

# **Capstone Project Report**

## **Report 3 Software Requirement Specification**

Hanoi, August 2019

**Project: National High School Exam Support System**

Group D12-RT04

# Mục lục

<b>1</b>	<b>Record of Changes</b>	<b>2</b>
<b>2</b>	<b>Software Requirement Specification</b>	<b>2</b>
2.1	Product Overview . . . . .	2
2.2	User Requirements . . . . .	2
2.2.1	Actors . . . . .	2
2.2.2	Use Cases . . . . .	3
2.3	Functional Requirements . . . . .	4
2.3.1	System Functional Overview . . . . .	4
2.3.2	Course Management . . . . .	6
2.4	Non-Functional Requirements . . . . .	7
2.4.1	External Interfaces . . . . .	7
2.4.2	Quality Attributes . . . . .	7
<b>3</b>	<b>Requirement Appendix</b>	<b>8</b>
3.1	Business Rules . . . . .	8
3.2	Common Requirements . . . . .	8
3.3	Application Messages List . . . . .	8

# 1 Record of Changes

Date	A*M, D	In charge	Change Description
August 2019	A	Group D12-RT04	Initial draft of Software Requirement Specification

\* A - Added, M - Modified, D - Deleted

## 2 Software Requirement Specification

### 2.1 Product Overview

The National High School Exam Support System is a web-based platform designed to assist high school students in preparing for the national high school examination in Vietnam. The system allows students to access, purchase, and enroll in courses, practice with mock exams, and review their knowledge gaps with support from qualified teachers. Teachers can create and manage courses, upload practice tests, and earn commissions from course sales. Administrators manage the system, including user accounts, course approvals, feedback, and financial reporting. The system aims to streamline exam preparation, reduce errors, and provide personalized learning recommendations.

**Context Diagram Description:** The system interfaces with three main external entities: Students, Teachers, and Administrators. Students interact with the system to register accounts, browse and purchase courses, take practice tests, and receive feedback. Teachers interface to create and manage courses, upload tests, and respond to student queries. Administrators manage user accounts, course approvals, vouchers, and system analytics. Data flows include user credentials, course content, test results, payment transactions, and feedback messages. External systems include Google for authentication, email services for notifications, and payment gateways for transactions.

### 2.2 User Requirements

#### 2.2.1 Actors

#	Actor	Description
1	Student	High school students preparing for the national exam. They register accounts, purchase and access courses, take practice tests, and seek feedback from teachers.
2	Teacher	Qualified educators who create and manage courses, upload practice tests, answer student queries, and earn commissions from course sales.
3	Administrator	System managers responsible for overseeing user accounts, course approvals, feedback moderation, voucher management, and system analytics.

## 2.2.2 Use Cases

**Diagram(s) Use Case Diagram Description:** The use case diagram includes three actors: Student, Teacher, and Administrator. Student use cases include: Register Account, Login/Logout, Reset Password, Browse Courses, Purchase Course, Take Practice Test, Submit Test, View Results, and Send Feedback. Teacher use cases include: Register Account, Login/Logout, Reset Password, Create Course, Edit Course, Delete Test, Answer Student Queries, and View Course Statistics. Administrator use cases include: Login, Manage Users, Manage Teachers, Manage Courses, Create Vouchers, and View Reports. Relationships include Students interacting with Courses and Tests, Teachers managing Courses and Tests, and Administrators overseeing all entities.

### Descriptions

ID	Use Case	Actors	Use Case Description
UC01	Register Account	Student, Teacher	Allows users to create a new account using email or Google authentication.
UC02	Login/Logout	Student, Teacher, Administrator	Users log in with credentials or Google, and log out when done.
UC03	Reset Password	Student, Teacher	Users reset their password using OTP sent via email or phone.
UC04	Browse Courses	Student	Students search and view course details (title, teacher, price, content, ratings).
UC05	Purchase Course	Student	Students add courses to cart, select payment method, and confirm transactions.
UC06	Take Practice Test	Student	Students access practice tests or mock exams, categorized by subject, topic, or difficulty.
UC07	Submit Test	Student	Students submit tests manually or automatically when time expires, with warnings for incomplete answers.
UC08	View Results	Student	Students view test scores, correct/incorrect answers, explanations, and performance statistics.
UC09	Send Feedback	Student	Students send queries to teachers and receive responses.
UC10	Create Course	Teacher	Teachers create new courses with titles, descriptions, lessons, and materials.
UC11	Edit Course	Teacher	Teachers update course details, lessons, or materials.
UC12	Delete Test	Teacher	Teachers remove outdated or incorrect practice tests.
UC13	Answer Student Queries	Teacher	Teachers respond to student questions via course Q&A or messaging.
UC14	View Course Statistics	Teacher	Teachers view enrollment, completion rates, and test results.
UC15	Manage Users	Administrator	Admins approve, delete, or warn user accounts for violations.

UC16	Manage Teachers	Administrator	Admins approve teacher accounts, courses, and monitor activities.
UC17	Create Vouchers	Administrator	Admins add monthly or promotional vouchers.
UC18	View Reports	Administrator	Admins view user, course, and revenue statistics.

## UC12: Delete Test

**Objective:** Allows a teacher to delete an existing practice test.

**Actor:** Teacher

**Trigger:** Teacher clicks Delete in the Test Management section.

**Pre-condition:** Teacher is logged in successfully.

**Post-condition:** Test is deleted successfully.

### Activities Flow

1. Teacher navigates to the Test Management section.
2. Teacher selects a test and clicks Delete.
3. System displays a confirmation pop-up.
4. Teacher confirms deletion.
5. System deletes the test and returns to the test list.

### Business Rules

Step	BR Code	Description
(3)	BR01	<b>Pop-up Displaying Rules:</b> The system displays a confirmation pop-up: Are you sure you want to delete this test?
(5)	BR02	<b>Deletion Rules:</b> System deletes the test and updates the database. If a database error occurs, display MSG10: Database connection error.

## 2.3 Functional Requirements

### 2.3.1 System Functional Overview

**Screens Flow** **Screens Flow Description:** The system includes the following screens: Home (displays popular courses, vouchers, and top teachers), Search (allows filtering courses by subject, teacher, or class), Student Profile (shows enrolled courses, test results, and feedback), Teacher Profile (displays managed courses, tests, and earnings), Admin Dashboard (manages users, courses, and reports), Course Details (shows course overview, lessons, and reviews), Cart (displays selected courses and payment options), Test Interface (for practice tests and mock exams), and Results (displays test scores and analysis). Navigation flows from Home to Search, Course Details, Cart, or Profile. Teachers access Course Management from their Profile, and Admins access all management functions from the Dashboard.

## Screen Descriptions

#	Feature	Screen	Description
1	Course Browsing	Home	Displays popular courses, vouchers, and top-rated teachers.
2	Course Browsing	Search	Allows searching and filtering courses by name, subject, teacher, or class.
3	Course Management	Course Details	Shows course title, description, price, lessons, and reviews.
4	Payment	Cart	Displays selected courses, payment methods, and transaction confirmation.
5	Testing	Test Interface	Provides practice tests or mock exams with subject, topic, and difficulty filters.
6	Results	Results	Displays test scores, correct/incorrect answers, and performance statistics.
7	Profile	Student Profile	Shows enrolled courses, test history, and feedback.
8	Profile	Teacher Profile	Displays managed courses, tests, earnings, and feedback.
9	Admin	Admin Dashboard	Manages users, teachers, courses, vouchers, and reports.

## Screen Authorization

Screen	Student	Teacher	Administrator
Home	X	X	X
Search	X	X	X
Course Details	X	X	X
Cart	X		
Test Interface	X		
Results	X		
Student Profile	X		
Teacher Profile		X	
Admin Dashboard			X
Manage Users			X
Manage Teachers			X
Manage Courses		X	X
Create Course		X	
Delete Test		X	X
Create Vouchers			X
View Reports		X	X

## Non-Screen Functions

#	Feature	System Function	Description
1	Notifications	Send Email Confirmation	Sends email confirmations for registrations, purchases, or test submissions.

2	Payment Processing	Process Payment	Integrates with payment gateways to process course purchases.
3	Analytics	Generate Reports	Generates user, course, and revenue reports for admins and teachers.

**Entity Relationship Diagram ERD Description:** The system includes entities such as User (Student or Teacher, with attributes: ID, email, password, name, phone), Course (ID, title, description, price, teacher ID, subject, class), Test (ID, course ID, type, difficulty, questions), Enrollment (student ID, course ID, purchase date), Result (student ID, test ID, score, answers), Feedback (student ID, course ID, content, response), Voucher (ID, code, discount, expiry date), and Transaction (ID, student ID, course ID, amount, date). Relationships include: Students enroll in Courses, Courses have Tests, Students submit Results for Tests, Teachers create Courses and Tests, and Admins manage Vouchers and Users.

#### Entities Description

#	Entity	Description
1	User	Represents students or teachers with account details (ID, email, password, name, phone).
2	Course	Contains course details (ID, title, description, price, teacher ID, subject, class).
3	Test	Practice tests or mock exams (ID, course ID, type, difficulty, questions).
4	Enrollment	Tracks student course purchases (student ID, course ID, purchase date).
5	Result	Stores test results (student ID, test ID, score, answers).
6	Feedback	Records student queries and teacher responses (student ID, course ID, content, response).
7	Voucher	Manages discount codes (ID, code, discount, expiry date).
8	Transaction	Logs payment details (ID, student ID, course ID, amount, date).

### 2.3.2 Course Management

#### Create Course

**Function Trigger:** Teacher navigates to Teacher Profile and clicks Create Course.

**Function Description:** Allows teachers to create a new course by entering title, description, subject, class, price, lessons, and materials (PDF, video, links). Teachers are the primary actors. The interface includes input fields and file upload options. Data is validated and stored in the database.

**Screen Layout:** A form with fields for title, description, subject, class, price, and sections for adding lessons and uploading materials.

**Function Details:**

- Validates mandatory fields (title, description, price).
- Ensures price is a positive number.
- Supports multiple lesson entries with optional PDF/video uploads.

- Displays MSG04: Add course successfully on completion, or MSG10: Database connection error on failure.

### Screen Content

#	Component	Comp. Type	Editable	Mandatory	Default Value	Description
1	Screen Title	Label	No	N/A	N/A	Displays Create
2	Title	Text	Yes	Yes	N/A	Course title input
3	Description	Textarea	Yes	Yes	N/A	Course description
4	Price	Numeric	Yes	Yes	0	Course price in VND
5	Subject	Dropdown	Yes	Yes	N/A	Select subject (e.g. Physics)
6	Class	Dropdown	Yes	Yes	N/A	Select class (e.g. 10th grade)
7	Add Lesson	Button	N/A	N/A	N/A	Adds a new lesson
8	Upload Material	File	Yes	No	N/A	Uploads PDF or image
9	Save	Button	N/A	N/A	N/A	Saves the course

## 2.4 Non-Functional Requirements

### 2.4.1 External Interfaces

The system integrates with Google for authentication, email services for notifications (e.g., transaction confirmations), and payment gateways (e.g., VNPay, Momo) for course purchases. All financial transactions use 256-bit encryption to ensure security.

### 2.4.2 Quality Attributes

#### Usability

- The system requires no more than 30 minutes of training for students and teachers to perform basic tasks (e.g., browsing courses, creating courses).
- The interface adheres to modern web design standards (responsive, intuitive navigation).
- Search functionality provides results within 2 seconds for common queries.

#### Reliability

- Availability: 99.9% uptime, with maintenance windows outside peak hours (10 PM-2 AM).
- Mean Time Between Failures (MTBF): 500 hours.
- Mean Time To Repair (MTTR): 1 hour.
- Maximum Bugs: 1 critical bug per 1,000 lines of code, with critical defined as data loss or system unavailability.



## Performance

- Response Time: Average 1 second, maximum 3 seconds for page loads and search queries.
- Throughput: Supports 1,000 concurrent users.
- Capacity: Handles up to 10,000 registered users and 1,000 courses.
- Resource Utilization: Maximum 4GB RAM and 50% CPU usage on the server.

## 3 Requirement Appendix

### 3.1 Business Rules

ID	Rule Definition
BR01	The system displays a confirmation pop-up for test deletion: Are you sure you want to delete this test?
BR02	Test deletion updates the database; errors trigger MSG10: Database connection error.
BR03	Course purchases must use a single payment method per transaction.
BR04	Teachers earn commissions based on course sales, calculated as a percentage set by the admin.
BR05	Vouchers are valid only within their expiry date and cannot be combined.
BR06	All financial transactions require 256-bit encryption.

### 3.2 Common Requirements

- All users must authenticate via email/password or Google.
- Courses must include at least one lesson and a description.
- Mock exams must have exactly 50 multiple-choice questions.
- Feedback responses must be provided within 24 hours.

### 3.3 Application Messages List

#	Message Code	Message Type	Context	Content
1	MSG01	In line	No search results	No search results.
2	MSG02	In red, under text box	Mandatory field empty	The field is required.
3	MSG03	Toast message	Course created successfully	Add course successfully.
4	MSG04	Toast message	Course purchase confirmed	Purchase confirmed successfully.
5	MSG05	Toast message	Email confirmation sent	A confirmation email has been sent to {email_address}.
6	MSG06	Toast message	Test deleted successfully	Delete test successfully.

7	MSG07	In line	Database connection error	Database connection error.
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