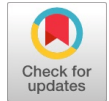


UMIT Project Management System

Anita Morey, Tanvi Chile, Sejal Jadhav, Seher Shah



Abstract: Usha Mittal Institute of Technology evaluates students' projects through multiple stages over various semesters. To manage all project functionality and evaluate these projects per student using an automated system, we proposed the UMIT Project Management System. Currently, UMIT handles all the project work manually. The UMIT has many phases of the projects. In the third-year semester, VI, there is a project, Project I, which has two phases: Project I-A and Project I-B. In the Final year, semester VII students have Project II, which consists of two phases: Project II-A and Project II-B. Similarly, in the final year, Semester VIII, there is a Project III with four phases: Project III-A, Project III-B, Project III-C, and Project III-D. All these phases have their rubric format for the evaluation. Managing all these phases with specific rubric formats and calculation of marks is very complicated on a manual basis. To perform all the project-related activities like submission of synopsis, evaluation schedule, group forming, guide allocation, Rubric mark sheet, etc. UMIT Project Management System has been developed. By alleviating the manual burdens associated with project evaluations, the UMIT PMS enhances accuracy and transparency, fostering an organised academic environment that is focused on quality and innovation. Its user-friendly design ensures accessibility for all users, promoting efficiency and innovation in project management.

Keywords: UMIT PMS, Admin, Rubric, Project, Students, Guide, Phases, Dashboard.

I. INTRODUCTION

At the Usha Mittal Institute of Technology, students undertake projects in various semesters, and these projects are evaluated at multiple stages throughout the academic year. Each evaluation is conducted by filling in the predefined rubrics for each student separately by both the guide and the examiner. Currently, UMIT handles all the project work manually. The UMIT has many phases of the projects. In the third-year semester, VI, there is a project, Project I, which has two phases: Project I-A and Project I-B.

In the Final year, semester VII students have Project II, which consists of two phases: Project Phase II-A and Project Phase II-B. Similarly, in Final Year Sem-VIII, there is Project III, accompanied by its rubric and parameters for assessing various aspects of the project, including the innovative nature of the topic, the student's understanding, the project's objectives, design and analysis, implementation, communication skills, presentation style, and group coordination. This diversity in evaluation criteria and the involvement of different guides and examiners complicate the manual entry of marks, as well as the aggregation and averaging of these marks for internal and external assessments. Such manual processes are not only time-consuming but also prone to human errors. To address these issues, the proposed UMIT Project Management System (UMIT PMS) aims to automate and streamline the project management workflow. The system will handle user registration, facilitate group formation, and allocate guides to student groups. It will also manage project-related notifications, schedule meetings, and provide rubric formats to both students and faculty. Guides and examiners can input marks directly into the system, and the project coordinator will review and finalise these marks before they are submitted.

Additionally, UMIT PMS will provide features for automated alerts, comprehensive reporting, and tools for communication, such as meeting links, a report editor, and a calendar for scheduling. By improving data management, reducing errors, and enhancing communication, the UMIT Project Management System (PMS) is expected to significantly boost the efficiency and accuracy of project management, thereby enriching the educational experience for both students and teachers. By implementing such a system, UMIT aims to facilitate improved project management, ensuring the timely and accurate completion of project phases, thereby enhancing the overall educational experience for students and improving administrative efficiency for faculty members.

To provide a more functional context, the UMIT PMS will incorporate features such as automated Rubric Mark Sheets for digital submission of synopses and reports, along with an extensive guide directory to simplify mentor selection for student projects. Furthermore, the system will introduce the innovative concept of interdepartmental project groups, allowing students from different academic disciplines to collaborate effectively. Administrators can efficiently manage student, guide, and examiner data, thereby streamlining administrative tasks and minimising errors. Guides and examiners will utilise Rubric Mark Sheets to accurately evaluate and assign marks to student projects, with the system securely storing cumulative marks. Additionally, the system will provide meeting links to guides, students, and admins, which will be functional for each dashboard and easy to access all the

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functionalities.

A. Background:

The Usha Mittal Institute of Technology (UMIT) relies on a manual system for managing grade sheet entries across various project phases, resulting in persistent delays and complications. This manual process requires substantial effort from supervisors, guides, and external examiners to develop comprehensive mark sheets. With six branches mandating two distinct projects - Project I for third-year students and Projects II and III for fourth-year students, each involving multiple phases - the reliance on manual record-keeping has significantly slowed the generation of project reports and hindered effective monitoring of project teams. The current manual system is inadequate for timely alerts and notifications, considering the varying time constraints and the status of individual project components. The labour-intensive nature of organising student copies and manually entering grades increases the risk of errors, especially with large data volumes.

B. Research Motivation:

The motivation behind this research stems from the urgent need to address the inefficiencies and challenges faced by the manual project management workflow at UMIT. Currently, manual processes for managing project-related tasks, such as marking sheet entries, project group formation, guide allocation, evaluation using rubrics, and final marking sheet generation, are time-consuming and prone to errors. These challenges not only hinder the timely completion of projects but also impact the overall quality of project outcomes. By developing an automated Project Management System, we aim to streamline processes, enhance efficiency, and improve the overall project management experience for both students and faculty members. This system will alleviate the burden of manual tasks, promote consistency and transparency in evaluations, and facilitate better coordination and communication among project stakeholders.

C. Scope of the Study:

This study focuses on developing and implementing the UMIT Project Management System within the existing project management workflow. The scope includes designing and integrating various functionalities to streamline project management processes and enhance efficiency. The scope also encompasses documenting the development process, including software design, implementation, testing, and deployment, to provide insights for future enhancements and scalability.

D. Objectives:

The objectives of the UMIT Project Management System encompass developing an automated solution tailored to streamline the management of mark sheet entries for student projects, aiming to enhance efficiency and accuracy in project evaluation processes. This comprehensive system aims to achieve the following:

a. *Implement Rubrics:*

Develop and integrate detailed rubrics into the system to ensure consistent, objective, and transparent evaluation of all project work. By defining clear evaluation criteria for various project aspects such as research methodology, presentation

quality, and technical proficiency, the system will facilitate fair and stabilize grading across different projects and examiners. The Rubrics will provide specific guidelines and benchmarks for assessment.

b. *Facilitate Project Group Creation:*

Provide functionality that enables students to form project groups efficiently within the system, facilitating effective collaboration and management. Through intuitive user interfaces and automated group allocation algorithms, students create, join, and manage project groups based on their interests, expertise, and availability. This feature will foster teamwork and synergy among group members, facilitating interdisciplinary collaboration and enhancing project outcomes.

c. *Allocate Guides:*

Enable the system to assign guides to each student or project group, ensuring proper mentorship and supervision throughout the project. By automating the guide allocation process based on student preferences, expertise, and availability, the system will ensure that every group receives adequate mentorship and support. Guides will have access to project information, milestones, and group progress, enabling them to provide timely feedback, guidance, and assistance to project teams.

d. *Rubrics Evaluation Process:*

Implement a structured evaluation process using predefined rubrics to ensure fair, unbiased, and accurate assessment of each project based on set criteria. The system will automate evaluation tasks, including rubric-based scoring, feedback generation, and result aggregation, to promote consistency and transparency in the evaluation process. Evaluators assess student projects objectively and systematically, providing a basis for informed decision-making and constructive feedback.

e. *Generate Automated Final Mark sheet:*

Develop an automated system that generates customised final mark sheets for each project, tailored to departmental requirements. By automatically compiling and aggregating individual project scores, calculating overall grades, and formatting the mark sheet, the system will streamline the mark sheet generation process, reducing errors and administrative workload. Students and faculty members will have access to final mark sheets through the system, promoting transparency and accountability in the evaluation process. By achieving these objectives, the UMIT Project Management System aims to create an efficient, reliable, and transparent process for managing student projects.

II. LITERATURE REVIEW

We conducted our literature review on several project management tools in all areas.

Each research area focuses on distinct aspects of collaborative project management, offering something unique and different. A project management system is a set of processes, tools, and techniques used to plan, execute, and close projects effectively. It helps ensure that projects are completed on time, within budget, and meet quality and performance objectives [2]. This literature review

examines the definition, importance, key components, benefits, and challenges of project management systems, concluding with a comprehensive list of references and citations related to the topic.

A project management system is a structured approach to managing projects, involving processes and methodologies to achieve project goals. It encompasses planning, organizing, and controlling resources to complete specific project goals and objectives [7]. Effective project management systems are crucial for organisations to ensure the efficient utilisation of resources, meet customer expectations, and deliver projects within specified timeframes. They contribute to increased productivity, improved quality, and enhanced customer satisfaction.

A. Automated Project Management Systems:

The literature traces the evolution of project management tools from their manual origins to semi-automated and fully automated solutions. Early project management methods were labour-intensive and manual, but have introduced semi-automated tools that streamline some processes [6]. Today, fully automated systems offer comprehensive features that support various project management functions, significantly enhancing efficiency and effectiveness (Azzopardi, 2024; Nasr, 2024). Automated project management systems incorporate features to improve project execution and management [4]. Core functionalities include task scheduling, progress tracking, resource allocation, and communication tools. These systems help streamline workflows, enhance collaboration among team members, and provide real-time insights into project status, to better decision-making and increase project efficiency (The Digital Project Manager, 2024; Project Management, 2024) [2]. automated project management systems offer numerous benefits, such as increased operational efficiency, minimized errors, and improved scalability.

B. Digital Transformation in Academic Administration:

This section explores broader trends in the digital transformation of academic administration [8]. The adoption of technologies such as cloud-based solutions, data analytics, and artificial intelligence has the potential to revolutionize administrative processes and enhance educational experiences [5]. These technologies can streamline administrative tasks, provide data-driven insights, and support innovative teaching and learning methods [3]. The transition to digital solutions in academic administration involves several challenges. Key issues include ensuring data privacy and security, meeting infrastructure requirements, and addressing regulatory compliance [9] [10].

III. RESEARCH METHODOLOGY

The UMIT Project Management System is designed to streamline the academic project management process for students, guides, and administrators. The system is divided into three main dashboards, each catering to the needs of its users: the Student, Admin, and Guide dashboards.

A. System Design:

The UMIT Project Management System is designed to streamline and automate the project management process for students, guides, and administrators at the Usha Mittal Institute of Technology [1]. The system architecture

comprises several interconnected components that facilitate efficient project tracking, grading, and collaboration across various departments.

B. Component Overview

The UMIT Project Management System is structured around several key components to facilitate effective project management and evaluation. At the core is the Dashboard, which serves as the central interface for users, offering real-time updates on project status, deadlines, and important announcements. The Project Management Module supports functionalities such as project creation, task assignment, milestone tracking, and progress monitoring, ensuring that all aspects of a project are efficiently managed and tracked. The Marks Management System integrates automated mechanisms, rubric-based evaluation tools, and feedback systems to ensure the fair and accurate assessment of student projects. System architecture features a web-based interface that is accessible via desktop and mobile devices, offering flexibility in user interaction.

C. User Interface

The User Interface Design of the UMIT Project Management System focuses on creating a user-centric experience by incorporating intuitive navigation and visually appealing layouts that enhance usability and user experience. The design is responsive, ensuring the interface is optimised for various screen sizes and devices, thereby providing a seamless experience across desktops, tablets, and mobile phones.

The Guide Dashboard within the UMIT Project Management System provides comprehensive tools to manage and oversee assigned projects and students. It includes sections displaying Guide ID Details for personal information and Projects to access detailed project information. Guides can also view Students and their relevant details, ensuring they can monitor each student's progress effectively. Information about the Internal Examiner (Examiner 1) and the External Examiner (Examiner 2) is available to facilitate the coordination of evaluations. The dashboard provides access to Rubrics, outlining the criteria for project evaluation. Finally, a Logout feature ensures that guides can securely end their session, maintaining the system. The Student Dashboard is designed to cater to the needs of students, displaying their Student ID details, as well as information about their Allocated Guide. Students can access details of their Project Groups and manage Inter-dept-groups for interdepartmental collaborations. The dashboard features a Meeting section for viewing scheduled meetings and a Calendar for tracking project-related dates and deadlines. The Add Submissions feature enables students to upload project materials, ensuring that submissions are organised and easily accessible. Students can also access Rubrics to understand the criteria on which their projects will be evaluated, such as the guide dashboard and a Logout feature.

IV. PROCEDURE

A. Registration and Login:

The UMIT Project Management System begins with users registering using valid credentials.



Upon successful registration, users can log in securely to access personalised features and dashboards tailored to their specific roles, ensuring a secure and individualised user experience.

B. Student Dashboard:

The Student Dashboard allows students to form project groups and collaborate effectively on their assignments. It facilitates interaction with guides, enabling students to schedule meetings and submit project documents seamlessly, thus ensuring organized and efficient project management.

C. Guide Dashboard:

Guides have access to a comprehensive dashboard, where they can manage assigned project groups and assess their progress. They evaluate projects using predefined rubrics, fulfilling their roles as Examiner 1 and Examiner 2. Based on these evaluations, final mark sheets are generated, ensuring a structured and fair assessment.

D. Admin Dashboard:

Administrators use the Admin Dashboard to manage user profiles and allocate necessary resources. They play a crucial role in overseeing the accuracy and distribution of final mark sheets, ensuring that the assessment process is transparent and reliable.

E. Project Management:

Within the project management framework, administrators allocate guides and projects to ensure efficient oversight and management. Guides are responsible for overseeing groups, evaluating projects, and marking rubric sheets, while students focus on collaboration and the timely submission of project documents.

F. Rubrics Evaluation Process:

The system employs a structured rubric evaluation process where guides evaluate projects based on predefined criteria. Both Examiner 1 and Examiner 2 independently assess the projects, ensuring a comprehensive and unbiased evaluation. The independent assessments from both examiners contribute to a fair and balanced review of the projects. This method ensures consistency and accuracy in the evaluation process.

G. Final Mark Sheet Generation:

After evaluations are complete, guides submit final mark sheets that reflect the assessment results. Administrators then verify the accuracy of these mark sheets and ensure their proper distribution to students, maintaining the integrity of the grading process.

H. System Maintenance:

To ensure the system operates smoothly, administrators are responsible for regular maintenance. They address any technical issues that arise and work to maintain the overall system functionality, providing a reliable platform for all the dashboards within the system.

V. IMPLEMENTATION

A. Entity Relationship Diagram:

The Entity Relationship Diagram (ERD) for the UNIT Project Management System represents the various user roles and their interactions within the system. The primary entities

include Admin, Guide, Examiner, and Student, each characterised by unique identifiers such as ID, name, email address, phone number, and password. The Group By Projects entity illustrates the relationship between guides and students, clearly indicating which students are assigned to which guides, thereby establishing a structured mentorship and oversight process. Furthermore, the Synopsis entity holds the synopsis submissions from students, linking them to the respective Student ID, Guide ID, and the actual synopsis text. This ensures that all project proposals and preliminary reports are systematically documented and accessible. Finally, the Mark sheet entity records the total marks of the students, referenced by their Student ID, thereby providing a clear and organized summary of each student's performance. This ERD effectively encapsulates the various components and their relationships, supporting the structured and efficient management of academic projects within the system.

B. Admin Dashboard Functionalities:

The UNIT Project Management System (PMS) includes comprehensive functionalities for managing profiles and project allocations. Admin Details allows viewing specific information about administrators, ensuring apparent oversight.

Student Details enables the addition, update, and deletion of student profiles, maintaining accurate and up-to-date records. Similarly, Guide Details empowers the management of guide profiles, allowing for the addition, updating, and deletion of guides within the system. The system also includes Fetch Project Details, which provides access to specific project information, aiding in project tracking and management. The UNIT PMS supports the management of project groups across the Inter-Department, enabling the organisation and coordination of interdepartmental project groups. Through Allocate Guide, administrators can assign guides to projects, ensuring that each project receives proper mentorship and guidance. The system also incorporates Rubrics and Final Mark sheet functionalities, utilizing structured evaluation rubrics to assess projects and generating final mark sheets to document and communicate student performance. These features collectively ensure a streamlined and efficient process for managing Admin, Guide, and Student profiles, as well as allocating guides to project groups within the UNIT PMS.

C. Student Dashboard Functionalities:

The student dashboard within the UNIT Project Management System offers a comprehensive set of functionalities designed to streamline project management for students. One key feature is the ability to view the Allocate Guide Details, allowing students to see detailed information about their assigned guides, including contact information and the project guidance schedule, which facilitates effective communication and support. Additionally, the dashboard enables students to form and manage Project Groups within their class, where they can assign roles and responsibilities, promoting collaborative teamwork. For interdisciplinary collaboration, the dashboard facilitates the creation of Department Project Groups, enabling students to coordinate roles and



responsibilities across various departments.

This fosters a more integrated approach to project work. Students can submit reports and synopses through the system, allowing them to upload their project reports and synopses. They can track the submission status and receive feedback from their guides, ensuring a structured and efficient process for managing their project documentation and evaluations. These functionalities collectively enhance the student experience, providing robust tools for effective project management and collaboration.

D. Guide Dashboard Functionalities:

Guides can view their IDs and the IDs of external examiners, ensuring clarity and accountability. Guides can also access project details and student allocation, providing them with comprehensive information about each project and the associated student IDs. This facilitates effective oversight and management of the projects under their supervision. Additionally, guides can view student details, allowing them to access relevant information about the students involved in their projects, which facilitates personalised mentoring. In their dual roles as External Examiner 1 and External Examiner 2, guides can evaluate student projects according to specified criteria, ensuring a fair and structured assessment process. They can fill rubrics for evaluation, assigning marks based on predefined criteria for each project phase, thereby maintaining consistency and objectivity in the evaluation process. These functionalities collectively enable guides to mentor students effectively and ensure thorough and impartial project evaluations.

E. Rubrics Evaluation Process and Final Mark Sheet Generation:

Students at the Usha Mittal Institute of Technology (UMIT) are responsible for forming their project groups, either with their classmates or by collaborating with students from other departments. Administrators oversee these project groups, managing the assignments and ensuring that guides are appropriately allocated to intra- and interdepartmental groups. The evaluation process-specific rubrics are designed for different academic years and phases. For third-year students, the rubrics are divided into Phase I-A and Phase I-B. Fourth-year students follow distinct rubrics for the seventh and eighth semesters, with the seventh semester comprising Phase II-A and Phase II-B, the eighth semester comprising Phase III-A, Phase III-B, Phase III-C and Phase III-D. Notably, Phase III-D includes separate rubrics for internal and external examiners. Guides play a crucial role in evaluating projects, using predefined criteria to select their roles as Internal Examiner 1 or External Examiner 1, and specifying the relevant department and year. The system incorporates built-in rubrics for each phase and department, facilitating a standardized and scalable evaluation process. Once the rubric evaluation for all phases is complete, administrators ensure the accuracy and consistency of the results before finalising them. Final mark sheets are then generated and can be downloaded by administrators in Excel format. This organized method enhances the efficiency of project management at UMIT, ensuring smooth teamwork and accurate evaluations.

VI. RESULT AND DISCUSSION

The UMIT Project Management System has significantly streamlined project management processes at the Usha Mittal Institute of Technology. Students efficiently form and manage their project groups, either within or across different departments, fostering collaboration. Administrators effectively oversee the allocation of guides and project groups. The system's user-friendly interface and robust features have enhanced communication and coordination among all stakeholders. Additionally, the system provides real-time updates and progress tracking, improving the overall efficiency and success of project management. The automated reminders and notifications keep students and guides informed about important deadlines and milestones, reducing delays and ensuring timely project completion.

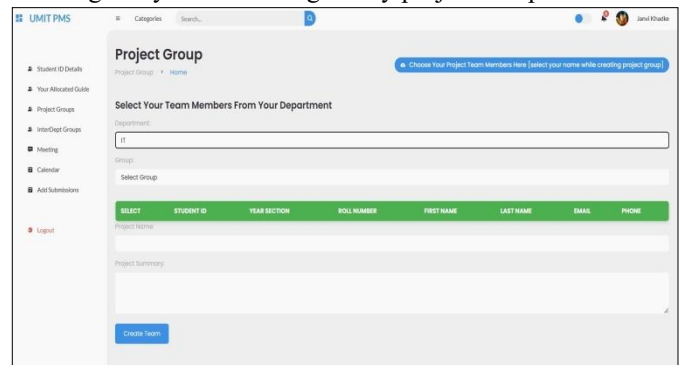


Figure 1: Student Project Group Creation

Figure 1 illustrates how students create project groups within the UMIT Project Management System. Students can form groups with their classmates or collaborate with peers from other departments. Once invitations are accepted, the group formation is confirmed, and the project details can be submitted for approval. This system enables dynamic group configurations, diverse skill sets, and varied perspectives in project work. After the groups are formed and the project coordinator or administrator approves the projects, the UMIT PMS facilitates guide allocation, ensuring each group has a dedicated guide for mentorship and evaluation throughout the project phases.

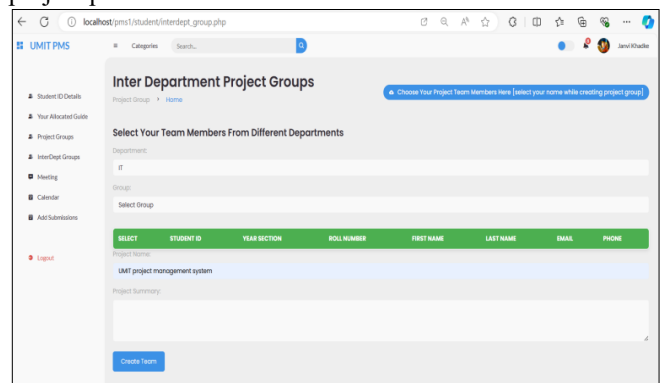


Figure 2: Creation of Inter-Department Project Groups by Students

Figure 2 depicts the process for creating inter-departmental project groups by students within the UMIT Project Management System.

It illustrates how students can establish project teams across different departments, promoting interdisciplinary collaboration. The diagram shows the steps for students to form these groups, assign roles, and coordinate activities with peers from various academic departments. It also facilitates better communication between departments.

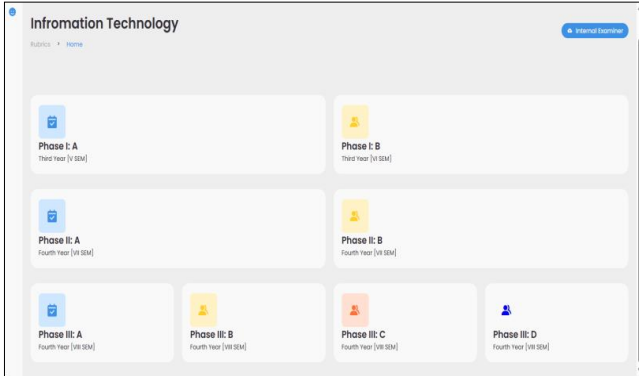


Figure 3: Phase-Wise Display of Rubrics

Figure 3 illustrates the phase-wise display of rubrics for Examiner 1 and Examiner 2 within the UMIT Project Management System. It demonstrates how the system presents detailed evaluation criteria for each project phase to internal and external examiners. The diagram illustrates how the rubrics are organised by phase, enabling examiners to access and utilise the specific criteria relevant to each.

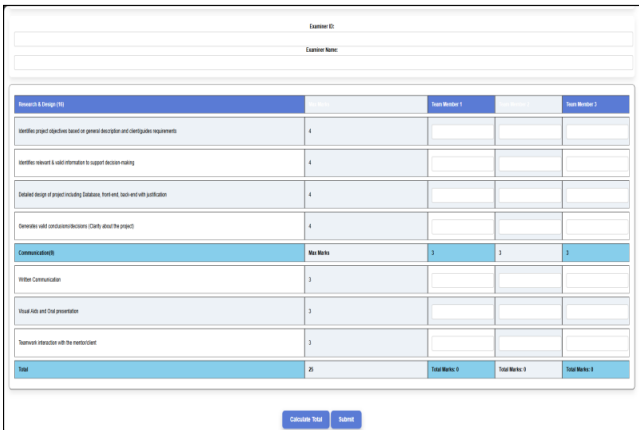


Figure 4: Rubric Evaluation Form for Internal and External Examiners

Figure 4 illustrates the process of rubric evaluation conducted by External Examiner 1 and External Examiner 2 within the UMIT Project Management System. It shows how the system enables these examiners to assess student projects using predefined evaluation criteria. The diagram details how examiners access and complete the rubrics for each project phase, providing scores and comments based on the established benchmark. This functionality ensures that external examiners can independently evaluate projects, contributing to a fair and objective assessment.

	A	B	C	D	E	F	G	H	I	J	K
1	Student ID	Roll Number	First Name	Last Name	Project Title	IE	EE	Total(I)	Total(E)	Total Marks	Average
2	2025011	2	Sarika	Deshmukh	now1	Anita Morey	Mohan Bonde	13	12	25	12.5
3	2025012	3	Sujata	Chile	now1	Anita Morey	Mohan Bonde	11	16	27	13.5
4	2025013	4	Kirti	Ghosh	now1	Anita Morey	Mohan Bonde	11	13	24	12

Figure 5: Final Mark sheet

Figure 5 illustrates an Excel sheet that presents the final mark sheet for students within the UMIT Project

Management System. The sheet includes the total marks awarded by the Internal Examiner and the External Examiner for each student. It details the scores given by both examiners and calculates the average of these scores to provide a comprehensive view of each student's performance. The Excel format facilitates easy review, comparison, and analysis of the evaluation results, ensuring clarity and accuracy in documenting and distributing final marks.

VII. CONCLUSION & FUTURE WORK

The UMIT PMS is developed for the project management of Usha Mittal Institute of Technology as per the current syllabus scheme. We have implemented the dashboard to manage the Student Rubric modules. Using our system, students can form project groups, and administrators can allocate guides to these groups. Students can submit their synopsis or report using our system. Examiners are assigned to the groups for the phase evaluation of students. Examiners can fill in the marks according to the predefined format of the rubric; the calculation of rubric marks is done automatically. The Rubrics mark sheet is implemented for generating final marks from various sources. The UMIT Project Management System (UMIT PMS) offers a comprehensive solution to managing project evaluations and workflows at the Usha Mittal Institute of Technology.

By implementing a sophisticated digital platform, UMIT PMS effectively addresses the limitations of manual project evaluation processes. It supports third-year projects with two distinct phases, Phase IA and Phase IB, and fourth-year projects with a more detailed structure, including six phases: Phase II-A, Phase II-B, Phase III-A, Phase III-B, Phase III-C, and Phase III-D. Notably, Phase III-D includes separate rubrics for internal and external examiners, ensuring a nuanced and fair assessment. We have successfully implemented the UMIT PMS, achieving all the mentioned objectives.

Currently, this system is developed for a specific institute, tailored to the constraints of its syllabus scheme. In the future, the system can be customised to accommodate syllabus changes and adapted to meet the requirements of other institutions.

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Availability of Data and Materials	Not relevant.
Authors Contributions	All authors have equal participation in this article.

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