Software Requirements Specification (SRS)

Thapar Auditorium and Room Management System (TARMS)

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1. Purpose and Scope

The goal is to manage room and auditorium bookings, approvals, and scheduling for Thapar Institute of Engineering & Technology. The system will serve students, faculty, and administrators. The primary outcome is to reduce manual booking processes and waiting time while improving accuracy of room allocation and scheduling.

2. Stakeholders and User Classes

- **Student**: Undergraduate and graduate students who request room bookings for events, meetings, or activities.
- **Faculty**: Teaching staff who approve/reject booking requests and manage room allocations.
- **System Administrator**: IT staff who manage user accounts, system configuration, and backups.
- **Department Coordinator**: Staff who oversee room availability and resolve conflicts.
- **Information Technology Support**: Staff who maintain hosting, monitoring, and system updates.

3. System Context (High Level)

The system connects to the university's student/faculty database for authentication, stores booking data and user profiles in MongoDB, and provides web-based interfaces for room management. It integrates with the university's existing infrastructure and follows institutional policies for room allocation.

4. Assumptions, Dependencies, Constraints

- The university provides unique user identifiers for students and faculty.
- Room booking requests must be approved by authorized faculty members.
- Booking data must be retained for audit purposes for three years.
- Normal usage supports up to two hundred concurrent users.
- System must operate during university business hours (8 AM to 8 PM).

5. Definitions and Glossary

- **Student**: Any authenticated student permitted to request room bookings.
- **Faculty**: Any authenticated faculty member authorized to approve booking requests.
- **Room**: A uniquely identifiable space (classroom, auditorium, meeting room) available for booking.
- **Booking Request**: A formal request for room allocation with specific date, time, and purpose.
- **Status**: Current state of a booking request (Requested, On Hold, Approved, Rejected).

6. Functional Requirements

FR-1. User Authentication - When a user enters credentials (User ID/Username, Password, Member Type), the system shall authenticate and create a session within three seconds. - The system shall redirect students to the student dashboard and faculty to the faculty dashboard based on their role.

FR-2. Student Registration - When a new student registers, the system shall collect Name, User ID, Email, Mobile Number, Member Type, Date of Birth, and Password. - The system shall validate that User ID and Email are unique and create the account in the database.

FR-3. Faculty Registration - When a new faculty member registers, the system shall collect Faculty Name, Position, Username, Mobile Number, Member Type, Email, and Password. - The system shall validate that Username and Email are unique and create the faculty account.

FR-4. Room Availability Display - When a student accesses the home page, the system shall display all rooms with their current status (Available, Booked, On Hold) within two seconds. - The system shall show Room Number, Room Name, Status, and a “Book Now” button for available rooms.

FR-5. Booking Request Creation - When a student selects an available room and submits a booking form, the system shall collect event details including Room Name, Event Name, Purpose, Date, Time, Number of People, and Requirements (AC, Sound System). - The system shall create a booking request with “Requested” status and store it in the database.

FR-6. Faculty Approval Process - When a faculty member logs in, the system shall display all booking requests with “On Hold” status. - When a faculty member approves or rejects a request, the system shall update the request status and notify the student within five seconds.

FR-7. Booking History - When a student accesses “My Requests”, the system shall display all booking requests made by that student with their current status. - The system shall allow students to delete their own pending requests.

FR-8. Personal Information Management - When a user accesses personal information, the system shall display their current details. - When a user updates their information, the system shall validate and save the changes to the database.

FR-9. Password Management - When a user changes their password, the system shall verify the current password and update to the new password. - When a user requests password reset, the system shall log the request for administrative processing.

FR-10. Contact and Feedback - When a user submits contact information or feedback, the system shall store the data with timestamp for administrative review.

7. Quality Attributes (Measurable Targets)

Performance: Under normal load of two hundred concurrent users, page response time shall be under three seconds for ninety-five percent of requests and under five seconds for ninety-nine percent of requests.

Availability: The service shall be available ninety-nine percent of the time during business hours (8 AM to 8 PM), excluding scheduled maintenance announced at least twenty-four hours in advance.

Security: All user sessions shall timeout after fifteen minutes of inactivity. Access to faculty features shall require explicit faculty role assignment. All booking actions shall be recorded with user ID, timestamp, and action details.

Usability: A new student shall be able to search for a room and submit a booking request without training, completing the task within five minutes during a standard usability study with at least ten participants.

Accessibility: The web interface shall support keyboard navigation and provide alternative text for images to meet basic accessibility requirements.

Maintainability: Database backup and restore procedures shall be documented and executable within thirty minutes by IT support staff.

8. External Interfaces

Human Interfaces: - Web interface for students and faculty using HTML5, CSS3, and JavaScript. - Handlebars templating engine for dynamic content generation.

System Interfaces: - MongoDB database for data persistence using Mongoose ODM. - Express.js web framework for HTTP request handling. - Express-session for session management with MongoDB session store.

Data Formats: - JSON for API responses and data exchange. - HTML forms for user input and data submission.

9. Data Requirements

Entities: User, Faculty, Room, Booking_Form, Contact, Feedback, ResetPassword, SessionData.

Identifiers: Each entity shall have a unique MongoDB ObjectId. User IDs and faculty usernames shall be unique within their respective collections.

Retention: Booking records shall be retained for three years; user session data for fifteen minutes; contact and feedback data for one year.

Privacy: User contact details shall be visible only to the user themselves and system administrators. Faculty can view booking request details but not personal user information.

10. Acceptance Criteria and Test Ideas

Authentication: A valid student login with correct credentials redirects to student dashboard within three seconds; invalid credentials show error message.

Booking Request: A student can successfully submit a booking request for an available room; the request appears in faculty approval queue with “On Hold” status.

Faculty Approval: A faculty member can approve a booking request; the request status changes to “Approved” and the room status updates to “Booked”.

Session Management: User session expires after fifteen minutes of inactivity; user is redirected to login page when accessing protected routes.

Data Validation: System prevents duplicate User IDs and Email addresses during registration; form validation ensures required fields are completed.

11. Out-of-Scope

- Integration with university email system for notifications.
- Mobile application development.
- Advanced reporting and analytics dashboard.
- Integration with university calendar systems.
- Payment processing for room usage fees.
- Equipment inventory management.

12. Prioritization

Must-have: User authentication, room availability display, booking request creation, faculty approval process, basic user profile management.

Should-have: Booking history, password management, contact/feedback forms, session management.

Could-have: Email notifications, advanced search filters, room capacity management, conflict resolution tools.

13. Traceability Slice (Illustrative)

Goal: Reduce average room booking processing time by seventy percent within one semester.

- **Linked Requirements**: Booking request creation (FR-5), faculty approval process (FR-6), room availability display (FR-4).
- **Linked Tests**: Booking workflow test T-B-001, approval process test T-A-002, performance load test T-P-003.

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