Entry Presence and Grade process.

Form Key In (Administrator)

Semester : [Dropdown] Tahun Ajaran : [Dropdown]

NIM	Nama Mahasiswa
04522072	Erick Jamaluddin Ghani
04522126	Adhi Sulistiyanto
04522206	Agung Wibowo

Fakultas : [Fakultas Teknik]
 Jurusan : [Teknik Elektro]
 NIM / Nama Mhs : [04522072] [Erick Jamaluddin Ghani]
 Semester : [1]
 Nama Mata Kuliah : [Fisika 1]

Hari	Jam	Mata Kuliah	SKS	Kls	Ruang	Dosen
Senin	06.00	Fisika 1	2	A	1	Pak Aji
Senin	09.00	Calculus 1	2	B	2	Pak Udin
Selasa	08.00	Aljabar Linear	2	A	3	Pak Budi

[Save] [Edit]
 [Delete] [Refresh]

Mata Kuliah Yang Sudah Diambil →

Hari	Jam	Mata Kuliah	SKS	Kls	Ruang	Dosen
Senin	06.00	Fisika 1	2	A	1	Pak Aji

Figure 4.18 Form Key In

First, select the Semester (odd or even), Academic Year, the name of the Faculty and Department that available, then that will show up information from Student Table and Course Schedule Table.

The second process is to select one of student from the Students Table and selecting Subjects to be taken by the student from Course Schedule Table. Student and subject data was selected will appear in the NIM / Student Name and Subject column. The semester blank column must be filled in accordance with semester required.

After process above are completed, press the SAVE button, which will store the selected information data in the database (SQL Server). The data has been stored can be seen in Was Taken Course Table.

➤ The function of each button:

-  = Used to store or saving the data that has been entered in each column, then it will be stored in the available databases (SQL Server). If, during the storage process failure occurs, it is because of one of the columns that have not been filled.

-  = Used to delete the selected subject data that are not needed, by selecting and pressing one of the course schedule on the was taken course table then press DELETE button.

• Where, will show up the question:

1. Yakin akan menghapus data ini..?? press YES for delete, NO for back into normal condition.
2. Menghapus data akan menghilangkan semua record tentang pegawai bersangkutan, lanjutkan..??
3. Data yang hilang sepenuhnya menjadi tanggung jawab Anda, apakah anda benar – benar yakin..??

-  = Used to editing or change the information already stored. By selecting one of course schedule on was taken course table then click EDIT button. After that you can change the data on Semester column, and please press SAVE to store new data.

-  = Used to refresh the form

C. Form Entry Presence and Grade

This form serves to entry the number of presence and the grade of a student in each course was taken. Which the grade information can be used to support on Academic Form there are: KHS Academic Semester, KHS Cumulative, and the Performace Index information.

Mata Kuliah	Kls	Dosen
Aljabar Linear	A	Pak Budi
Calculus 1	B	Pak Udin
Fisika 1	A	Pak Aji

Nama NIM	Nama Mahasiswa	Absen	Nilai
04522072	Erick Jamaluddin Ghani	1	A

Figure 4.19 Form Entry Presence and Grade

First is select the Semester (odd or even), Academic Year, the name of the Faculty and Department that available, and then will show up the information on Subject Table.

The second process is to choose one of the needed Subjects from Subject Table and then will show up the information on Subject Names column, about day /

hour / class / classroom data and also will show up the information about who the students that taking that course on the Presence and Grade of Student Table (table at the bottom of screen).

The third process is to select one of student from Presence and Grade of Student Table (the bottom of the screen), then the information about that student will appear in the NIM / Name of Student.

After all the information on the available column completed, you can do the presence and grade entry process, by changing or fill in presence and grade column. After the data entered in presence and grade column deemed appropriate, press the SAVE button to save your presence and grade data of a student on a particular selected subject.

Such information can be seen in Presence and Grade of Student Table (table bottom of the screen).

➤ The function of each button:

-  = Used to store or saving the data that has been entered in each column, then it will be stored in the available databases (SQL Server). If, during the storage process failure occurs, it is because of one of the columns that have not been filled.

-  = Used to refresh the form.

-  = Used to make a print out of Presence and Grade report of each student in each courses.

Print out example:



Laporan Absensi dan Nilai

Fakultas : Fakultas Teknik
Jurusan : Teknik Elektro
Tahun Ajaran : 2008-2009 / Ganjil
Mata Kuliah : Fisika 1

NIM	Nama	Absen	Nilai
04522072	Erick Jamaluddin Ghani	9	A
04522126	Adhi Sulistiyanto	8	A
04522206	Agung Wibowo	8	A

Figure 4.20 Print out Presence and Grade Report

Form Akademik & Entry Nilai

Form Akademik dan Entry Nilai

Fakultas :

Jurusan :

NIM / Nama Mhs :

NIM	Nama Mahasiswa
04522071	Alex Piero
04522072	Erick Jamaluddin Ghani
04522126	Adhi Sulistiyanto
04522206	Agung Wibowo

KHS Semester **KHS Kumulatif** **Index Prestasi**

Semester : **Nama MK :**

Nilai :

Mata Kuliah	Dosen	SKS	Nilai
Aljabar Linear	Pak Budi	2	A/B
Calculus 1	Pak Udin	2	A

Figure 4.22 Form Academic Data

KHS Semester information are gives information about the subjects was taken in each semester, the lecturer for every courses was taken, number of credits, and the grade obtained in each of subjects taken.

Form Akademik & Entry Nilai

Form Akademik dan Entry Nilai

Fakultas : Fakultas Teknik

Jurusan : Teknik Elektro

NIM / Nama Mhs : 04522072 Erick Jamaluddin Ghani

NIM	Nama Mahasiswa
04522071	Alex Piero
04522072	Erick Jamaluddin Ghani
04522126	Adhi Sulistiyanto
04522206	Agung Wibowo

KHS Semester **KHS Kumulatif** Index Prestasi

Nama MK :

Print Nilai : Save

Mata Kuliah	Dosen	SKS	Nilai
Aljabar Linear	Pak Budi	2	A/B
Calculus 1	Pak Udin	2	A

Refresh

Figure 4.23 Form Academic Data

KHS Cumulative information are gives information about all student academic information in a overall semester, started from lecturer of every courses taken, number of credits, and the grade obtained in each of subjects taken.

NIM	Nama Mahasiswa
04522071	Alex Piero
04522072	Erick Jamaluddin Ghani
04522126	Adhi Sulistiyanto
04522206	Agung Wibowo

Semester	SKS Diambil	Index Prestasi
1	4	3.75

Figure 4.24 Form Academic Data

Student Performance Index that have been taken throughout the semester.

- The function of each button:

-  = Used to store or saving the data that has been entered in each column, then it will be stored in the available databases (SQL Server). If, during the storage process failure occurs, it is because of one of the columns that have not been filled.

-  = Used to refresh the form

-  = Used to make a print out KHS Semester and KHS Cumulative

Print out example:

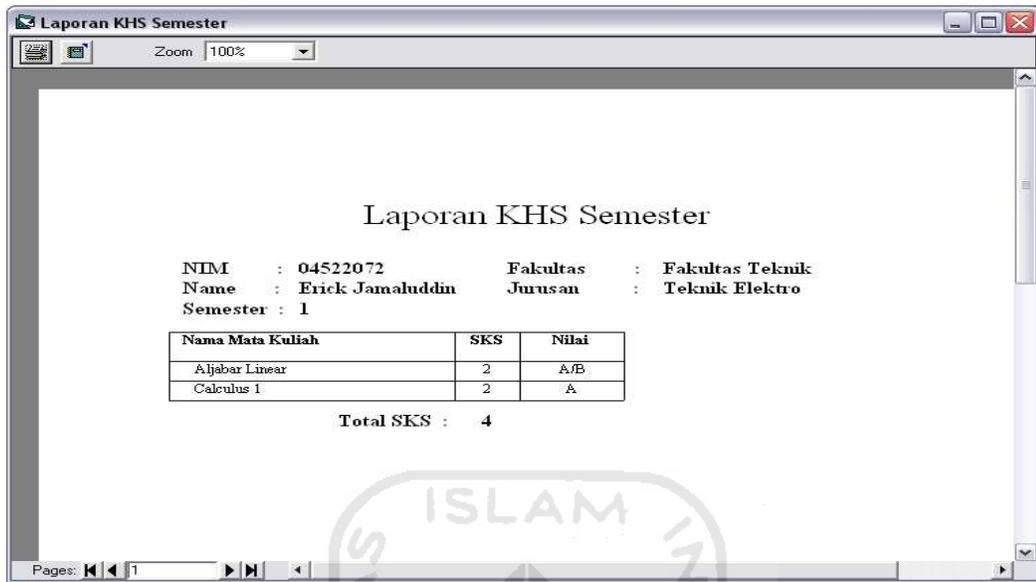


Figure 4.25 Print out KHS Semester report

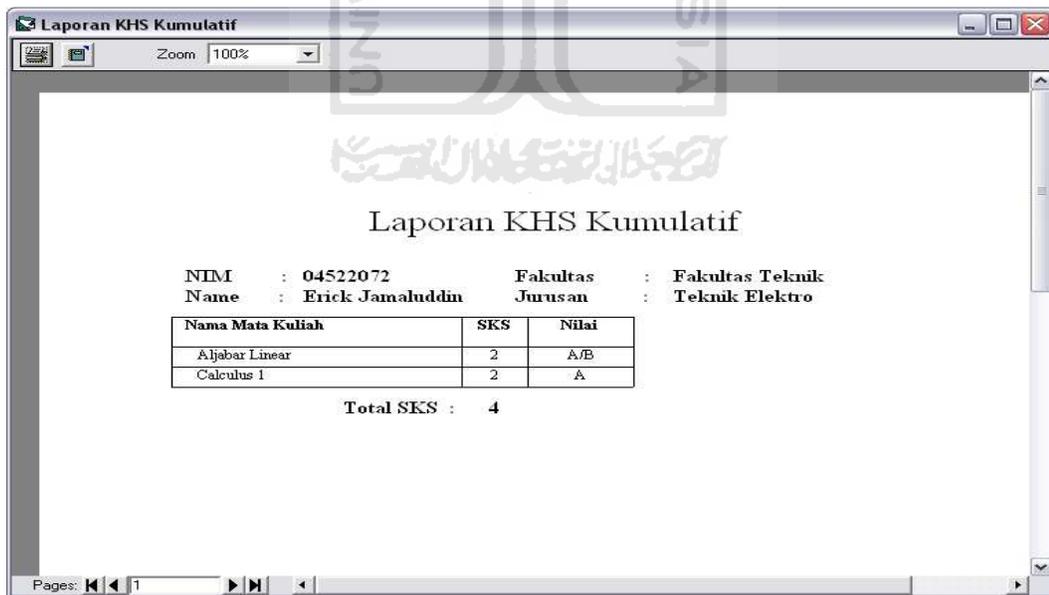


Figure 4.26 Print out KHS Cumulative report

CHAPTER V

DISCUSSION

In order to improve the quality of Universitas Darul 'Ulum, especially in terms of improving academic data management, started from students data processing, the courses until the grade processing of the end of each semester, then it was built an academic management information system - based on the computers as a substitute for paper-based system previously applicable at Universitas Darul 'Ulum.

Computer-based information system has been developed and implemented at the Universitas Darul 'Ulum, through the development process that has been presented in the previous chapter (chapter IV).

By computer-based data processing in an academic management information system, data storage and data processing problems can be resolved. Why is that? That is because, a computer-based information system supported by some software. First, its system supported by a large database systems and relatively safe (Microsoft SQL Server 2005 Express) that serves to support the storage process. And also this system supported by a friendly user interface system (Microsoft Visual Basic 6.0) where, this system will makes easy interaction between computers and their users, which resulted in increased effectiveness and efficiency of human resource or operator in data processing so that can provide required important information. For the security of information on the use of this application, each faculty will appoint an administrator, where the admin has the authority and full access in the use of this application. Admin

also have responsible for the system password so this system information cannot be accessed by just anyone.

In addition to these two things (storage and data processing), there are any others things that being concern, there are about the speed and accuracy of the information that produced by a computer-based information system is much better than the old system (paper-based system), and it makes increased the information value.

Use of computers clearly will facilitate and accelerate to providing information, because that's the reason why we used the computers as a solution of improving the performance of an information system. Computers in the management information system (MIS) is formulated as an electronic data processing equipment, capable of receiving input and output, has a high speed, high accuracy, and can store instructions to solve the problem. And the use of computers in the new management information system can be said to be effective and efficient if:

- The volume of processed data in large quantities
- The data processing requires a complex calculation
- Repetitive data processing or work
- Requires a fast processing
- Requires a good file, so easy to find out back the data required
- Requires high level of accuracy

Basically the requirements above we can be found in the academic MIS process at the university that has a large amount of student data so that needed to a good information facilities in order to provide services for every student, lecturer although for the university itself.

CHAPTER VI

CONCLUSION AND SUGGESTION

6.1 Conclusion

After doing discussion, the result of the research can be concluded as follows:

- 1) The computer-based academic management information system was built at Universitas Darul ‘Ulum. This system information was designed by using system lifecycle method, data flow diagram process, databases system (Microsoft SQL Server 2005 Express) and for the user interface application designed by using Microsoft Visual Basic 6.0.
- 2) By using the new computer-based information system, the university get some improvement on:
 - Efficiency of Human Resources, because from input data process, key in student, until become a result of the study, just need one operator (admin) for made that process.
 - Large Memory Data and Integrated Database System, it is supporting data store process and it can make time efficiency because all of data needed in process was integrate each other so easier to be used, So it will reduce the wasting time problem, when missing important data.

6.2 Suggestion

Area of improvement is widely open. Interface design and database structure can be enhanced to improve system performance. It is expected that there will be any development of Universitas Darul 'Ulum side because this application has been designed to be developed in every time based on changes that might be occur in the information process at Universitas Darul' Ulum. So this system information will be in stay up to date.



REFERENCES

- Laudon, K.C., Laudon, J.P. (2000). *Management Information Systems*. Sixth Edition. Prentice-Hall. New Jersey.
- McLeod, R (1998). *Management Information System*. Seventh Edition. Prentice-Hall. New Jersey.
- McLeod Jr., R., Schell, G.P. (2004). *Management Information System*. Eighth Edition. Prentice-Hall. New York.
- Nugroho, B., Indriyana, I. (2007). *Membuat Aplikasi Database SQL Server dengan Visual Basic 6.0*. First Edition. Gava Media. Yogyakarta.
- O'Brien, J.A. (1997). *Introduction to Information Systems*. Eighth Edition. Times Mirror. United States of America.
- Sutabri. T. (2005). *Sistem Informasi Manajemen*. First Edition. Andi. Yogyakarta
- Wahyono, T. (2004). *Sistem Informasi (Konsep Dasar, Analisis Desain dan Implementasi)*. First Edition. Graha Ilmu. Yogyakarta