



Department of Information and Communication Technology

Faculty of Technology

University of Ruhuna

Object Oriented Programming Practicum

ICT2132

Mini Project

Group NO: 04

Submitted to: Mr. P.H.P. Nuwan Laksiri

Group Members: -

TG/2022/1354

LMC Wijesinghe

TG/2022/1360

GK Gunawardhana

TG/2022/1359

KD Samarawickrama

TG/2022/1403

RWMLM Rasingolla

Contents

<i>Brief introduction to the Solution</i>	<i>3</i>
<i>ER Diagram of TecSys</i>	<i>4</i>
<i>Class Diagram of TecSys</i>	<i>5</i>
<i>Table solutions in database use in TecSys</i>	<i>6</i>
Admin details	6
Lecture details.....	6
Undergraduate details.....	6
Technical officer details	6
Courses details	6
Marks details	7
Timetable details.....	7
Medical details	7
Attendance details	7
<i>UI designs in TecSys.....</i>	<i>8</i>
Login page.....	8
Admin.....	8
Lecturer	9
Undergraduate.....	9
Technical Officer	9
Attendance	10
Courses	10
Time Table.....	10
Medical	11
Notices	11
Grades	11
Settings.....	12
<i>Tools and Techniques we have used for this project</i>	<i>14</i>
<i>Security measures that we have taken to project.....</i>	<i>14</i>
<i>Functional Requirements</i>	<i>15</i>
<i>Non Functional Requirements</i>	<i>16</i>
<i>Problems that we faced during the development of the Solution.....</i>	<i>16</i>
<i>Solutions / How we have overcome the above the identified problems</i>	<i>16</i>
<i>Individual contribution to System development</i>	<i>17</i>
Github Repository Link:.....	17
References	17

Brief Introduction about the problem/ Group project

Develop a System to Managing academic and administrative operations for Faculty Of Technology for handling User profiles (Admin,Lecture,Student, Technical Officer) ,managing Course Details, maintaining Undergraduate Marks and grades, tracking Undergraduate Attendance, handling Notices ,Timetables and Medicals.

Our group project aimed to address this problem by developing a Faculty Management System using Java for the front end and MySQL for the backend. This system helps manage all academic activities in one centralized system for the Faculty of Technology at the University of Ruhuna.

Brief introduction to the Solution

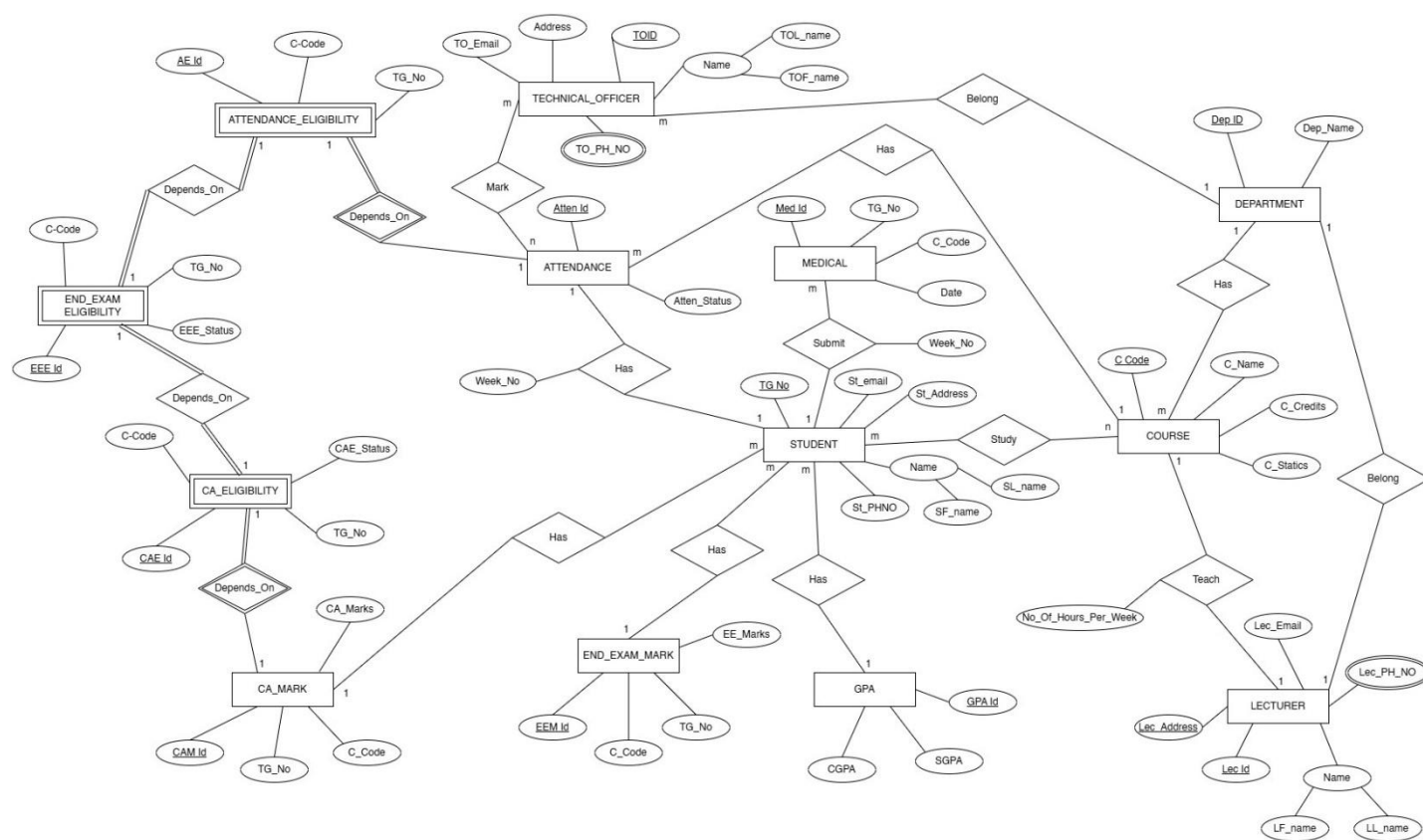
The solution we developed is a Java-based application connected to a MySQL database, designed to support four main types of users:

- ✓ Admin
- ✓ Lecturer
- ✓ Technical Officer
- ✓ Undergraduate

The system automatically identifies the user's role by checking the **prefix of the username** — for example, usernames starting with "**lec**" indicate a Lecturer, "**tg**" for an Undergraduate, "**to**" for a Technical Officer, and "**admin**" for the Admin user. Based on this identification, the system grants access to specific features and interfaces related to their role.

By using a **centralized design**, all operations are streamlined under one system, making academic processes faster, more accurate, and easier to monitor.

ER Diagram of TecSys



Class Diagram of TecSys

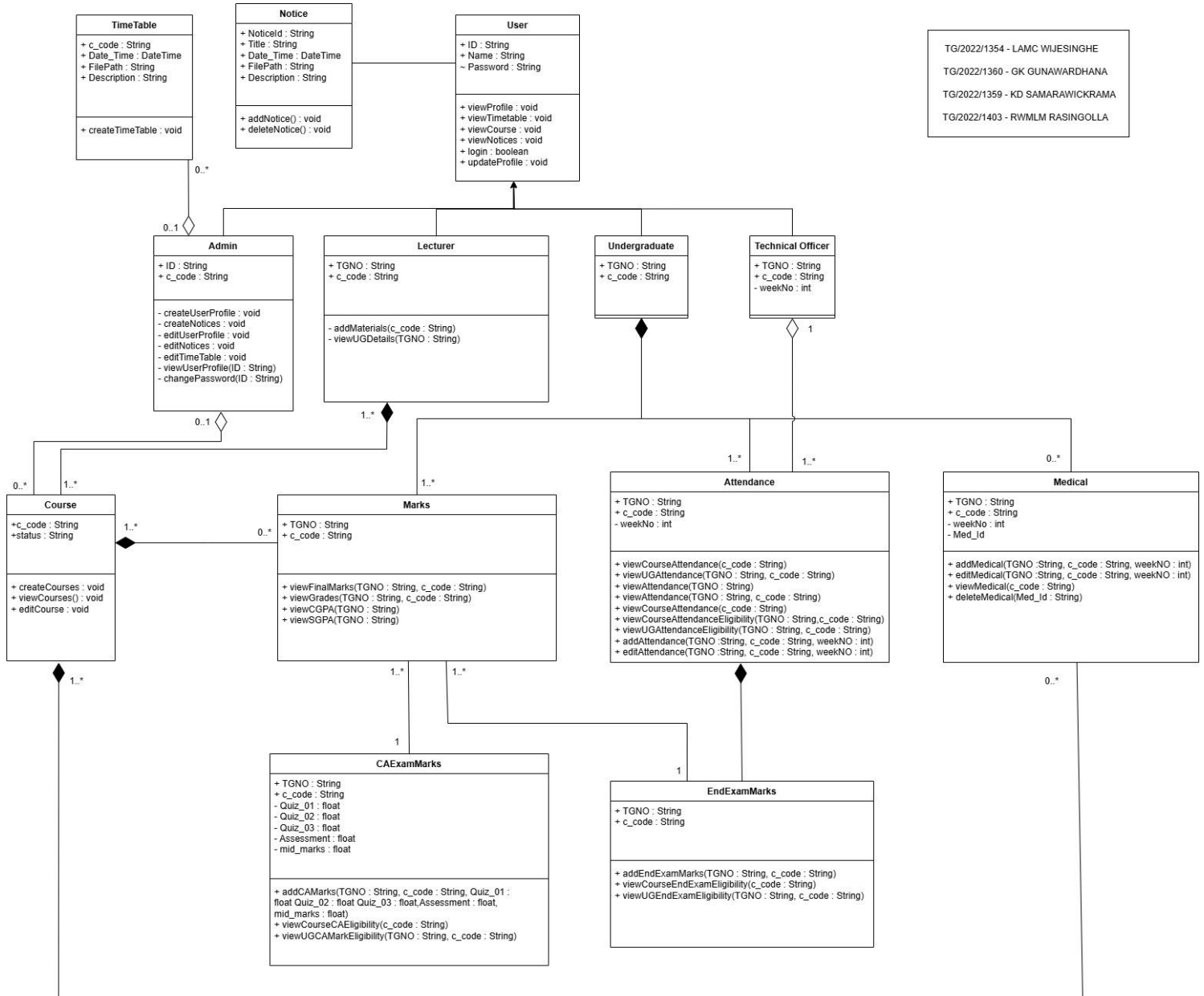


Table solutions in database use in TecSys

The system uses a MySQL database to store and manage all information, including user profiles, course details, attendance records, medical submissions, marks, grades, timetables, and notices. We designed the database with connected tables using primary and foreign keys to keep the data accurate, consistent, and easy to manage.

Admin details

adno	adfname	adlname	adaddress	ademail	adphno	adpassword	adProfImg
admin1	Subash	Jayasinghe	Matara	subash@gmail.com	981111321	123	./Resources/Images/5267.jpg

Lecture details

```
mysql> select * from lecturer;
```

lecno	lecfname	leclname	lecaddress	leceemail	lecpno	lecpasssword	lecProfImg
lec1234	Nuwan	Laksiri	Colombo	nuwan@gmail.com	713828492	pass123	./Resources/Images/1234.jpg
lec5678	Shashitha	Lakal	Kandy	lakal@gmail.com	773589263	secure456	./Resources/Images/5678.jpg
lec9101	Chanduni	Gamage	Galle	chanduni@gmail.com	765432198	mypassword	./Resources/Images/9101.jpg
lec1121	Akila	Brahmana	Kurunegala	akila@gmail.com	742890716	strong789	./Resources/Images/1121.jpg
lec3141	Novoda	Weerasinghe	Matara	navoda@gmail.com	725893023	randomPwd	./Resources/Images/3141.jpg
lec5121	Rumeshika	Kumarihami	Bandarawela	rumeshika@gmail.com	782342145	word123	./Resources/Images/3142.jpg
lec1357	Chathuranga	Adhikari	Kaluthara	chathuranga@gmail.com	752929832	get098	./Resources/Images/3148.jpg

7 rows in set (0.00 sec)

Undergraduate details

```
mysql> select * from undergraduate;
```

tgno	ugfname	uglname	ugaddress	ugemail	ugphno	ugpassword	ugProfImg	study_year	study_semester
tg5432	Athula	Nihan	Matara	athula@gmail.com	987004321	123	Resources/Images/5432.jpg	2	1
tg1234	Kavindu	Perera	Colombo	kavindu@gmail.com	987654321	123	Resources/Images/1234.jpg	2	1
tg5678	Sahan	Fernando	Kandy	sahan@gmail.com	876543219	123	Resources/Images/5678.jpg	2	1
tg9101	Nethmi	Silva	Galle	nethmi@gmail.com	765432198	123	Resources/Images/9101.jpg	2	1
tg1121	Ravindu	Bandara	Kurunegala	ravindu@gmail.com	654321987	123	Resources/Images/1121.jpg	2	1
tg3141	Dilini	Weerasinghe	Matara	dilini@gmail.com	543219876	123	Resources/Images/3141.jpg	2	1

Technical officer details

```
mysql> select * from technical_officer;
```

tono	tofname	tolname	toaddress	toemail	tophno	topasssword	toProfImg
to2222	Sunil	Perera	Colombo	sunil@gmail.com	987654321	pass123	./Resources/Images/2222.jpg
to3333	Kamal	Fernando	Kandy	kamal@gmail.com	876543219	secure456	./Resources/Images/3333.jpg
to4444	Ranjith	Silva	Galle	ranjith@gmail.com	765432198	mypassword	./Resources/Images/4444.jpg
to5555	Suresh	Bandara	Kurunegala	suresh@gmail.com	654321987	strong789	./Resources/Images/5555.jpg
to6666	Pradeep	Weerasinghe	Matara	pradeep@gmail.com	543219876	randomPwd	./Resources/Images/6666.jpg

5 rows in set (0.00 sec)

Courses details

```
mysql> select * from courses;
```

course_id	course_name	level_no	semester_no	status	quizzes_perc	assessment_perc	mid_term_perc	final_theory_perc	final_practical_perc
ICT0001	Data Structures and Algorithms	2	1	theory/practical	10	0	20	40	30
ICT0002	Object Oriented Programming	2	1	theory	10	10	20	60	0
ICT0003	Object Oriented Programming Practicum III	2	1	theory/practical	10	20	0	40	30
ICT0004	Object Oriented Analysis and Design	2	1	practical	0	20	20	0	60
ICT0005	E-Commerce Implementation Management and Security	2	1	theory	10	20	0	70	0

Marks details

```
mysql> SElect * from marks;
```

mark_id	tgno	course_id	quiz_one	quiz_second	quiz_third	quiz_fourth	assessment_one	assessment_second	mid_term	final_theory	final_practical
1	tg5678	ICT2113	100	100	100	0	0	0	100	100	100
2	tg5432	ICT2122	100	100	100	100	0	100	100	100	0
3	tg1234	ICT2133	100	100	100	0	0	100	0	100	100
4	tg9101	ICT2142	0	0	0	0	0	100	100	0	100
5	tg1121	ICT2152	100	100	100	0	100	100	0	100	0

Timetable details

time_table_id	course_id	module_day	time
1	ICT0001	Monday	8.00 - 12.00
2	ICT0002	Thursday	8.00 - 10.00
3	ICT0003	Thursday	1.00 - 3.00
4	ICT0004	Tuesday	9.00 - 11.00
5	ICT0005	Wednesday	10.00 - 12.00

Medical details

```
mysql> select * from medical;
```

medical_no	tono	tgno	course_id	week_no	med_reason
1	to0001	tg0001	ICT0001	1	Influenza

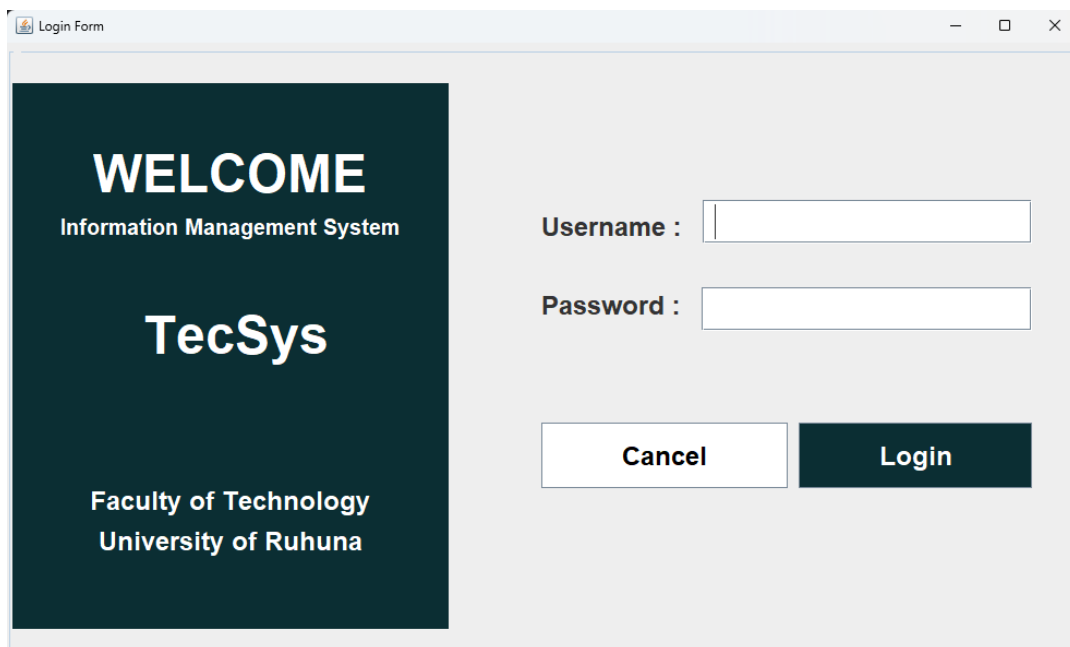
Attendance details

atten_id	tono	tgno	course_id	week_no	course_status	atten_status	med_id
5	to0001	tg0001	ICT2113	3	theory	present	NULL
6	to0001	tg0001	ICT2113	3	practical	present	NULL
7	to0001	tg0001	ICT2113	4	theory	present	NULL
8	to0001	tg0001	ICT2113	4	practical	present	NULL
9	to0001	tg0001	ICT2113	5	theory	absent	NULL
10	to0001	tg0001	ICT2113	5	practical	present	NULL
11	to0001	tg0001	ICT2113	6	theory	present	NULL
12	to0001	tg0001	ICT2113	6	practical	present	NULL
13	to0001	tg0001	ICT2113	7	theory	present	NULL
14	to0001	tg0001	ICT2113	7	practical	present	NULL

Additionally, many to many relationship tables are included in Tecsys database. If users update their details then database is automatically updated.

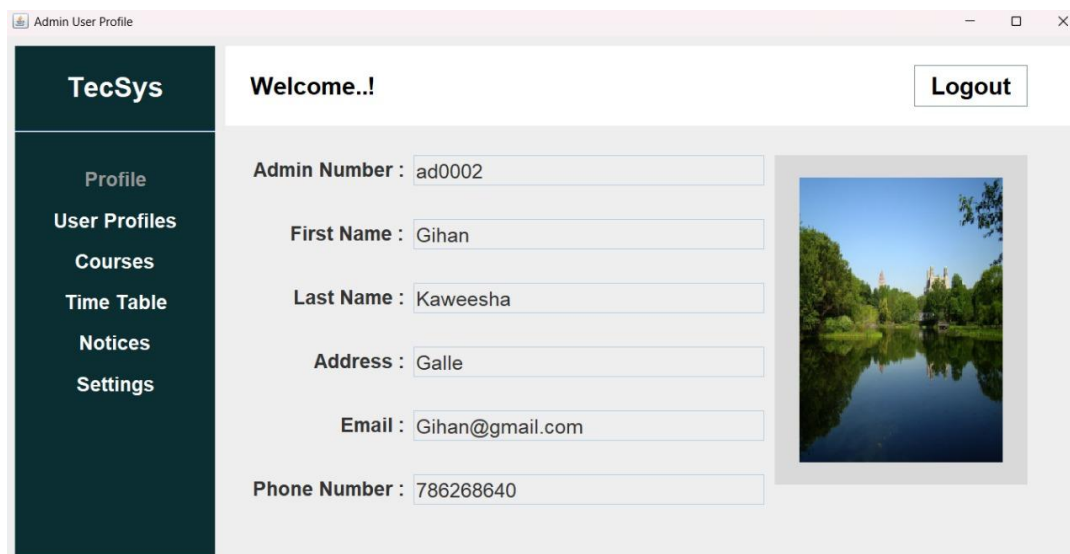
UI designs in TecSys

Login page



The Login Form is a web application window titled "Login Form". It features a dark teal sidebar on the left with the text "WELCOME", "Information Management System", "TecSys", and "Faculty of Technology University of Ruhuna". The main content area is light gray and contains a "Username :" label with a text input field, a "Password :" label with a text input field, and two buttons: "Cancel" and "Login".

Admin



The Admin User Profile is a web application window titled "Admin User Profile". It features a dark teal sidebar on the left with the text "TecSys", "Profile", "User Profiles", "Courses", "Time Table", "Notices", and "Settings". The main content area is light gray and contains a "Welcome..!" message, a "Logout" button, and a form with the following fields: "Admin Number : ad0002", "First Name : Gihan", "Last Name : Kaweesha", "Address : Galle", "Email : Gihan@gmail.com", and "Phone Number : 786268640". A placeholder image of a lake is also present.

Lecturer

TecSys
Profile
Attendance
Time Table
Courses
Medical
Notices
Grades
Marks
Settings

Welcome..!

Logout

Lec Number :


First Name :

Last Name :

Address :

Email :

Phone Number :



Undergraduate

TecSys
Profile
Attendance
Courses
Time Table
Medical
Notices
Grades
Settings

Welcome..!

Logout

TG Number :


First Name :

Last Name :

Address :

Email :

Phone Number :



Technical Officer

TecSys
Profile
Attendance
Time Table
Medical
Notices
Settings

Welcome..!

Logout

TO Number :

First Name :

Last Name :

Address :

Email :

Phone Number :

Department :



Additionally, every users have attendance, timetable, medical, courses, notices, marks and settings panels based on their privileges. For a example following card panels are based on undergraduate. In here, call each panel using card names.

Attendance

TecSys **Attendance Details** **Logout**

Level No Semester No Subject Code Subject Status

Week No	Course No	Course Name	Attendance Status	Medical No	Medical Reason
15	ICT2122	Object Oriented Prog...	absent		
14	ICT2122	Object Oriented Prog...	present		
13	ICT2122	Object Oriented Prog...	present		
12	ICT2122	Object Oriented Prog...	absent		
11	ICT2122	Object Oriented Prog...	present		
10	ICT2122	Object Oriented Prog...	present		
9	ICT2122	Object Oriented Prog...	absent		
8	ICT2122	Object Oriented Prog...	present		
7	ICT2122	Object Oriented Prog...	absent		
6	ICT2122	Object Oriented Prog...	present		
5	ICT2122	Object Oriented Prog...	absent		
4	ICT2122	Object Oriented Prog...	absent		
3	ICT2122	Object Oriented Prog...	present		

Attendance Percentage : 53.8462% Attendance with Medica Percentage : 53.8462%

Courses

TecSys **Your Courses** **Logout**

Level No Semester No

Course

Course Material

Time Table

TecSys **Undergraduate Time Table** **Logout**

Level No Semester No

Day	Course Code	Course Module	Time
Monday	ICT2142	Object Oriented Analysis and ...	8.00 - 12.00
Tuesday	ICT2133	Object Oriented Programming...	8.00 - 10.00
Wednesday	ICT2152	E-Commerce Implementation ...	10.00 - 12.00
Thursday	ICT2113	Data Structures and Algorithms	8.00 - 12.00
Thursday	ICT2122	Object Oriented Programming	1.00 - 3.00

Medical

TecSys

Profile
Student Details
Attendance
Time Table
Courses
Medical
Notices
Grades
Marks
Settings

Student Medical Information

Logout

Level No Semester No Course Code

Medical_No	Student_tgno	Week_No	Course_Status	Medical_Reason
1	tg0001	1	theory	Influenza

Notices

TecSys

Profile
Student Details
Attendance
Time Table
Courses
Medical
Notices
Grades
Marks
Settings

Notices

Logout

Workshop on AI

Topics Covered
Introduction to Artificial Intelligence

Machine Learning Algorithms & Applications

Deep Learning & Neural Networks

Ethical Considerations in AI

Hands-on Coding Sessions with Python

Who Should Attend?
This workshop is ideal for students interested in AI, software development, and data science. No prior AI knowledge is required, but a basic understanding of programming will be beneficial.

Registration Details
Interested participants must register online via the university portal before September 10th. Seats are limited, so early registration is recommended.

Join us in exploring the future of AI and its impact on industries worldwide!

Grades

TecSys

Profile
Attendance
Courses
Time Table
Medical
Notices
Grades
Settings

Grades and GPA

Logout

Level No Semester No

Course Code	Course Name	CA Marks	Eligibility for Final ...	Final Marks	Attendance Eligibi...	Grade
ICT0001	Data Structures a...	30.0	Eligible	70.0	64.2857	Not Released
ICT0002	Object Oriented P...	40.0	Eligible	60.0	46.6667	Not Released
ICT0003	Object Oriented P...	30.0	Eligible	70.0	50.0	Not Released
ICT0004	Object Oriented A...	40.0	Eligible	60.0	50.0	Not Released
ICT0005	E-Commerce Imp...	30.0	Eligible	70.0	46.6667	Not Released

CGPA : 0.57 SGPA : 0.0 Current Class : Class Unavailable

11 | Page

Settings

The screenshot shows the 'Undergraduate User Profile' settings page. On the left is a dark sidebar with the 'TecSys' logo and a menu containing 'Profile', 'Attendance', 'Courses', 'Time Table', 'Medical', 'Notices', 'Grades', and 'Settings'. The main content area is titled 'Settings Configuration' and includes a 'Logout' button in the top right. It contains three input fields: 'Address' (filled with 'Colombo'), 'Email' (filled with 'kavindu@gmail.com'), and 'Phone Number' (filled with '987654321'). To the right of these fields is a section for 'Select New Profile Image' with a 'Select Image' button. At the bottom are 'Cancel' and 'Update' buttons.

In addition to this admin can,

1. view user details.

The screenshot shows the 'Admin User Profile' 'User Profile Details' page. The sidebar is similar to the first screenshot but includes 'User Profiles' in the menu. The main content area has a 'Logout' button and a tabbed interface with 'View User', 'Add User', 'Update User', and 'Delete User'. The 'View User' tab is active, showing a form with fields for 'User Type' (set to 'Undergraduate'), 'User ID', 'First Name', 'Last Name', 'Address', 'Email', and 'Phone Number'. There is a large grey area labeled 'Label' and a table with columns 'User ID', 'First N...', 'Last N...', and 'Phone...'.

2. Add user details

This screenshot shows the same 'Admin User Profile' 'User Profile Details' page, but with the 'Add User' tab selected. The 'View User' form is replaced by an 'Add User' form with fields for 'First Name', 'Last Name', 'Address', 'Email', 'Phone Number', and 'AD Number'. An 'Add User' button is located at the bottom right of the form. The sidebar and top navigation remain the same.

3. Update user details

The screenshot shows the 'Admin User Profile' window. On the left is a dark sidebar with the 'TecSys' logo and a menu: Profile, User Profiles, Courses, Time Table, Notices, and Settings. The main area is titled 'User Profile Details' and has a 'Logout' button. Below the title are tabs: View User, Add User, Update User (selected), and Delete User. Under these are sub-tabs: Admin, Undergraduate, Lecturer, and Technical Officer (selected). The form contains the following fields: First Name (Kamal), Last Name (Wickramasinghe), Address (42 Temple Road, Matara), Email (kamal.w@example.com), Phone Number (714567890), and TO Number (a dropdown menu set to 'to0001'). An 'Update User' button is at the bottom right.

4. Delete user details

The screenshot shows the 'Admin User Profile' window with the 'Delete User' tab selected. The sidebar and 'User Profile Details' header are the same. The 'Delete User' tab contains a 'User Type' dropdown menu set to 'Admin' and a 'User ID' dropdown menu. To the right is a table with columns: User ID, First Name, Last Name, and Phone Number. The table is currently empty. A 'Delete User' button is located at the bottom left of the form area.

Tools and Techniques we have used for this project

- IntelliJ idea and Swing UI
 - To create and maintain GUI (Graphical User Interface)
 - To maintain java codes
 - To Connect the database using MySQL connectors
- MYSQL server
 - To create and manage database efficiency
 - To create table structures and data insertion
- Draw.io
 - Used to create ER diagram and Class diagram
- GitHub and GitHub Desktop
 - To manage and collaborate on database and version control
- Microsoft word
 - To Create Final Report and SRS report
- Figma
 - To Design UI designs

Security measures that we have taken to project

- **Role-based access control (RBAC)** to restrict access based on user roles.
- **Database constraints** (Primary key, foreign keys, Auto increment) to maintain data integrity.
- **Limited profile editing permissions** (e.g.,. Lecturer, Technical officer, students can't change username or password).

Functional Requirements

Admin

- Create and maintain all User Profiles
- Create and maintain Courses
- Create and maintain Notices

Lecturer

- Can update their profile except username and password
- Can modify and add materials to courses
- Can upload marks for all kind of exams
- Can see undergraduate details
- Can see undergraduate eligibility
- Can see undergraduate marks, grades and GPA
- Can see attendance and medical records of undergraduate
- Can see notices
- Create and maintain Timetables

Technical Officer

- Can update their profile except username and password
- Can add and maintain attendance details of undergraduate
- Can add and maintain medical details of undergraduate
- Can see notices
- Can see timetables of their department

Undergraduate

- Can update only contact details and profile picture of their profile
- Can see attendance details
- Can see medical details
- Can see their course details
- Can see their grades and GPA
- Can see their timetables
- Can see notices

Non Functional Requirements

1. Performance Requirements

- The system must support simultaneous access for more users without performance delay.

2. Security Requirements

- Only authorized users can access specific functionalities based on their roles (Admin, Lecturer, Technical Officer, Undergraduate).
- Sensitive data like passwords must not be displayed or logged in any format.

3. Maintainability

- The code must be organized following object-oriented programming (OOP) principles (such as class, object encapsulation, polymorphism , Inheritance) for easy maintenance.

4. Portability

- The system should be able to run on Windows, Linux, and macOS operating systems .

Problems that we faced during the development of the Solution.

- **Database complexity:** Mapping relationships among multiple entities (e.g., medical, attendance) was challenging.
- **GUI synchronization:** Ensuring that the user interface reflects real-time updates from the database
- **Team coordination:** Dividing tasks and merging contributions without conflicts was time-consuming.

Solutions / How we have overcome the above the identified problems

- **Database complexity:** We created a detailed ER diagram to represent Tecsys details.
- **GUI Synchronization:** We used a single main frame with multiple panels, switching panels inside the main frame based on user actions to keep the interface simple and organized.
- **Team coordination:** Used GitHub for version control, assigned tasks to project , and conducted regular group communication.

Individual contribution to System development

TG_no	Name	Individual contribution
TG/2022/1354	LMC Wijesinghe	*Create SRS Document *Create Class diagram *Login page *Undergraduate Functionalities
TG/2022/1359	KD Samarawickrama	*Create ER diagram *Lecturer Functionalities
TG/2022/1360	GK Gunawardhana	*Admin Functionalities *Database Functionalities
TG/2022/1403	RWMLM Rasingolla	*Create Final Report *Technical Officer Functionalities

GitHub Repository Link:

https://github.com/chira0001/Java_mini_project.git

References

- W3 Schools
- Lecture Notes
- Oracle Java Documentation