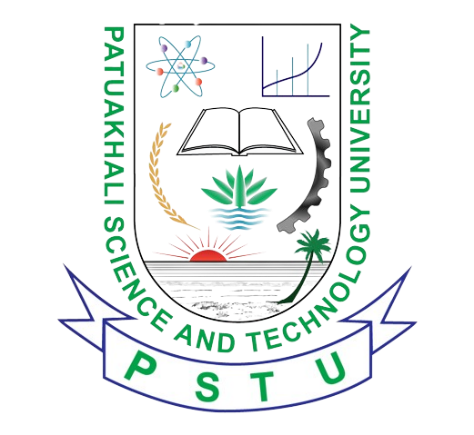
**PSTU Result and Enrollment Automation System Using Django Framework and MySQL**

by

Md. Tasnif Rahman

Mehedi Hasan Rabbi

PROJECT SUBMITTED IN PARTIAL FULLFILLMENT OF THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE & ENGINEERING



FACULTY OF COMPUTER SCIENCE & ENGINEERING

PATUAKHALI SCIENCE & TECHNOLOGY UNIVERSITY

29th October, 2024

**DECLARATION OF ORIGINAL WORK**

The project titled “PSTU Result and Enrollment Automation System Using Django Framework and MySQL”, submitted by Md. Tasnif Rahman, Roll No. **1802014**, Session: 2018-19 and Mehedi Hasan Rabbi, Roll No. **1802052**, Session: 2018-19 to the Faculty of Computer Science and Engineering, Patuakhali Science & Technology University, has been accepted as satisfactory for the fulfilment of the requirements for the degree of Bachelor of Science in Computer Science & Engineering and approved as to its style and contents.

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**DEDICATION**

We dedicate this project to Allah Almighty, our Creator, our strong pillar, and our source of inspiration, wisdom, knowledge, and understanding. We also dedicate this work to our family and friends, whose support and encouragement have been invaluable throughout this journey.

**Letter of Approval**

This Project Submitted by Md. Tasnif Rahman bearing ID No. 1802014, Mehedi Hasan Rabbi bearing ID No. 1802052 in partial fulfillment of Final Project Submission for B.Sc. in CSE degree has been examined and accepted for further process.

**Approved**

**………………………………**

**Golam Md. Muradul Bashir**

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**ABSTRACT**

The PSTU Result and Enrollment Automation System is designed to streamline the result processing and enrollment management at Patuakhali Science and Technology University (PSTU). Built using Django and MySQL, the system provides secure, role-based access for admins, teachers, and students. It automates tasks like student enrollment, course management, GPA/CGPA calculations, and academic progress tracking. The system also enforces university rules for promotions and F-grade removal while improving accuracy and efficiency. This platform enhances the administrative workflow by reducing manual errors and offering real-time data updates. Teachers can easily manage course results and track student performance, while students can access their academic progress and register for courses. Admins have complete oversight of system operations and can generate reports for decision-making. The system’s user-friendly design and robust security make it a reliable tool for PSTU, ensuring compliance with university policies and supporting future scalability for additional features.

**ACKNOWLEDGMENTS**

First, we are thankful to almighty Allah. He blesses us to complete this project successfully and deliver this within deadline.

The satisfaction that accompanies the successful completion of any task would be incomplete without the mention of people whose ceaseless cooperation made it possible, whose constant guidance and encouragement crown all efforts with success.

We are also grateful to our supervisor Golam Md. Muradul Bashir, Professor, Department of Computer and Communication Engineering, Faculty of Computer Science & Engineering, Patuakhali Science & Technology University.

We are also grateful to CSE 16th batch, Patuakhali Science & Technology University.

With Best Regards,

Md. Tasnif Rahman

Mehedi Hasan Rabbi

**DECLARATION**

We declare that the work presented in this “PSTU Result and Enrollment Automation System Using Django Framework and MySQL” submitted to the Patuakhali Science and Technology University, for the award of the Bachelor of Science in Computer Science and Engineering degree, is our original work. We have not plagiarized or submitted the same work for the award of any other degree. In-case this undertaking is found incorrect, I accept that my degree may be unconditionally withdrawn.

|  |  |
| --- | --- |
| ………………………………….  Md. Tasnif Rahman | ………………………………….  Mehedi Hasan Rabbi |

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# **CHAPTER 1**

# **INTRODUCTION**

## **Introduction**

This report details the development and implementation of the PSTU Result and Enrollment Automation System, aimed at improving the administrative processes and communication within Patuakhali Science and Technology University (PSTU). The system, built using the Django framework and Python, employs Django ORM for efficient database management. Its user-friendly interface is designed using HTML, CSS, Bootstrap, and JavaScript.

The system integrates various administrative features such as student enrollment, course management, result processing, and faculty administration. It supports real-time data updates for GPA and CGPA calculations, compliance with university promotion rules, and F-grade removal processes. The platform enables administrators to manage student records, track academic progress, and disseminate notices seamlessly.

Future improvements include further UI enhancements, fully automated enrollment workflows, and the introduction of a student clearance system, ensuring that the system evolves with PSTU’s growing requirements. This report provides an overview of the system’s development, its role in improving administrative efficiency, and its potential to support future expansions.

## **Motivation**

In the contemporary educational landscape, the imperative for a robust university management system is paramount. With the escalating integration of technology in education, the absence of a centralized platform for administrative management and teacher-student information dissemination poses formidable challenges for educational institutions. Without an efficient website or education management system, institutions grapple with the intricate orchestration of notices, admissions, forms, and other administrative functions, particularly in sprawling establishments with multifarious departments and faculties. Moreover, the absence of a unified repository for teacher information impedes students' access to updated faculty details, hindering communication and class coordination. The development of the PSTU Result and Enrollment Automation System Using Django Framework and MySQL is spurred by a commitment to surmount these obstacles, furnishing educational institutions with a comprehensive solution. By centralizing administrative operations and teacher information, the system promises streamlined processes, alleviated administrative burdens, and enhanced stakeholder communication, thereby fostering an environment conducive to academic excellence and institutional efficiency.

## **Existing System**

Patuakhali Science and Technology University (PSTU) currently employs a manual enrollment system for admitting new students. This system relies on paper applications, in-person interactions, and manual data entry for processing admissions.

Here's a breakdown of the existing enrollment process:

* Application: Prospective students acquire application forms physically, complete them by hand, and submit them along with required documents, again in physical form.
* Processing: University staff manually review applications, verify documents, and record applicant information into the university database.
* Selection & Notification: Admissions decisions are made based on manual evaluation. Accepted students are notified through letters or phone calls.
* Enrollment: Upon acceptance, student’s complete registration formalities in person, including document verification and fee payment.

This manual system presents several limitations:

* Inefficiency: The paper-based process is time-consuming for both applicants and university staff.
* Data Errors: Manual data entry increases the risk of errors and inconsistencies in student records.
* Limited Accessibility: Prospective students, especially those from remote locations, face difficulties in applying and completing the enrollment process.

The existing manual enrollment system at PSTU hinders efficiency, transparency, and accessibility in the admission process. The need for a dedicated, software-based enrollment system is evident to address these shortcomings.

## **Updated System**

The updated PSTU Result and Enrollment Automation System introduces a fully integrated module designed to streamline student registration, course selection, and academic result management. It provides students with intuitive interfaces for viewing available courses, selecting course preferences, and enrolling in subjects. Administrators can efficiently manage and update course offerings, monitor enrollment activity, and generate academic reports.

The system includes automated GPA/CGPA calculations, adherence to university policies for student promotion, and handling of F-grade removal based on predefined rules. A secure fee payment gateway facilitates smooth financial transactions, ensuring hassle-free online payments. Automated notifications remind students of deadlines and communicate status updates regarding their academic progress.

Designed with a responsive interface, the system is accessible from both desktop and mobile devices, offering users a seamless experience across platforms. This enhanced version improves enrollment management, fostering greater efficiency and satisfaction for both students and university administrators

## **1.5** **Contributions**

The PSTU Result and Enrollment Automation System Using Django Framework and MySQL, developed on the Django framework, embodies significant contributions to the realm of university management and academic administration. Leveraging Django's robust MVC architecture, the system offers a cohesive and scalable solution for streamlining administrative processes and enhancing communication within educational institutions.

At its core, Django's adherence to the Model-View-Controller (MVC) paradigm facilitates the separation of concerns, enabling clear delineation between data management, user interface, and application logic layers. This architectural clarity enhances code maintainability and extensibility, laying a solid foundation for future system enhancements.

Furthermore, Django's built-in ORM (Object-Relational Mapping) capabilities streamline database interactions, minimizing the need for manual SQL queries and reducing the risk of SQL injection vulnerabilities. This ensures robust and secure data management, crucial for safeguarding sensitive student and faculty information.

The integration of Django's authentication system empowers administrators to implement granular access controls, facilitating role-based permissions and ensuring data privacy and security. Additionally, Django's templating engine enables the creation of dynamic and responsive user interfaces, enhancing user experience across devices.

## **Objectives**

The updated PSTU Result and Enrollment Automation System has several key objectives aimed at improving the efficiency and security of the current system:

Implement Full Automation of Student Enrollment: Streamline the entire student enrollment process, including course selection, fee payment, and document submission, to reduce manual intervention and enhance operational efficiency.

Enhance User Authentication Mechanisms: Strengthen authentication protocols for administrators, teachers, and faculty members to ensure secure access and protect sensitive information.

Optimize Database Structure and Query Performance: Refine the database schema and enhance query performance to improve system responsiveness, minimize resource consumption, and ensure scalability.

Improve User Experience: Ensure a user-friendly interface with responsive design, making the system accessible across devices while improving the overall user experience.

Support Future Expansion: Build a flexible system architecture that can accommodate future enhancements, such as automated grading and advanced reporting tools.

## **Organization of Project Reports**

**Chapter 2** Shows the literature review of the project.

**Chapter 3** Shows the Methodology of the Project.

**Chapter 4** The design of the database described.

**Chapter 5** Software Design Process Described.

**Chapter 6** This chapter introduces the Conclusion, the limitations of the project and prospective future scopes.

## **Summary**

The introduction chapter provides an overview of the project and its purpose. It explains the background and motivation for the development of the system, as well as its scope and objectives. It also outlines the methodology used in the development process and briefly describes the structure of the report.

# **CHAPTER 2**

# **LITERATURE REVIEW OF PROJECT**

## **Introduction**

This chapter covers the literature review of our system, including the definition of literature review, a review of similar university system, and a comparison of our system to those reviewed.

## **Literature Review**

A literature review is a critical analysis of relevant literature on a particular research topic. It can serve as an integral part of the research process or stand alone as a separate project. This literature review will examine existing systems that share similarities with our project.

## **Similar System**

In admission.bubt.edu.bd, du.ac.bd, ru.ac.bd and juniv.edu are web-based software and is designed to manage their university. There are several systems based on that. However, we will compare these websites based on our updated version and future plan.

## **Comparisons with our System**

In comparison to the University of Dhaka's enrollment system, our PSTU Enrollment system features similar models for students, courses, faculty, and semesters. Our student model captures essential details such as student ID, registration ID, and academic affiliation, while the courses model manages course specifics like code, title, and credit hours. Similarly, our faculty model stores faculty information, and the semester model organizes academic semesters. While both systems likely share these fundamental components, differences may exist in the specific attributes and functionalities tailored to each university's enrollment process and academic structure. Despite potential variations, the core purpose of efficiently managing student enrollment and academic information remains consistent across both systems.

## **Summary**

This section outlines the examination of existing literature and analogous applications of our system. Additionally, a juxtaposition of our system with these applications is presented.

# **CHAPTER 3**

# **METHODOLOGY**

## **Introduction of Methodology**

The methodology section details the systematic approach adopted to develop and implement the PSTU Result and Enrollment Automation System. It covers the research design, data collection techniques, system development processes, and any challenges encountered. The methodology is essential for ensuring the accuracy, reliability, and validity of the project outcomes. By employing a structured research design and using appropriate development tools, the project aims to achieve its objectives effectively. This section highlights how each phase of the project was planned, executed, and evaluated to deliver a functional and reliable system, ensuring transparency and credibility in the development process.

## **Facts finding techniques**

Fact-finding techniques are the methods used to gather information and data about a particular system or problem in order to analyze and understand it better. For this project, the fact-finding techniques used include interviews with faculty dean office personnel, surveys of users, observation of current systems, and analysis of existing documents and reports. These techniques help to identify the requirements, constraints, and opportunities associated with the system, and inform the design and development process.

## **Software Development Life Cycle (SDLC)**

The Software Development Life Cycle (SDLC) provides a framework and guidelines for developing high-quality software. When implementing SDLC, the goal is to create a system that meets the primary owner's expectations. In the case of our University Management System project, we are following the SDLC to ensure that our website is reliable and meets the needs of its users. By incorporating SDLC into our development process, we aim to produce a high-quality system that is efficient, effective, and user-friendly.

### **Software process model**

The software process model adopted for the PSTU Result and Enrollment Automation System Using Django Framework and MySQL is the Waterfall Model. This model offers a structured, sequential approach to software development, encompassing distinct phases such as requirement analysis, design, implementation, testing, and maintenance. In the context of PSTU Result and Enrollment Automation System Using Django Framework and MySQL, each phase progresses linearly, with the completion of one phase preceding the initiation of the next. The Waterfall Model ensures a systematic and organized development process, promoting clarity and predictability throughout the project lifecycle. By adhering to this model, the PSTU Result and Enrollment Automation System Using Django Framework and MySQLaims to achieve comprehensive requirements gathering, robust system design, meticulous implementation, rigorous testing, and seamless maintenance, resulting in a reliable and efficient enrollment system tailored to the specific needs of Patuakhali Science and Technology University.

### **Feasibility Study**

Feasibility study is a pivotal phase in the development of the PSTU Result and Enrollment Automation System Using Django Framework and MySQL. It involves a comprehensive analysis of technical, economic, operational, and scheduling factors to ascertain the system's viability and practicality. The study confirmed that the proposed system is feasible, with the anticipated benefits outweighing the associated costs. PSTU Result and Enrollment Automation System Using Django Framework and MySQL is poised to enhance the university's management processes, fostering greater efficiency and efficacy in student enrollment and administrative tasks. This feasibility assessment underscores the potential value of the PSTU Result and Enrollment Automation System Using Django Framework and MySQL in addressing the specific needs of Patuakhali Science and Technology University, positioning it as a valuable asset for improving operational workflows and enhancing the overall educational experience.

### **Technical Feasibility**

* Compatibility of the proposed system with the existing IT infrastructure of the university.
* Availability of necessary hardware and software for development, testing, and deployment of the system.
* Adequate network infrastructure to support the system's operations.
* Ability to handle increasing data and user load.
* Security and privacy measures to ensure the protection of sensitive information.

### **Operational Feasibility**

Operational feasibility assessment for the PSTU Result and Enrollment Automation System Using Django Framework and MySQL affirms its efficiency and effectiveness in the intended operational environment. Key points highlighting its operational feasibility include:

* User-Friendly Design: The system boasts an intuitive interface, ensuring ease of navigation and task execution, thereby minimizing the need for extensive user training.
* Robust Testing: Rigorous testing procedures have been conducted to verify system robustness, ensuring seamless operation even under high user loads.
* Scalability: The system architecture supports scalability, facilitating future expansion to accommodate evolving university requirements and growing user bases.
* Accessibility: With its web-based nature, the system offers universal accessibility, enabling users to access it from any location at any time, fostering convenience and flexibility in usage.

### **Economic Feasibility**

* The system will also help in reducing the cost of paperwork and storage as most of the data will be stored electronically.
* The system will also increase revenue for the university as it will attract more students and increase the efficiency of the admission and fee collection process.

## **Summary**

The process model of our system is described in this chapter, where we have chosen the Agile model due to its effectiveness in understanding the required system requirements. The SDLC will be followed in the development of our system.

# **CHAPTER 4**

# **DATABASE DESIGN**

## **Database Design**

Database design is fundamental in the development of the PSTU Result and Enrollment Automation System Using Django Framework and MySQL. It encompasses structuring data storage for efficient management and retrieval. Modern database management systems and tools will be utilized to ensure optimal performance and scalability. Data security and integrity will be paramount, with stringent access controls and backup procedures implemented. The design will prioritize a structured and logical organization of data, facilitating seamless manipulation and management throughout the system's lifecycle

## **Entity Relationship Diagram**

Entity Relationship Diagram (ERD) is a graphical representation of the entities and their relationships to each other in a database. It helps to visualize the database structure and ensure that all data is properly organized.

### **PSTU Result and Enrollment Automation System Using Django Framework and MySQL ER Diagram**

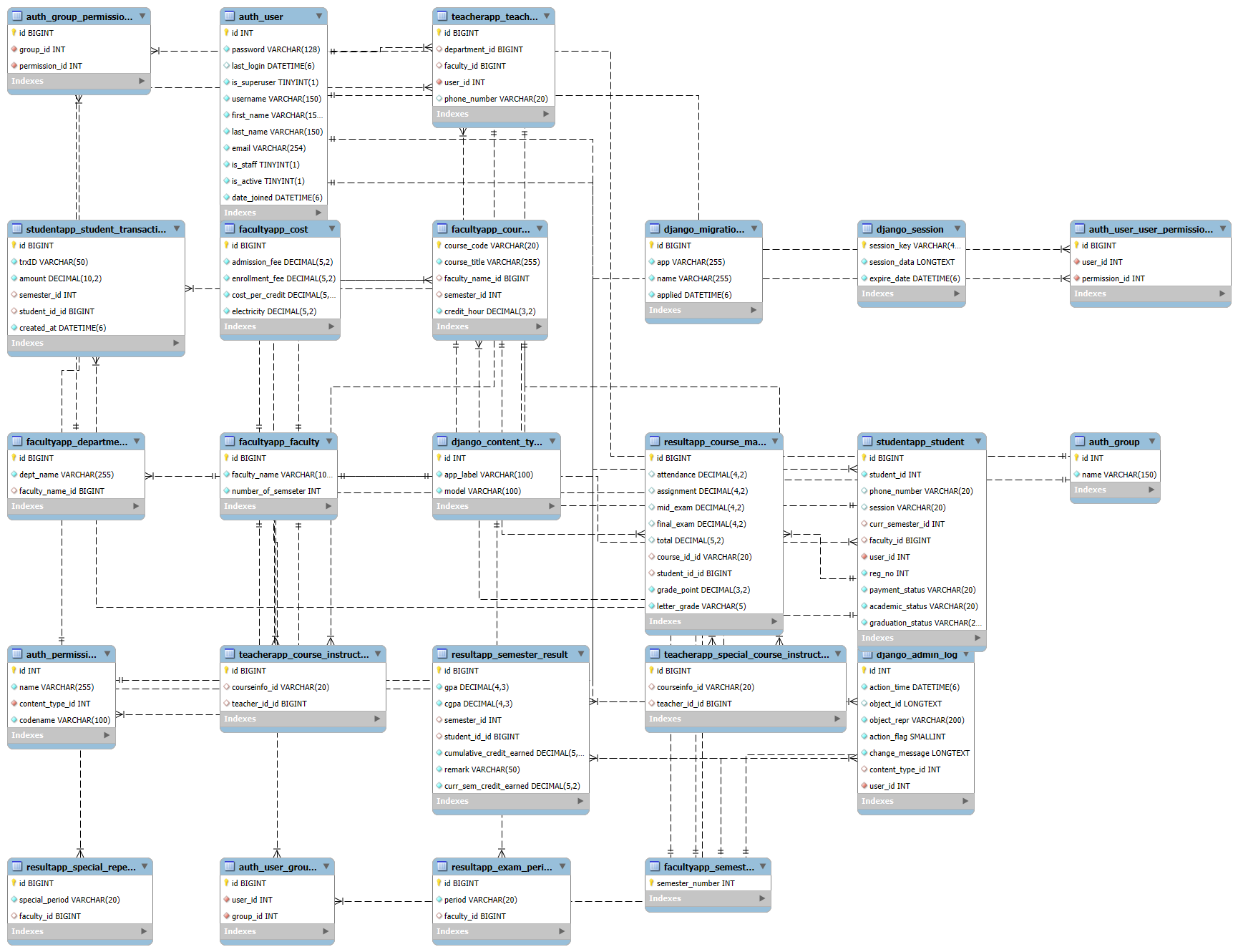


Figure : PSTU Result and Enrollment Automation System ER Diagram

## **Summary**

In this chapter, we have covered several topics related to the University Management System of PSTU. Firstly, we discussed the data dictionary and the database management system. We also provided a detailed explanation of the various tables used in the system. Additionally, we have included the symbols and meanings used in the database design. Finally, we have presented the ERD for the system along with a brief description of the same.

# **CHAPTER 5**

# **SOFTWARE DESIGN**

## **Introduction**

In the software design phase of PSTU Result and Enrollment Automation System Using Django Framework and MySQL, we'll convert requirements into a structured software representation. This includes detailing components, interfaces, and necessary data for implementation. The design will guide the development team, documenting architecture, requirements, and design decisions, ensuring alignment with project specifications and industry standards.

## **Overall design**

### **Admin Panel**

A screenshot of a computer

Description automatically generated

Figure : Admin Panel

### **Faculty Admin Panel**

A screenshot of a computer

Description automatically generated

Figure : Faculty Admin Panel

### **Teacher Admin Panel**

A screenshot of a computer dashboard

Description automatically generated

Figure : Teacher Admin Panel

### A screenshot of a computer Description automatically generated**Student Dashboard**A screenshot of a user interface Description automatically generated

Figure 5: Student Dashboard

### **Next Semester Course List**

A screenshot of a computer

Description automatically generated

Figure 6: Next Semester Course List

### **Payment Using SSLCOMMERZ**

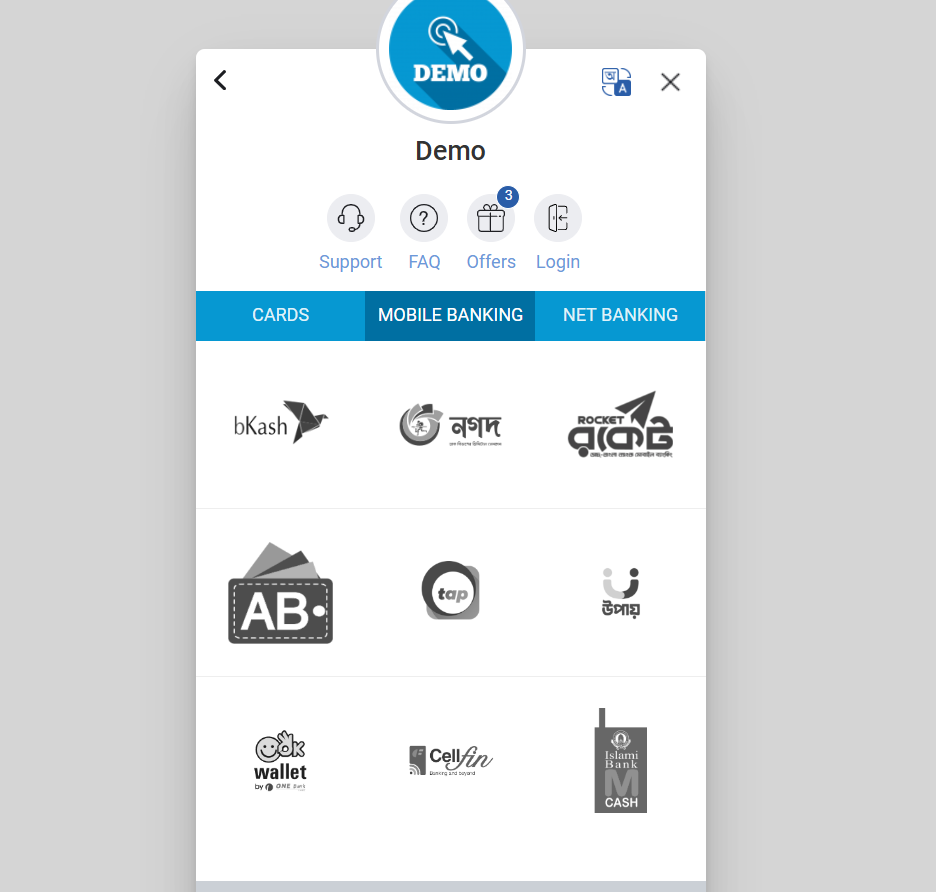


Figure : Payment Using SSLCOMMERZ

### **Regular Period: Semester Result (Full passed and max 50% F-grade Clause: 18.1.1 and 18.1.2)**

A screenshot of a calendar

Description automatically generated

Figure : Academic Progress Rule (18.1.1 and 18.1.2)

### **5.2.8 F-Removal Period: Maximum two F-grade Condition (Clause: 18.1.3 and 18.1.4). e.g. Two courses fail**

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Description automatically generated**

Figure : Academic Progress Rule (18.1.3 and 18.1.4). e.g. Two course fail.

### **5.2.9 F-Removal Period: Maximum two F-grade Condition (Clause: 18.1.3 and 18.1.4). e.g. Two courses fail**

**A screenshot of a calendar

Description automatically generated**

Figure : Academic Progress Rule (18.1.3 and 18.1.4). e.g. Three course fail.

### **5.2.10 Next Semester Promotion (Clause: 18.1.4)**

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Figure : Academic Progress Rule (18.1.4).

### **5.2.11 Regular Period: Minimum GPA 2.00 and CGPA 2.25 (Clause: 18.1.1)**

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Figure : Academic Progress Rule (18.1.1).

### **5.2.12 After Special Repeat**

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Description automatically generated

Figure : After Special Repeat

## **Summary**

In this chapter, we have presented the Admin Panel, Student Account Create and Delete, Course Add and Delete, Student Dashboard, Next Semester Course List, Payment Page Design. Through this presentation, readers can understand the relation between System Design and Requirement Engineering, as well as how it affects the Design Techniques used.

# **CHAPTER 6**

# **TESTING AND SEQURITY**

## **Introduction**

Testing and security are vital for the PSTU Result and Enrollment Automation System Using Django Framework and MySQL. Testing verifies functionality through unit, integration, and system tests, ensuring compliance with requirements. Security testing safeguards against unauthorized access and data breaches, employing measures like vulnerability assessments and encryption. Ongoing maintenance plans are crucial for sustaining functionality and security.

## **Research Objective & Development Approach of Agile Methods**

In this chapter, we explore the topic of testing and security in the context of our project. The exploratory research conducted aimed to provide answers to two key questions: Firstly, what agile testing deployment approaches are being used by researchers and software companies? Secondly, what is the formal process used to insert testing in agile development teams? Based on the studies surveyed, we can observe that the testing deployment approaches used in agile development teams tend to be influenced by the types of extreme programming methodologies being implemented. One important aspect of testing in this context is the use of regression tests to ensure that any new features added to the software are thoroughly tested and do not affect the behavior of other features. In addition, the survey revealed several characteristics of testing in agile development:

* Automation of testing - this involves the use of automated tools and scripts to conduct tests and detect errors more efficiently.
* Integration testing - this involves testing individual components of the system as well as the system as a whole to ensure they work together as intended.
* Continuous integration testing - this involves conducting tests on a regular basis, often daily or weekly, to identify and address any issues that arise quickly.
* Tester as a team member - this involves including testers as part of the development team to ensure that testing is integrated into the development process from the beginning.

### **Test Automation**

Test automation is the process of automating test cases and executing them using automation tools or software. There are several phases involved in test automation that help ensure the quality of the software product. These phases include:

* Test Planning: This phase involves creating a test plan that outlines the test objectives, scope, and requirements. It also includes identifying the types of tests to be executed, setting up the test environment, and selecting the appropriate testing tools.
* Test Development: In this phase, test cases are developed based on the requirements and specifications of the system. The test cases are created using automation tools and are designed to be executed repeatedly.
* Test Execution: Once the test cases are developed, they are executed using the automation tool. The tool simulates the actions of a human tester and runs the test cases. The results of the test execution are then compared to the expected results to determine if the software meets the requirements.

### **Regression Tests**

Regression testing in the PSTU Result and Enrollment Automation System Using Django Framework and MySQL verifies that existing functionalities remain intact after system changes. It involves re-running functional and non-functional tests to ensure continued correct performance despite modifications to the system or its environment.

## **Summary**

In this chapter, the focus is on the actual outcomes of the entry system. During testing, various defects were identified, which aided in error recovery and made the software more efficient and smoother. The debugging process was performed step-by-step on all data, including owner, admin, and user.

# **CHAPTER 7**

# **CONCLUSION**

## **Introduction**

The conclusion section summarizes the findings and outcomes of the study, and provides recommendations for future work. It is an important section as it helps to tie all the pieces of the research together and highlight the key points that have been made throughout the study.

## **Project Outcomes**

The PSTU Result and Enrollment Automation System Using Django Framework and MySQL resulted in the successful development of a comprehensive university management system using the Django framework. It incorporated essential features such as user authentication, course management, student enrollment, and profile management. Various testing techniques were applied to ensure functionality, reliability, and security. The system was designed with a user-centric approach, focusing on usability and accessibility. Overall, the project outcomes reflect the successful application of software engineering principles and methodologies to develop a robust and user-friendly university enrollment system.

## **Future Works**

Some of the future works of the project are the following:

* Manage failed course exam after special repeat.
* Multiple faculty mark distribution control.
* Dormitory payment integration.

## **Summary**

In conclusion, the PSTU Result and Enrollment Automation System Using Django Framework and MySQL successfully applied software engineering principles and agile methodologies to enhance administrative efficiency and communication. Future work includes implementing a faculty-wise website and refining user interfaces for an improved experience. Overall, the project demonstrates effective project management and collaborative development efforts.

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