

**SCTR's Pune Institute of Computer Technology
(PICT) Pune**

**AN
INTERNSHIP REPORT
ON**

Library Management System for PICT

SUBMITTED BY
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32243

Under the guidance of
Ms. P. B. Tathe
ASSTT.PROFESSOR



**DEPARTMENT OF ELECTRONICS AND
TELECOMMUNICATION ENGINEERING**
ACADEMIC YEAR 2024-25



DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

**SCTR's Pune Institute of Computer Technology (PICT), Pune
Maharashtra 411043**

CERTIFICATE

This is to certify that the internship report titled
"Library Management System for PICT"

**Submitted by
Anurag Ashish Maloo
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has satisfactorily completed the curriculum-based internship under the guidance of Ms. P.B. Tathe, PICT towards the partial fulfillment of third year Electronics and Telecommunication Engineering Semester VI, Academic Year 2024-25 of Savitribai Phule Pune University.

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Head of the Department

Place: PICT, Pune

Date:22/04/25

Acknowledgement

It is with great pleasure that I present this internship report on the "Library Management System for PICT." This internship has provided me with valuable insights and hands-on experience, and I am grateful to everyone who supported me during this period. First and foremost, I would like to extend my heartfelt thanks to my internship guide and mentor, Ms. P. B. Tathe, for her constant support, expert guidance, and encouragement throughout the duration of the internship. Her valuable suggestions and timely feedback were crucial in helping me stay on track and successfully complete this project. I truly appreciate her unwavering support. I am also deeply grateful to the Head of the Electronics and Telecommunication Engineering Department, Dr. M. V. Munot, for her continuous encouragement and constructive feedback. Her guidance significantly enhanced the quality of this project, and I am thankful for the opportunities provided under her leadership. Special thanks to our Department Internship Coordinator, Ms. A. K. Patel, for her efficient coordination and prompt assistance in resolving any queries. Her efforts ensured that the internship process ran smoothly and that I had all the necessary resources to complete my work. Lastly, I would like to acknowledge the entire faculty and staff of PICT for their support throughout my academic journey. Their contributions, both in terms of knowledge and motivation, have played a significant role in the successful completion of this Internship. I am extremely grateful to all those who have contributed to my learning and growth, and I sincerely appreciate their encouragement and support.

Abstract

The Library Management System (LMS) is a web-based application developed using the MERN stack (MongoDB, Express.js, React, and Node.js) to facilitate the efficient management of library resources, users, and transactions. This system offers two distinct user interfaces: one for admin users and another for students, providing tailored functionalities to meet the needs of both roles. The admin interface allows for comprehensive management of books, including adding new books, tracking issued and returned books, renewing borrowals, and handling damaged or lost books. Admin users can also manage student records, track overdue fines, and maintain a history of financial transactions. The system automatically applies fines for overdue books and keeps a record of payment details, including transaction IDs. On the student side, the system provides access to essential library information, such as available books, issued books, due dates, and any outstanding fines. Students can track their book issues, returns, and payment history, along with news updates and library-related notifications. The MERN stack enables a robust, scalable, and efficient system, with a responsive user interface for both admins and students. The backend, powered by Node.js and Express, handles business logic and data management with MongoDB as the database, while React is used to create a dynamic and interactive front-end experience. This project demonstrates the effectiveness of the MERN stack in developing full-stack applications that offer a user-friendly interface and seamless performance, ultimately improving the overall library management experience. This system not only automates and simplifies library operations but also enhances user experience, making it easier for both administrators and students to manage library resources, fines, and transactions efficiently.

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1. Title:

Library Management System for PICT

2. Introduction

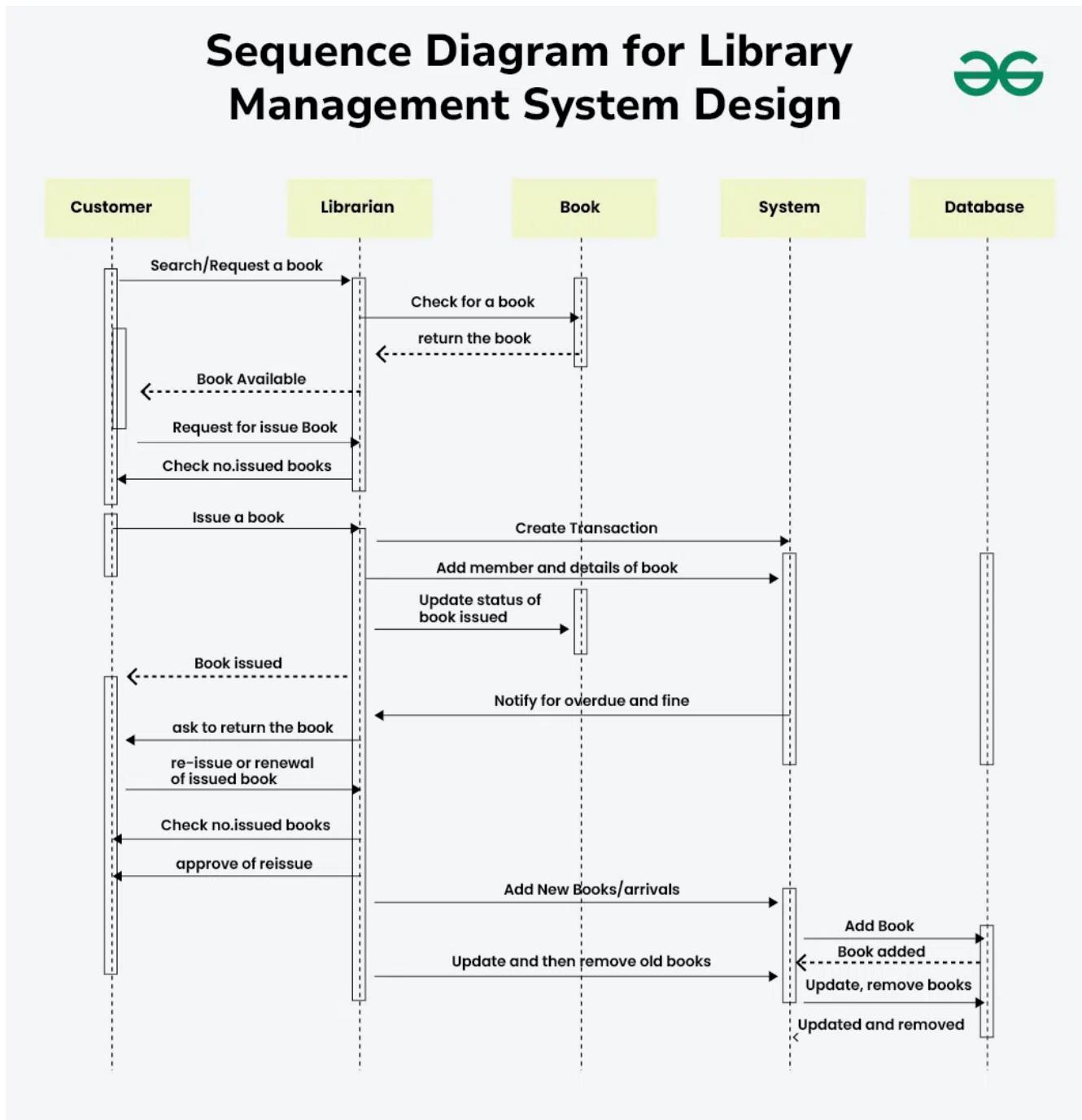


Figure 1. Sequence Diagram for LMS

The Library Management System (LMS) developed using the MERN stack—comprising MongoDB, Express.js, React, and Node.js—aims to modernize and streamline the management of library operations. This web-based application caters to two primary user roles: Admin and Student, each with tailored functionalities to enhance the efficiency and user experience of library services. The Admin Panel allows for comprehensive management of books, including adding new books, tracking issued and returned books, renewing borrowals, and handling damaged or lost books. Admins can also manage student records, track overdue fines, and maintain transaction histories. The system automatically applies fines for overdue books and keeps a record of payment details, including transaction IDs. On the Student Portal, users can access essential library information, such as available books, issued books, due dates, and any outstanding fines. Students can track their book issues, returns, and payment history, along with news updates and library-related notifications. Leveraging the MERN stack enables the development of a robust, scalable, and efficient system, with a responsive user interface for both admins and students. The backend, powered by Node.js and Express.js, handles business logic and data management with MongoDB as the database, while React is used to create a dynamic and interactive front-end experience. This LMS not only automates and simplifies library operations but also enhances user experience, making it easier for both administrators and students to manage library resources, transactions, and records efficiently.

3. Problem statement

In many educational institutions, traditional library management still relies heavily on manual record-keeping, physical registers, and disconnected systems, which often result in inefficiencies, data redundancy, human error, and difficulty in tracking resources and transactions accurately. Librarians face challenges in maintaining up-to-date records of books, managing the inflow and outflow of borrowed items, calculating and collecting fines for overdue books, and keeping track of damaged or lost resources. On the other hand, students struggle with a lack of transparency regarding book availability, due dates, their borrowing history, and overdue payments, often needing to visit the library physically just to make inquiries or perform basic actions. Moreover, with the increasing number of students and a growing library collection, managing data manually becomes increasingly complex and time-consuming. There is also a lack of real-time synchronization between book availability and issue/return records, leading to potential confusion and dissatisfaction among users. In today's digital age, where convenience and speed are vital, such outdated systems hinder productivity and user experience. To overcome these problems, there is a pressing need for a centralized, user-friendly, and automated system that can digitize and streamline all aspects of library management. The objective is to create a modern, web-based Library Management System using the MERN (MongoDB, Express.js, React, Node.js) stack that addresses these challenges effectively. This system should enable administrators to manage books, users, fines, and reports seamlessly while offering students a transparent and accessible interface to manage their library interactions efficiently. The proposed solution aims to not only reduce the burden on library staff but also enhance the overall experience for users by providing quick access to resources, accurate transaction logs, and smooth information flow within the library ecosystem.

4.Objectives and scope

Objectives of the Library Management System (LMS) Project:

- i. To design and develop a fully functional web-based Library Management System using the MERN stack (MongoDB, Express.js, React, Node.js).
- ii. To automate the management of library operations such as book issuance, return, renewal, and inventory maintenance.
- iii. To provide an efficient system for tracking overdue books, calculating fines, and maintaining transaction records.
- iv. To enable administrators to manage student accounts, add new users, and keep accurate records of borrowed, returned, lost, or damaged books.
- v. To offer students a self-service dashboard where they can check book availability, view their borrowing history, and monitor dues or payments.
- vi. To minimize human errors and reduce the time and effort required for day-to-day library operations.
- vii. To enhance accessibility and transparency by providing real-time updates and easy navigation for both administrators and students.
- viii. To ensure data consistency, integrity, and security throughout the system.

Scope of the Library Management System (LMS) Project:

The scope of this project covers the complete automation of a college-level library system. It includes two main modules: the **Admin Panel** and the **Student Portal**.

- **Admin Panel:** The administrator can manage the entire book inventory, issue or return books, handle overdue fines, track payments, renew issued books, manage lost or damaged records, and register new users. Admins can also view the list of all students, generate records, and maintain transactional logs.
- **Student Portal:** Students can log in to view announcements, access the list of available books, see their currently issued books, returned books, dues, pending payments, issue history, and payment history. They can track their borrowing and ensure timely returns to avoid penalties.

The system is scalable and can be expanded to include more advanced features in the future, such as integration with email/SMS alerts, QR code scanning, advanced search filters, and role-based access control. Designed for institutions with growing library needs, the system ensures efficiency, reliability, and a user-friendly experience for all stakeholders involved.

5.Methodological details

The development of the Library Management System (LMS) project was carried out using a structured and systematic methodology to ensure functionality, scalability, and a smooth user experience. The project was implemented using the MERN stack, comprising MongoDB, Express.js, React, and Node.js. The process began with thorough requirement gathering, where the existing challenges of manual library operations were identified. This helped in defining the necessary features for both admin and student modules, such as book issuance, returns, fine management, and real-time tracking of library resources. Once the requirements were finalized, the system design phase focused on creating a modular architecture. The database schema was structured in MongoDB, defining collections for users, books, transactions, and dues. Simultaneously, frontend layouts for the admin and student dashboards were wireframed using React.js, ensuring a responsive and intuitive interface. The frontend was developed to allow dynamic data rendering and smooth navigation, enhancing the user experience. The backend was built using Node.js and Express.js, where APIs were developed to handle all core functionalities such as issuing books, returning books, updating transactions, and calculating overdue fines. Throughout the development, the system was tested manually to identify and fix any functional bugs or edge cases. Data integrity and smooth interaction between the frontend and backend were verified. The final system was deployed using cloud platforms, with MongoDB Atlas used as the database solution. This methodological approach ensured that the LMS was robust, user-friendly, and capable of meeting the evolving needs of library operations in an academic setting.

6.Usage of Modern engineering tools

The development of the Library Management System (LMS) was significantly enhanced by the use of various modern engineering tools that streamlined the workflow and improved the overall quality of the project. The MERN stack—comprising MongoDB, Express.js, React.js, and Node.js—served as the core development framework, enabling efficient, full-stack JavaScript development and seamless integration between the frontend and backend. MongoDB was used as the primary database for storing and managing dynamic library data, while pgAdmin was utilized to explore and manage relational database aspects during the development and testing phases. Visual Studio Code (VS Code) served as the primary integrated development environment (IDE), offering features such as intelligent code completion, live debugging, and version control integration, which greatly boosted coding productivity. For testing RESTful APIs, Postman was used extensively to ensure robust communication between the client and server. To ensure a consistent and portable development environment across different systems, Docker was employed for containerizing the application, simplifying deployment and reducing compatibility issues. These modern tools collectively contributed to the development of a scalable, maintainable, and high-performing web application that effectively addresses the operational needs of a library system.

7. Outcome/ results of internship work

The internship resulted in the successful development and deployment of a fully functional Library Management System (LMS) tailored to meet the specific needs of an academic institution like PICT. The system provides two separate login portals—for administrators and students—each with distinct access and functionalities. For the admin, the system allows efficient management of library operations such as issuing and returning books, maintaining a record of issued, available, lost, and damaged books, managing student records, monitoring overdue books, and handling fine payments with detailed transaction records. The admin can also add new users, update existing records, and keep the library inventory organized and up to date. On the student side, the system provides a personalized dashboard displaying real-time information about issued books, return history, pending dues, library notices, and other relevant updates. The interface is user-friendly and intuitive, ensuring smooth interaction and ease of access to all necessary library resources. Through the use of modern tools like the MERN stack, Docker, MongoDB, pgAdmin, Postman, and VS Code, the project demonstrated the practical application of full-stack web development and software engineering practices. It enhanced technical skills in frontend and backend development, API integration, database management, and containerization. The project also improved understanding of system design, role-based access control, and secure data handling. Overall, the internship provided a hands-on learning experience and a strong foundation for building scalable web applications in a real-world environment. Below are the Screenshots of the Project:

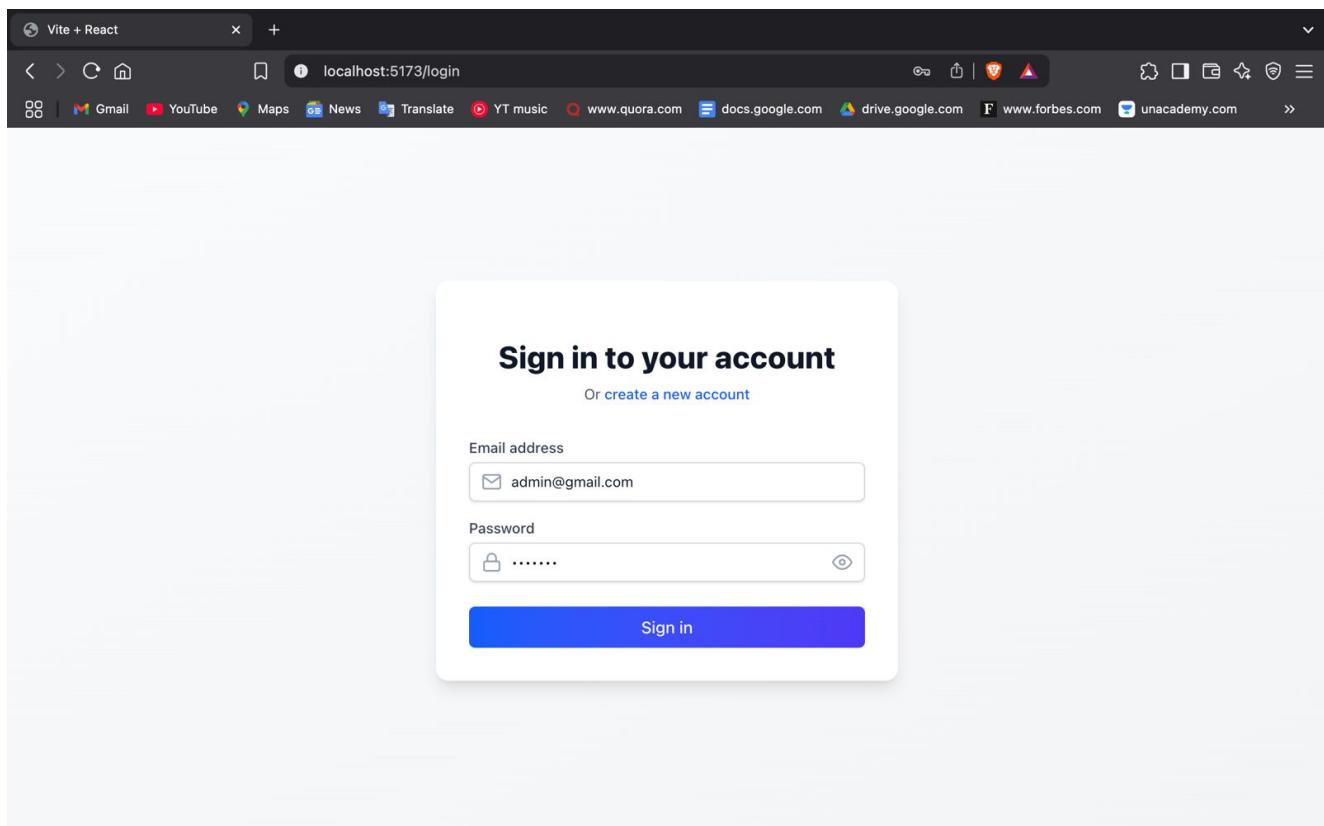


Figure 2. Sign in Page of Admin/Student Account

Dashboard

Welcome to your library management system

| | | | |
|--------------------------|-----------------------------|--------------------------|---------------------------|
| Total Books 96 | Total Students 10 | Books Issued 4 | Overdue Books 0 |
|--------------------------|-----------------------------|--------------------------|---------------------------|

| Financial Overview | | Library Status | |
|----------------------|-----|--------------------|----|
| Total Fine Collected | ₹60 | Lost/Damaged Books | 5 |
| Pending Payments | 1 | Available Books | 87 |

Recent Issues

| BOOK | USER | ISSUE DATE | STATUS |
|---|------------------------------|------------|--------|
| Embedded Systems: Introduction to ARM Cortex-M Jonathan W. Valvano | Prasad Gujar pg@gmail.com | 20/04/2025 | Issued |

Figure 3. Dashboard of Admin Login

| | | | |
|------------------|----------|-----------------|-----------|
| Pending Payments | 1 | Available Books | 87 |
|------------------|----------|-----------------|-----------|

Recent Issues

| BOOK | USER | ISSUE DATE | STATUS |
|---|-------------------------------------|------------|----------|
| Embedded Systems: Introduction to ARM Cortex-M Jonathan W. Valvano | Prasad Gujar pg@gmail.com | 20/04/2025 | Issued |
| CMOS VLSI Design Neil H.E. Weste | Pushpak Jadhav pushpak@gmail.com | 19/04/2025 | Issued |
| Hacking: The Art of Exploitation Jon Erickson | Sahil dino999@gmail.com | 19/04/2025 | Issued |
| Signals and Systems Alan V. Oppenheim | Priya Sharma dino2@gmail.com | 19/04/2025 | Issued |
| Clean Code Robert C. Martin | Sahil dino999@gmail.com | 18/04/2025 | Returned |

Figure 4. List of Recent Issues visible to Admin

The screenshot shows the 'Books' page of the Library Management System. At the top, there is a navigation bar with links for Dashboard, Books (which is the active tab), Issues, Lost/Damaged Books, Users, and Dues. On the right side of the navigation bar, there is a user profile for 'Vikas Mehra' (ADMIN) and a 'Logout' button. Below the navigation bar, there is a search bar with the placeholder 'Search by title, author, ISBN, or category...'. The main content area displays a grid of book cards. Each card contains the book's title, author, ISBN, category, quantity, and status. There are edit and delete icons next to each book entry. The books listed are:

- Power System Analysis an...** by J. Duncan Glover. ISBN: 9781305632134. Category: Power Systems. Quantity: 1. Status: Available.
- Learning Web Developme...** by Harmeet Singh. ISBN: 9781783989188. Category: Web Development. Quantity: 1. Status: Available.
- Engineering Mathematics** by K.A. Stroud. ISBN: 9780198070894. Category: Engineering Mathema... . Quantity: 1. Status: Available.
- OS by AB** by Avadhut Bhong. ISBN: 7777777777777. Category: Operating Systems. Quantity: 1. Status: Available.
- DSA by Aditya** by Aditya Chidrawar. ISBN: 9771234567890. Category: Data Structures & Algo... . Quantity: 1. Status: Available.
- Operating Systems: Three...** by Remzi H. Arpacı-Dusseau. ISBN: 9781985086593. Category: Operating Systems. Quantity: 1. Status: Available.

Add New Book

Figure 5. List of all Books in Library

The screenshot shows a 'Add New Book' modal window. The modal has a title 'Add New Book' at the top right with a close button. It contains six input fields with placeholder text: 'Title' (Enter book title), 'Author' (Enter author name), 'ISBN' (Enter ISBN), 'Publication' (Enter publication name), 'Category' (Select a category), and 'Quantity' (1). At the bottom of the modal are two buttons: 'Cancel' and 'Add Book' (highlighted in blue).

Figure 6. Feature to add new book to Admin

Book Issues

Issue New Book

Search by book title, author, or user name

All Status

Currently Issued Books

| Book Title | Author | Issued By | Issue Date | Due Date | Status |
|---------------------------|---------------------|-------------------------------------|------------|------------|--------|
| Embedded Systems: Intr... | Jonathan W. Valvano | Prasad Gujar pg@gmail.com | 20/04/2025 | 05/05/2025 | Issued |
| CMOS VLSI Design | Neil H.E. Weste | Pushpak Jadhav pushpak@gmail.com | 19/04/2025 | 05/05/2025 | Issued |
| Signals and Systems | Alan V. Oppenheim | Priya Sharma dino2@gmail.com | 19/04/2025 | 04/05/2025 | Issued |

Figure 7. List of Currently Issued books

Returned Books

| Book Title | Author | Issued By | Issue Date | Due Date | Return Date | Status |
|--------------------------------|----------------------|---------------------------------|------------|------------|-------------|----------|
| Artificial Intelligence: A ... | Stuart Russell | Vikram Singh dino5@gmail.com | 18/04/2025 | 03/05/2025 | 18/04/2025 | Returned |
| Database System Conce... | Abraham Silberschatz | Priya Sharma dino2@gmail.com | 18/04/2025 | 03/05/2025 | 30/04/2025 | Returned |
| Clean Code | Robert C. Martin | Sahil dino999@gmail.com | 18/04/2025 | 03/05/2025 | 21/04/2025 | Returned |
| Electric Circuits | James W. Nilsson | Sneha Gupta dino4@gmail.com | | | | |
| Engineering Mathematics | K.A. Stroud | Priya Sharma dino2@gmail.com | | | | |
| Signals and Systems | Alan V. Oppenheim | Priya Sharma dino2@gmail.com | | | | |

Figure 8: List of Returned Books

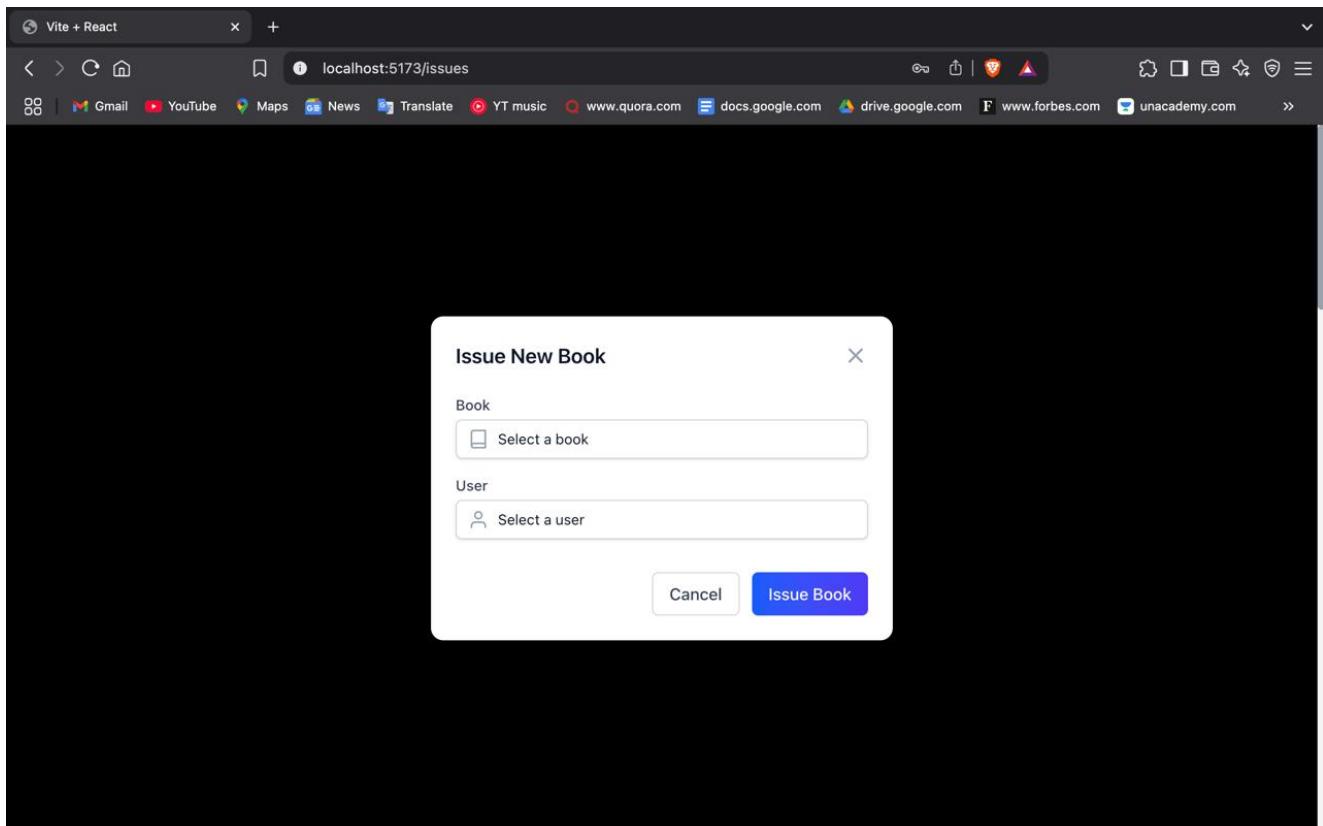


Figure 9. Feature of Issuing new book by Admin

| Introduction to Algorithms | | Clean Code | | Hacking: The Art of Exploitation | |
|--|--------------------------|----------------------------------|------------------------------|----------------------------------|--------------------------------|
| Thomas H. Cormen | Edit | Robert C. Martin | Edit | Jon Erickson | Edit |
| ISBN □ 9780262033848 | Quantity 2 | ISBN □ 9780132350884 | Quantity 1 | ISBN □ 9781593271442 | Quantity 2 |
| Category Data Structures & Algorithms | Publication MIT Press | Category Software Engineering | Publication Prentice Hall | Category Cybersecurity | Publication No Starch Press |

Figure 10. Lost/Damaged Books List

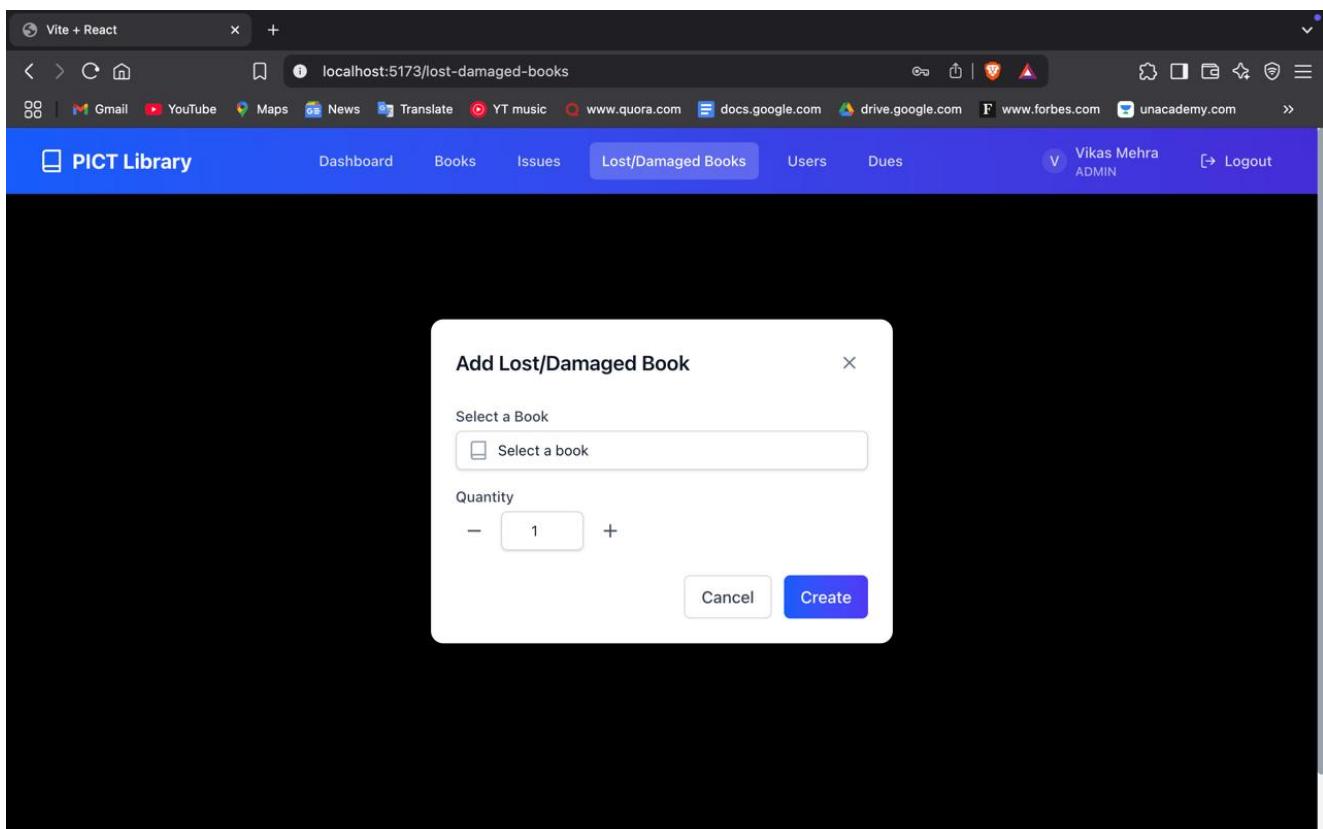


Figure 11. Feature of Adding Lost/Damaged Book to Admin

The screenshot shows a list of users in the 'Users' section. The users listed are:

- Sneha Gupta** (STUDENT)
 - Email: dino4@gmail.com
 - Phone: 6543210987
 - User ID: U4
- Vikas Mehra** (ADMIN)
 - Email: admin@gmail.com
 - Phone: 91234567890
 - User ID: U6
- Suresh Nair** (ADMIN)
 - Email: admin2@gmail.com
 - Phone: 7345678901
 - User ID: U8
- Meena Iyer** (ADMIN)
 - Email: admin3@gmail.com
 - Phone: 6567890123
- Rahul Desai** (ADMIN)
 - Email: admin4@gmail.com
 - Phone: 5557890123
- Kavita Joshi** (ADMIN)
 - Email: admin5@gmail.com
 - Phone: 4578901234

Figure 12. List of all the Users

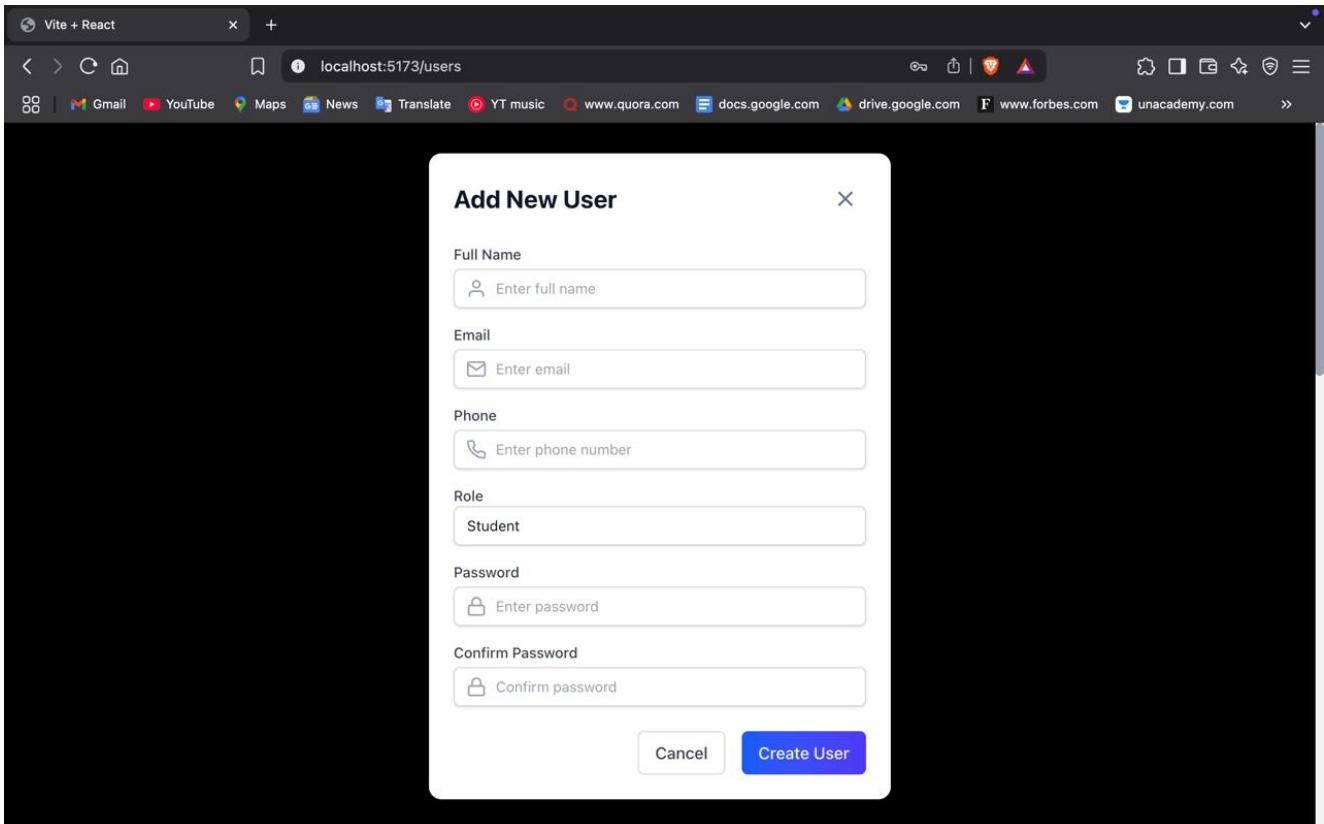


Figure 13. Admin can add new user

| PAYMENT ID | USER | AMOUNT | STATUS | PAYMENT METHOD | TRANSACTION ID | ACTIONS |
|------------|-----------------|--------|------------------------|----------------|------------------|---------------------------------------|
| P4 | Sneha Gupta | ₹40.00 | ✗ FAILED | UPI | dhgcvb4567 | Edit Delete |
| P1 | Sahil Katkamwar | ₹20.00 | ⌚ PENDING | Not specified | Not available | Edit Delete |
| P6 | Priya Sharma | ₹40.00 | ✓ PAID | UPI | dxgrtfyjgjkuh567 | Edit Delete |
| P5 | Vikram Singh | ₹20.00 | ✓ PAID | CARD | TXN012 | Edit Delete |

Figure 14. List of Dues Paid/Unpaid by students

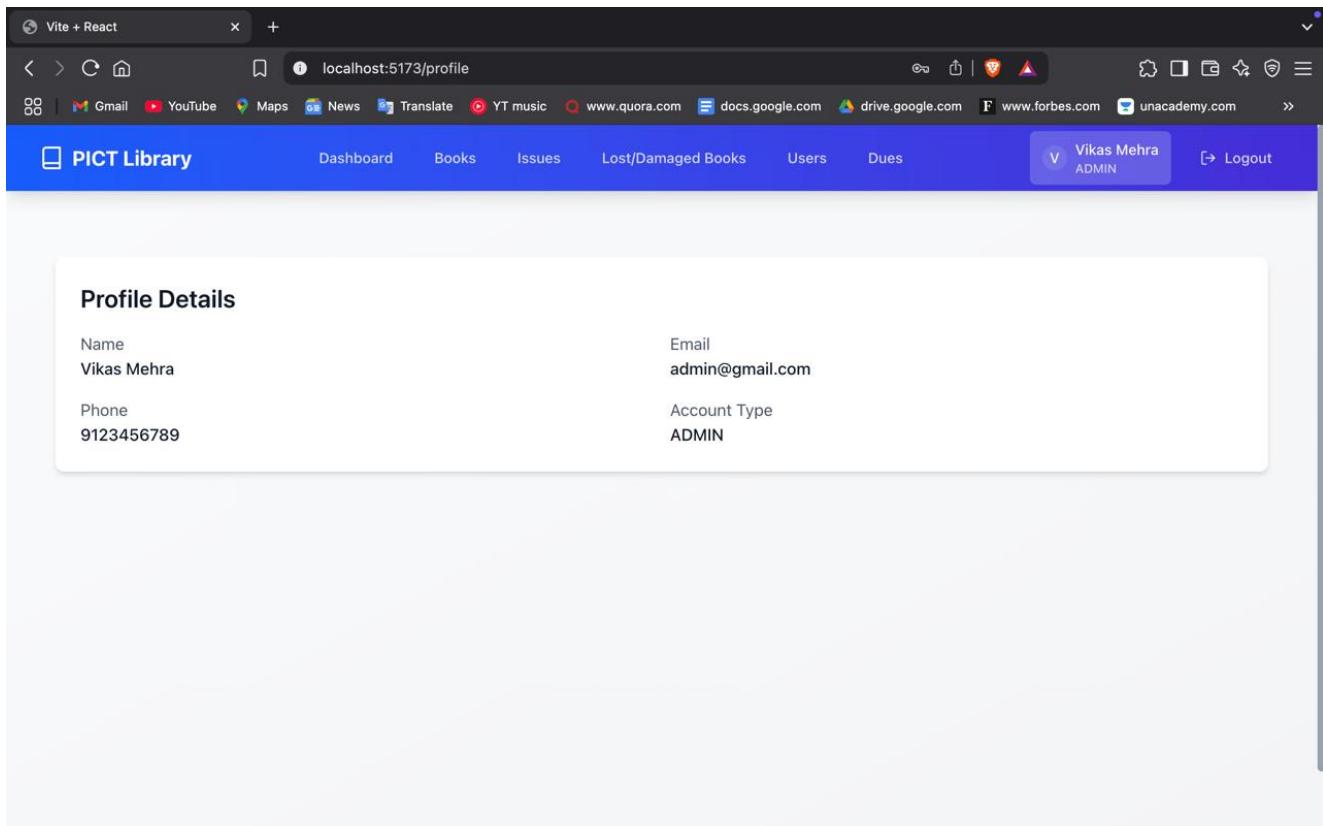


Figure 15. Profile View of Admin

The screenshot shows a web browser window with the URL `localhost:5173/dashboard`. The page title is "PICT Library". The main content area is titled "Dashboard" and features a section titled "PICT Library News" with the following items:

- New Books Added**: 120+ new titles added this month including "AI Superpowers" by Kai-Fu Lee and "Clean Architecture" by Robert C. Martin. Visit the New Arrivals shelf!
- Extended Library Hours During Exams**: Library will remain open till 10 PM from April 25 to May 15 to support your exam preparations.
- Book Donation Drive**: Over 200+ books donated by alumni are now available in the Open Access section. Free to borrow!
- Research Paper Published**: Dr. Snehal Patil from the IT Department has published a paper on "Quantum Neural Networks" in IEEE Access. Now available in the Digital Library.
- Workshop Announcement**: Attend our upcoming workshop: "How to Write a Research Paper" on May 3rd, 2025. Register now at the front desk.
- Monthly Book Review Contest**: Submit a review of any book you read from the library and win exciting prizes! Last date: April 30, 2025.

Figure 16. Dashboard of Student Login (News of Library)

The screenshot shows the PICT Library dashboard. At the top right, a student profile for 'Sahil Katkamwar STUDENT' is logged in, with a 'Logout' button. The dashboard features a sidebar on the left with sections for 'shelf!', 'Extended Library Hours During Exams' (library open till 10 PM from April 25 to May 15), 'Book Donation Drive' (over 200+ books donated by alumni available in Open Access), and 'Library.' (a general note). Below this is a 'Library Information' section with icons for 'Library Hours' (Monday-Friday 8:00 AM - 8:00 PM, Saturday 9:00 AM - 5:00 PM, Sunday Closed), 'Contact Number' (+91 98765 43210), 'Email' (librarian@pict.edu), and 'Librarian' (Dr. Rajesh Kumar).

Figure 17. Dashboard of Student Login (Library Information)

The screenshot shows the 'Books' page of the PICT Library. At the top right, the student profile 'Sahil Katkamwar STUDENT' is logged in, with a 'Logout' button. The page title is 'Books' and it says 'Browse and manage library books'. A search bar at the top allows searching by title, author, ISBN, or category. Below the search bar, there are six book cards arranged in two rows of three. Each card displays the book title, author, ISBN, category, quantity, status, and a green 'Available' button.

| Book Title | Author | ISBN | Category | Quantity | Status |
|-----------------------------|-------------------------|---------------|-------------------------|----------|-----------|
| Power System Analysis an... | J. Duncan Glover | 9781305632134 | Power Systems | 1 | Available |
| Learning Web Developme... | Harmeet Singh | 9781783989188 | Web Development | 1 | Available |
| Engineering Mathematics | K.A. Stroud | 9780198070894 | Engineering Mathema... | 1 | Available |
| OS by AB | Avadhut Bhong | 9798765432109 | Operating Systems | 1 | Available |
| DSA by Aditya | Aditya Chidrawar | 9781783989188 | Data Structures D. Algo | 1 | Available |
| Operating Systems: Three... | Remzi H. Arpacı-Dusseau | 9781005086502 | Operating Systems | 1 | Available |

Figure 18. List of Books available to students

The screenshot shows a web browser window for 'Vite + React' at 'localhost:5173/issues'. The header includes the PICT Library logo, navigation links for Dashboard, Books, My Issues (selected), and My Dues, and a user profile for Sahil Katkamwar (STUDENT) with a logout link.

Currently Issued Books:

No currently issued books found

Returned Books:

Operating Systems: Thre...
Remzi H. Arpaci-Dusseau

Issued By: **Sahil Katkamwar** (dino@gmail.com)

| Issue Date | Due Date |
|------------|------------|
| 01/04/2025 | 16/04/2025 |

| Return Date | Status |
|-------------|----------|
| 18/04/2025 | Returned |

Figure 19. List of Currently issued and Returned books of the student

The screenshot shows a web browser window for 'Vite + React' at 'localhost:5173/payments'. The header includes the PICT Library logo, navigation links for Dashboard, Books, My Issues, and My Dues (selected), and a user profile for Sahil Katkamwar (STUDENT) with a logout link.

My Dues:
View and manage payment records

Search by payment ID, user name, description, or status... All Statuses

| PAYMENT ID | USER | AMOUNT | STATUS | PAYMENT METHOD | TRANSACTION ID |
|------------|-----------------|--------|---------|----------------|----------------|
| P1 | Sahil Katkamwar | ₹20.00 | PENDING | Not specified | Not available |

Figure 20. Dues paid/pending of that particular student

Profile Details

| | |
|-----------------|----------------|
| Name | Email |
| Sahil Katkamwar | dino@gmail.com |
| Phone | Account Type |
| 1234567890 | STUDENT |

Current Issues
No current issues

Pending Payments
₹20.00
Status: PENDING

Figure 21. Student Profile View (Profile details, Current Issues)

Pending Payments
₹20.00
Status: PENDING

Issue History

| | |
|--------------------------------------|--------------------------|
| Operating Systems: Three Easy Pieces | Returned: April 18, 2025 |
| by Remzi H. Arpacı-Dusseau | |
| Issued: April 1, 2025 | |

Payment History
No payment history

Figure 22. Student Profile View (Issue History,Payment History)

7. Achievements

The Library Management System (LMS) project achieved several key milestones during its development and implementation. One of the most significant achievements was the successful creation of a fully functional, user-friendly, and scalable web application using the MERN stack, which integrates modern technologies like MongoDB, Express.js, React.js, and Node.js. The project streamlined the entire library workflow by replacing traditional manual processes with automated features such as book issuance, returns, fine calculation, user management, and transaction tracking. The system's dual-login functionality for admins and students was effectively implemented, providing role-based access control and secure user authentication. The inclusion of features like overdue fine management, book renewal, lost/damaged book tracking, and detailed payment records added practical value and made the system suitable for real-world academic environments. Additionally, the use of tools like Docker for containerization and deployment ensured portability and consistency across development environments. Integration of Postman for API testing and pgAdmin for database exploration further contributed to the robustness and efficiency of the application. The project also helped enhance the developer's technical proficiency in full-stack development, database management, API integration, and software design. Overall, the LMS project not only met its intended goals but also laid a strong foundation for future enhancements and scalability.