

CAPSTONE PROJECTS INFORMATION SHEET			
Project Code	CP-2025-05		
Group Code	G-07		
Project Name (EN)	Electric Vehicle Station-based Rental System		
Project Name (VN)	Phần mềm thuê xe điện tại điểm thuê		
Supervisor 1	Lâm Hữu Khánh Phương (PhuongLHK@fpt.edu.vn)		
Supervisor 2			
Stakeholders	EV Renter (end users), Station Staff, Admin		
Student 1	Nguyen Ba Thai Duong	SE196325	
Student 2	Doan Cong Khoa	SE196307	
Student 3	Mai Chi Huy	SE161980	
Student 4	Nguyen Ngoc Ve Sy	SE160343	
Student 5			
Context	Many primary students struggle with vocabulary retention using traditional methods.		
Problems / Challenges	Kids find it hard to stay engaged; lack of image-based learning tools; limited feedback.		
Proposed Solutions	AI-based image recognition + gamified vocabulary learning aligned with Cambridge YLE.		
Assumptions & Constraints			
ID	Type	Description	Impact / Notes
A-01	Assumption	Students will have access to smartphones or tablets with internet connection.	Critical for app usability.
A-02	Assumption	Dataset for training image recognition is sufficient and labeled correctly.	Impacts model accuracy.
A-03	Assumption	Supervisors will be available for weekly consultations.	Affects timeline if unavailable.
C-01	Constraint	Project duration limited to 4 months.	Limits scope & feature development.
C-02	Constraint	Budget restricted to free / open-source tools.	Technology stack must be cost-free.
C-03	Constraint	Must comply with school's data privacy policy for children under 13.	Restricts data collection and storage.
C-04	Constraint	Final product must run on both Android tablets and Windows PC.	Technical scope fixed.

Business Rules				
ID	Description			
BR-01	Corporation has multiple EV stations.			
BR-02	Each EV station has multiple vehicles.			
BR-03	Renter must be at least 18 years old and has eligible driver license + personal ID.			
BR-04	All users (including Renter, Staff and Administrator) must have an account (including email and password) for system authentication & authorization.			
BR-05	Renter can only book/rent 1 vehicle at a time. (No new contract if there are still existing valid contract)			
BR-06	Vehicle must be returned at its designated departure location.			
BR-07	Renter is responsible for the vehicle during rental period. (As stated in contract)			
BR-08	Renter can only book vehicle at least 2 working hours later than actual booking creation time.			
BR-09	Rental Price = 0.3% vehicle value (base price + condition + mileage) * days of rental period			
BR-10	Rental Deposit = 5 * Rental Price (maximum 70% base price)			
BR-11	Minimum rental period is 1 day, and ALL rental should be calculated by day. Maximum rental period is 3650 days.			
BR-12	Renter is not allowed to cancel booking within 1 hour before estimated time.			
	Staff contact renter for verification at booking creation + 1 hour till estimated time.			
BR-13	System perform auto-analyzation to check for violated, late and booking failure related renters to notify admin as potential-threat renters (-> suspended, banned).			
BR-14	Renter is allowed to create a complaint form within 7 days after completion of contract.			
BR-15	Pre-booking Deposit = 2% vehicle value			
BR-16	Contract must be signed by both parties (Renter and Station Staff) to be legal.			
BR-17	Admin is able to reallocate vehicle and staff as needed.			
BR-18	Staff must check vehicle condition after a contract is completed. Vehicle will have Maintenance status for at least 3 days.			
BR-19	Grace period for returning vehicle is 3 hours. Any return later is considered late-return and must be notified to Staff.			
BR-20	Late penalty = 0.3% vehicle value * days of late period.			
BR-21	Staff is obliged to contact the renter 3 times: - Grace period has passed. - 1 day late has passed. - 3 day late has passed.			
	If renter don't return the vehicle, contract will be marked as violated and Admin must be notified.			
BR-22	After consideration with Administrator and renter, Rental Deposit will be (partial) non-refundable. (50%, 75%, 100%)			
BR-23	Wrong return location penalty = Allocation price (???)			
BR-24	Staff must check vehicle condition before establishing a contract. Vehicle condition will be captured/recorded.			
BR-25	Any unexpected cost that is not renter's fault will be compensated by corporation.			
BR-26	Staff must confirm renter's personal ID and driver license.			

BR-27	Staff must report admin in case any vehicle in station is damaged.			
BR-28				
BR-29				
BR-30				
BR-31				
BR-32				
BR-33				
BR-34				
BR-35				

No.	Story ID	As a...	I want...	So that...	Acceptance Criteria	Priority	Related Req.	Status
1	US-01	EV Renter	to register an account with my email	I can access rental features	Given valid email/password/docs → When submit → Then account queued for verification; email sent.	High	FR-01	Draft
2	US-02	EV Renter	to search and book a vehicle	I can reserve an available EV	Given login → When search/filter/select/pay deposit → Then booking confirmed; vehicle reserved.	High	FR-02	Draft
3	US-03	EV Renter	to check-in and receive the vehicle	I can start my rental safely	Given booking → When arrive/QR scan/present docs → Then e-sign contract; status to Active.	High	FR-03	Draft
4	US-04	EV Renter	to return the vehicle and pay	I can complete the rental	Given active rental → When return/inspect/pay extras → Then deposit refunded; history updated.	High	FR-04	Draft
5	US-05	EV Renter	to view my rental history	I can track usage and costs	Given login → When view history/filter → Then see details/charts; export CSV.	Medium	FR-05	Draft
6	US-06	EV Renter	to cancel a booking	I can adjust plans if needed	Given booking >1h early → When cancel → Then refund deposit; vehicle available.	Medium	FR-06	Draft
7	US-07	EV Renter	to file a complaint post-ride	I can report issues	Given completed contract <7 days → When submit form/photos → Then ticket created; notified.	Low	FR-07	Draft
8	US-08	Station Staff	to verify renter docs and vehicle	I can ensure safe handover	Given renter arrival → When scan/check → Then approve/log; proceed to contract.	High	FR-08	Draft
9	US-09	Station Staff	to process payments and receipts	I can handle financials on-site	Given contract → When calculate/process → Then receipt generated; status updated.	High	FR-09	Draft
10	US-10	Station Staff	to update vehicle status	I can maintain fleet	Given inspection → When update/flag → Then notify Admin; vehicle to Maintenance.	Medium	FR-10	Draft
11	US-11	Station Staff	to escalate violations/late fees	I can enforce rules	Given late >3 days → When contact 3x/mark violated → Then notify Admin.	Medium	FR-11	Draft
12	US-12	Admin	to monitor fleets and stations	I can oversee operations	Given dashboard → When view maps/reports → Then see real-time status.	High	FR-12	Draft
13	US-13	Admin	to manage users and stations	I can handle risks and performance	Given users tab → When edit/blacklist/reassign → Then changes logged.	Medium	FR-13	Draft
14	US-14	Admin	to generate reports and analytics	I can make data-driven decisions	Given filters → When generate → Then export PDF/CSV; optional AI suggestions.	Medium	FR-14	Draft
15	US-15	Admin	to reallocate resources	I can balance demand	Given surge alert → When drag-drop/reassign → Then updates sent.	Low	FR-15	Draft

No.	Req ID	Type	Requirement Description	Category	Priority	Source	Acceptance Criteria	Status	Notes
1	FR-01	FR	The system shall allow renters to register with email, password, and docs.	User Mgmt	High	Stakeholder	Valid inputs create queued account; verification email sent; docs upl	Draft	Password ≥8 chars; age ≥18.
2	FR-02	FR	The system shall enable vehicle search/booking via map with filters.	Rental Mgmt	High	Business Rule	Logged-in user selects vehicle/time; 50% deposit paid; confirmation	Approved	Integrates Google Maps API.
3	FR-03	FR	The system shall support check-in with doc verification and e-contract.	Process	High	Stakeholder	QR scan triggers; staff approves; status to Active; photos logged.	Draft	Cross-check with risk list.
4	FR-04	FR	The system shall handle vehicle returns with inspections and fee calculations.	Rental Mgmt	High	Business Rule	Inspection photos; auto-fee calc (incl. penalties); deposit refund prc	Draft	Only at original station.
5	FR-05	FR	The system shall provide rental history views with stats and exports.	Reporting	Medium	Stakeholder	Filtered list/charts; CSV export; accurate costs/mileage.	Draft	Read-only for renters.
6	FR-06	FR	The system shall allow booking cancellations with refunds.	Process	Medium	Business Rule	>1 hour early: full refund; status to Cancelled; vehicle available.	Draft	No cancel within 1 hour.
7	FR-07	FR	The system shall enable post-rental complaints within 7 days.	Support	Low	Stakeholder	Form with photos; ticket created; escalated to Admin.	Draft	Max 1 per contract.
8	FR-08	FR	The system shall allow staff to verify docs and conditions.	Verification	High	Business Rule	Scan/match to profile; log approval; deny if invalid.	Approved	OCR optional.
9	FR-09	FR	The system shall process on-site payments/deposits with receipts.	Financial	High	Stakeholder	Auto-calc; methods (VNPAY/cash); receipt emailed.	Draft	Secure gateway integration.
10	FR-10	FR	The system shall let staff update vehicle status and report issues.	Fleet Mgmt	Medium	Business Rule	Status change (e.g., Maintenance); notify Admin; photos required.	Draft	Min 3-day maintenance.
11	FR-11	FR	The system shall support escalation for violations/lates.	Compliance	Medium	Stakeholder	Auto-flag after 3 contacts; mark Violated; notify Admin.	Draft	Penalty calc applied.
12	FR-12	FR	The system shall provide Admin dashboards for monitoring.	Oversight	High	Business Rule	Real-time maps/reports; filters for stations/vehicles.	Draft	Refresh every 5 min.
13	FR-13	FR	The system shall allow Admin to manage users/staff (e.g., blacklist).	User Mgmt	Medium	Stakeholder	Edit profiles; performance metrics; changes audited.	Draft	Evidence required for bans.
14	FR-14	FR	The system shall generate reports with optional AI forecasts.	Reporting	Medium	Business Rule	Filtered exports (PDF/CSV); AI suggestions for demand.	Draft	Date/station filters.
15	FR-15	FR	The system shall enable Admin resource reallocation.	Oversight	Low	Stakeholder	Drag-drop interface; alerts sent; logs updated.	Draft	For vehicles/staff.
16	NFR-01	NFR	The system shall respond to actions within 2 seconds for 95% requests.	Performance	High	Supervisor	Measured under 100 users; load tests pass.	Draft	Stress test in week 8.
17	NFR-02	NFR	The system shall be available 99.5% during operating hours.	Reliability	High	Policy	Uptime logs ≥99.5%/month; fallback for outages.	Draft	Monitor with Vercel.
18	NFR-03	NFR	The system shall encrypt sensitive data with AES-256.	Security	High	Mentor	DB fields hashed/encrypted; audit confirms.	Approved	Covers passwords/docs.
19	NFR-04	NFR	The UI shall be mobile-responsive and support major browsers.	Usability	Medium	Supervisor	Tested on Chrome/Edge/mobile; no layout issues.	Draft	Use Bootstrap/React.

Entity ID	Entity Name	Attributes	PK	FK	Relationships	Description	
E-01	User	UserID:INT (PK), Name:NVARCHAR(100), DateOfBirth:DATE, Email:NVARCHAR(100) (Unique), F	UserID	–	1–N with Booking (as Customer/Staff)	Store system users	
E-02	Station	StationID:INT (PK), Name:NVARCHAR(100), Address:NVARCHAR(255), ContactNumber:NVARC	StationID	–	1–N with Vehicle, 1–N with Booking	Store rental stations	
E-03	Model	ModelID:INT (PK), Brand:NVARCHAR(50), ModelName:NVARCHAR(50), VehicleType:NVARC	ModelID	–	1–N with Vehicle	Store vehicle models	
E-04	Vehicle	VehicleID:INT (PK), ModelID:INT (FK), StationID:INT (FK), PlateNumber:NVARCHAR(20) (Unique)	VehicleID	ModelID → Model(ModelID), StationID → Station(StationID)	N–1 with Model, N–1 with Station	Store vehicles	
E-05	Booking	BookingID:INT (PK), UserID:INT (FK), VehicleID:INT (FK), StationID:INT (FK), StaffID:INT (FK), Sta	BookingID	UserID → User(UserID), StaffID → User(UserID), VehicleID → Vehicle(VehicleID)	N–1 with User (Customer/Staff), 1–N with Vehicle	Store booking details	
E-06	Deposit	DepositID:INT (PK), BookingID:INT (FK), Amount:DECIMAL(10,2), Status:NVARCHAR(20), Create	DepositID	BookingID → Booking(BookingID)	1–1 with Booking	Store deposits	
E-07	Contract	ContractID:INT (PK), BookingID:INT (FK), RenterSignature:NVARCHAR(255), StaffSignature:NVA	ContractID	BookingID → Booking(BookingID)	1–1 with Booking, 1–N with Vehicle	Store contracts	
E-08	VehicleCondition	ReportID:INT (PK), ContractID:INT (FK), VehicleID:INT (FK), StaffID:INT (FK), ReportTime:DATETI	ReportID	ContractID → Contract(ContractID), VehicleID → Vehicle(VehicleID)	N–1 with Contract, N–1 with Vehicle	Record vehicle condition before/after rental	
E-09	Feedback	FeedbackID:INT (PK), ContractID:INT (FK), UserID:INT (FK), Category:NVARCHAR(20), Stars:INT	FeedbackID	ContractID → Contract(ContractID), UserID → User(UserID)	N–1 with Contract, N–1 with User	Store ratings/feedback	
E-10	Complaint	ComplaintID:INT (PK), ContractID:INT (FK), UserID:INT (FK), StaffID:INT (FK), IssueDescription:N	ComplaintID	ContractID → Contract(ContractID), UserID → User(UserID)	N–1 with Contract, N–1 with User	Store complaint records	
E-11	Payment	PaymentID:INT (PK), BookingID:INT (FK), Method:NVARCHAR(20), Amount:DECIMAL(10,2), Paym	PaymentID	BookingID → Booking(BookingID)	N–1 with Booking	Store payments	
E-12	AuditLog	LogID:INT (PK), UserID:INT (FK), Action:NVARCHAR(255), Timestamp:DATETIME	LogID	UserID → User(UserID)	N–1 with User	Store user activity logs	

Resource ID	Type	Name / Title	Link (URL)	Owner / Contact	Notes
RS-01	Source Code Repo	GitHub Repository	<a href="https://github.com/group05/capstone-2025">https://github.com/group05/capstone-2025</a>	Student 1 (Hoang)	Main codebase, branch develop
RS-02	Documentation	Google Drive Docs	<a href="https://drive.google.com/drive/folder/xyz123">https://drive.google.com/drive/folder/xyz123</a>	Student 2 (Khoa)	Contains SRS, Design, User Manual
RS-03	Demo Website	Capstone Web App	<a href="https://demo.capstone2025.com">https://demo.capstone2025.com</a>	Student 4 (Huy)	Test account: user/demo123
RS-04	Dataset	Training Dataset	<a href="https://drive.google.com/file/dataset789">https://drive.google.com/file/dataset789</a>	Student 5 (Anh)	5,000 labeled images
RS-05	Presentation Slides	Google Slides	<a href="https://docs.google.com/presentation/abc456">https://docs.google.com/presentation/abc456</a>	Student 3 (Linh)	Final defense slides

Ref ID	Type	Title / Description	Link (URL)	Source / Author	Notes
REF-01	Research Paper	AI for Vocabulary Learning in Kids	<a href="https://doi.org/10.1016/j.chb.2024.107054">https://doi.org/10.1016/j.chb.2024.107054</a>	Elsevier – Computers in Human Behavior	Background study
REF-02	Standard	IEEE 830 – Software Requirements Specification	<a href="https://ieeexplore.ieee.org/document/727204">https://ieeexplore.ieee.org/document/727204</a>	IEEE	For SRS template
REF-03	Book	Software Engineering (Pressman, 9th Edition)	<a href="https://www.mheducation.com/">https://www.mheducation.com/...</a>	Roger S. Pressman	Theory reference
REF-04	Article	Gamification in E-Learning	<a href="https://edtechmagazine.com/article/2023...">https://edtechmagazine.com/article/2023...</a>	EdTech Magazine	Used in design rationale
REF-05	Documentation	Firebase Authentication Guide	<a href="https://firebase.google.com/docs/auth">https://firebase.google.com/docs/auth</a>	Google Developers	Implementation support



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