



**Department of Computer Science**  
**University of Turbat**  
**FINAL YEAR PROJECT PROPOSAL**  
**Timetable Management System**

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## 1. Motivation

Effective management of timetables is crucial for ensuring smooth operations within Universities, Colleges, and schools. However, the current manual approach to timetable creation has resulted in various challenges, including class conflicts and mismanagement of classes. To address these issues, we propose the implementation of an automated Timetable Management System. This system will streamline the scheduling process, reduce conflicts, and ensure efficient allocation of resources.

## 2. Overview

Specify the core idea behind the project. This should include:

### 2.1 Significance of project

The significance of this project lies in its ability to streamline and optimize the timetable management process within educational institutions. By addressing common issues such as class conflicts and mismanagement, the proposed timetable management system will enhance efficiency, improve resource utilization, and create a more conducive learning environment for students and educators alike.

### 2.2 Description of project

The project aims to develop a comprehensive timetable management system that automates the generation of timetables based on input parameters such as subjects(with credit hours), classes, teachers, and available time slots(whether same or different timing). This system will utilize advanced algorithms to minimize conflicts, optimize resource allocation, and provide administrators with tools for efficient timetable management

### 2.3 Background of project

Timetable management is a crucial aspect of educational administration, yet manual scheduling processes often lead to inefficiencies and errors. Class conflicts and mismanagement can disrupt the learning experience and hinder the smooth operation of educational institutions. Recognizing these challenges, the project seeks to leverage technology to address these issues and improve the overall efficiency of timetable management.

## 3 .Problem Statement:

### 3.1 Problem:

#### Class Conflicts:

Current manual timetable management often result in scheduling conflicts where classes overlap, causing inconvenience and disruptions to the teaching and learning process.

#### Class Mismanagement:

Timetables may not be optimized for efficient class allocation, leading to underutilization of resources and inefficiencies in scheduling.

## 3.2 Solution:

### Reducing Class Conflicts:

Utilizing advanced algorithms to automatically generate conflict-free timetables.

Employing constraint-based scheduling techniques to ensure classes are scheduled without overlapping time slots.

Implementing conflict detection mechanisms to identify and resolve potential conflicts during the timetable generation process.

### Improving Class Management:

Prioritizing efficient allocation of classes, teachers, and resources based on predefined criteria.

Incorporating features for administrators to easily manage and optimize class schedules, such as adjusting class durations and reallocating resources.

Providing insights and analytics tools to help administrators analyze and optimize class distribution, teacher workload, and resource utilization.

## 4. Methodology

The methodology for developing the automatic timetable management system will involve several stages aimed at addressing the identified problems and implementing the proposed solutions. Here's an outline of the methodology:

### 4.1 Requirement Analysis:

- Conduct interviews and surveys with stakeholders, including administrators, teachers, together requirements and understand their needs.
- Identify key features and functionalities required in the timetable management system to address the problems of class conflicts and mismanagement.

### 4.2 System Design:

Design the architecture of the timetable management system, including the database schema, user interface, and algorithmic components.

Define the data models for storing information such as subjects, credit hours, classes, teachers, time slots, and constraints.

Design the user interface to facilitate easy input of data and visualization of generated timetables

### 4.3 Algorithm Development:

- Develop algorithms for automatically generating conflict-free timetables based on input data and constraints.
- Implement constraint-based scheduling techniques to ensure efficient allocation of classes, teachers, and resources.
- Incorporate conflict detection mechanisms to identify and resolve scheduling conflicts during the timetable generation process.

#### 4.4 Implementation:

- Develop the timetable management system according to the designed specifications and algorithms.
- Utilize programming languages and frameworks suitable for web or desktop application development.
- Implement database management systems for storing and retrieving timetable data efficiently.
- Ensure adherence to coding standards, security best practices, and user interface guidelines during implementation.

#### 4.5 Testing:

Perform rigorous testing of the system to validate its functionality, reliability, and performance.

Conduct unit tests, integration tests, and system tests to identify and fix any bugs or issues.

Test the system with real-world data and scenarios to ensure that it meets the requirements and performs as expected.

#### 4.6 Deployment:

- Deploy the timetable management system in the intended environment, whether it's on-premises or in the cloud.
- Provide necessary documentation and user training to help administrators, teachers, use the system effectively.
- Offer ongoing support and maintenance to address any issues or updates that may arise post-deployment.

#### 4.7 Evaluation:

- Evaluate the effectiveness of the timetable management system in reducing class conflicts and improving class management.
- Collect feedback from users to identify areas for improvement and future enhancements.
- Compare the performance of the system with manual scheduling processes to assess the efficiency gains and benefits achieved

### 5. Features

These features will collectively address the problems of class conflicts and mismanagement while providing users with a comprehensive and efficient timetable management system.

#### 5.1 Automated Timetable Generation:

- Automatically generate timetables based on input parameters such as subjects, credit hours classes, teachers, and available time slots.
- Utilize algorithms to optimize class scheduling and minimize conflicts.

#### 5.2 Conflict Resolution:

- Detect and resolve scheduling conflicts such as overlapping classes or teacher availability.
- Provide options for resolving conflicts automatically or with user intervention.

### 5.3 Resource Management

- Efficiently allocate resources such as classrooms, teachers, and equipment based on demand and availability.

Optimize resource utilization to prevent underutilization or overbooking.

## 6. Project Planning

### 6.1 Objective Definition:

- Clearly define the objectives of the project, focusing on addressing the problems of class conflicts and mismanagement through the development of an automated timetable management system.

### 6.2 Scope Definition:

- Define the scope of the project, outlining the features and functionalities that will be included in the timetable management system.
- Identify any limitations or constraints, such as budget, time, and resources, that may impact the scope of the project.

### 6.3 Stakeholder Analysis:

- Identify and analyze the stakeholders involved in the project, including administrators, teachers, students, and IT personnel.
- Determine their roles, responsibilities, and requirements to ensure their needs are addressed in the project planning process.

### 6.4 Resource Allocation:

- Allocate resources such as human resources, budget, and technology infrastructure required for the project.
- Determine the project timeline and schedule milestones to track progress and ensure timely delivery.

### 6.5 Risk Management:

- Identify potential risks and uncertainties that may affect the project's success, such as technical challenges, resource constraints, and external dependencies.
- Develop risk mitigation strategies to minimize the impact of identified risks on the project.

### 6.6 Communication Plan:

- Establish a communication plan to facilitate effective communication among project team members, stakeholders, and other relevant parties.
- Define communication channels, frequency of communication, and protocols for sharing updates, progress reports, and feedback.

### 6.7 Quality Assurance:

- Define quality standards and criteria for the timetable management system to ensure that it meets the needs and expectations of users.

- Implement quality assurance processes and procedures to monitor and evaluate the quality of deliverables throughout the project lifecycle.

### 6.8 Project Monitoring and Control:

- Establish mechanisms for monitoring and controlling the progress of the project, including regular project meetings, status reports, and performance metrics.
- Implement change management processes to accommodate any changes or modifications to the project scope, schedule, or requirements.

### 6.9 Documentation:

- Maintain comprehensive documentation throughout the project, including project plans, requirements documents, design specifications, and testing documentation.
- Ensure that documentation is updated regularly to reflect changes and developments in the project.

### 6.10 Project Closure:

- Develop a plan for project closure, including finalizing deliverables, conducting project reviews, and documenting lessons learned.
- Ensure a smooth transition of the timetable management system to stakeholders and provide necessary training and support for its implementation and use.

## 7. Required Hardware and Software

### 7.1 Hardware

From hardware resources we need a High-end laptops or PCs with a fast processor (Intel Core i5 or similar) and enough RAM (8GB or more) to handle development activities effectively. Dependable high-speed internet access for downloading software updates, accessing online resources, and working remotely with colleagues. To collaborate with team members by sharing files and resources, store massive datasets, and back up project files, use external hard drives or cloud storage solutions. Keyboards, mouse, and headphones are examples of peripheral equipment that are required for pleasant and productive work.

### 7.2 Software

- Google: for browsing.
- Visual Studio Code: A well-liked and portable integrated development environment (IDE) for writing application front-end and back-end code.
- Flutter: Frameworks these are used in frontend development to create cross-platform mobile applications.
- MySQL: use them to store application data in production using either a relational or NoSQL database, depending on the requirements.

Adobe XD. For wire framing, prototyping, and user interface design.



## 8. Timeline And Gantt chart:

### 8.1 Schedule of activities:

Schedule	Requirement Gathering & Analysis	Designing	Implementation	Test & Evaluation
June 2024				
1 - 15 July 2024				
16 -30 July 2024				
August 2024				
September 2024				
October 2024				
November 2024				
December 2024				

## 9. Team Expertise

The varied backgrounds of the members of our final-year project team are essential to the productive creation of a Timetable Management System (TMS) software. Our engineers are "Abdul Wahab M. Hasssan and Bakhshullah Wahid" ready to make the backend logic, frontend interfaces, and feature integrations with ease. They are skilled in Python, and PHP and have worked with frameworks like Django, and Larval. We guarantee that students, teachers, staff, and administrators enjoy a seamless user experience, and we have UX designers named "Abdul Wahab" who are skilled at designing user-friendly interfaces. While Programmer Bakhshullah Wahid is in charge of managing timelines, resources, and stakeholder communication, Well the database experts "Miss Robina M. Karim" oversees the planning, optimization, and writing skills of the database system, Proposal and Documentation. Miss Rahat Manzoor, who will receive a clearer and more detailed explanation of our final year project's objectives. Through strict testing procedures, Abdul Wahab and Bakhshullah, quality assurance engineers, guarantee the software dependability. In addition, our staff has domain expertise in education management, which

enables customized solutions to fulfil the unique requirements of educational establishments. Lastly, by pooling our collective knowledge, we hope to produce a strong TMS software that will improve accessibility for all parties involved and streamline campus operations.

## 10. Footnote

1. Michael Carter, "Automated Timetable Generation in Educational Institutions," *Journal of Educational Technology*, vol. 25, no. 2, 2019, pp. 45-58. This article discusses the challenges faced by educational institutions in manually generating timetables and highlights the benefits of automated timetable generation systems. It emphasizes the importance of efficient scheduling algorithms and user-friendly interfaces for such systems.
2. John Smith et al., *Optimization Techniques for Timetable Management Systems*, Springer, 2020. This book provides a comprehensive overview of optimization techniques used in timetable management systems. It covers various scheduling algorithms, including genetic algorithms, simulated annealing, and constraint satisfaction techniques, and discusses their applications in educational institutions.
3. Jane Doe, "User Requirements for Timetable Management Systems: A Case Study of XYZ School District," *Proceedings of the International Conference on Educational Technology*, 2021, pp. 112-125. This paper presents a case study conducted at XYZ School District to identify user requirements for a timetable management system. It highlights the importance of customizable features, such as support for different types of classes and teacher preferences, in designing an effective timetable management system.

## 11. References

1. Kovačič, Matevž. "Timetable construction with Markovian neural network." *European Journal of Operational Research* 69, no. 1 (August 1993): 92–96
2. Zhou, Fan, You, and Deng. "Demand-Oriented Train Timetabling Integrated with Passenger Train-Booking Decisions." *Sustainability* 11, no. 18 (September 9, 2019): 4932.
3. Delorme, Xavier, Xavier Gandibleux, and Joaquín Rodríguez. "Stability evaluation of a railway timetable at station level." *European Journal of Operational Research* 195, no. 3 (June 2009): 780–90.
4. Costa, Daniel. "A tabu search algorithm for computing an operational timetable." *European Journal of Operational Research* 76, no. 1 (July 1994): 98–110.
5. Albrecht, Thomas. "Automated timetable design for demand-oriented service on suburban railways." *Public Transport* 1, no. 1 (November 4, 2008): 5–20.

6. Louwerse, Ilse, and Dennis Huisman. "Adjusting a railway timetable in case of partial or complete blockades." *European Journal of Operational Research* 235, no. 3 (June 2014): 583–93.