Classroom Booking System: Database & Interface Guide

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This document provides a concise explanation of the purpose of each table in the relational schema and serves as a user manual for operating the web interface in different roles.

Part I: Database Table Explanations (Schema Purpose)

The system is built on an 8-table, fully normalized schema designed to ensure data integrity and facilitate quick, complex queries (like matching rooms to multiple required features).

Table Name	Type	Purpose and Primary Function	Key Attributes
Instructors	Entity	Stores metadata for staff authorized to request bookings. This table acts as the reference for the InstructorID in the Bookings table.	InstructorID (PK), Name, Department.
Administrators	Entity	Stores metadata for staff authorized to manage the system. This table acts as the reference for who approves/rejects a booking.	AdminID (PK), Name, ContactInfo.
Rooms	Entity	Stores permanent details for all bookable resources. Excludes availability or features list to maintain normalization.	RoomID (PK), RoomNameOrNumber, Capacity, Location.
Features	Reference	A master lookup table containing every unique technological and physical asset (e.g., 'Projector', 'Zoom-Capable', 'Lab Equipment').	FeatureID (PK), FeatureName.
Courses	Entity	Stores details about academic offerings that may necessitate specific room features.	CourseID (PK), CourseName, CreditHours.
Room_Features	**Junction**	Maps the **many-to-many** relationship between Roomsand Features. Defines *what a room has*.	RoomID (FK), FeatureID(FK).
Course_Requirements	**Junction**	Maps the **many-to-many** relationship between Coursesand Features. Defines *what a course needs*.	CourseID (FK), FeatureID(FK).
Bookings	Transaction	The central table that records every room reservation request.	BookingID (PK), Date, StartTime, Status, RoomID(FK), InstructorID (FK).

Data Integrity (Constraints)

The Bookings table ensures integrity through two critical UNIQUE constraints:

1. **Unique (RoomID, Date, StartTime):** Prevents the database from recording two simultaneous bookings for the same room.
2. **Unique (InstructorID, Date, StartTime):** Prevents an instructor from having overlapping bookings in two different rooms.

Part II: Interface Usage Guide

The application (index.html) is a single-page interface that adapts based on the user's selected role.

A. Switching User Roles

To test the system's different permissions:

1. **User Selector:** Use the **"Change User"** dropdown at the top of the page.
2. **Select ID:** Choose a user ID (e.g., I-2: Prof. Samuel Chen or A-1: Admin Alice).
3. **Role Buttons:** The **Instructor View** and **Administrator Panel** buttons will automatically load the appropriate dashboard based on your selection.

B. Instructor Role Functions

Goal: Search available rooms and submit requests.

Section	Functionality	SQL Logic Used
Find Resources(Search Panel)	**Room Search**	**Func 1 & 2** (Search available rooms by capacity and features). The system filters the room list based on availability at the requested date/time.
Available Rooms	**Request Book**	Opens a form to select the course and submit a booking, which creates a new record in the Bookings table with Status='Pending'.
My Reservations	**View Bookings**	**Informal Query 2** (Displays all bookings, sorted by date).
My Reservations	**Cancel Booking**	**Func 4** (Deletes the record from Bookings). Only allowed if the booking has a Status='Pending'.

C. Administrator Role Functions

Goal: Manage pending requests and view room utilization.

Section	Functionality	SQL Logic Used
Awaiting Approval	**Display Pending**	**Informal Query 1** (Lists all bookings with Status='Pending').
Awaiting Approval	**Approve**	**Func 5** (Updates Status to 'Approved' and sets AdminID). Includes a check to prevent approving two requests for the same room/time.
Awaiting Approval	**Reject**	**Func 3** (Updates Status to 'Rejected' and sets AdminID).
Usage History	**View Schedule**	**Informal Query 5** (Displays all approved bookings for the selected room, past and future, sorted by date).