# Web based Student Management System

## R. G. Manchanayake

Index No: 4/10029



Supervisors : Dr Ajith Madurapperuma Mr Lochandaka Ranathunga

October 2007

This dissertation is submitted in partial fulfillment of the requirement of the Degree of MSc in Information Technology

of

the University of Moratuwa

#### **Declaration**

I certify that this dissertation does not incorporate, without acknowledgement, any material previously submitted for a Degree or Diploma in any University and to the best of knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organizations.

	University of Moratuwa, Sri Lanka.
	Electronic Theses & Dissertations
(4/10029)	www.lib.mrt.ac.lk

Approved for submission	
Supervisor	Supervisor
Dr Ajith Madurapperuma	Mr L Ranathunga
Senior Lecturer	Lecturer
Faculty of Information Technology	Faculty of Information Technology

#### Acknowledgement

First I would like to express my sincere gratitude to my supervisors Dr Ajith Madurapperuma, senior lecturer and Mr Lochandaka Ranathunga, lecturer who are attached to the Faculty of Information Technology- University of Moratuwa, for guiding me throughout the project. A big thank to Dr Ajith Madurapperuma, (Former Dean-IT Faculty) for introducing an MSc program in Information Technology. I would like to express my sincere gratitude to Dr Asoka Karunananda for spending his valuable time to guide us for writing a quality dissertation.

Also I like to thank all faculty members who taught from the very first module to the very last, because without even one of them I may not be able to make this project successful.

I thankfully acknowledge support of all other members of the academic staff of the department. Especially I remember with much appreciation the support given by Mr Geeth De Mel. A word of thanks is also due to the non-academic staff for their help in numerous ways.

Next I would like to thank Mr C Gunadasa, Director (MIS), National Institute of Business Management (NIBM), who provides all required information about student/ staff activities which helped me a lot to carry out this project without a failure. I make this an opportunity to thank all my friends/ batch mates for their assistance during the project.

Last but not least I thank my beloved mother and wife who always lead me to achieve goals in every endeavor of my life. Their belief in me, and the persistent support, has given me a great self-confidence.

#### **Abstract**

National Institute of Business Management is the premier training institute in Sri Lanka, which is functioning as a statutory body under the Ministry of Skills Development, Vocational and Technical Education. The web-based system will increase the productivity and the customer satisfaction by automating student registration & other student administration work.

In an increasingly competitive education/ training industry, the imperative need and search for efficient, cost effective techniques, particularly through application of computer and communication technology has dramatically intensified. Attending to student matters manually results a series of problems for the student as well as for the staff in an educational institute. Therefore this project focus on solving these problems through a web based (On-Line) system where the Students, Course Secretaries & Course Administrators can access the system from any location.

At the time of login, system identifies the user category and provided different types of links. For the course administrator login: it provides Backup database, Distribute exam details, generate reports, create and modify course catalogs. For the course secretary login: it provides uploading student marks/ attendance detail, print result sheets and view student details. A student/ customer can register and do online payment, course selection, submit assignments, view student module marks/ details of attendance on different courses etc. Providing student guidance with dynamic information is a major advantage in this system. Reader is provided with blend of technical and management information in a simplified manner, which is meant for easy understanding even by a non-technical user. The system has been implemented using Web & Database technologies to run on Windows platform. The system has been evaluated by using test data and based on the evaluation we conclude that the project was successful.

# **Table of Contents**

Acknowledgement	i
Abstract	ii
Table of Contents	iii
List of Figures	vi
List of Tables	viii
List of Acronyms	viii
Chapter 1.0 – Introduction	1
1.1 – Prolegomena	1
1.2 - Organization Overview	1
1.2.1– Divisions and Activities	1
1.3 - NIBM Mission & Vision	3
1.4 - Overview of the Web based Student Management System	4
1.5 – Problem in brief Moratuwa, Sri Lanka.	5
1.6 - Objective of the system & Dissertations	5
1.7 – Scope of the system	6
1.8 – Overview of the Report	6
1.9 – Summary	7
Chapter 2.0 – Importance of a web based solution for NIBM	8
2.1 – Introduction	8
2.2 - Problem Definition	8
2.3 - Research/ Commercial work done in similar area	9
2.3.1 - University of Antarctica	9
2.3.2 - Western Kentucky University	11
2.3.3 - University of Arizona	11
2.3.4 - California State University	12
2.3.5 - University of Arkansas- United States	12
2.3.6 - The Catawba County Schools –USA	13
2.3.7 - Manvish - Development centre, India	14
2.3.8 - Henderson State University – Arizona	15

2.4 - Comparison of common features in similar projects	15
2.5 – Specialized domain knowledge	16
2.6 – Summary	17
Chapter 3.0 – Analysis and Specification	18
3.1 – Introduction	18
3.2 - Methodology	18
3.3 – Data Collection	18
3.4 – Limitations of the study	19
3.5 – Current Analysis	19
3.5.1 – Beginning of the problem	19
3.5.2 – Method of attack	19
3.5.3 – SWOT Analysis	19
3.5.4 – Competitors impact of the problem	20
3.5.5 – Present situation at NIBM	21
3.6 – Detail System Analysis	21
3.7 - Proposed Analysis  Electronic Theses & Dissertations	26
3.8 – Software Requirements	27
3.8.1 – User Requirements	27
3.8.2 – System Requirements	28
3.8.3 – Domain Requirements	29
3.9 – Summary	31
Chapter 4.0 – System Level Design	32
4.1 - Introduction	32
4.2 - Security Issues	32
4.3 – Web Security	33
4.4 - Mitigation Techniques	33
4.4.1 - Denial of Service attack mitigation	33
4.4.2 - Password attack mitigation	34
4.4.3 - Man in the Middle attacks mitigation	34
4.5 - Web security based on the OSI 7 layered model for the	
Student Management system	34
4.5.1- Physical and Data Link Layers	34

4.5.2 - Network and Transport Layers	34
4.5.3 - Session and Presentation Layers	35
4.5.4- Application Layer	35
4.6 -Internet Payment Gateways	35
4.7 -User Authentication	35
4.8 -Web based Technologies	36
4.9 -Backend database security	36
4.9.1 -Administrator Login	36
4.9.2 -Managing user access and privileges	37
4.10 -Web Hosting	37
4.11 -Policies and Enforcement	38
4.12 -Web design considerations	39
4.13 -Managing the web based system	42
4.14 - System design using Unified Modeling Language	42
4.14.1- Use Case Diagram	42
4.14.2- Class Diagram	44
4.14.3- Sequence Diagram	44
4.14.4- State chart Diagram	45
4.14.5- Deployment Diagram	46
4.14.6- Activity Diagram	46
4.15 – Database Design	46
4.16 – Summary	49
Chapter 5.0 – Implementation and Testing	50
5.1 – Introduction	50
5.2 – Implementation Methodology	50
5.2.1- Support escalation	59
5.3 – Student Guidance	60
5.3.1- Goals and Objectives	61
5.3.2 – Overall description of the student guidance	63
5.4 – Software Testing	64
5.5 – Summary	65

Chapter 6.0	– Evaluation	66
	6.1 – Introduction	66
	6.2 – Components effecting the evaluation	67
	6.3 – Web design consideration	69
	6.4 – Usability Evaluation	69
	6.5 - Summary	72
Chapter 7.0	-Conclusion and Future work	73
	7.1 – Introduction	73
	7.2 - Conclusion	73
	7.3 - Return on Investment in Student Management System	74
	7.4 – Future work	75
References		76
Appendix A	- Financial Summary up to year 2005	77
Appendix B	<ul> <li>Income Expenditure &amp; Net profit at NIBM</li> </ul>	79
Appendix C	Organization Chart The cost & Discortations	80
Appendix D	-Test Cases Lib. mrt. ac.lk	81
Appendix E	– UML Diagrams	84
Appendix F	– Database Schema	96
Appendix G	- Sample Questionnaire	103
Appendix H	- Software Requirement Specification (SRS)	107
Appendix I	- Project Charter	114
List of Fig	gures	
Figure 1-1	- Block Diagram of Major Interconnections	4
Figure 3-1	- Detailed deployed Application	31
Figure 4-1	- HTML and HTTP	32
Figure 4-2	- Security at different layers	33
Figure 4-3	- Three-Layer Architecture	39
Figure 4-4	- Design Modules	40
Figure 4-5	- Different wings of the System	41
Figure 4-6	- Use Case Diagram	43

Figure 4-7	- Class Diagram	44
Figure 4-8	- Sequence Diagram (Backup Database)	45
Figure 4-9	- State chart Diagram (GUI)	45
Figure 4-10	- Deployment Diagram	46
Figure 4-11	- Entity Relationship Diagram	48
Figure 4-12	- Main Activity Diagram	49
Figure 5-1	- Project design steps	51
Figure 5-2	- Java script code to validate compulsory fields	53
Figure 5-3	- PHP code to select data from the Database	53
Figure 5-4	- Home Page	54
Figure 5-5	- Login Screen	54
Figure 5-6	- New Student registration screen	55
Figure 5-7	- Student ID & Password verification Screen	55
Figure 5-8	- Course Selection & registration Screen	56
Figure 5-9	- Pay Online Screen	56
Figure 5-10	- Course selection by Administrator	57
Figure 5-11	PHP code to send Emails Liectronic Theses & Dissertations	58
Figure 5-12	- Attendance details screen	58
Figure 5-13	- Auto generated Email screen	59
Figure 5-14	- User Support	59
Figure 5-15	- Student Main Menu screen	62
Figure 5-16	- Web based Student guidance screen	63
Figure 6-1	- Layout Architecture	66
Figure 6-2	- User satisfaction Graph 1	70
Figure 6-3	- User satisfaction Graph 2	72
Figure B1	- Financial Analysis	79
Figure E1	-Use case Diagram	84
Figure E2	-Class Diagram	85
Figure E3	-Deployment Diagram	85
Figure E4	-Sequence Diagrams	86
Figure E5	-State Chart Diagrams	93
Figure E6	-Activity Diagram	95

#### **List of Tables**

Γable 2-1 - Comparison of common features in web applications	16
Table 6-1 - Average User Satisfaction	71
Гable A.1- Financial Summary	77
Table A.2 – SWOT Analysis	78
Γable G-1 – Summarized User response	103

## **List of Acronyms**

NIBM - National Institute of Business Management

SMS - Student Management System

DBA - Database Administrator

MIS - Management Information Systems

