

# SmartSeat – Intelligent Workspace Booking System

*Comprehensive Project Plan for Wissen Technology Placement Drive*

## Project Objective

Design and implement a modern, fully functional seat booking system that maximizes workspace utilization using batch-based allocation, dynamic buffer management, strict booking windows, prepaid enforcement, cross-batch optimization, AI chatbot support, and Google authentication.

## Seat Infrastructure

Batch	Spots	Seats
Batch1	5	40
Batch2	5	40

## Booking Rules

- Same-Batch Booking: Users can book up to 14 days before their allocated meeting days.
- Batch1 days: Monday, Tuesday, Wednesday.
- Batch2 days: Thursday, Friday.
- Cross-Batch Booking: Allowed ONLY one day before the meeting date AND only after 3:00 PM.
- Booking allowed only after successful prepaid payment.
- No booking allowed on holidays.

## Updated Cross-Batch Rule

If a user attempts to book outside their assigned batch days, the system allows booking only when the current date is exactly one day before the meeting and the time is after 3:00 PM. This ensures priority utilization for the primary batch while enabling last-minute optimization of unused seats.

## Seat Release & Buffer Logic

- Users can release booked seats if unable to attend.
- Released seats increase the buffer count dynamically.
- Example: Initial buffer = 10 → After release = 11.

## Database Design Overview

- Users table to store authentication and profile data.

- Seats table to manage physical seat allocation.
- Bookings table to track reservations and payment status.
- BufferSeats table for dynamic buffer management.
- Holidays table to block bookings on restricted dates.

## Recommended Technology Stack

- Frontend: React.js + Tailwind CSS + Framer Motion
- Backend: Node.js + Express
- Database: PostgreSQL
- Authentication: Google OAuth / Firebase Auth
- Payments: Razorpay (Test Mode)
- Chatbot: OpenAI API or rule-based assistant
- Deployment: Vercel (frontend) + Render (backend)

## Core Booking Validation Flow

- Check holiday restriction.
- Verify prepaid payment success.
- Identify meeting day batch.
  - If same batch → allow within 14 days window.
  - If cross batch → allow only if one day before AND time > 3 PM.
- Check seat availability and prevent duplicates.
- Confirm booking and update buffer if needed.