Varendra University

Department of Computer Science and Engineering

ASSIGNMENT

Course Code : **CSE 2201**

Course Title : **Software Engineering & System Analysis**

Submission Date : **5th November, 2025**

Assignment Title :
End-to-End Software Project Management Scheme for a Cross-Platform Student Productivity Mobile Application

Submitted By	Submitted To
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Signature of Teacher

Project Title:
StudyBuddy – A Mobile Learning Assistant App

❖ 1. Project Initiation

- **Goal:** Design and develop a full-featured, cross-platform mobile app on iOS & Android using React Native that helps university students advance their productivity by centralizing study schedules, progress tracking, and peer collaboration.

➢ Key Features & Functionalities (In Scope):

- **User Authentication:** Secure, seamless sign-on via email/password, Google, and University SSO (Critical Path).
- **Personal Dashboard:** An intuitive, at-a-glance view of the user's critical path items-upcoming exams, assignments, scheduled study sessions.
- **Smart Scheduler:** An AI-supported study planner, using the Pomodoro Technique to optimize time management.
- **Study Groups & Collaboration:** Functionality to create/join groups, share curated notes, and real-time in-app chat integration.
- **Progress Analytics:** Visual, data-driven reports in the form of charts/graphs on cumulative study hours and performance metrics by subject.
- **Resource Library:** Securely upload, store, and share university resources such as PDFs, flashcards, and verified past papers.
- **Push Notifications:** Timely reminders of scheduled tasks, group activity, and upcoming deadlines to ensure maximum task completion.

➢ Out of Scope (Initial Release - MVP Focus):

- Native Windows/macOS Desktop Application
- Complex Offline-first data synchronization.
- Advanced AI-driven tutoring/content generation. Subject to a future phase, Phase II.

➢ Stakeholders and Roles:

Stakeholder	Role	Key Responsibilities & Engagement
Project Sponsor	University Authority	**High-level accountability** for project funding, strategic alignment with university goals, and scope sign-off.
Project Manager	"X" (Student Lead)	**End-to-end project oversight:** Resource allocation, risk mitigation, schedule adherence, and all external reporting.
Development Team	5 Student Developers	**Core execution:** Feature development, technical implementation, unit/integration testing, and deployment support.
UI/UX Designer	Team Member	**User experience excellence:** Wireframing, prototyping, user flow definition, and accessibility compliance.
End Users	University Students	**Critical feedback loop:** Alpha/Beta testing, validating user stories, and providing post-launch utilization data.
IT Admin	University IT Dept.	**Technical gatekeeper:** Providing API access for SSO integration and ensuring security/data compliance.

➢ Project Charter:

1. **Project Title:** StudyBuddy Mobile App
2. **Objective:** The objective will be to deliver a user-centric, highly scalable mobile application that is proven to measurably improve student productivity and peer-to-peer collaboration by May 30, 2026.
3. **Constraints (The Triple Constraint + Team):**
    - **Budget:** 480,000 BDT - Comprehensive funding covering stipends to cloud infrastructure and quality assurance.

- **Timeline:** 6 months, from December 1, 2025, through May 30, 2026.
- **Team:** 5 highly motivated, part-time student developers (15 hours/week commitment).
- **Technology:** Cross-platform requirement using React Native.

4. **Assumptions:**
   - Prompt access to the necessary university SSO API documentation and sandboxes.
   - The original cloud architecture at Firebase/AWS will scale to support up to 1000 users on standard/free tiers, before the requirement for major paid upgrades.
   - Team members reliably devote the agreed-upon 15 hours/week to the project.
5. **Success Indication-Observation Criteria :**
   - **User Adoption:** Achieve a baseline of 500+ active, unique users within the first academic semester post-launch.
   - **Quality Score:** Keep an average rating of 4.0+ in the stores on both platforms.
   - **Usability:** Obtain a 90 percent completion rate for major features, such as scheduling a study session or creating a group.
   - **Project Delivery:** On-time and strictly within the 480,000 BDT budget.

❖ 2. Project Planning

➢ Work Breakdown Structure (WBS):

The WBS defines all project work necessary to reach the objective, logically structured.

1.0 Project Initiation (PM Focus):
1.1 Scope Definition & Sign-off
1.2 Stakeholder Analysis & Communication Plan
1.3 Project Charter Formalization

2.0 Requirements & Design (UX/Design Focus):
2.1 Detailed User Stories & Acceptance Criteria
2.2 Wireframes & Prototypes Comprehensive UI/UX (Figma)
2.3 Robust Database Schema Design & Normalization

2.4 API Design & Technical Specification Documentation

3.0 Development: Coding & Integration Focus:

3.1 Backend/Cloud Infrastructure Setup & Configuration
3.2 Frontend, React Native - Core Component Library Development
3.3 Secure Authentication & SSO Module Implementation
3.4 Smart Scheduler & Notification Engine Development
3.5 Implementation of study groups, chat, and resource sharing
3.6 Progress Analytics Dashboard & Reporting Module
3.7 Security Audits (Input Validation, API Keys)

4.0 Testing & Quality Assurance (QA Focus):

4.1 Unit Testing (Code Level Coverage > 80%)
4.2 Integration Testing: API & Database Interoperability
4.3 User Acceptance Testing - UAT with target users (beta group)
4.4 Performance & Load Testing

5.0 Deployment & Closure (Final PM Phase):

5.1 App Store & Google Play Submission & Approval
5.2 Initial User Onboarding & Support Documentation
5.3 Comprehensive Project Report, Handoff, and Lessons Learned

➢ Project Schedule (Gantt Chart)

The schedule is based on a **Scrum methodology** but defines the macro-level phase durations.

Task (WBS Link)	Duration	Start Date	End Date	Dependencies (Predecessor)
1.0 Project Initiation	1 week	Dec 1	Dec 7	—
2.0 Requirements & Design	3 weeks	Dec 8	Dec 28	**1.0**
3.1 Backend Setup	2 weeks	Dec 29	Jan 11	**2.0**
3.3 Authentication Module	2 weeks	Jan 12	Jan 25	**3.1 (High Priority)**
3.2 Frontend Core Dev	6 weeks	Jan 12	Feb 22	**2.0 (Parallel to Backend)**
3.4 Scheduler Engine	3 weeks	Jan 26	Feb 15	**3.1**
3.5 Study Groups	3 weeks	Feb 16	Mar 8	**3.1**

3.6 Analytics Dashboard	2 weeks	Mar 9	Mar 22	**3.1**
4.0 Testing (All Phases)	4 weeks	Mar 23	Apr 19	**3.0 (Development Complete)**
5.1 Deployment	2 weeks	Apr 20	May 3	**4.0**
5.3 Closure & Report	3 weeks	May 4	May 30	**5.1**

Critical Path: 1.0 Initiation → 2.0 Design → 3.1 Backend Setup → 3.3/3.4 Development → 4.0 Testing → 5.1 Deployment. Testing is the longest post-development phase and a critical constraint.

- **2.3 Budget Allocation (Total: 480,000 BDT)**

Category	Item	Rationale	Cost (BDT)
Human Resources	Developer Stipends (5 × 6 months)	Competitive compensation (approx. 6,000 BDT/member/month) to ensure retention and high commitment.	**180,000**
	Project Manager Stipend (6 months)	Higher stipend for leadership, risk, and administrative overhead (approx. 10,000 BDT/month).	**60,000**
Cloud & Tools	Firebase (Premium Auth/Storage/DB)	Scalable, pay-as-you-go hosting, crucial for high-traffic features like real-time chat.	**75,000**
	AWS S3/Cloudflare (CDN/Storage)	Offload static content and files from Firebase to optimize costs and global delivery.	**20,000**
	Figma Pro/JIRA/Confluence	Professional licenses for design collaboration and rigorous issue tracking/documentation.	**15,000**
	App Store/Google Play Fees	Annual registration and console fees for submission compliance.	**10,000**

Quality Assurance (QA)	Test Devices (2 iOS/2 Android)	Purchase/lease of diverse test devices to ensure cross-device compatibility and minimize bugs.	**80,000**
Miscellaneous	Domain, SSL, Initial Marketing Campaign	Costs for a professional domain and a small, targeted digital launch campaign.	**40,000**
Contingency Reserve	5% Buffer	Reserve for unforeseen technical issues or critical scope changes.	**10,000**
Total Project Budget			**480,000 BDT**

❖ 3. Team Formation

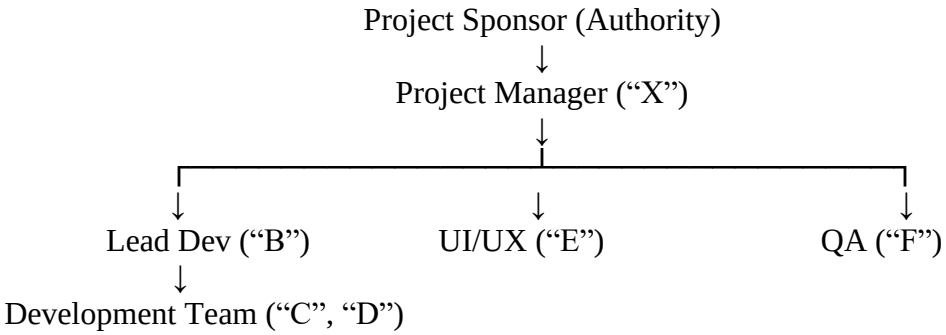
➢ Roles and Expert Responsibilities

The team utilizes the available resources by assigning clear, complementary roles.

Role	Member	Expert Responsibilities
Project Manager	"A"	**Project control:** Scheduling, financial tracking, external communication, and risk mitigation.
Lead Developer	"B"	**Technical Authority:** Defines architecture, code standards, manages CI/CD pipeline, and performs code reviews.
Frontend Developer	"C"	**User Interface (UI) Execution:** Implements all React Native components and state management.
Backend Developer	"D"	**System Logic:** Manages Firebase services, develops RESTful APIs, and ensures data security/integrity.
UI/UX Designer	"E"	**Design Authority:** User research, interactive prototyping, and delivering final design specifications.
QA Tester (Integrated)	"F"	**Quality Control:** Creates and executes test plans, manages bug tickets, and facilitates UAT.

➢ Organizational Chart

The chart illustrates a flat, project-focused structure ensuring efficient communication channels directly to the Project Manager.

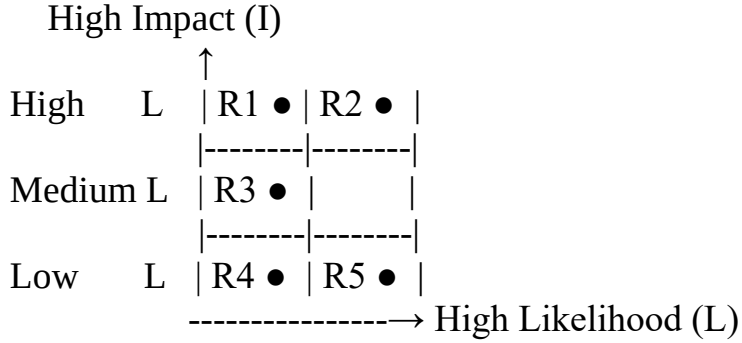


❖ 4. Risk Management

- **Risk Identification and Prioritization:** We identify key risks across the project lifecycle and assess their potential impact.

Risk ID	Risk Description	Category	Likelihood (L)	Impact (I)	Priority
R1	SSO Integration Failure/Delays	Technical	Medium	High	High
R2	Team Member Attrition	Resource	High	High	Critical
R3	Scope Creep (Feature Requests)	Management	Medium	Medium	Medium
R4	App Store Policy Rejection	Compliance	Low	High	High
R5	Cloud Service Cost Overrun	Financial	Low	Medium	Low

- **Risk Probability-Impact Matrix:** This visual tool focuses attention on high-priority risks (High Likelihood/High Impact).



Focus: R1 & R2 require immediate and proactive mitigation strategies.

- **Risk Mitigation Plan: Proactive Response:**

Risk	Mitigation Strategy (Proactive)	Owner	Contingency (Reactive)
R1	Initiate SSO API handshake/sandbox testing in Sprint 1 (Dec 1-14).	"B"	Develop a robust email/social auth fallback system and defer SSO integration to Phase II if necessary.
R2	Mandate cross-training on key components and conduct weekly psychological safety check-ins.	"X"	Maintain an updated list of pre-vetted backup student developers for rapid recruitment and onboarding (funded by Contingency Reserve).
R3	Establish a formal Change Control Board (CCB) that must approve any new requirement after Week 3.	"X"	De-prioritize the lowest-value existing feature to accommodate any approved change within the timeline.
R4	Dedicated review of App Store Guidelines by "E" / "F" in the design phase.	"E"	Budget a 2-week buffer in the schedule to address and re-submit the app after rejection.
R5	Set up real-time billing alerts on Firebase/AWS dashboards and review expenses weekly.	"X"	Pivot to the standard (lower-cost) Firebase database structure instead of specialized cloud functions if costs spike.

❖ 5. Development Methodology

- **Methodology: Agile (Scrum)**

Justification for Choosing Agile (Scrum)

- **Customer-Centric:** The project fundamentally relies on University students' (End User) feedback in order to confirm some features like Smart Scheduler and Study Groups. Scrum supports this with frequent Sprint Reviews.

- **Adaptability:** With the part-time team and the very real likelihood that the initial requirements will evolve-as indeed may happen within a university IT-bound context-iterative and flexibility are imperative.
- **Early Value Delivery:** Agile prioritizes giving an MVP out as quickly as possible to ensure we launch with core features, iterate, and capture maximum value within the 6-month constraint..

- **Sprint Breakdown (6 x 2-week Sprints):**
  The project is structured into six focused, two-week sprints to maintain velocity and deliver continuous integration.

Sprint	Dates	Goal	Key Deliverables & Focus
Sprint 1	Dec 29 – Jan 11	Foundation	**Secure Login/Registration**, Dashboard UI Skeleton, Initial Backend Setup.
Sprint 2	Jan 12 – Jan 25	Core Engine I	**Smart Scheduler** functionality, Push Notification service integration.
Sprint 3	Jan 26 – Feb 8	Collaboration	**Study Group creation**, Real-time chat basic implementation.
Sprint 4	Feb 9 – Feb 22	Resource & Data	**Resource Library** upload/view functionality, Basic Progress Analytics data collection.
Sprint 5	Feb 23 – Mar 8	Insights & Polish	**Visual Analytics Reports**, Final UI/UX review and bug backlog clearance.
Sprint 6	Mar 9 – Mar 22	Final QA/UAT	End-to-end testing, final security review, and User Acceptance Testing sign-off.

Daily Standups: A daily quick sync, 15 minutes via Discord, covers 'What was done yesterday,' 'What will be done today,' and 'Blockers/Issues.'

Sprint Reviews: Formal presentation and demonstration of the working software, at the end of each sprint, with the Project Sponsor and a small group of end-users.

❖ 6. Conclusion

The StudyBuddy project is based on a very strong, professional management scheme. The deliberate choice of the Agile (Scrum) methodology, combined with a realistic budget of BDT 480,000 and a proactive risk mitigation plan, promises a high probability of success.

This strategic approach ensures:

- Measurable success is defined by clear KPIs: 500+ active users, 4.0+ ratings.
- Resource Optimization: Efficient use of the budget of 480,000 BDT by the 5-member team.
- High Quality: Through integrated QA by Riley and frequent user feedback loops.

This scheme meets not only the academic requirements but also functions as a deployable professional-grade template to deliver high-impact mobile products on time and within budget.