ICT2113 - Software Modeling & Analysis

Team - 0597R

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Project Specification Document - Student Feedback Review System

Version: v1
Date: 30 January 2026
Prepared by: Project Lead Team (0597R)
Organisation: EduTech Institute Singapore (ETIS)

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1. Declarations

1.1. Declaration on Use of AI Tools
This project was completed with the support of AI-based tools for language refinement, idea clarification, and structural guidance. All analysis, design decisions, and final content were done and validated by the project team, who take full responsibility for the work submitted.

1.2. Declaration on Plagiarism
This project is the original work of the project team. Any external sources referenced have been appropriately cited, and no part of this work has been copied or submitted for assessment elsewhere without proper acknowledgement.

2. Company Context

Company Name: EduTech Institute Singapore (ETIS)

Industry Sector: Higher Education & Educational Technology

Core Business

EduTech Institute Singapore operates as a private higher education institution offering diploma and degree programs across three key disciplines: technology, business, and design. Established in 2008, ETIS has grown to serve approximately 5,000 students annually across multiple campuses throughout Singapore. As a SkillsFuture-accredited institution, ETIS maintains strong industry partnerships with over 80 Singapore-based technology companies, providing students with internship placements, industry mentorships, and employment pathways upon graduation.

Current State & Strategic Context

For the past 8 years, ETIS has operated a manual paper-based student feedback collection system. While this system served adequately during our early growth phase, it has become increasingly inefficient and time-consuming to analyze as our student population has expanded from 1,200 to 5,000 students.

Project Goals for ETIS

Through this digital transformation, we aim to reduce feedback processing time from 3 weeks to real-time availability, increase student participation rates by 37% through convenient digital submission interfaces, enable evidence-based teaching improvements through automated sentiment analysis insights, achieve full compliance with Personal Data Protection Act (PDPA) regulations for student data protection, and establish scalable infrastructure that supports our institutional growth trajectory without proportional increases in administrative overhead.

3. Project Overview

3.1. Project Name and Context

Project Name: Student Feedback Review System

Body of Knowledge & Context

Educational research consistently demonstrates that systematic, timely feedback collection is critical for teaching quality improvement and student learning outcomes. Studies show that faculty who receive actionable feedback mid-semester can adjust their teaching methods, clarify confusing concepts, and modify pacing to better match student comprehension, resulting in measurable improvements in student satisfaction and learning achievement.

However, traditional paper-based feedback systems create significant barriers to realizing these benefits:

1. **Time Lag Problem**: Manual data entry and analysis delays insights by 2-3 weeks, making mid-course corrections impossible.
2. **Participation Rate Challenges**: Physical form distribution during class time achieves only 60-65% completion rates at ETIS, often because absent students never receive forms, or students skip questions they find unclear or repetitive.
3. **Analysis Limitations**: Manual review cannot identify sentiment patterns across thousands of free-text responses, meaning valuable qualitative insights about teaching effectiveness remain buried in stacks of paper forms.

4. **Resource Inefficiency**: Administrative staff at ETIS spend over 200 hours per semester on manual data entry, compilation, and report generation; time that could be redirected to direct student support activities.

Educational data mining research has shown that institutions leveraging automated feedback systems can discover useful patterns and apply them to improve overall quality of education. Analyzing student feedback data effectively helps institutions enhance students' learning capabilities in the classroom and identify systemic improvements needed at the course, program, and institutional levels.

3.2. Project Goals

Goal 1: Improve Feedback Participation Rate

Objective	Increase student feedback completion rate from the current baseline of 62% to a target minimum of 85% for all courses within two semesters of system deployment.
Performance Metrics	Tracked through system analytics comparing the number of submitted feedback surveys against the number of enrolled students in each course. Dashboard will display participation rates by course, department, and semester with trend visualization.
Feasibility	Comparable higher education institutions in Singapore using digital feedback systems report participation rates between 80-92%.
Strategic Rationale	Higher participation rates yield more representative data for teaching quality improvements and ensure feedback is statistically valid for faculty performance evaluations (ETIS policy requires minimum 70% response rate).
Target Timeline	Achieve 85% target by Semester 2, 2026.

Goal 2: Reduce Feedback Processing Time

Objective	Eliminate manual data entry delays and provide faculty with access to their feedback results within 24 hours of the survey submission deadline (compared to current 2-3 week delay).
Performance Metrics	Time measured from survey close timestamp to when faculty can access their results dashboard. System logs will track processing duration including data validation, sentiment analysis execution, and report generation.
Feasibility	Automated digital systems eliminate all manual processing steps. The 24-hour buffer allows for: automated data validation, natural language processing for sentiment analysis, and statistical calculation of rating distributions and comparisons
Strategic Rationale	Timely feedback is critical for enabling mid-semester teaching adjustments. Currently, by the time faculty receive feedback, opportunities for course corrections have passed. With 24-hour turnaround, feedback collected early can inform final weeks of instruction, exam preparation support, and immediate improvements for the next semester.
Target Timeline	Operational from the first semester of deployment.

Goal 3: Enable Sentiment-Based Insights Through Automated Analysis

Objective	Automatically classify open-ended feedback comments into positive, neutral, or negative sentiment categories using natural language processing algorithms, achieving a minimum accuracy of 85% validated against human-labeled reference data.
Performance Metrics	1. Sentiment classification accuracy tested against a gold-standard dataset of 500+ manually labeled student feedback comments 2. System generates sentiment distribution reports showing percentage breakdown (e.g., 65% positive, 25% neutral, 10% negative)
Feasibility	Modern natural language processing libraries (NLTK, TextBlob, VADER sentiment analyzer) achieve 85-92% accuracy on educational feedback when trained on domain-specific data. Vendors should have experience implementing sentiment analysis for customer feedback systems.
Strategic Rationale	Sentiment analysis surfaces patterns that are invisible in manual review of thousands of text comments. Faculty can immediately identify what aspects of their teaching resonate positively with students and which areas need attention, without reading every individual comment.
Target Timeline	Sentiment analysis engine must be operational by system launch.

Goal 4: Establish Scalable Data Infrastructure

Objective	Design database schema and application architecture to support 1,000 concurrent students without performance degradation below acceptable thresholds.
Performance Metrics	1. Database queries execute in <500ms for 90% of operations 2. Sentiment analysis processing completes within 2 hours for 10,000 student text responses 3. System uptime maintained at 99.5% during peak feedback collection periods
Feasibility	Database optimization through proper indexing, query optimization, and caching strategies proven in similar educational technology deployments.
Strategic Rationale	ETIS's strategic plan targets enrollment growth to 8,000 students by 2030. Building scalability into the system architecture from the start prevents costly re-platforming in 3-4 years and ensures the technology investment delivers long-term value.
Target Timeline	Architecture validated during User Acceptance Testing through comprehensive performance and load testing.

3.3. Stakeholders and Users

This section identifies all individuals and groups with vested interest in the project's success, their roles, responsibilities, and how they will interact with the system.

Primary Stakeholders (Decision Makers & Sponsors)

Board of Directors	
Name	Ms. Lim Hwee Hua,Mr. Peter Ho and Tan Eng Chye
Role	Governance body providing strategic direction and accountability
Authority	- Approve or reject major scope changes and final project outcome report
Responsibilities	- Ensure project aligns with institutional strategy and enrollment growth objectives

	- Hold CIO accountable for project delivery and ROI realization - Provide governance oversight on significant risks or issues escalated by CIO
Engagement	Quarterly updates via CIO, Final project outcome report and presentation

Chief Information Officer (CIO)	
Name	Mr. Robert Tan
Role	Delegated executive authority from Board to champion and execute digital transformation initiative; primary ETIS decision-maker for vendor engagement
Responsibilities	- Translate Board's strategic vision into detailed project requirements - Ensure project delivers business value aligned with institutional strategy - Report project status, risks, and issues to Board
Engagement	Bi-weekly steering committee meetings, Final acceptance sign-off

Primary Users (Daily System Interaction)

Academic Administrators	
System Role	Administrator (full system access)
Responsibilities	- Create and manage user accounts (students, faculty, admins) - Create questionnaires, schedule and deploy surveys - Generate institutional-level reports and analytics

Faculty Members	
System Role	Faculty
Responsibilities	- View personalized feedback dashboard for courses taught - Review rating distributions and sentiment analysis of comments

Students	
System Role	Student
Responsibilities	- Access list of courses/faculty eligible for feedback - Complete and submit feedback surveys

Secondary Stakeholders (Indirect Beneficiaries)

Department Heads & Program Directors	
Interest	Monitor teaching quality across their departments, identify faculty development needs
Responsibilities	Trend analysis, resource allocation decisions, faculty development program design

IT Support	
Interest	Provide technical support to end users, maintain system availability
Responsibilities	Password resets, user issue resolution, system health monitoring, escalation to vendor

4. Business Requirements

4.1. Business Operations Assumptions

The following assumptions define the operational context within which the Student Feedback Review System will be deployed and used:

1. ETIS already maintains authoritative records of students, faculty, subjects, and classes through existing academic administration processes.

2. All users (administrators, faculty, and students) are members of ETIS and are provisioned system access based on their institutional role.

3. Subject-class structures, faculty assignments, and student enrolments are determined prior to the start of each academic term and remain stable during the feedback collection period.

4. Feedback collection is conducted on a per-term basis and applies uniformly across all subjects and classes within the institution.

5. The feedback system is intended solely for academic quality assurance and teaching improvement purposes and is not used for automated grading, disciplinary actions, or performance appraisal decisions without additional institutional review processes.

4.2. Business Operations Requirements level 0

Please refer to the appendix Figure 1 for the requirements tree and Figure 2 for use case diagram

BOR-01	Role-based Access Control
Description	Authorised users shall be granted access to system functions and information according to their assigned roles.
Business Rules	- User identities shall be synchronized with the existing institutional database to ensure data integrity. - Users shall be assigned one or more predefined roles (e.g. Student, Faculty, Administrator). - Users shall only be permitted to perform actions and access information allowed by their assigned roles. - Academic Administrators shall be responsible for managing role assignments. - Academic Administrators shall be able to create, update, and deactivate other users' account details
Constraints	- Role definitions shall comply with institutional governance and data protection policies. - Role assignments shall remain consistent across all system functions.
Priority	Essential

BOR-02	Feedback Lifecycle Management
Description	Administrators shall be able to define and manage the availability period which the feedback submission is permitted. Administrators shall also be able to define the qualitative and quantitative feedback questions required for feedback collection
Business Rules	- Feedback can only be submitted within the active feedback period - Feedback periods apply uniformly across all subjects and classes within an academic term

	- Administrators shall be able to generate aggregated analysis reports of feedback results after the feedback period has ended.
Constraints	- Feedback periods must have a defined start and end date - At most one feedback period shall be active per academic term - Feedback questions cannot be modified or deleted once the feedback period has started to ensure data consistency. - Once a feedback period is closed, submissions are permanently disabled for that feedback form
Priority	Essential

4.3. Business Operations Requirements level 1

BOR-01.1	Self-Service Account Access
Description	Authorised users shall be able to manage their own authentication credentials and basic account access details without administrative intervention
Business Rules	- Users shall be able to update their own passwords - Users shall be required to verify their identity before credential changes are applied - Password updates shall comply with institutional security policies
Constraints	- Users shall not be permitted to modify their assigned roles or access privileges through self-service functions - Credential updates shall adhere to institutional password complexity and expiry rules
Priority	Essential

BOR-01.2	Administrative Audit Log
Description	Academic administrators shall be able to review audit records of administrative actions performed on user accounts and access controls
Business Rules	- Administrative actions performed by Academic Administrators shall be recorded. - Logged administrative actions shall include changes to user accounts, roles, and access permissions. - Audit records shall include the administrator identity, timestamp, and action performed. - Only Academic Administrators shall be permitted to access audit logs
Constraints	- Audit records shall be protected against unauthorised modification. - Audit log retention shall comply with institutional and regulatory requirements.
Priority	Essential

BOR-02.1	Feedback Submission By Students
Description	Students should be able to submit feedback for faculty based on the subjects and classes assigned to them during an active feedback period
Business Rules	- Students are only able to submit feedback for the subject-class pairing they have been assigned to

	- Students may submit feedback only once per subject-class pairing per feedback cycle - Feedback must be associated with the faculty assigned to the selected subject-class pairing
Constraints	- Feedback submission is only allowed during the feedback period defined by the administrators - Feedback submission shall be permitted only if all mandatory questions are completed and responses passes content validation (e.g profanity validation checks)
Priority	Essential

BOR-02.2	Faculty Feedback Access
Description	Faculty shall be able to view aggregated feedback results for their assigned subjects and classes after the feedback period has ended. Faculty shall also be able to view an analysed summary of their feedback.
Business Rules	- Faculty shall only have access to feedback associated with subjects and classes to which they are assigned. - Individual student identities shall not be disclosed to faculty. - Faculty shall be able to view an analysed summary of aggregated feedback associated with their assignments, including overall sentiment and commonly occurring feedback themes.
Constraints	- Feedback results are not accessible to faculty during the active feedback period - Faculty cannot modify or delete submitted feedback
Priority	Essential

4.4. External Business Systems and Regulatory Considerations

The Student Feedback Review System operates within ETIS's broader institutional and regulatory environment and must align with the following external systems and regulations:

External Business Systems:
- The system assumes integration with ETIS's existing academic administration or student information systems for reference data such as student enrolments, faculty assignments, subjects, and classes.

Government and Regulatory Compliance:
- The system must comply with Singapore's Personal Data Protection Act (PDPA), ensuring that personal data is collected, used, and disclosed only for legitimate educational purposes.

- Feedback records must be retained and managed in accordance with ETIS's data retention policies and applicable accreditation or audit requirements.

Primary Business System Alignment:
- The Student Feedback Review System is classified as an institutional academic feedback management system, supporting ETIS's strategic objectives of teaching quality enhancement, data-driven decision-making, and scalable digital operations.

Details of key system entities and data attributes are documented in Appendix Section 9.5 (Data Dictionary) to support clarity, data governance, and regulatory compliance.

5. Technical Requirements

Please refer to the appendix Figure 1 for the requirements tree

5.1. Client server architecture level 0

In the student feedback review system, the end of each semester when evaluations of instructors and classes would be the peak period when the system would handle the highest volume of traffic where many thousands of students would log in simultaneously to submit their feedback.

ITR-01	Cloud Data Infrastructure
Clause	The system shall implement a 3 tier client server architecture with a cloud hosted database and server.
Description	**Hardware:** The physical infrastructure would be supported using Amazon cloud services such as Amazon Aurora Serverless v2 a relational database service and Amazon's AWS EC2 cloud infrastructure the platform would then be ideal to accommodate the seasonal traffic spikes in feedback submissions. For the system it would also be supported by a variety of devices both on Android, IOS and Windows 10+ desktop or laptop to access the feedback system where students are then able to access the feedback form and submit, the faculty is able to view their feedback and finally administrative users are able to access the system's management tools.

5.2. Operational process level 1

ITR-01.1	Hosting and Cloud Infrastructure Operations
Clause	The system shall be deployed within Singapore and hosted on AWS EC2 instances and also using Amazon Aurora Serverless v2 database with 99.9% uptime
Description	To ensure high availability, the entire infrastructure would be provisioned within the Singapore region where 99.9% uptime is maintained through a combination of AWS EC2's automated failure detection and recovery and Amazon's Aurora Serverless v2's distributed, fault tolerant storage system. This setup ensures the system remains operational for students and faculty across various devices.

ITR-01.2	Expected performance standards
Clause	The system shall maintain a sub 2 second response time for 95% of all transactions made during the peak periods and would support concurrent loads up to 10 000 concurrent students
Description	Amazon Aurora Serverless v2 the database is designed with vertical scaling in place where after detecting large traffic spikes it would automatically adjust more CPU and RAM of the database instance thus handling the increased CRUD requests. Moreover, the database would shrink to its minimum cost automatically during lull periods such as student's semester breaks. Similarly, AWS EC2's auto scaling feature would also help manage the load during high traffic periods and also shrink during lull periods. This

	combined elasticity then ensures smooth and fluid interaction with the feedback form even during peak periods.

ITR-01.3	External data integration
Clause	The system shall integrate data from external databases such as the the registrar and HR database
Description	API interfaces are used to synchronise the feedback database system with external databases. Through external interfaces, student profiles are fetched from the registrar database and faculty profiles from the HR database. This then ensures that only currently enrolled students can access the feedback forms and that faculty members are always up to date preventing feedback to be sent to inactive or retired faculty members

ITR-01.4	Data security and encryption management
Clause	The system shall implement a multi layer encryption and network isolation protocols that would ensure confidentiality and integrity of faculty and student data
Description	The system utilises Amazon's AWS key management service (KMS) that would provide AES-256 encryption of data within Amazon's Aurora serverless v2 database. The data transit between the device(Andriod,IOS, window) that is used to submit the feedback and the AWS EC2 server will be encrypted using TLS 1.2+ protocol for HTTPS. The database is also deployed within its private subnet in AWS virtual private cloud (VPC) thus isolating it and making it inaccessible from the public internet and only reached through authorised application services.

ITR-01.5	Managed Maintenance and Automated Backups
Clause	The system shall utilise the automated cloud maintenance window and manage backup service thus ensuring continuous operation without any manual hardware intervention.
Description	The database maintenance is handled by Amazon Aurora Serverless v2 which will perform daily point in time backups within a pre defined maintenance window. AWS EC2 maintenance will be managed using Amazon Machine Images (AMI), allowing updates and seamless server replacements through the auto scaling feature.

ITR-01.6	Automated Data Migration
Clause	The system shall provide capability of migration by utilising automated migration tools that ensures secure transition of institutional data into the AWS cloud environment with zero data loss.
Description	AWS Database Migration Service (DMS) is used during the migration process to help perform secure, low latency transfer of student and faculty records between different cloud databases. The process also ensures that all database tables are accurately mapped without disrupting existing administrative processes and thus preventing operational downtime during the transition.

6. Financial Requirements

6.1. Cost Structure Breakdown

Cost Category	Description	Estimated Cost (SGD)
Requirements & Design	Requirements analysis, system design, database schema, UI wireframes	S$30,000
Software Development	Backend, frontend, feature implementation	S$95,000
Data & Analytics	Sentiment analysis logic, summary generation, testing with sample datasets	S$35,000
Testing & Quality Assurance	Unit testing, system testing, bug fixing, UAT support	S$25,000
Deployment & Setup	Cloud server configuration, database setup, deployment support	S$15,000
Documentation & Training	User manuals, admin guide, handover documentation	S$10,000
Contingency	Risk buffer for scope refinement, minor changes and maintenance	S$21,000
Total Estimated Budget		**S$231,000**

6.2. Cost Redaction Notice

The detailed cost breakdown and total project budget presented in this Project Specification are intended for ETIS internal planning and approval purposes only. In accordance with the tendering process, **all financial figures shall be redacted in the released version of the Project Specification** provided to external vendors, while milestone-based payment percentages may be retained for contractual reference.

6.3. Funding Sources

The project shall be fully funded by the customer organization (e.g., educational institution or academic department) as part of its IT systems enhancement and digital transformation budget. No external sponsorship, subscription-based funding, or third-party monetization is planned for the initial release of the system.

6.4. Payment Schedule

Payments to the vendor shall be made in phased installments, tied to clearly defined delivery milestones to reduce financial and project risk.

Payment Phase	Milestone Description	Percentage
Phase 1	Approval of Project Specification (PS), confirmation of project scope, stakeholder identification, and approval of high-level system architecture	15%
Phase 2	Completion and approval of the requirements analysis and establishment of an approved requirements baseline document	15%
Phase 3	Completion and approval of system design, including architecture	25%

	design, database design, security design, and user interface design	
Phase 4	Completion of system implementation for Admin, Student, and Faculty modules, with successful demonstration of core system workflows	15%
Phase 5	Successful completion of system testing and User Acceptance Testing (UAT), with stakeholder approval for deployment	10%
Phase 6	Final system release, deployment-ready build, completed documentation, system demonstration, and formal project handover	20%
Total		**100%**

6.5. Post-Deployment Maintenance and Monitoring

After deployment, the system will require ongoing maintenance and monitoring to ensure reliability, security, and performance during operational use.

Post-deployment activities include:

- Bug fixes and corrective maintenance
- Minor system updates and compatibility adjustments
- System performance and uptime monitoring during peak periods
- Application of security patches to maintain PDPA compliance

Maintenance and monitoring costs are not included in the initial development budget. These costs shall be covered under a separate support arrangement between the customer and the vendor. The estimated annual maintenance cost is expected to be approximately 10-15% of the initial development cost, in line with industry practice.

7. Project Delivery Requirements

7.1. Delivery Phases

The project delivery is managed through a structured timeline, with clearly defined milestones and acceptance points. Each milestone includes the allocated time for verification, review and acceptance. Please refer to the appendix Figure 3 for the project gantt chart.

Phases	Description
Phase 1: Project Initiation 2 weeks	Establish a stable project baseline and expectations. Confirm project objectives, scope and constraints. Review and approve project specification. Identify stakeholders and responsibilities. Create a high level architecture overview. Deliverables: - Approved project specification - Stakeholder list for all modules - High level architecture diagrams

Phase 2: **System Analysis** 3 weeks	Ensure requirements are complete, feasible and traceable. Translate requirements into structured use cases. Define workflows and interactions. Identify data requirements and constraints. Resolve ambiguities and inconsistencies. Deliverables: - Detailed requirements document - System workflow descriptions - Prioritised requirements list
Phase 3: **System Design** 3 weeks	Translate analysed requirements into system design. Define system architecture and component structure. Design database schema. Design user interface and navigation flows. Define security and access control. Decide on test strategies aligned with design. Deliverables: - System architecture and design documentation - Database design - User interface wireframes or mockups - Test strategies and verification plan
Phase 4: **Implementation** 4 weeks	Develop the system according to the approved design and specifications. Implement modules. Implement authentication and access control. Develop workflows for feedback submission and management. Internal verification during development. Record and resolve implementation. defects Deliverables: - Implemented system components - Source code repository - Internal verification and defect records
Phase 5: **System Testing** 3 weeks	Verify and validate the system to ensure it meets expectations. Conduct unit, integration and system testing. Perform user acceptance testing against acceptance criteria. Validate data correctness, usability and security. Resolve identified defects and conduct regression testing. Deliverables: - Test cases and test results - Defect and resolution reports - User acceptance testing outcomes
Phase 6: **Deployment** 4 weeks	Deliver the final system for deployment and project closure. Prepare deployment ready system build. Complete system and user documentation. Conduct final system demonstration. Perform soft launch in a controlled environment. Obtain final stakeholder sign off Deliverables: - Final deployment ready system Complete documentation with user guides and test reports - Final demonstration evidence - Formal sign off records Post Deployment Maintenance (Ensure system stability): - Monitor system usage, errors and performance during operation - Apply configuration adjustments if required - Post deployment hotfix logs

7.2. Verification, Testing and Acceptance Milestones

Verification ensures that deliverables meet the specifications while acceptance confirms that stakeholders agree the system is fit for the next phase. Verification and acceptance activities are conducted at the end of each milestone.

Milestone	Verification
M1	Verification: - Project specification reviewed for clarity and scope completeness - Architecture overview reviewed for technical consistency Acceptance: - Project scope defined clearly - Architecture overview approved
M2	Verification: - Requirements consistency check, no contradictions - Traceability plan established Acceptance: - Approved requirements baseline document
M3	Verification: - Design walkthrough against requirements - Database and security design reviewed - Test strategy confirmed Acceptance: - Design review sign-off - Approved and updated design documentation
M4	Verification: - Feature checklist completed - Internal verification results recorded - No unresolved high severity defects and updated defect log Acceptance: - Core workflow demonstration execute correctly without critical errors
M5	Verification: - System test pass rate meets target of 99% - Regression tests completed after fixes Acceptance: - UAT results and stakeholder deployment approved
M6	- Deployment test and stability checks - Documentation completeness review Acceptance: - Project deliverables are formally handed over - Final handover checklist and final sign off

7.3. Progress Reporting

Project progress shall be tracked and reported throughout the project lifecycle to ensure transparency and timely issue resolution. Progress reporting mechanisms include:

- Regular progress updates (e.g. weekly) summarising completed tasks, upcoming activities, and blockers

- Milestone status reporting, indicating verification and acceptance outcomes at the end of each milestone

- Issue and risk tracking, with severity, ownership, and mitigation actions recorded

- Stakeholder review meetings conducted at key milestones to confirm readiness to proceed

Progress is assessed based on milestone completion status, verification results, defect trends, and adherence to the approved project schedule.

8. Final Project Sign-off

This section confirms that the Project Specification for the Student Feedback Review System has been reviewed and validated for release.

By signing below, the Project Lead confirms that:
- The Project Specification is complete and internally validated
- Requirements and acceptance criteria are clearly defined for vendor response
- The document is approved for issue as part of the tender / bidding process
- This sign-off does not constitute system acceptance or project closure

Russell Wong Dong Yi	Russell Wong Dong Yi	30/1/2026
Name (Project Lead)	Signature	Date

The following stakeholders acknowledge the contents of this Project Specification and its release for vendor bidding. Final approval and project acceptance will be subject to post-implementation review.

Name (Board of Directors Representative)	Signature	Date

Name (Chief Information Officer)	Signature	Date

9. Appendix

9.1. Elicitation Documentation

Requirements for the Student Feedback Review System were elicited through a combination of brainstorming and focus group discussions. These techniques were selected to ensure that the perspectives of all primary stakeholder groups (academic administrators, faculty members, and students) were systematically captured. The elicitation process focused on identifying operational needs, access constraints, feedback workflows, and regulatory considerations relevant to ETIS's academic context.

Brainstorming
- Method
  - Three stakeholders were randomly selected from each of the three primary stakeholder groups (administrators, faculty, and students).
  - A structured round-robin brainstorming method was used, in which each participant took turns contributing one idea per round.

- Results
  - Clear role separation requirements, highlighting the need for distinct administrator, faculty, and student capabilities, directly informing BOR-01 (Role-based Access Control).
  - Student expectations for simplicity and fairness, including submitting feedback only once per subject-class pairing and only during a defined feedback window, reflected in BOR-02.1 (Feedback Submission by Students).
  - Faculty concerns regarding anonymity, reinforcing the requirement that only aggregated feedback be accessible, which influenced BOR-02.2 (Faculty Feedback Access).
  - Consensus that feedback periods should be centrally managed, leading to the identification of a formal feedback lifecycle, later refined in BOR-02 (Feedback Lifecycle Management).

Focus Groups
- Method
  - A focus group consisting of selected academic administrators and faculty members was facilitated by a neutral moderator.
  - The moderator introduced structured discussion topics related to feedback configuration, access control, reporting, and compliance, while ensuring balanced participation and preventing bias.

- Results
  - Formalisation of the feedback lifecycle, including fixed start and end dates, immutable feedback questions once the period begins, and permanent closure after submission, directly shaping BOR-02
  - Validation of aggregated feedback reporting, confirming that faculty should only access summarised results and analysed insights after the feedback period ends, strengthening BOR-02.2
  - Administrative responsibility for system governance, including role management, feedback configuration, and report generation, reinforcing the scope of BOR-01.
  - Administrative actions should be logged for traceability, thus defining BOR-01.2

- Alignment with regulatory obligations, particularly PDPA compliance and data retention requirements, ensuring that personal data protection and anonymity were embedded as non-functional constraints.

- Confirmation that the system supports quality assurance, not automated grading or disciplinary decisions, reinforcing the stated business operations assumptions.
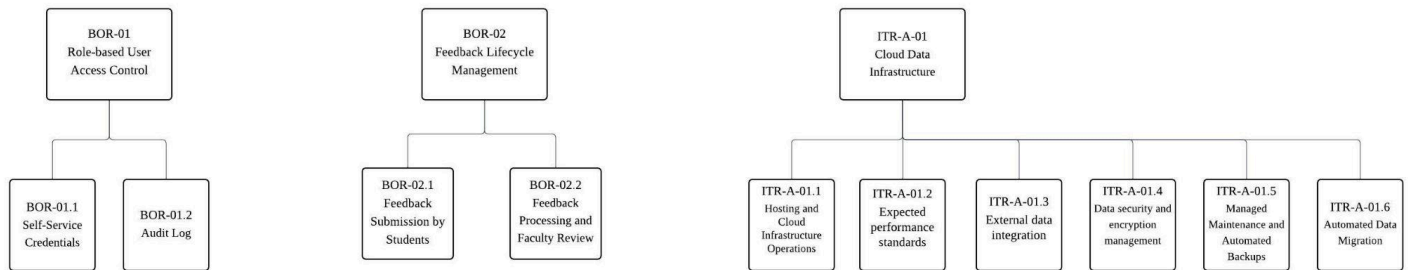
9.2. Requirements Tree
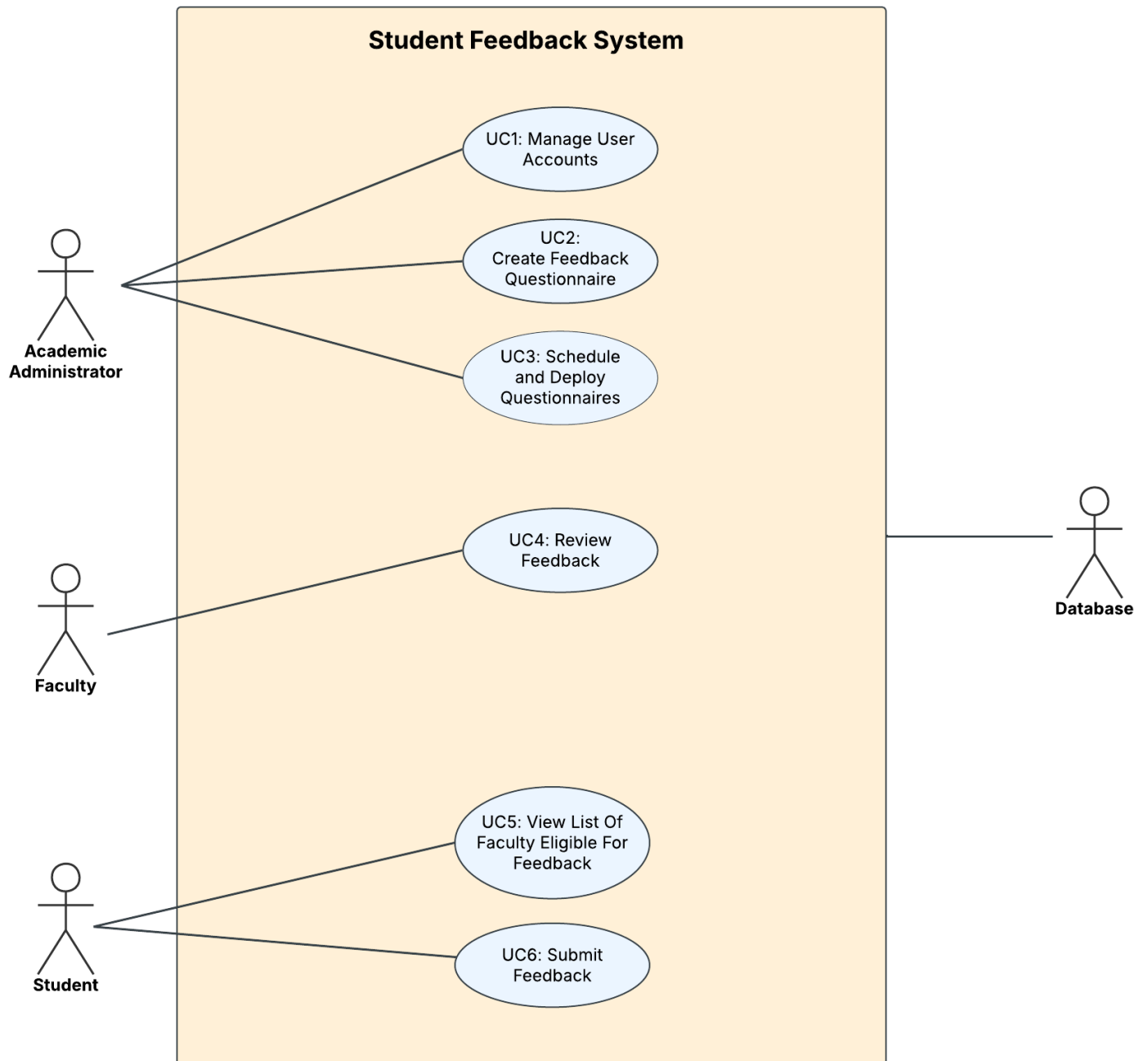

Figure 1: Requirements Tree

9.3. Use Case Diagram

Figure 2: Use Case Diagram

9.4. Project Gantt Chart
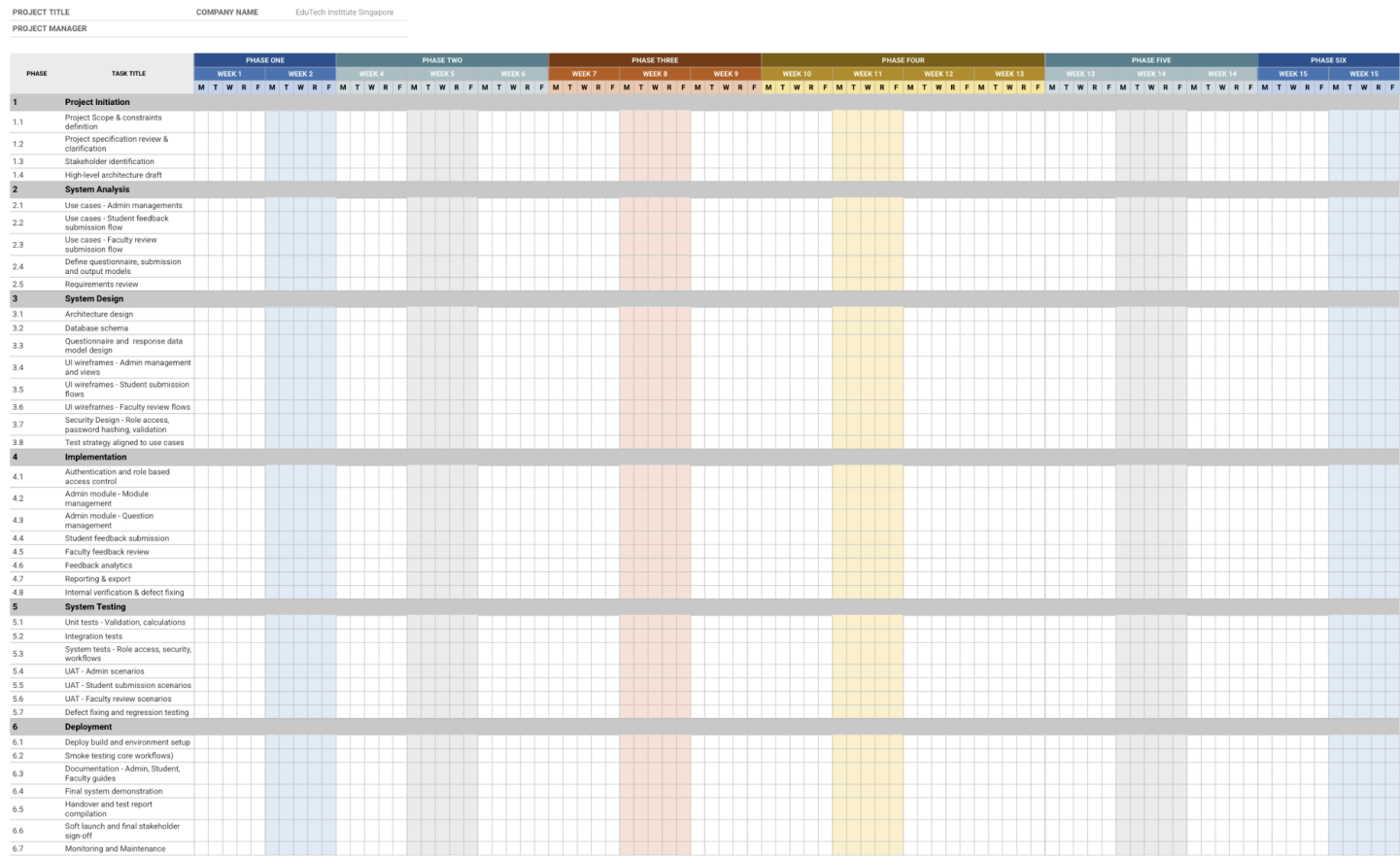
Figure 3: Project Gantt Chart

9.5. Data Dictionary

A. Core Entities

1) UserAccount

Attribute	Example	Description
username	'John Doe'	Login username using institutional credentials.
password_hash	'b94d27b9934d3e08a52e52d7da7dabfac484efe37a5380ee9088f7ace2efcde9'	Encrypted password for authentication.
role	'Student'	User role determining system access privileges.

B. Feedback Collection Entities

1. Question

Attribute	Example	Description
question_text	'On a scale of 1-5 what is your rating on this class?'	Text of the feedback question.
question_type	'Rating'	Type of response expected.
is_required	True	Indicates whether the question is mandatory.

2. FeedbackSubmission

Attribute	Example	Description
feedback_id	1	Unique identifier for a feedback submission.
student_id	200	Student who submitted the feedback.
faculty_id	354	Faculty being reviewed.
submitted_at	'2024-01-29 10:08:00'	Timestamp of submission.

C. Analytics / Reporting Entities

1. FeedbackAnalysisSummary

Attribute	Example	Description
sentiment_result	'Positive', 'Neutral', 'Negative'	Overall sentiment classification.
aggregated_summary	'Overall, the feedback received has been…'	Aggregated summary on all the feedback received by students, generated by ML.

10. Glossary

Term	Definition
Academic Administrator	A privileged user who manages user accounts, roles, feedback setup, and administrative governance functions.
Authorised User	Any ETIS member (student, faculty, administrator) who is provisioned access based on institutional role and records.
Role-Based Access Control (RBAC)	A control approach where system functions and information are accessible only according to assigned user roles (e.g., Student, Faculty, Administrator).
Feedback Lifecycle Management	Administrator capability to define the feedback period and questions, enforce submission rules, and generate aggregated analysis reports after the period ends.
Feedback Period	A defined start and end window during which feedback submission is permitted; submissions are disabled once the period is closed.
Subject–Class Pairing	A configured subject and class relationship used to determine who can submit feedback and for which class context.
Feedback Submission	A student's submitted feedback record associated with the relevant student and faculty, and captured with a submission timestamp.
Faculty Feedback Access	A rule that faculty can view feedback only after the feedback period ends, and only in aggregated form (student identities are not disclosed).

Administrative Audit Log	A protected record of administrative actions (e.g., account/role/access changes) including administrator identity, timestamp, and action performed; accessible only to Academic Administrators.
Password Policy	Institutional rules governing password updates and protection: users can update passwords via self-service, must verify identity before changes apply, and updates must follow complexity and expiry rules.
Password Hash	The stored (non-plaintext) representation of a password used for authentication (i.e., an encrypted/hashed form, not the raw password).
IT Support	Operational support responsible for password resets, user issue resolution, and system health monitoring/escalation.
Question	A feedback form item defined by text, type (e.g., rating), and whether it is mandatory.
FeedbackAnalysisSummary	An analytics entity representing summarised outcomes from feedback, such as sentiment and aggregated summary text.
Sentiment Result	The overall sentiment classification outcome (e.g., Positive/Neutral/Negative) derived from feedback text.
Aggregated Summary	A generated high-level textual summary of overall feedback received.