Department of Information and Communication Technology

Faculty of Technology

University of Ruhuna

Software Requirements Specification

System for Faculty of Technology / University of Ruhuna

Object Oriented Programming Practicum – ICT 2132

Group Members:

TG/2022/1365 – KPGS Sandaruwan
TG/2022/1366 – RAS Lakshan
TG/2022/1367 – SAPT Samarathunga
TG/2022/1392 – AMKS Amarakoon

CONTENT

1. INTRODUCTION

1.1 Purpose

The purpose of TecSys is to define the functional and non-functional requirements of the Faculty Management System designed for the Faculty of Technology, University of Ruhuna. This management system aims to streamline administrative, academic and undergraduate related processes by providing an integrated platform to manage user roles, academic records.

TecSys will serve to different user profiles, including Administrators, Lecturers, Students and Technical officers ensuring both secure access and reliable functionalities. With the implementation of this system the Faculty of Technology aims to enhance operational efficiency, improve data accuracy for all the users.

1.2 Scope

The TecSys is a comprehensive, role-based software solution which is designed for the convenience of the academic and administrative processes within the Faculty of Technology. The system is implemented as a centralized, MySQL based system which ensure the data management, security and accessibility for relevant users. Aim of implementing this Faculty Management System is to enhance efficiency, accuracy, and user experience in academic and administrative operations.

1.3 Overview

The TecSys is a comprehensive, role-based software solution which is designed for the convenience of the academic and administrative processes within the Faculty of Technology. The system is implemented as a centralized, MySQL based system which ensure the data management, security and accessibility for relevant users. Aim of implementing this Faculty Management System is to enhance efficiency, accuracy, and user experience in academic and administrative operations.

2. DESCRIPTION

2.1 System Objectives

- Efficient User Management
  - Provide a role-based authentication system for Admins, Lecturers, Undergraduates and Technical Officers
- Student Welfare and Academic Consideration
  - Enable undergraduates to submit medical records for academic absence
- Data Integrity, Security and Accessibility
  - Ensure secure storage of student records, marks and attendance data using a MySQL database.
- Operational Efficiency and Automation
  - Reduce manual workload by automating data processing and reporting.
- Streamlined Course and Academic Management
  - Maintain an organized record of course details, credit values and assigned lectures.

2.2 System Functions

- User Profile Management
  - Ability for users (Admins, Lecturers, Students and Technical Officers) to view and update personal profiles.
- Undergraduates Marks Management
  - System calculates final grades based on predefined grading criteria
  - View marks, enter, update and finalize marks according to the user privileges
- Undergraduate Attendance Tracking
  - The system generates attendance reports to assess final exam eligibility.
- Medical Records Handling
  - System maintain a logs medical records for academic and eligibility adjustments.
- Course Management
  - Undergraduates able to view information regarding courses available.

2.3 User Classes and Characteristics

Feature	Admin	Lecturer	Student	Technical Officer
Manage User Accounts	✅	🚫	🚫	🚫
Manage Courses	✅	✅	🚫	🚫
Enter & Update Marks	🚫	✅	🚫	🚫
View Grades	✅	✅	✅	🚫
Manage Attendance	✅	✅	🚫	🚫
View Attendance	✅	✅	✅	🚫
Post Notices	✅	✅	🚫	✅
View Notices	✅	✅	✅	✅
Manage Timetables	✅	🚫	🚫	✅
View Timetables	✅	✅	✅	✅
Approve Medicals	✅	🚫	🚫	🚫
Submit Medicals	🚫	🚫	✅	🚫

2.4 Operating Environment

The TecSys will be implemented using Java-based GUI for the front end and MySQL as the database backend. The system will be ensuring a reliable and user-friendly interface for Admins, Lecturers, Undergraduates, and Technical Officers. The MySQL database will store critical academic and administrative data, ensuring data integrity and security. The TecSys will implemented Role-Based Access Control, encryption for sensitive records, and automatic backups to prevent data loss.

Hardware Requirements

- Processor: Quad-core (or Higher) CPU
- RAM: 8GB or more
- Storage: 50GB of available space

Software Requirements

- Operating System: Windows or Linux
- Database Management System: MySQL
- Programming Language: Java

2.5 Design and Implementation Constraints

Technology Constraints:

- The system must implement using Java GUI and MySQL for the database.
- The System must run on Windows or Linux with a Java Runtime Environment installed.
- The MySQL database should be hosted on a local server or faculty network.

Hardware Constraints:

- The system requires sufficient memory and processing power for smooth performance.
- Storage requirement depends on the volume of data.

Security and Access Constraints:

- User authentication must include secure login mechanism such as hashed passwords.
- Data encryption is required for sensitive data and information such as undergraduate marks and medical records.
- Backup policies must be implemented to prevent data loss due to unauthorized access and modifications.

3. Specific Requirement

3.1 Functional Requirement

3.1.1 Admin

- Add, update and remove user accounts and assign roles and permission based on user privileges
- Schedule and monitor database backups
- Generate student performance reports

3.1.2 Lecturer

- Upload course materials and view assigned courses and student lists
- Enter update and finalize student marks
- Generate attendance reports for review

3.1.3 Technical Officer

- Maintain and update attendance of the undergraduates
- Manage medical report submissions

3.1.4 Undergraduates

- View personal profile and enrolled courses while accessing course materials and lecture schedules
- View attendance and eligibility status for exams
- Submit medical records for academic considerations

3.1.5 Non-functional Requirements

- System should handle multiple concurrent users without performance reduction
- Encrypt sensitive data such as student marks and medical records
- Ensure compatibility with Windows and Linux
- System should support for future expansion

4. Performance Requirement

4.1 Security Requirement

TecSys is integrated with security and performance to ensure efficient access control, data protection and system responsive without compromising with speed and smoothness.

- Authentication and Access control performance – User authentication must be processed within 5 seconds to ensure quick procedure without delays.
- Data Encryption and processing Efficiency – Sensitive data should be encrypted without causing noticeable delays in query execution.
- Optimized Database Queries – SQL queries related to student records, marks and attendance should be optimized to execute under 2 seconds.
- Secure Backup and Recovery Performance – TecSys recovery time should be less than 5 minutes in of a data breach or a failure.
- System monitoring and Intrusion Detection – TecSys should log security events without impacting the response time and should trigger alerts within 1 second a while maintaining the real-time performance.

By integrating these security features, the TecSys will provide a secure, fast and reliable performance for faculty operations without reduction of efficiency of the system.

4.2 Usability Requirement

The TecSys will be implemented with a user-friendly GUI using java which ensure convenience user experience for the users of the system. The interface will be simple, clean and convenient to navigate with essential features accessible from the main menu with consistent design with proper labels, buttons and tooltips for ease of use. The system will support for both Windows and Linux platform compatibility. Users should be able to study and learn the system operation within five minutes without formal training, aided by the documentation and tooltips. Error handling will provide clear, informative error messages to guide users in resolving issues and accessibility features like keyboard navigation will enhance usability for all users. Additionally, the system will maintain fast response time, ensuring data retrieval, form submission occur within two seconds under normal conditions.

4.3 Compatibility

The TecSys will be designed for higher compatibility across Windows and Linux environment ensuring seamless operations. Built with a Java based GUI and integrated with MySQL database, the system will operate on any machine with a Java Runtime Environment installed. It will support various screen resolutions ensuring consistent user experience across different display sizes. The system will also be compatible with networked environment allowing multiple users to access and manipulate data concurrently without conflicts. Additionally, the database structure will be optimized to work with local servers and faculty networks, ensuring reliable and efficient data management.

5. External Interface Requirement

User Interface Requirements

- TecSys will provide a Java-based Graphical User Interface for all the users of the system ensuring responsive experience.
- All forms and menus will follow a consistent design with tooltips, labels and validation messages.
- The UI will facilitate keyboard navigations and mouse interactions with light and dark mode option for convenience.

Hardware Interface Requirements

- The system will run on both Windows and Linux devices with a Java Runtime Environment installed.
- System will support USB or external devices for data backups and restorations.

Software Interface Requirements

- In order to secure storage and retrieval of data, the system will interact with a MySQL database.
- The system may integrate with email services to send notifications to undergraduates and faculty members.
- TecSys will allow PDF generation for reports such as grade sheet and student records.

By meeting above external interface requirements, the TecSys will ensure seamless integration with hardware, software by enhancing the efficiency and accessibility for faculty operations.

6. Additional Requirement

6.1 Accessibility

The TecSys will be implemented with the Java-based GUI. Hence, keyboard navigation allowing users to perform tasks without relying on a mouse. The system will also include adjustable fonts sizes and color customization options to enhance readability experience for the users. Tooltips and clear labels will be integrated into all interactive elements to guide through the system. Additionally, error messages will be very descriptive and user friendly which will help users to understand issues. These considerations will ensure the inclusive and user-friendly experience for all the users in the faculty premises.

6.2 Internationalization

The TecSys will be implemented with **i18n** internationalization support allowing it to facilitate users from various linguistic and cultural backgrounds. The system will also include both Sinhala, Tamil languages enabling users to switch between different languages as they prefer. Every UI element, error messages and notifications will be designed to support all the Unicode characters which will ensure compatibility with above languages. By incorporating the internationalization features, the TecSys will ensure accessibility and usability for global audience making it adaptable for foreign undergraduates in different countries.

7. References

- MySQL Documentation
- https://paravi.ruh.ac.lk/tecmis/
- http://teclms.ruh.ac.lk/
- https://www.w3.org/blog/international/
- https://www.w3schools.com/java/java_ref_reference.asp