# Feasibility Report: CampusRide – Smart Campus Carpooling App

## 1. Project Overview

Project Title: CampusRide – Smart Campus Carpooling App  
Objective: To make campus travel safer, cheaper, and more convenient through secure, verified carpooling among Thapar University students.  
Description: CampusRide is a campus-exclusive rideshare and carpooling platform that groups students traveling on similar routes and timings into shared trips. It ensures authenticity, privacy, and familiarity through verified @thapar.edu email login and a Circle of Trust network that connects users via 1st, 2nd, and 3rd-degree contacts for safer ride formation.  
Scope:  
- Students: Create, join, and coordinate verified ride groups with known or connected peers.  
- Admin: Monitor user activity, manage reports, and ensure security compliance.  
- Accessibility: Mobile-first app with potential expansion into campus taxis and payment systems.

## 2. Technical Feasibility

Proposed Technologies:  
- Frontend: Expo (React Native)  
- Backend: Node.js (API Gateway), Flask (Chat & Matching Services)  
- Database: SQL/CSV-based data storage for MVP  
- Design Tools: Figma  
- Hosting: Render / AWS Free Tier  
  
Key Functional Modules:  
- Authentication: OTP-based login with Thapar email verification  
- Trip Management: Create or join carpool groups  
- Smart Matching Algorithm: Suggests best-fit trip groups based on route overlap, timing, and mutual connections  
- Circle of Trust: Displays connections as  
 1° contacts: Directly connected peers (past trips or verified friends)  
 2° contacts: Friends of friends  
 3° contacts: Wider campus network suggestions  
 Users can prefer rides with 1° or 2° degree connections for safety and comfort.  
- In-App Chat: Enables coordination only after group formation  
- Notification & Archival: Automatic trip completion and chat history preservation  
  
Team Skill Set:  
- Mobile + Backend integration  
- Matching algorithm design & optimization  
- Secure chat implementation  
- UI/UX design and privacy-focused workflows  
  
Challenges:  
- Efficiently mapping and maintaining 3-tier trust relationships  
- Data synchronization and real-time updates  
- Balancing privacy with visibility of connections  
  
Conclusion: Technically feasible using available frameworks and achievable within a semester by a student team.

## 3. Economic Feasibility

Estimated Development Cost:  
- Tools/Frameworks: Free (React Native, Node.js, Flask, Figma)  
- Hosting/Database: Free or low-cost tiers (Render/Firebase)  
- Labor: Student effort, no external cost  
  
Estimated Timeline (12 weeks):  
Weeks 1–2: Requirement analysis & Circle of Trust prototype  
Weeks 3–6: Core features (login, trip creation, matching)  
Weeks 7–9: Chat integration & network graph module  
Weeks 10–11: Testing & debugging  
Week 12: Documentation & deployment  
  
Benefits:  
- Increases campus mobility convenience  
- Reduces transport cost and carbon footprint  
- Enhances social connectivity via trusted peer networks  
  
Conclusion: Economically viable, low-cost development with high community benefit.

## 4. Operational Feasibility

End Users: Thapar students and campus administrators  
Usability: Intuitive interface with real-time trip and chat dashboards  
System Features:  
- OTP-verified login via Thapar email  
- Trip creation/joining and in-app chat  
- Circle of Trust visibility to prioritize safer ride connections  
- Gender-based visibility and optional preferences  
Resistance: Low — the system is campus-restricted and privacy-secured  
Training Required: Minimal (self-explanatory onboarding)  
  
Conclusion: Operationally robust and ideal for internal campus deployment.

## 5. Schedule Feasibility

Estimated Duration: 12 weeks  
Milestones:  
1. Requirement Analysis & Circle of Trust Mapping  
2. Authentication & Trip Module  
3. Matching Algorithm & Chat System  
4. Testing & Release  
  
Conclusion: The schedule is realistic and fits within a standard academic project timeline.

## 6. Legal & Ethical Feasibility

Data Privacy: Only verified Thapar users; no external visibility.  
Data Handling: Minimal personal data stored; no public sharing.  
Legal Compliance: Aligns with academic data protection norms.  
Ethical Considerations:  
- Circle of Trust ensures rides only with verified and connected peers.  
- Gender-based privacy controls available.  
- Secure logout and data deletion options.  
  
Conclusion: Fully compliant, safe, and ethically sound.

## 7. Conclusion & Recommendation

After evaluating all feasibility factors — technical, economic, operational, schedule, and ethical — the CampusRide project is highly viable and community-focused.  
The Circle of Trust feature strengthens safety, familiarity, and user confidence, making CampusRide not just a utility but a social innovation for campus transport.  
Recommendation: Proceed with MVP development and future expansion to include digital payments, campus taxi integration, and real-time analytics dashboards.