

# **Project Report**

**PROJECT : Library Management System (SMARTLIB)**

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## **1. Introduction**

SmartLib is a web-based Library Management System designed to automate and simplify library operations. The system allows students, faculty members, and librarians to interact with the library through a single online platform. It manages book records, issuing and returning of books, user requests, fines, and reports efficiently.

## **2. Objectives of the System**

The main objectives of SmartLib are:

- To automate manual library processes
- To maintain accurate records of books and users
- To provide role-based access (Student, Faculty, Librarian)
- To manage book issuing, returning, and overdue tracking
- To reduce paperwork and human errors

## **3. Software and Tools Used**

- Visual Studio Code (Code Editor)
- XAMPP (Apache Server & MySQL)
- PHP (Server-side scripting)
- MySQL / phpMyAdmin (Database)
- HTML, CSS (User Interface Design)

## **4. User Roles in SmartLib**

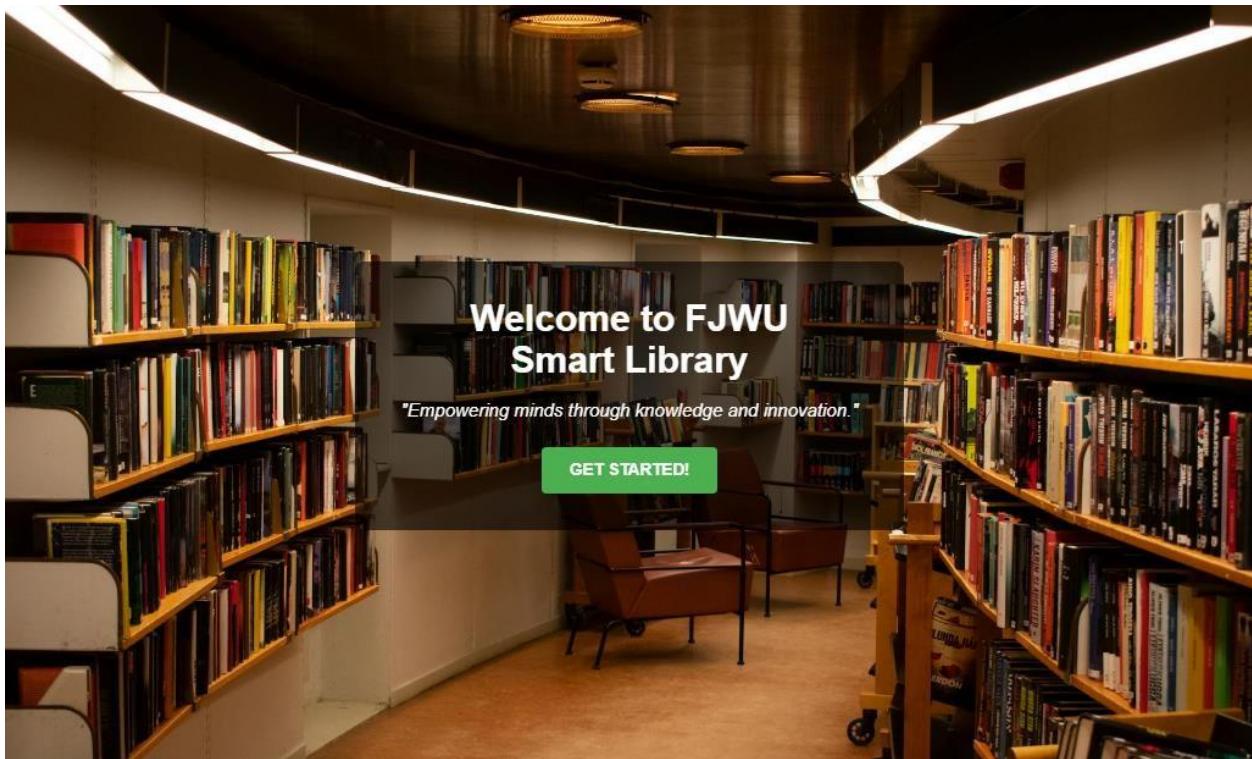
SmartLib supports three main user roles:

- Student
- Faculty
- Librarian

## **5. Functional Requirements**

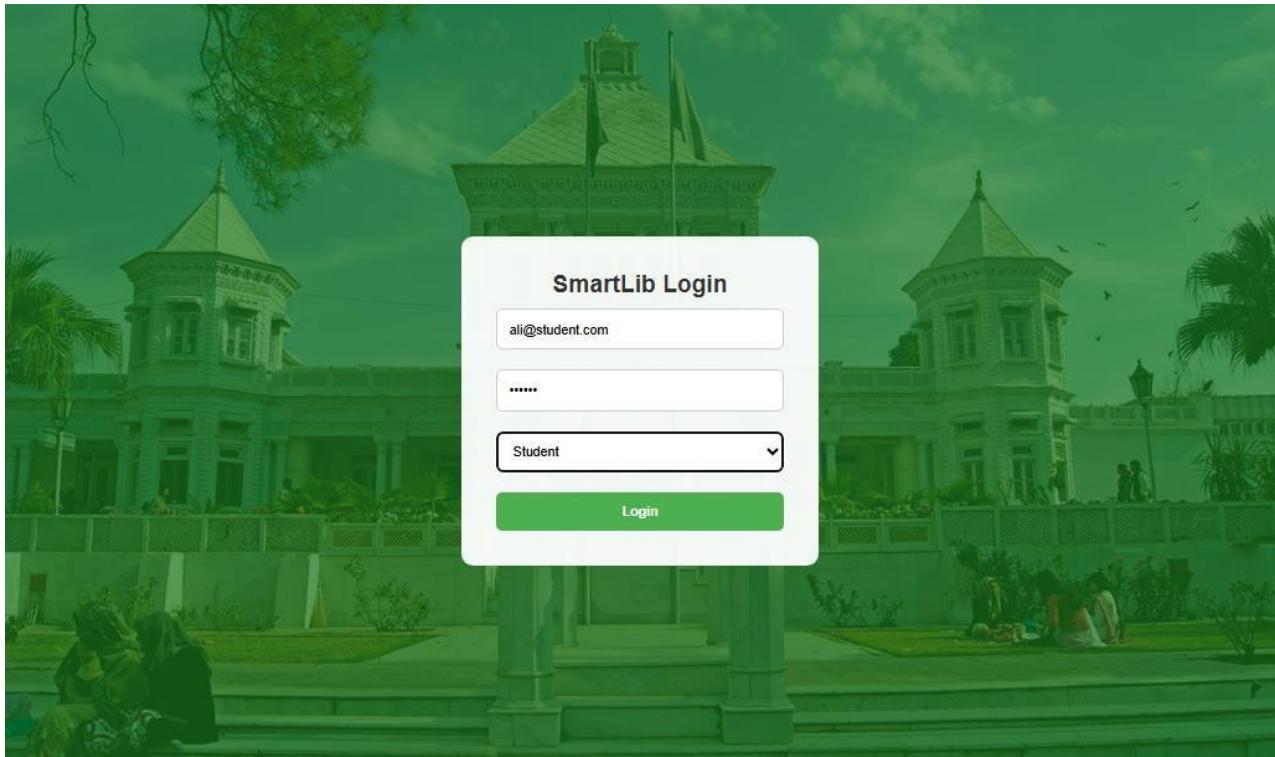
### **5.1 Welcome Page**

The welcome page is the first interface of the system. It displays a brief introduction to SmartLib and provides a **Get Started** button that redirects users to the login page.



### **5.2 Login System**

Users log in using their email, password, and role selection. After successful authentication, the system redirects them to their respective dashboards.



## 5.3 Session and Cookie Management

The SmartLib system uses **PHP Sessions** and **Cookies** to manage user authentication and improve user experience.

Sessions are used to store secure information such as member\_id and user role after login. This ensures that only authorized users can access their respective dashboards. Session data is stored on the server and is destroyed on logout or browser close.

Cookies are used for non-sensitive purposes such as remembering the user's email address and storing last visit information. Cookies remain stored on the user's browser for a limited time to improve usability without compromising security.

## 5.4 Student Module

### 5.4.1 Student Dashboard

The Student Dashboard is the main screen after login. It provides an overview of the student's library activity.

## Features shown on dashboard:

- Welcome message with last login time
- Total Books Borrowed
- Overdue Books Count
- Total Fine Amount

The screenshot shows the SmartLib dashboard for a user named Ali Khan. The sidebar on the left includes links for Dashboard, Browse Books, My Books, Request Book, Return Book, Profile, and Logout. The main content area displays a welcome message with the date of last login (Dec 31, 2025 @ 08:46). It features three summary boxes: 'Books Borrowed' (2), 'Overdue' (0), and 'Fine' (Rs. 0). Below these is a search bar with placeholder text 'Search books by title or author...'. A section titled 'Available Books' lists ten books with columns for Title, Author, Category, and Status (all marked as 'Available').

Title	Author	Category	Status
Database Systems	Elmasri	Computer Science	Available
Computer Networks	Andrew Tanenbaum	Networking	Available
Artificial Intelligence	Stuart Russell	AI	Available
Machine Learning	Tom Mitchell	AI	Available
Web Development	Jon Duckett	Web	Available
Software Engineering	Ian Sommerville	SE	Available
Cyber Security	William Stallings	Security	Available
Cloud Computing	Rajkumar Buyya	Cloud	Available
Big Data Analytics	Viktor Mayer	Data Science	Available
Python Programming	Mark Lutz	Programming	Available

This dashboard helps students quickly understand their current library status.

### 5.4.2 Browse Books

The Browse Books page allows students to:

- Search books by title, author, or ISBN
- Filter books by category and availability
- View book details such as title, author, category, ISBN, copies, and status
- Submit a request for available books

**Browse Books**

Find books by searching or filtering below

Title	Author	Category	ISBN	Copies	Status	Action
Artificial Intelligence	Stuart Russell	AI	ISBN004	0	AVAILABLE	Unavailable
Big Data Analytics	Viktor Mayer	Data Science	ISBN011	1	AVAILABLE	Request
Cloud Computing	Rajkumar Buyya	Cloud	ISBN009	3	AVAILABLE	Request
Compiler Design	Aho Ullman	Computer Science	ISBN015	1	REQUESTED	Request
Computer Networks	Andrew Tanenbaum	Networking	ISBN003	3	AVAILABLE	Request
Cyber Security	William Stallings	Security	ISBN008	3	AVAILABLE	Request
Data Mining	Han & Kamber	Data Science	ISBN010	2	REQUESTED	Request
Database Systems	Elmasri	Computer Science	ISBN001	5	AVAILABLE	Request
Discrete Mathematics	Kenneth Rosen	Mathematics	ISBN014	3	AVAILABLE	Request
Java Complete Reference	Herbert Schildt	Programming	ISBN013	4	REQUESTED	Request

### 5.4.3 My Books

This section displays the complete book history of the student, including:

- Issued books
- Returned books
- Due dates
- Status (Issued / Returned / Overdue)
- Fine (if applicable)

**My Books**

Track your borrowed books and request status

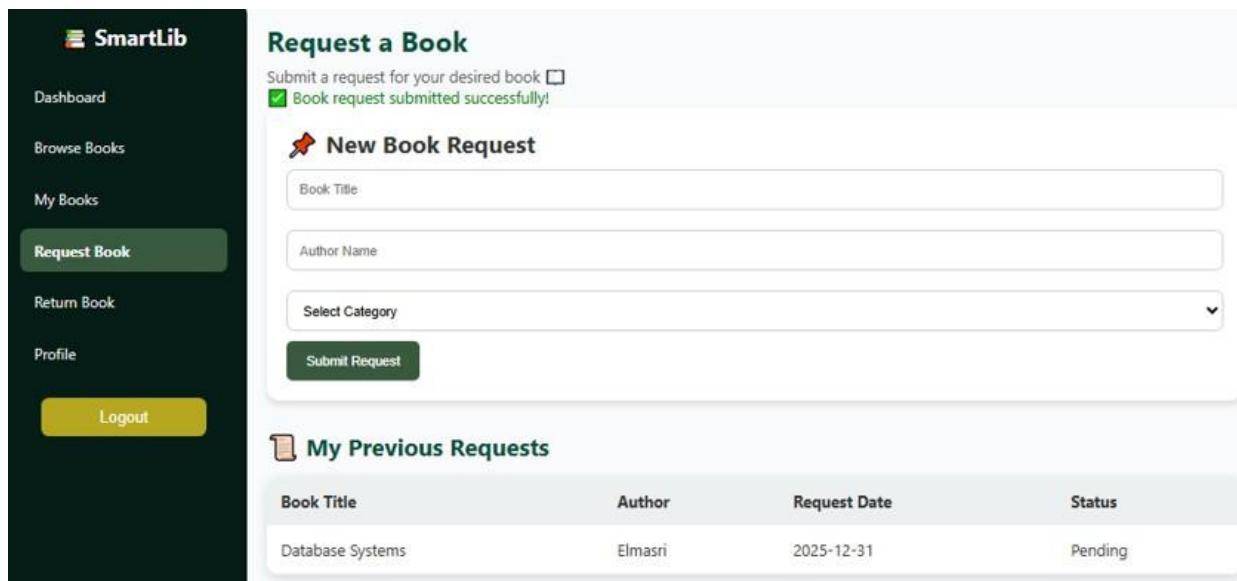
Title	Author	Issue Date	Due Date	Status	Fine
Machine Learning	Tom Mitchell	2025-12-31	2026-01-14	RETURNED	-
Python Programming	Mark Lutz	2025-12-31	2026-01-14	RETURNED	-
Java Complete Reference	Herbert Schildt	2025-12-31	2026-01-14	ISSUED / ON TIME	-
Operating Systems	Silberschatz	2025-12-31	2026-01-14	ISSUED / ON TIME	-
Artificial Intelligence	Stuart Russell	2025-02-01	2025-02-20	RETURNED	-
Database Systems	Elmasri	2025-01-01	2025-01-15	RETURNED	-

#### 5.4.4 Request Book

Students can submit a book request by providing:

- Book title
- Author name
- Category

After submission, the request appears in **My Previous Requests** with status **Pending** until approved by the librarian. If both a student and a faculty request the same book, the faculty request is given priority.



The screenshot shows the SmartLib application interface. On the left, a dark sidebar menu includes 'SmartLib' logo, 'Dashboard', 'Browse Books', 'My Books', 'Request Book' (highlighted in green), 'Return Book', 'Profile', and 'Logout'. The main content area has a light background. At the top right, a success message says 'Book request submitted successfully!' with a checkmark icon. Below it, a 'New Book Request' form has fields for 'Book Title', 'Author Name', 'Select Category' (with a dropdown arrow), and a 'Submit Request' button. At the bottom, a section titled 'My Previous Requests' lists a single entry: 'Database Systems' by 'Elmasri' with a 'Request Date' of '2025-12-31' and a 'Status' of 'Pending'.

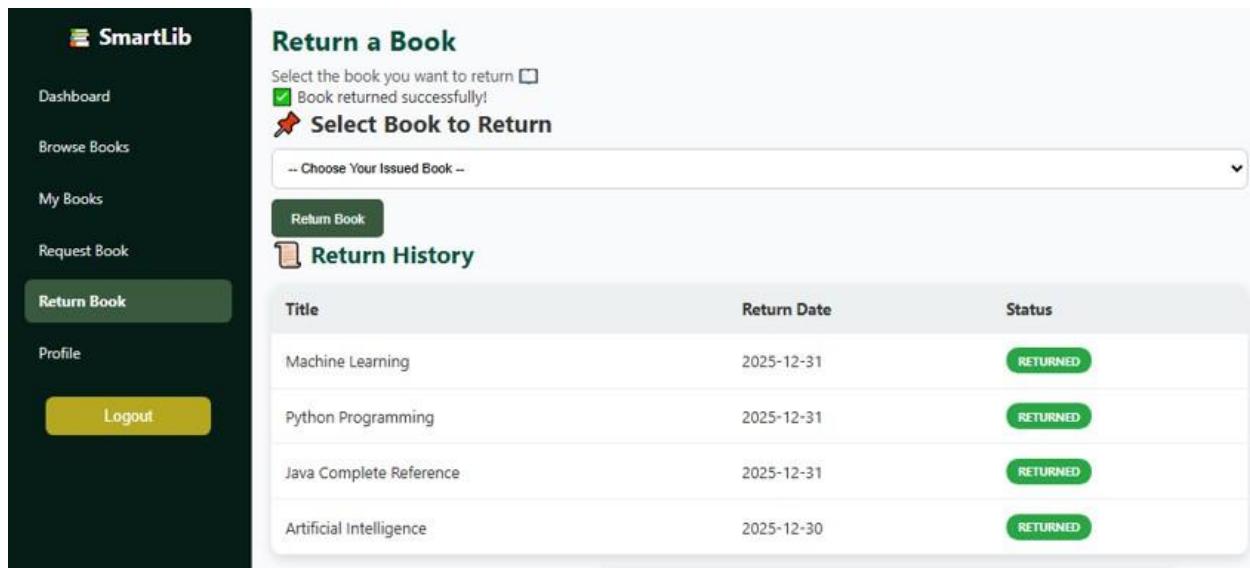
Book Title	Author	Request Date	Status
Database Systems	Elmasri	2025-12-31	Pending

#### 5.4.5 Return Book

Students can return issued books from this section.

##### Functions:

- Select issued book from dropdown
- Submit return request
- Automatically update return date and status
- View return history



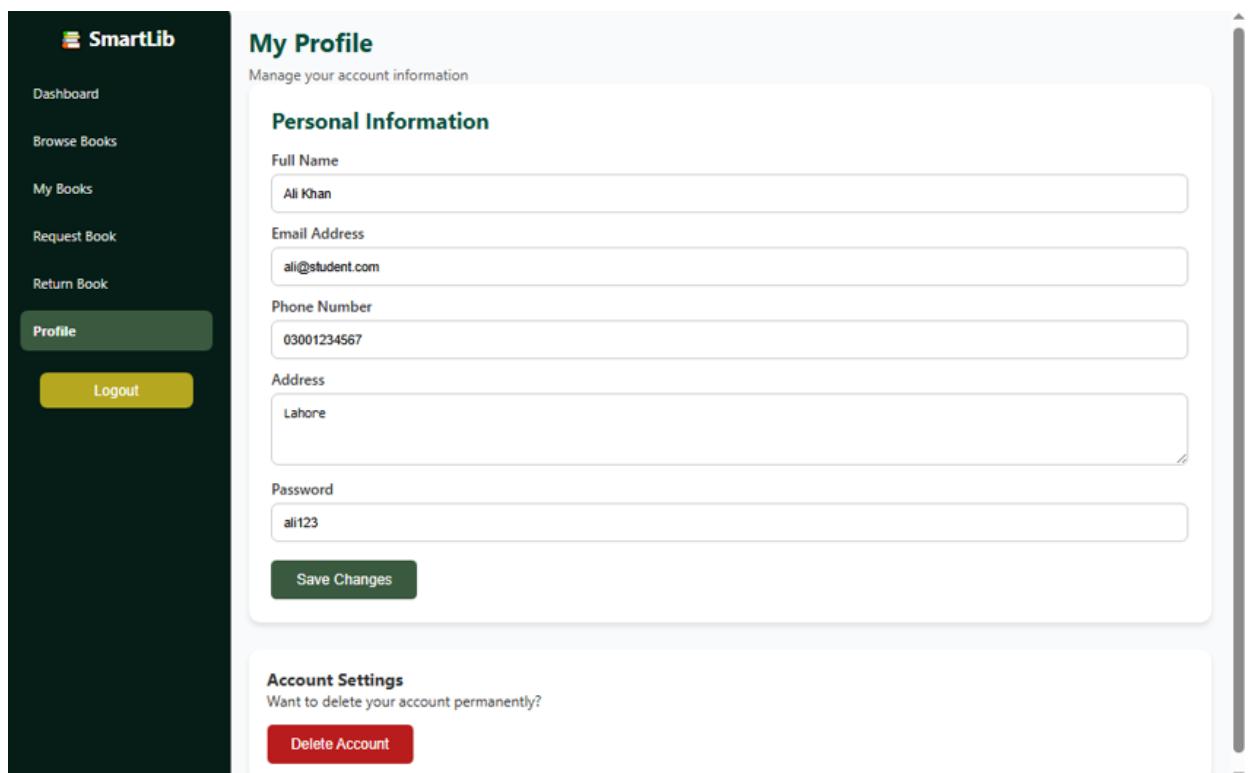
The screenshot shows the 'Return a Book' section of the SmartLib application. On the left, a dark sidebar menu includes 'Dashboard', 'Browse Books', 'My Books', 'Request Book', 'Return Book' (which is highlighted in green), and 'Profile'. Below these are 'Logout' and 'Logout' buttons. The main content area has a header 'Return a Book' with a success message: 'Select the book you want to return' and 'Book returned successfully!'. A red star icon is next to the message. A dropdown menu titled 'Select Book to Return' contains the placeholder 'Choose Your Issued Book...'. Below this is a green 'Return Book' button. The 'Return History' section displays a table with four rows of issued books:

Title	Return Date	Status
Machine Learning	2025-12-31	RETURNED
Python Programming	2025-12-31	RETURNED
Java Complete Reference	2025-12-31	RETURNED
Artificial Intelligence	2025-12-30	RETURNED

#### 5.4.6 Profile Management

Students can:

- Update personal information (name, email, phone, address)
- Change password
- Delete account permanently



The screenshot shows the 'My Profile' section of the SmartLib application. The sidebar menu is identical to the previous screen. The main content area has a header 'My Profile' with a sub-instruction 'Manage your account information'. A section titled 'Personal Information' contains five input fields: 'Full Name' (Ali Khan), 'Email Address' (ali@student.com), 'Phone Number' (03001234567), 'Address' (Lahore), and 'Password' (ali123). Below this is a green 'Save Changes' button. At the bottom, there's an 'Account Settings' section with a note 'Want to delete your account permanently?' and a red 'Delete Account' button.

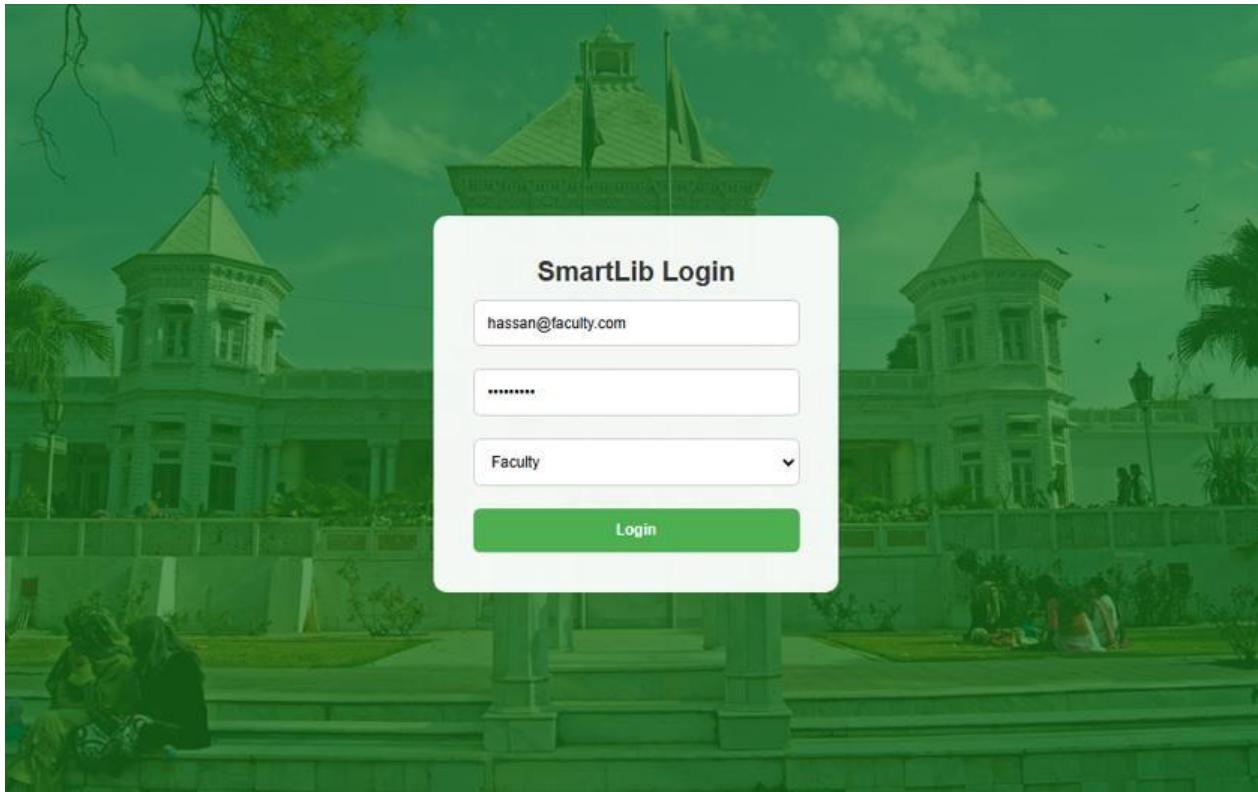
## **5.5 Faculty Module**

Faculty members have similar features to students but with additional privileges:

- Priority access in book requests
- Extended issue duration (up to 30 days)
- No overdue fine policy
- Book recommendation feature

### **5.5.1 Faculty Dashboard**

After successful login, faculty members are redirected to the **Faculty Dashboard**.



#### **Dashboard Features:**

- Welcome message with last login time
- Quick access buttons for:
  - Issue Books
  - Return Books
  - Recommended Books
  - Priority Requests

- Reports
- Display of faculty privileges

The screenshot shows the SmartLib Faculty Dashboard. On the left, a dark sidebar lists navigation options: Dashboard (selected), Issue Books, Return Books, Recommended Books, Priority Requests, Reports, and My Profile. At the bottom of the sidebar is a yellow 'Logout' button. The main content area has a light gray header 'Welcome, Dr. Hassan' and a sub-header 'Manage your issued books, recommendations, and reports with higher privileges.' Below this is a teal status bar showing 'Last Session: Dec 31, 2025 @ 08:49'. The dashboard features five rounded rectangular cards arranged in two rows. The top row contains 'Issue Books' (with a 'Go' button), 'Return Books' (with a 'Go' button), and 'Recommended Books' (with a 'Go' button). The bottom row contains 'Priority Requests' (with a 'Go' button) and 'Reports' (with a 'Go' button). Below these cards is a section titled 'Faculty Privileges' containing four items: 'Extended Issue Duration' (Faculty can issue books for up to 30 days), 'No Late Fines' (Faculty are exempted from overdue fines), 'Book Recommendations' (Faculty can suggest new titles), and 'Priority Access' (Faculty requests are processed first). A small 'Logout' button is located at the bottom of this section.

The dashboard acts as a central control panel for all faculty-related operations.

### 5.5.2 Issue Books

Faculty members can issue books directly from the **Issue Books** section.

#### Functional Details:

- Faculty can issue books for **up to 30 days**
- Book selection through dropdown list
- Issue duration selectable (default: 30 days)
- Issued book appears in issued history with status **Issued**

The screenshot shows the SmartLib application interface. On the left, a dark sidebar menu includes 'Dashboard', 'Issue Books' (which is highlighted in green), 'Return Books', 'Recommended Books', 'Priority Requests', 'Reports', and 'My Profile'. At the bottom of the sidebar is a yellow 'Logout' button. The main content area has a light gray header 'Issue Books' with a note 'Faculty can issue books for up to 30 days.' Below this, a green success message box contains the text 'Book requested successfully!' with a checkmark icon. The form fields include 'Book ID' (dropdown menu 'Select Book'), 'Issue Duration (Days)' (dropdown menu '30 Days'), and a green 'Issue Book' button. A table below lists issued books with columns: Title, Author, Issue Date, Due Date, Return Date, and Status. The table data is as follows:

Title	Author	Issue Date	Due Date	Return Date	Status
Cyber Security	William Stallings	2025-12-31	2026-01-30	2025-12-31	Returned
Big Data Analytics	Viktor Mayer	2025-12-31	2026-01-30	2025-12-31	Returned
Web Development	Jon Duckett	2025-12-31	2026-01-30	—	Issued
Discrete Mathematics	Kenneth Rosen	2025-12-31	2026-01-30	—	Requested
Artificial Intelligence	Stuart Russell	2025-12-30	2026-01-29	2025-12-30	Returned
Artificial Intelligence	Stuart Russell	2025-12-30	2026-01-29	2025-12-30	Returned
Web Development	Jon Duckett	2025-02-05	2025-02-25	2025-12-30	Returned

This feature allows faculty members extended access to books compared to students.

### 5.5.3 Return Books

Faculty members can return issued books at any time using the **Return Books** section.

#### Functions:

- Select issued book from dropdown
- Submit return request
- Automatically update return date
- Book status changes to **Returned**
- Return history is updated instantly

The screenshot shows the SmartLib application interface. On the left is a dark sidebar with white text and icons for navigation. The main area has a light gray background. At the top, it says "Return Books" and "Faculty members can return issued books anytime". Below that is a success message: "Book returned successfully!" with a green checkmark icon. A "Select Issued Book" dropdown menu is open, showing a single option: "... Select Issued Book ...". A "Return Book" button is below the dropdown. The main content area contains a table with two columns: "Book Title" and "Return Date". The table lists six items, each with a "Web Development" title and a "2025-12-31" date. There are also entries for "Cyber Security", "Big Data Analytics", "Artificial Intelligence", and another "Artificial Intelligence" entry, all with the same date.

Book Title	Return Date
Web Development	2025-12-31
Cyber Security	2025-12-31
Big Data Analytics	2025-12-31
Web Development	2025-12-31
Artificial Intelligence	2025-12-30
Artificial Intelligence	2025-12-30

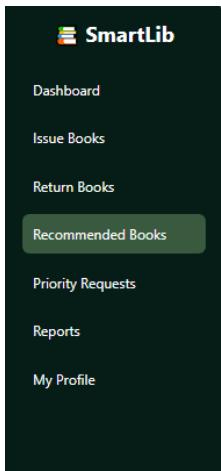
Faculty members are **exempted from late fines**, even if the book is returned after the due date.

#### 5.5.4 Recommended Books

Faculty members can suggest new books to be added to the library collection.

#### Recommendation Form Includes:

- Book title
- Author name
- Reason for recommendation



**SmartLib**

- Dashboard
- Issue Books
- Return Books
- Recommended Books**
- Priority Requests
- Reports
- My Profile

**Recommend a New Book**

Suggest a book you'd like the library to add

**Book Title**

**Author Name**

**Reason for Recommendation**

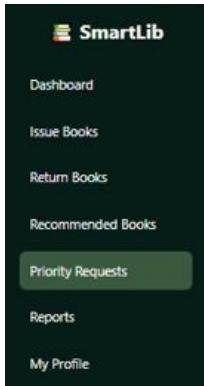
This feature helps improve the quality of the library collection.

### 5.5.5 Priority Book Requests

Faculty members have access to a **Priority Requests** section.

#### Priority Logic:

- Faculty book requests are marked as **Priority**
- If both a student and a faculty request the same book:
  - Faculty request is processed first



**Priority Book Requests**

Your priority requests only.

ID	Book Title	Author	Priority	Status	Request Date	Requested By
18	Discrete Mathematics	Kenneth Rosen	priority	pending	2025-12-31	Dr. Hassan

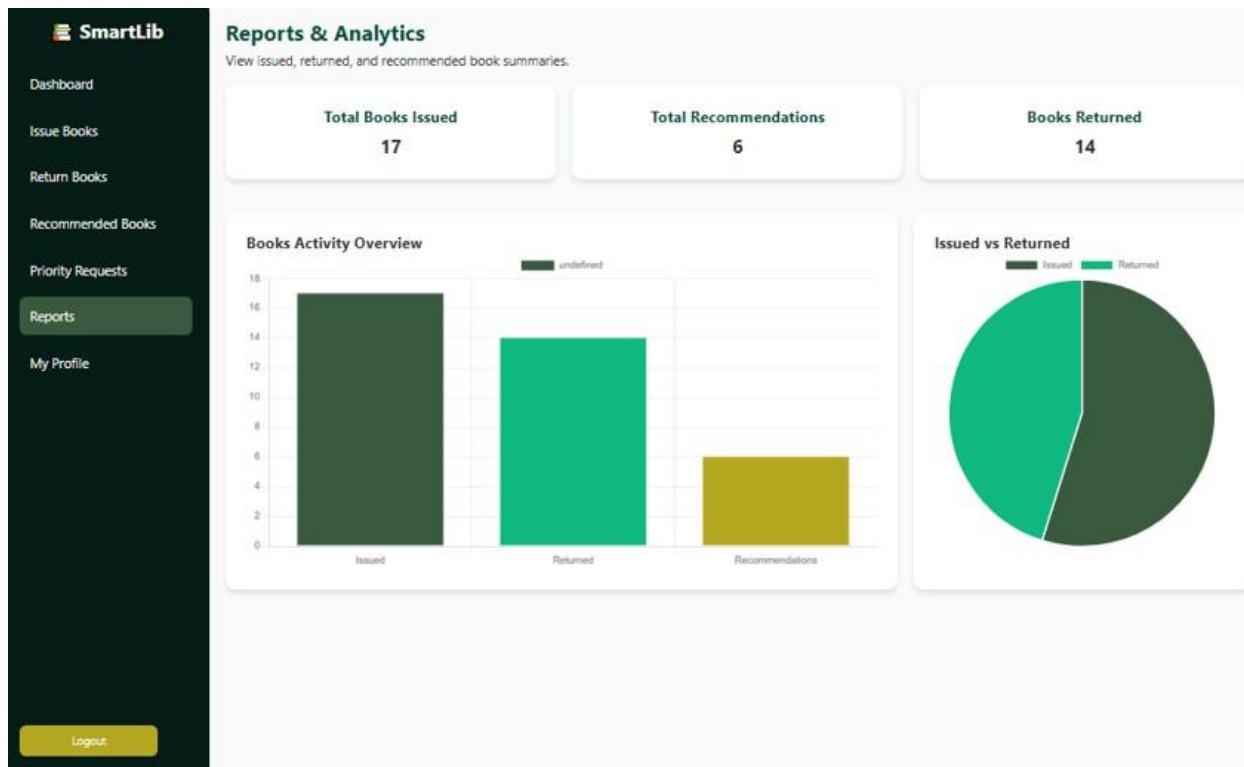
This ensures faculty members receive faster access to required books.

## 5.5.6 Reports

Faculty members can view analytical reports related to their library activity.

### Reports Include:

- Total books issued
- Total books returned
- Total recommendations submitted
- Graphical representation (bar charts & pie charts)



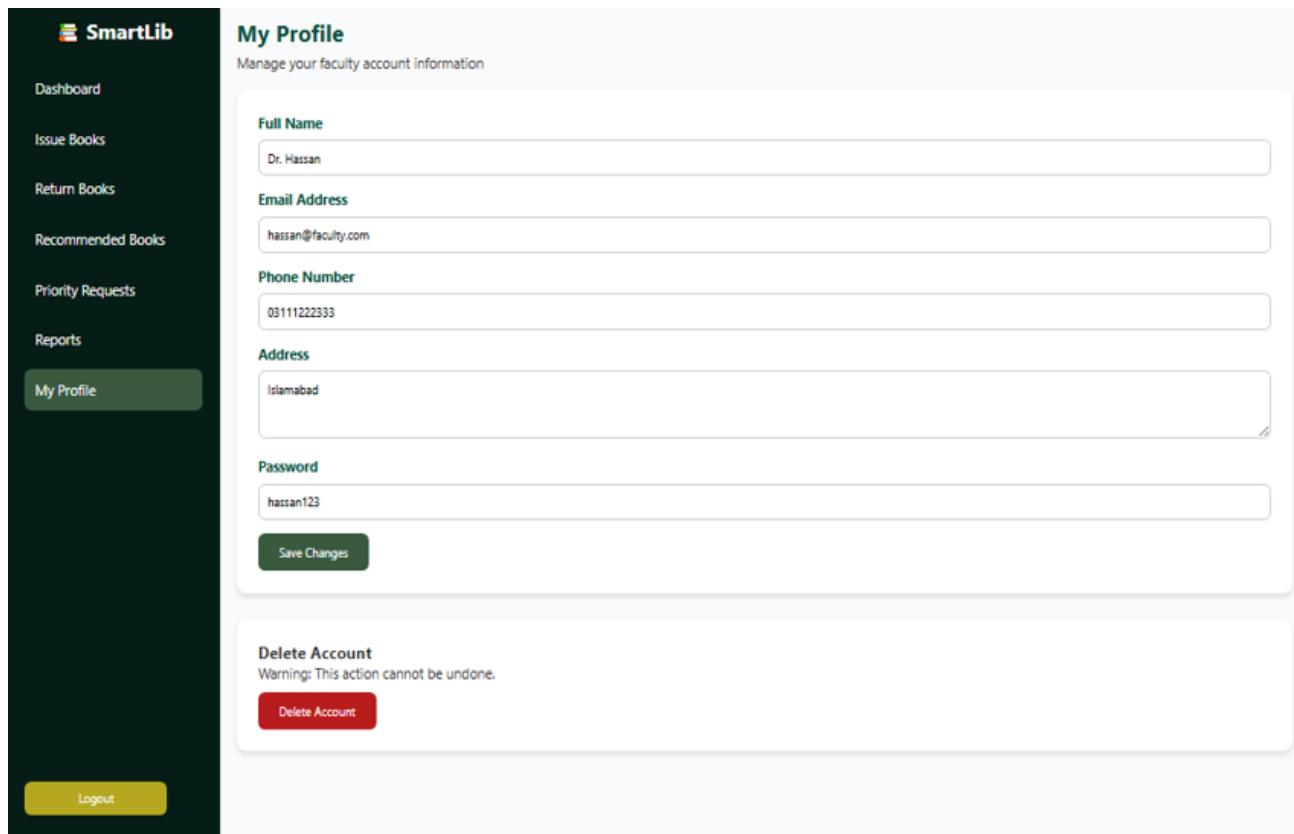
Reports help faculty track their usage and contribution to the library.

## 5.5.7 Faculty Profile Management

Faculty members can manage their personal profile information.

### Profile Features:

- Update name, email, phone number, and address
- Change password
- Delete account permanently (irreversible action)



The screenshot shows the 'My Profile' section of the SmartLib application. On the left, a dark sidebar lists navigation options: Dashboard, Issue Books, Return Books, Recommended Books, Priority Requests, Reports, and My Profile, which is highlighted with a green background. At the bottom of the sidebar is a yellow Logout button. The main content area has a light gray header 'My Profile' and a sub-header 'Manage your faculty account information'. It contains five input fields with placeholder text: 'Full Name' (Dr. Hassan), 'Email Address' (hassan@faculty.com), 'Phone Number' (03111222333), 'Address' (Islamabad), and 'Password' (hassan123). Below these fields is a green 'Save Changes' button. A separate section titled 'Delete Account' with a warning message 'Warning: This action cannot be undone.' contains a red 'Delete Account' button.

**Full Name**  
Dr. Hassan

**Email Address**  
hassan@faculty.com

**Phone Number**  
03111222333

**Address**  
Islamabad

**Password**  
hassan123

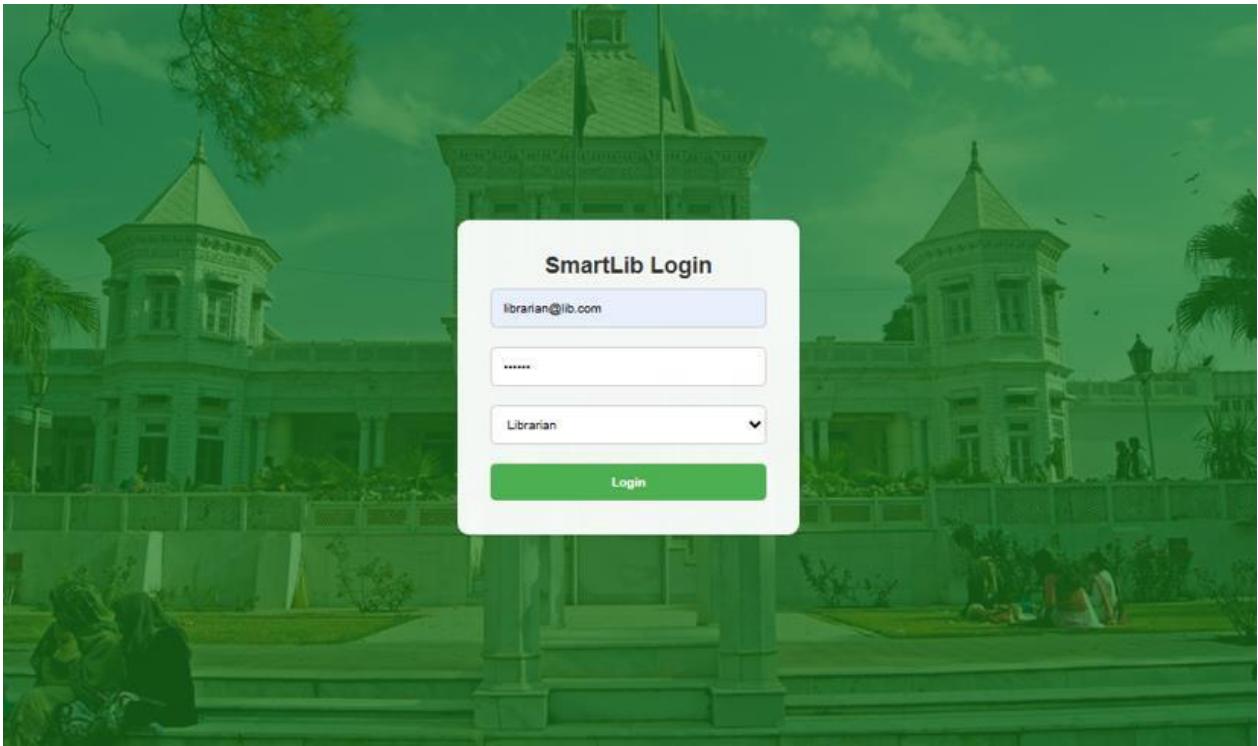
**Delete Account**  
Warning: This action cannot be undone.  
**Delete Account**

**Logout**

## 5.6 Librarian Module

The librarian dashboard provides complete control over the system

The librarian accesses the system through the SmartLib Login page by selecting the **Librarian** role and entering valid credentials.

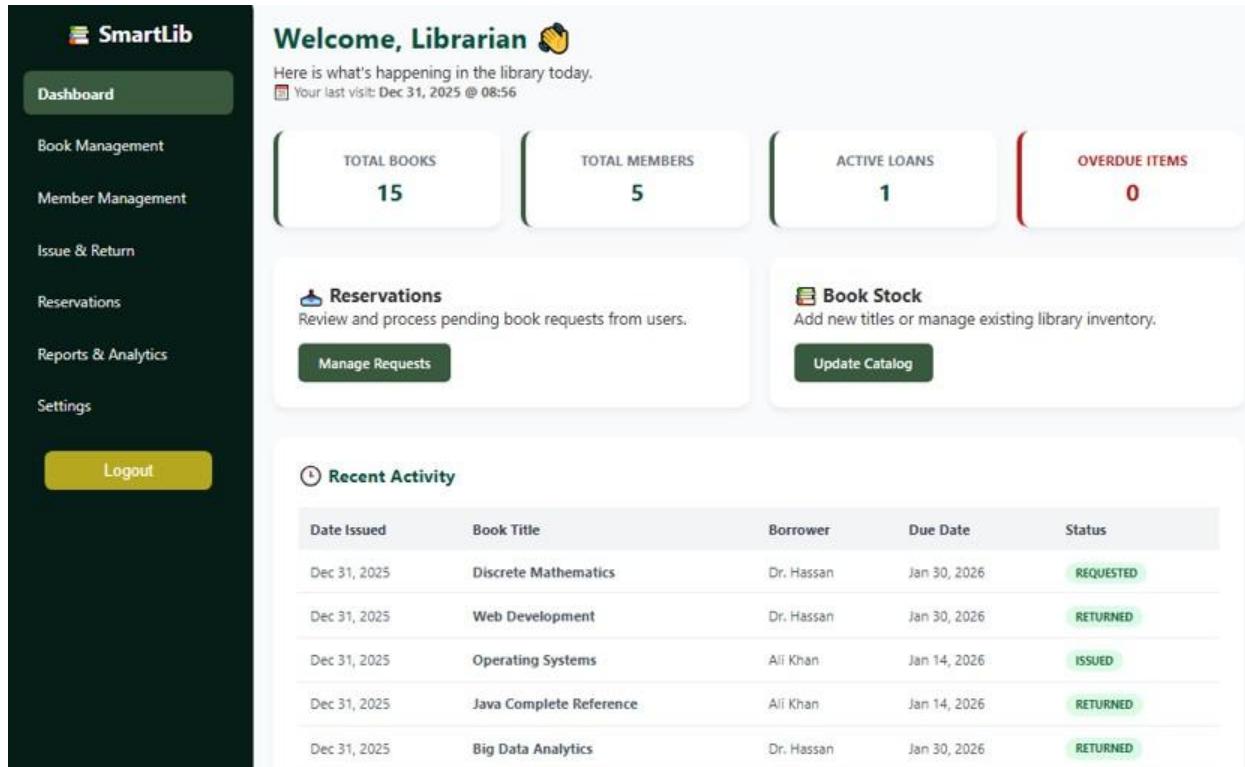


### 5.6.1 Librarian Dashboard

The Librarian Dashboard provides a real-time overview of library activity.

#### Dashboard Information Cards:

- Welcome message with last login time
- Total Books
- Total Members
- Active Loans
- Overdue Items
- Quick access buttons for Reservations and Book Stock
- Recent Activity table showing issued, returned, and requested books



This dashboard helps the librarian monitor library status at a glance.

### 5.6.2 Book Management

The Book Management module allows librarians to manage the library inventory.

Functions:

- Add new books (Title, Author, Category, ISBN, Copies)
- Modify existing book details
- Delete books from the catalog
- Search books by Title, Author, or ISBN
- View availability status (Available / Requested)

The screenshot shows the SmartLib Book Management system. On the left is a dark sidebar with navigation links: Dashboard, Book Management (which is selected and highlighted in green), Member Management, Issue & Return, Reservations, Reports & Analytics, Settings, and Logout. The main content area has a title "Book Management" with a subtitle "Add, Modify, or Delete books from the system." Below this are three buttons: "+ Add Book" (green), "Modify Book" (blue), and "Delete Book" (red). A search bar with placeholder text "Search by Title, Author, or ISBN..." and a "Search" button are also present. The central part of the screen displays a table of books:

ID	Title	Author	Category	ISBN	Copies	Status
1	Database Systems	Elmasri	Computer Science	ISBN001	5	Requested
2	Operating Systems	Silberschatz	Computer Science	ISBN002	4	Requested
3	Computer Networks	Andrew Tanenbaum	Networking	ISBN003	3	Available
4	Artificial Intelligence	Stuart Russell	AI	ISBN004	0	Available
5	Machine Learning	Tom Mitchell	AI	ISBN005	2	Available
6	Web Development	Jon Duckett	Web	ISBN006	5	Available
7	Software Engineering	Ian Sommerville	SE	ISBN007	3	Available
8	Cyber Security	William Stallings	Security	ISBN008	3	Available
9	Cloud Computing	Rajkumar Buyya	Cloud	ISBN009	3	Available
10	Data Mining	Han & Kamber	Data Science	ISBN010	2	Requested
11	Big Data Analytics	Viktor Mayer	Data Science	ISBN011	1	Available

### 5.6.3 Member Management

The Member Management module is used to manage users of the system.

Functions:

- Add new members
- Modify member details (Name, Email, Role)
- Delete members from the system
- View complete member registry
- Search members by Name, Email, or ID

The screenshot shows the Member Management module of the SmartLib library management system. On the left is a dark sidebar with navigation links: Dashboard, Book Management, Member Management (selected), Issue & Return, Reservations, Reports & Analytics, Settings, and Logout. The main content area has a header "Member Management" with a subtitle "Manage library access for students, faculty, and staff." Below this are three sections: "Add New Member" (with fields for Full Name, Email, Phone, Address, and a dropdown for Role with "Student" selected, followed by a "Add Member" button), "Modify Member" (with fields for ID, New Name, New Email, and a dropdown for Change Role with "Optional" selected, followed by an "Update" button), and "Delete Member" (with a field for Enter Member ID and a "Delete" button). At the bottom is a "Member Registry" section with a search bar and a table:

ID	Name	Email	Role	Date Joined
#5	Librarian	librarian@lib.com	LIBRARIAN	Dec 30, 2025
#4	Dr. Alina	alina@faculty.com	FACULTY	Dec 30, 2025
#3	Dr. Hassan	hassan@faculty.com	FACULTY	Dec 30, 2025
#2	Sara Ahmed	sara@student.com	STUDENT	Dec 30, 2025
#1	Ali Khan	ali@student.com	STUDENT	Dec 30, 2025

This module helps librarians control access and maintain user records.

#### 5.6.4 Issue & Return Books

This module handles book issuing and returning operations.

Issue Books:

- View currently issued books
- Track borrower details
- Monitor issue date and due date

The screenshot shows the SmartLib library management system. On the left is a dark sidebar with the SmartLib logo at the top. Below it are several menu items: Dashboard, Book Management, Member Management, **Issue & Return** (which is highlighted in green), Reservations, Reports & Analytics, and Settings. At the bottom of the sidebar is a yellow 'Logout' button. The main content area has a light gray header with the title 'Issue & Return Books' and a subtitle 'Track active loans and process library returns'. Below this is a section titled 'Currently Issued Books' with a table. The table has columns for Issue ID, Borrower, Book Title, Issue Date, Due Date, and Action. A single row is shown: Issue ID #15, Borrower Ali Khan (ID: 1), Book Title Operating Systems, Issue Date Dec 31, 2025, Due Date Jan 14, 2026, and Action 'Process Return' (in a green button). The 'Process Return' button has been clicked, as indicated by a green success message at the top of the page: 'Book has been successfully returned and marked as available.'

## Return Books:

- Process book returns
- Automatically update book status to Available
- Update return history
- Display success confirmation messages

This screenshot shows the same SmartLib interface as the previous one, but with a different state. The sidebar and header are identical. The main content area now displays a message: 'No books are currently issued.' This indicates that after the book was returned, it was marked as available, and no other books are currently loaned out.

## 5.6.5 Reservations (Book Requests)

The Reservations module manages pending book requests.

### Features:

- View all pending book requests
- Faculty requests are marked as **High Priority**
- Approve or reject requests

- Automatically assign due dates upon approval

**Pending Book Requests**

Review and process incoming book reservations. High priority items are listed first.

Priority	Member Info	Book Title	Request Date	Actions
FACULTY	Dr. Hassan Member ID: #3	Discrete Mathematics	Dec 31, 2025	<button>Approve</button> <button>Reject</button>
STUDENT	Ali Khan Member ID: #1	Database Systems	Dec 31, 2025	<button>Approve</button> <button>Reject</button>

**Pending Book Requests**

Review and process incoming book reservations. High priority items are listed first.

**Request Approved. Due Date: 2026-01-14**

Priority	Member Info	Book Title	Request Date	Actions
All clear! No pending requests to process.				

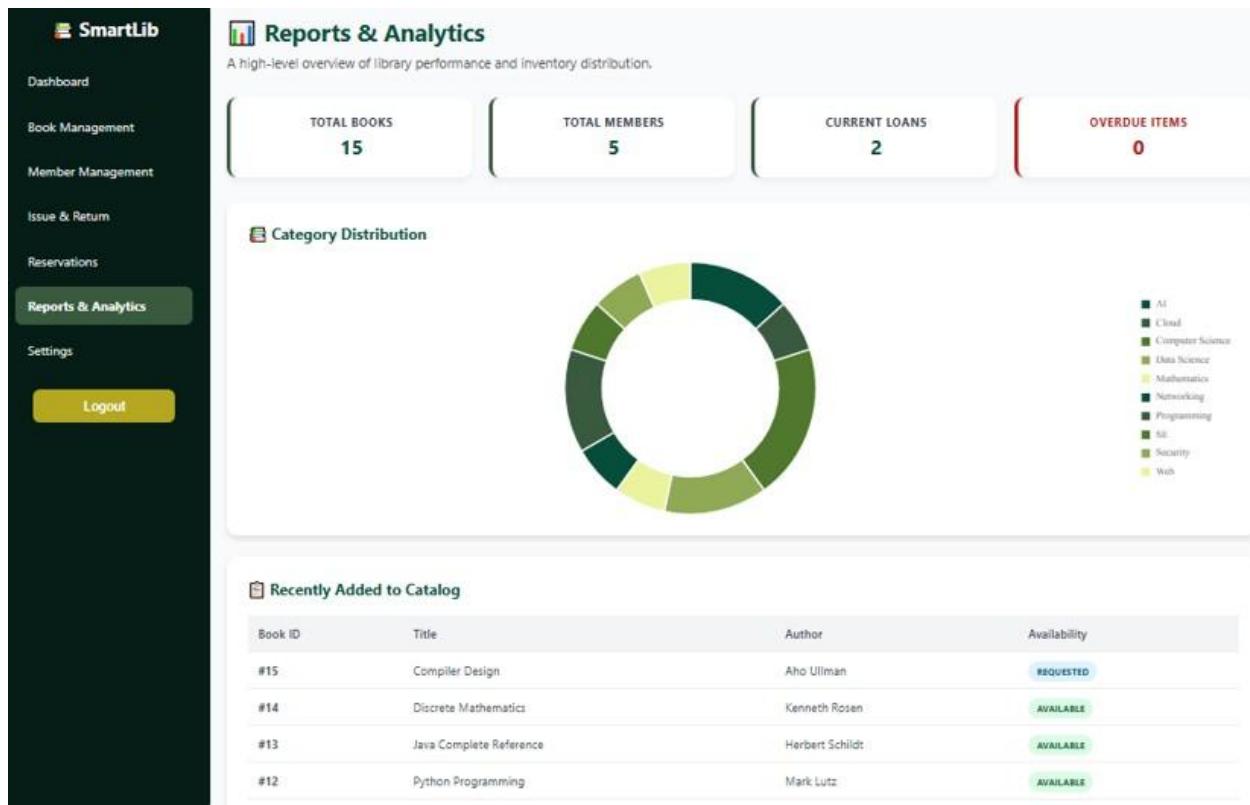
**Priority Rule:** If both a Student and a Faculty member request the same book, the Faculty request is processed first.

### 5.6.6 Reports & Analytics

The Reports & Analytics module provides insights into library performance.

Reports Include:

- Total Books
- Total Members
- Current Loans
- Overdue Items
- Category-wise book distribution (graphical view)
- Recently added books



This module helps librarians analyze usage patterns and inventory distribution.

### 5.6.7 Account Settings

The Settings module allows librarians to manage their account.

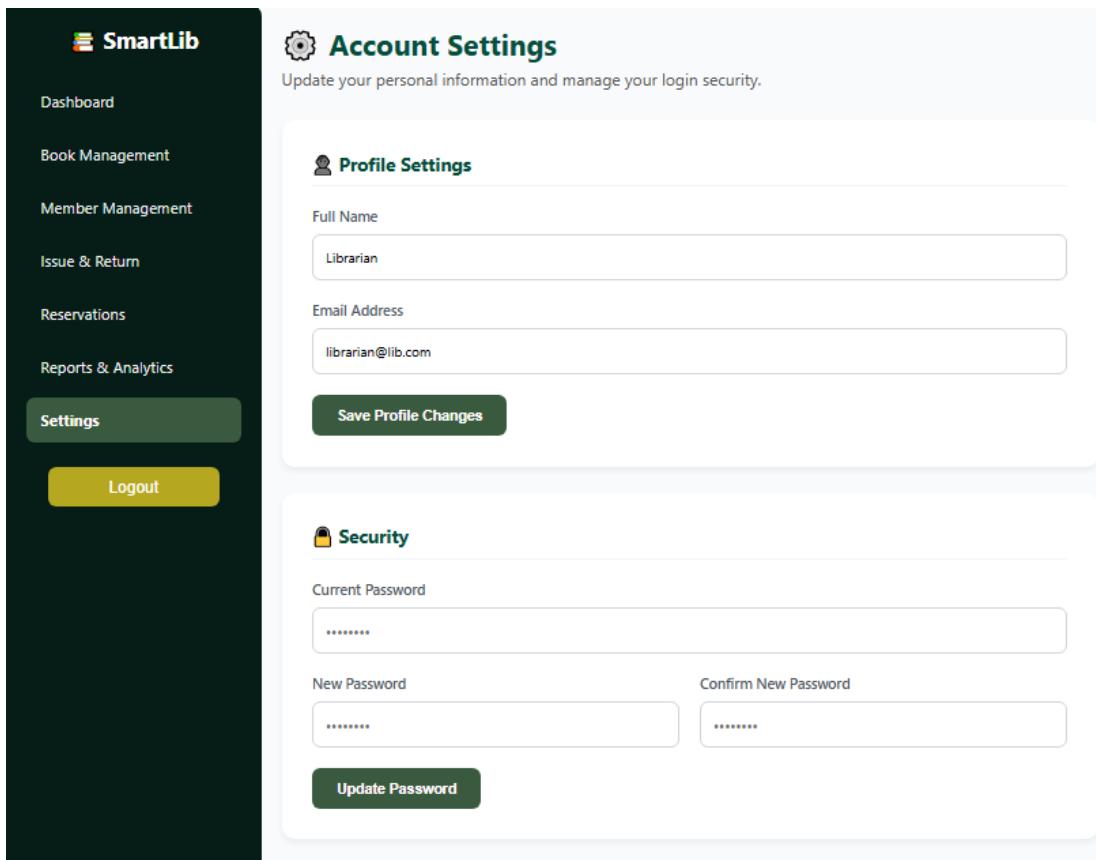
Profile Settings:

- Update full name
- Update email address

Security Settings:

- Change password
- Confirm password update securely

This ensures account security and updated personal information.



## **6. Non-Functional Requirements**

Non-functional requirements describe how the system performs its functions rather than what functions it performs. These requirements ensure that the SmartLib system is reliable, secure, and easy to use.

### **6.1 User-Friendly Interface**

The SmartLib system provides a clean, simple, and well-organized user interface. Dashboards are designed according to user roles (Student, Faculty, Librarian), allowing users to easily understand and navigate the system. Clear buttons, readable fonts, and meaningful labels help users perform tasks without technical knowledge or training.

### **6.2 Secure Login and Session Management**

Security is a key requirement of the SmartLib system. User authentication is handled through a secure login mechanism using email, password, and role selection. PHP sessions are used to maintain user login states and prevent

unauthorized access. Users cannot access restricted pages without proper authentication, and session termination occurs on logout to ensure safety.

In addition to sessions, cookies are used for non-sensitive data such as last login information and remembered email address. This combination of sessions and cookies ensures strong security while providing a better user experience.

### **6.3 Role-Based Access Control**

SmartLib implements strict role-based access control to protect system data. Each user role has specific permissions:

- Students can only access student-related features.
- Faculty members have additional privileges such as priority requests and extended issue duration.
- Librarians have full administrative access.  
This separation of roles ensures data integrity and prevents misuse of system resources.

### **6.4 Fast Response Time**

The system is designed to respond quickly to user actions such as searching books, submitting requests, and loading dashboards. Efficient database queries and optimized backend logic help reduce delays, ensuring a smooth user experience even with multiple users accessing the system simultaneously.

### **6.5 Data Accuracy and Consistency**

SmartLib ensures accurate and consistent data by using a centralized MySQL database. All records related to books, users, issues, returns, and fines are stored and updated in real time. Validation checks are applied to avoid incorrect data entry, ensuring reliable reports and correct system behavior.

## **7. Conclusion**

SmartLib is a complete and efficient web-based Library Management System designed to automate and simplify library operations. The system successfully replaces manual processes with a digital platform that improves accuracy, saves time, and reduces paperwork.

By providing role-based access for students, faculty, and librarians, SmartLib ensures secure and organized management of library activities. Features such as book requests, priority handling for faculty, issue and return management, fine calculation, and reporting make the system practical and effective for real-world use.

Overall, SmartLib enhances the productivity of librarians, improves accessibility for users, and offers a reliable solution for modern library management.