



CAPSTONE PROJECT REPORT

Report 3 – Software Requirement Specification

– Da Nang, Jan 2025 –

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I. Record of Changes

Date	A* M, D	In charge	Change Description
23/01/2025	A,M	ThangTVB	Create Product Overview, User Requirement
23/01/2025	A,M	AnhNN	Create Functional Requirement Overview
01/02/2025	A,M	AnhNN	Create Functional Requirement
01/02/2025	A,M	BaoPG	Create Functional Requirement
01/02/2025	A,M	ThangTVB	Create Functional Requirement
01/02/2025	A,M	TuanND	Create Functional Requirement
01/02/2025	A,M	QuangTVD	Create Functional Requirement
01/03/2025	A	ThangTVB	Create Non-Functional Requirement
20/04/2025	M	ThangTVB	Baseline document
22/04/2025	M	BaoPG	Fix comment and baseline document

*A - Added M - Modified D - Deleted

Table 1 - Record of Changes

II. Software Requirement Specification

1. Product Overview

The Building a real-time platform to support exam management and organization at FPT University using Clean Architecture, NextJS, .Net, MySQL, and Zalo Mini App (FUEM) is a comprehensive platform designed to enhance the efficiency of exam management and organization at FPT University Da Nang. FUEM aims to automate key exam-related processes, streamline workflows and provide robust reporting and analysis capabilities. By minimizing the manual work and reducing errors, FUEM ensures a smooth and reliable examination process for students, lecturers and administrative staff.

Key Objectives of the system:

- Design and develop a comprehensive digital transformation platform:** Create a comprehensive digital exam management system, helping to improve the efficiency of exam management and organization at FPT University.
- Optimize exam management and organization processes:** Automate processes related to exam registration, exam proctor assignment, and exam-related information submission to minimize manual work and errors.
- Support for receiving and handling exam incidents:** Optimize the flow of receiving incidents from exam supervisors and handling incidents during the exam.
- Reporting and data analysis support:** Provides reporting, statistics, and data analysis features by exam and by period.
- Enhance user experience:** Provide a friendly, easy-to-use interface for lecturers and staff of the examination room and IT department, helping them easily interact with the system.

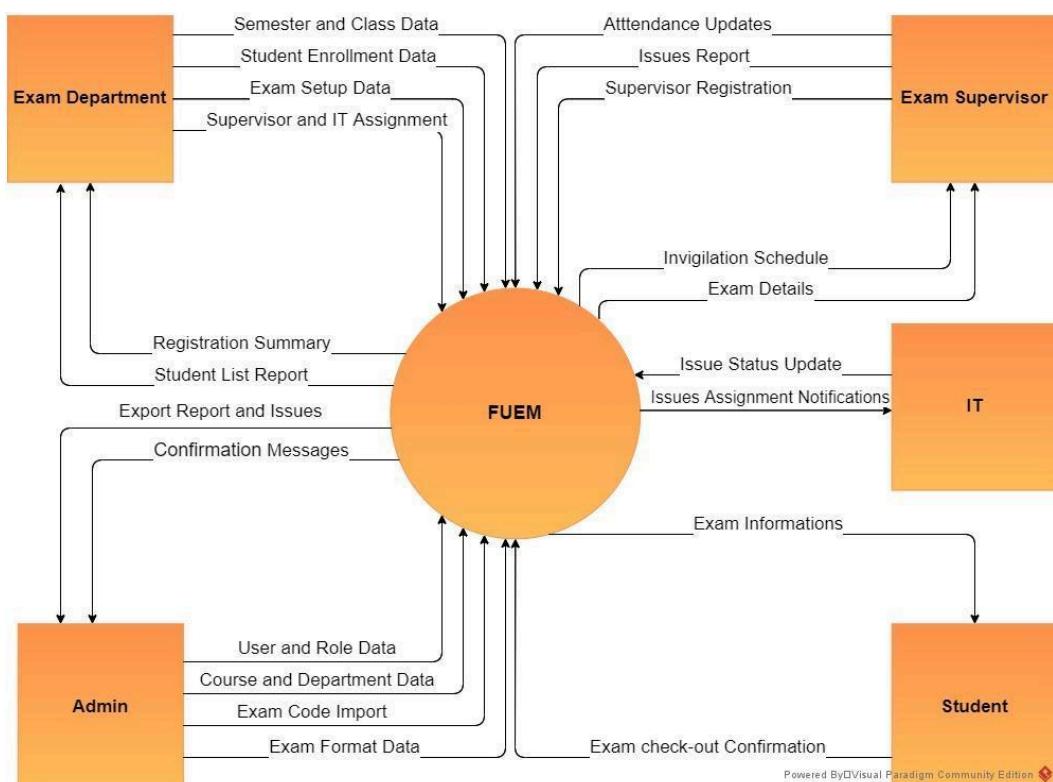


Figure 1 - System Context Diagram

2. User Requirements

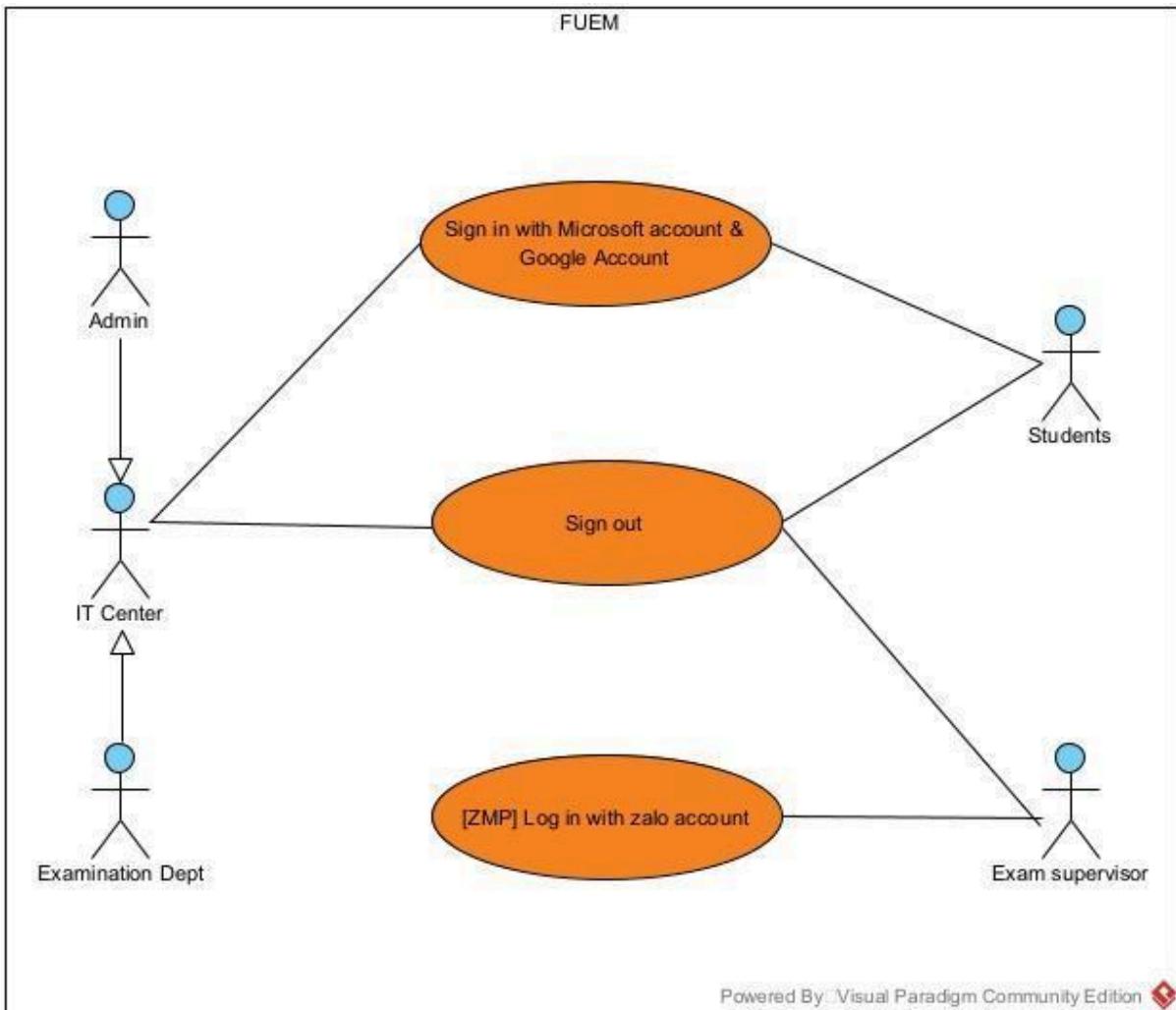
2.1 Actors

#	Actor	Description
1	Admin	Responsible for overall system management, including user permissions, data security, and monitoring the performance of the system. Administrators also handle issues and ensure compliance with university policies.
2	IT	Provides technical support, troubleshooting technical issues and assists users with examination-related
3	Exam Supervisors	Responsible for monitoring exam execution, verifying student identities, and ensuring adherence to examination regulations. Report incidents in real-time and coordinate with the Examination Dept or IT Center to resolve issues. Also have the ability to register for exams.
4	Examination Department	Oversees exam scheduling, assigns supervisors and manages the entire examination process.
5	Students	Have a platform for students to checkout

Table 2 - Actors

2.2 Use Cases

2.2.1 Diagram(s)



[Figure 2 - Use Case Diagram For Authorization](#)

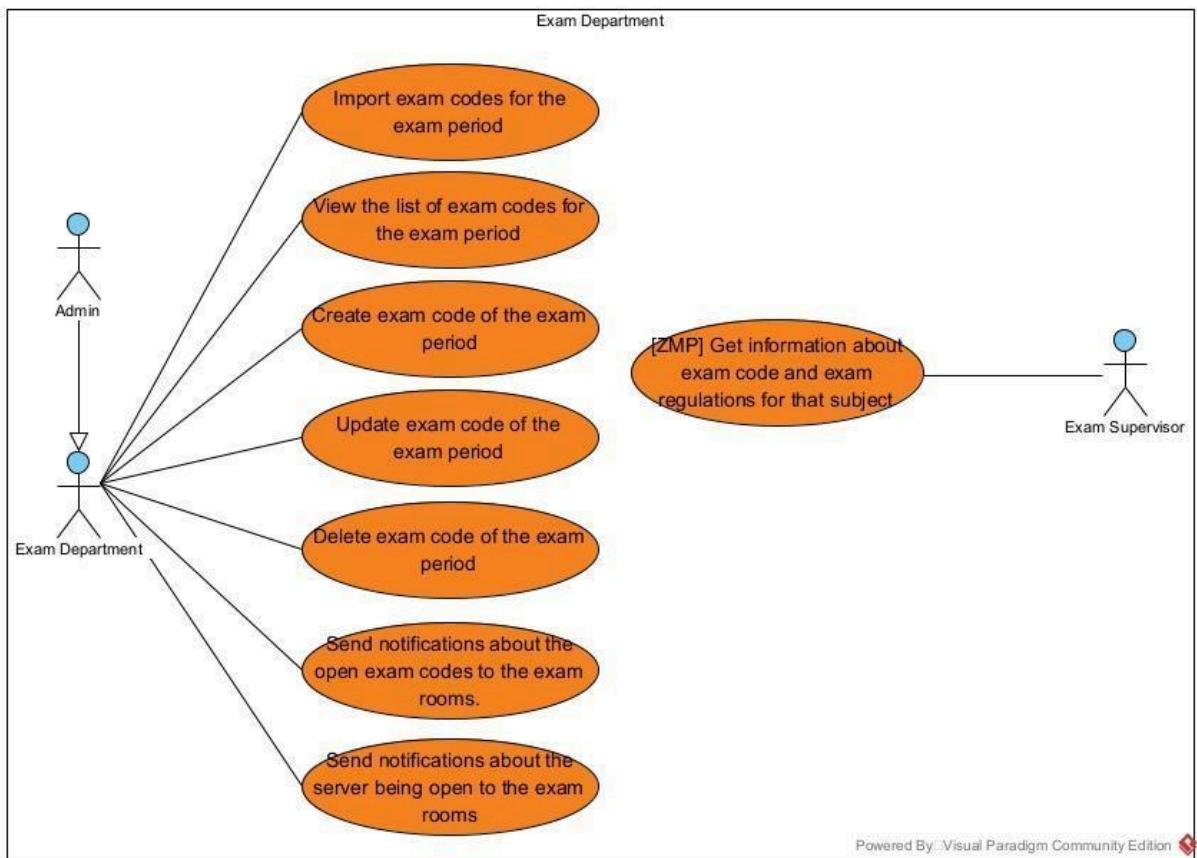


Figure 3 - Use Case Diagram For Exam Code

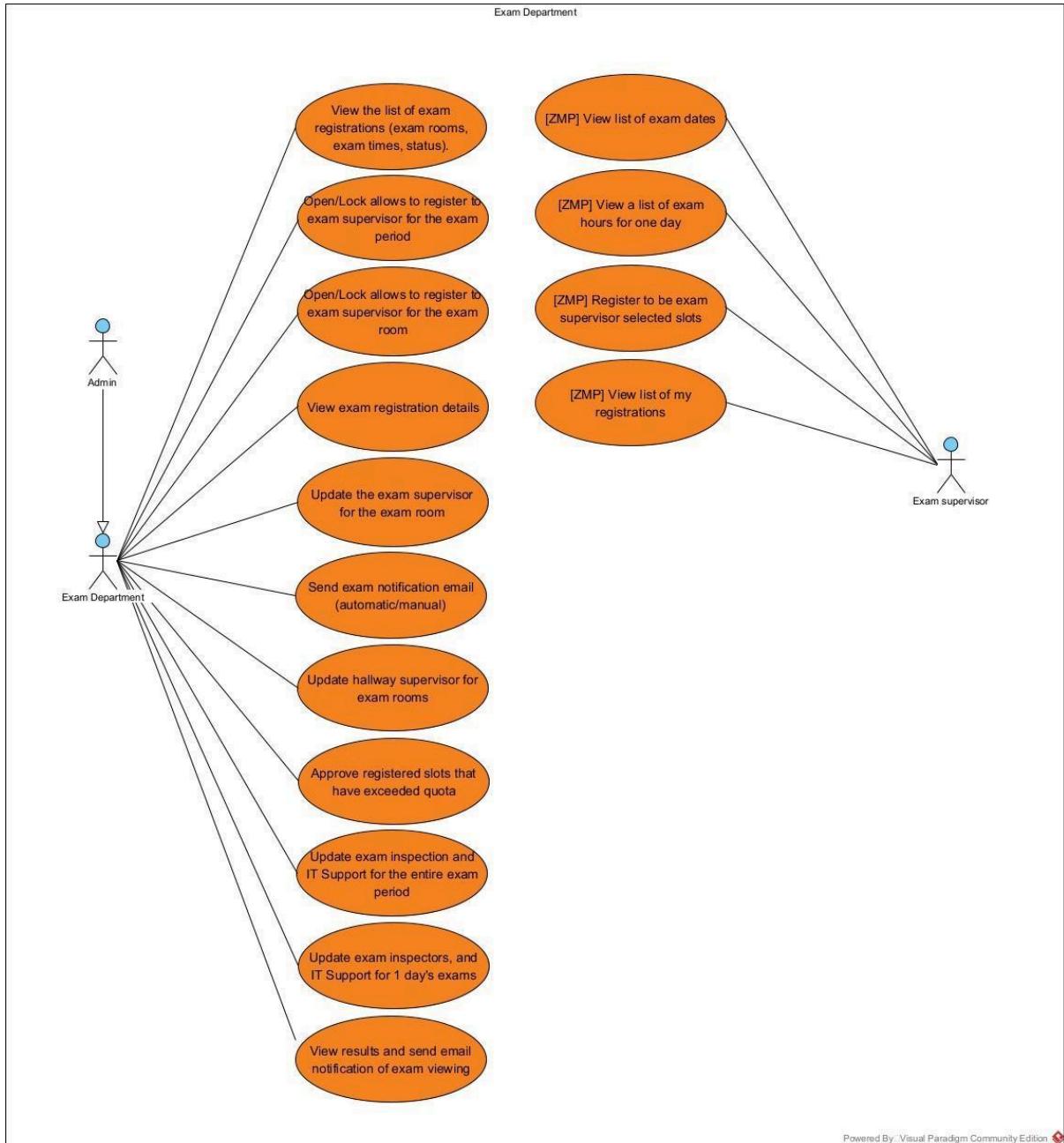
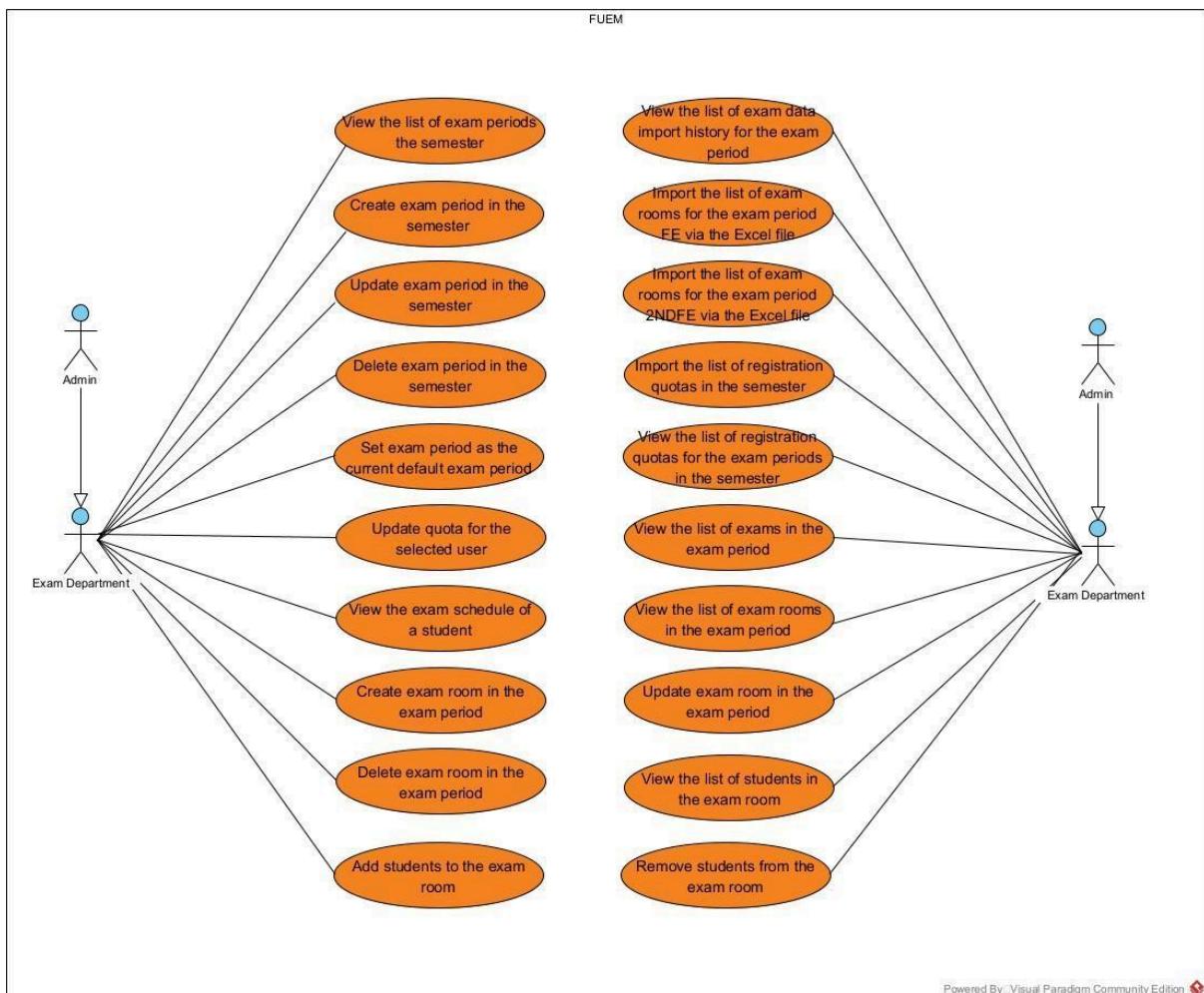
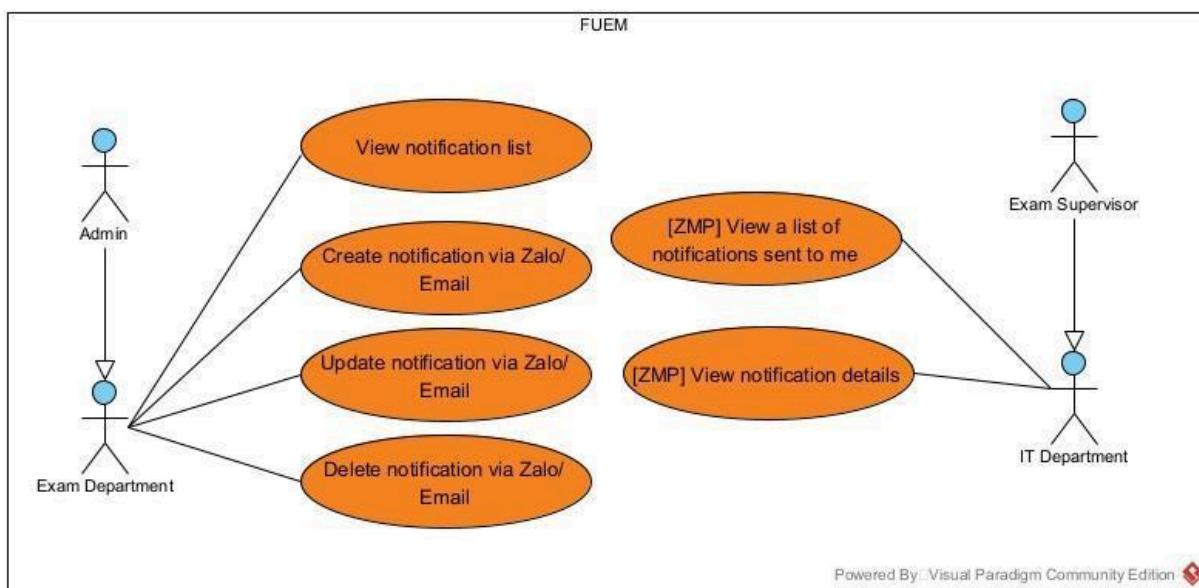


Figure 4 - Use Case Diagram For Exam Registration

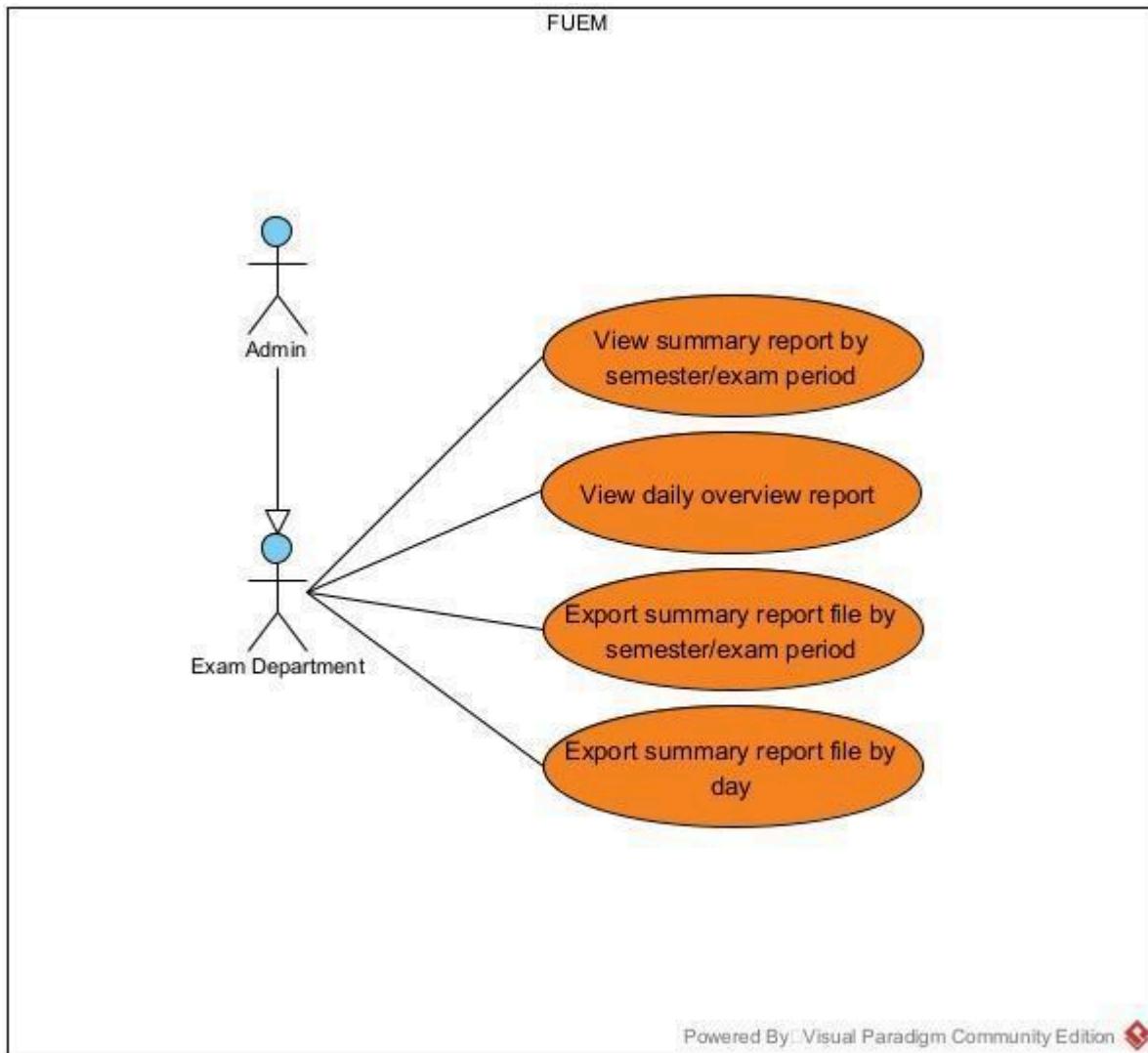
Powered By: Visual Paradigm Community Edition



[Figure 5 - Use Case Diagram For Initialize the exam](#)



[Figure 6 - Use Case Diagram For Notification](#)



[**Figure 7 - Use Case Diagram For Report**](#)

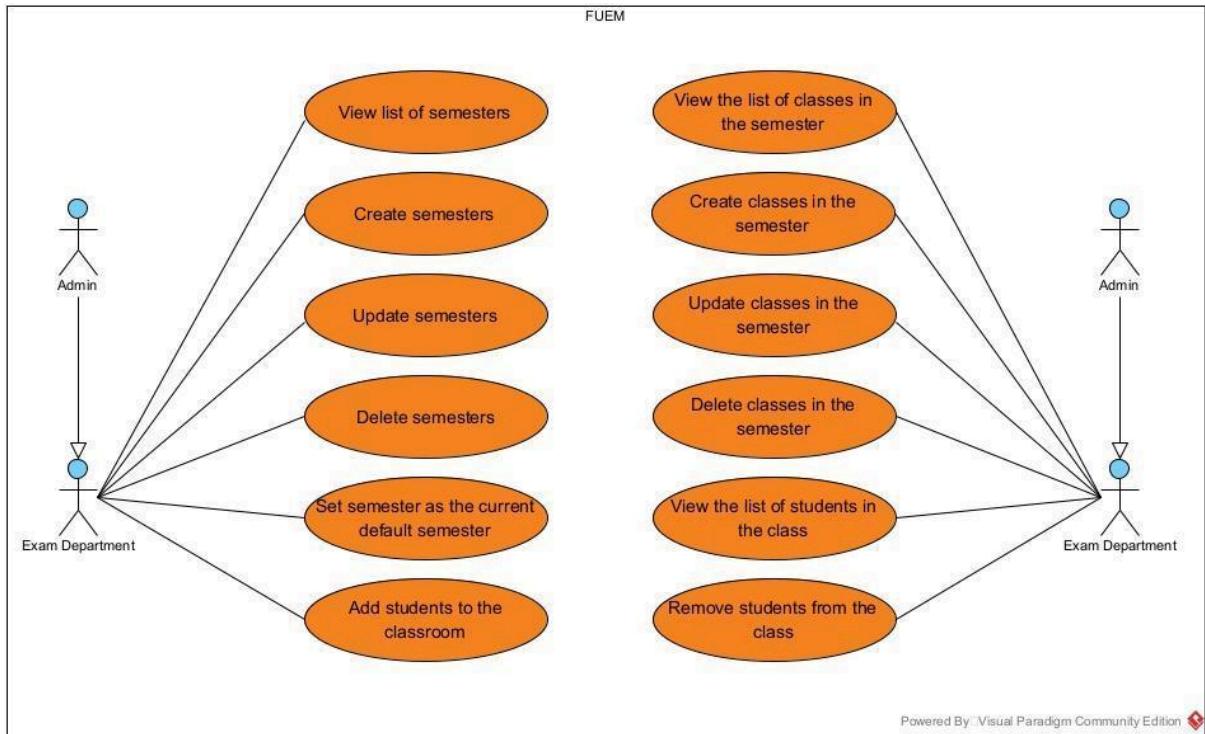


Figure 8 - Use Case Diagram For Semester Configuration

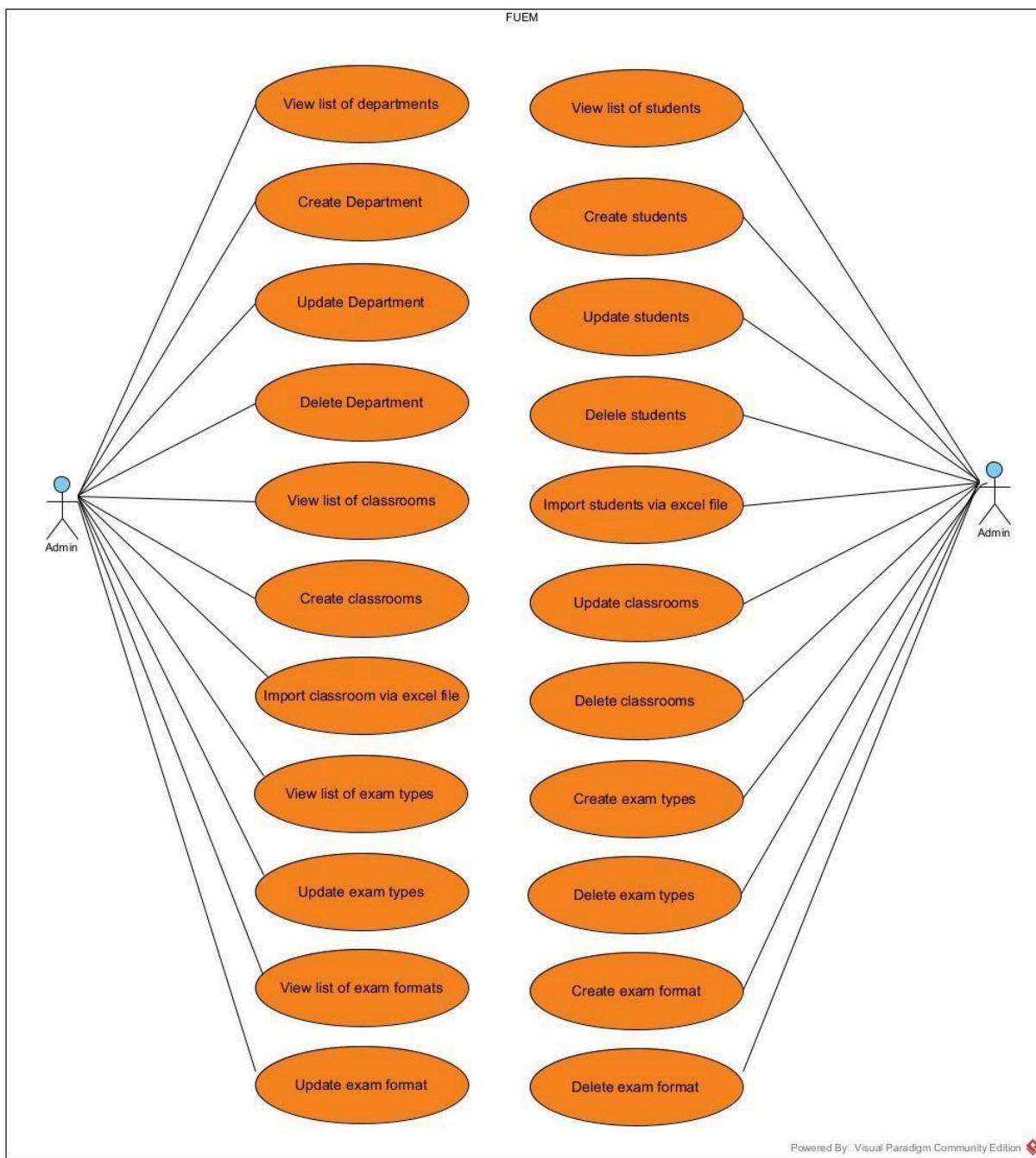
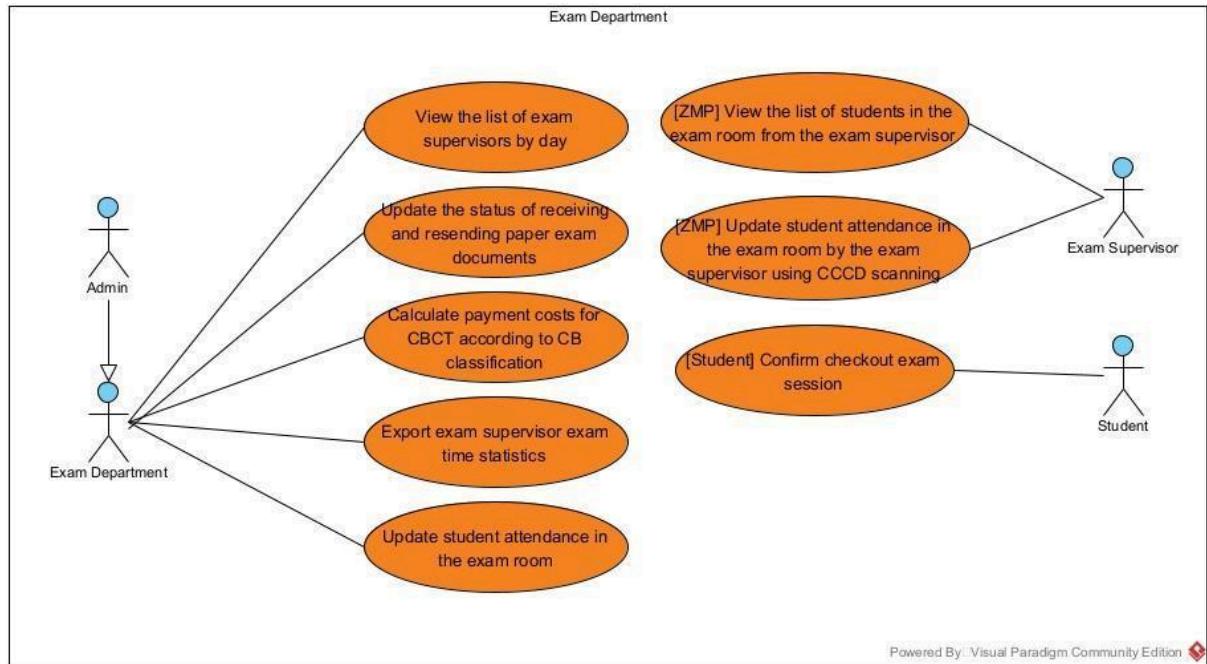
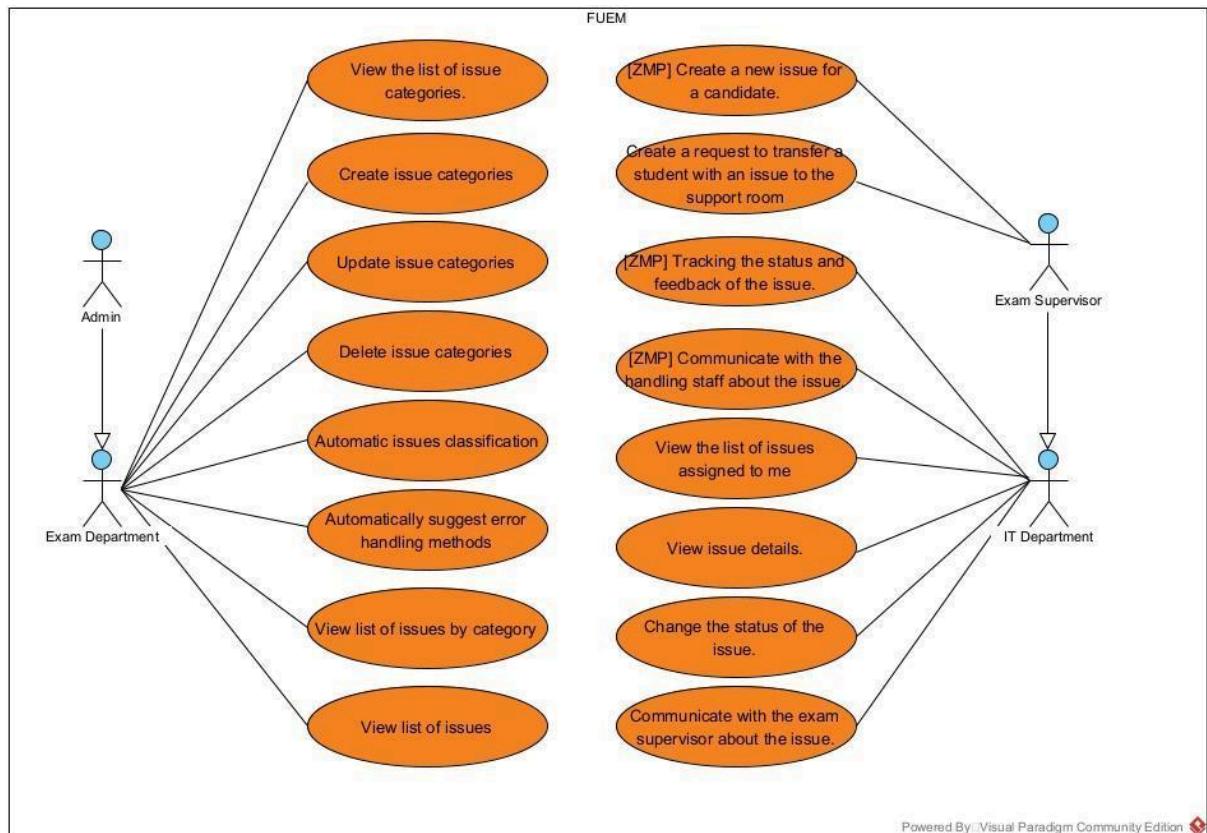


Figure 9 - Use Case Diagram For System Configuration



[Figure 10 - Use Case Diagram For Check Attendance](#)



[Figure 11 - Use Case Diagram For Troubleshooting problems](#)

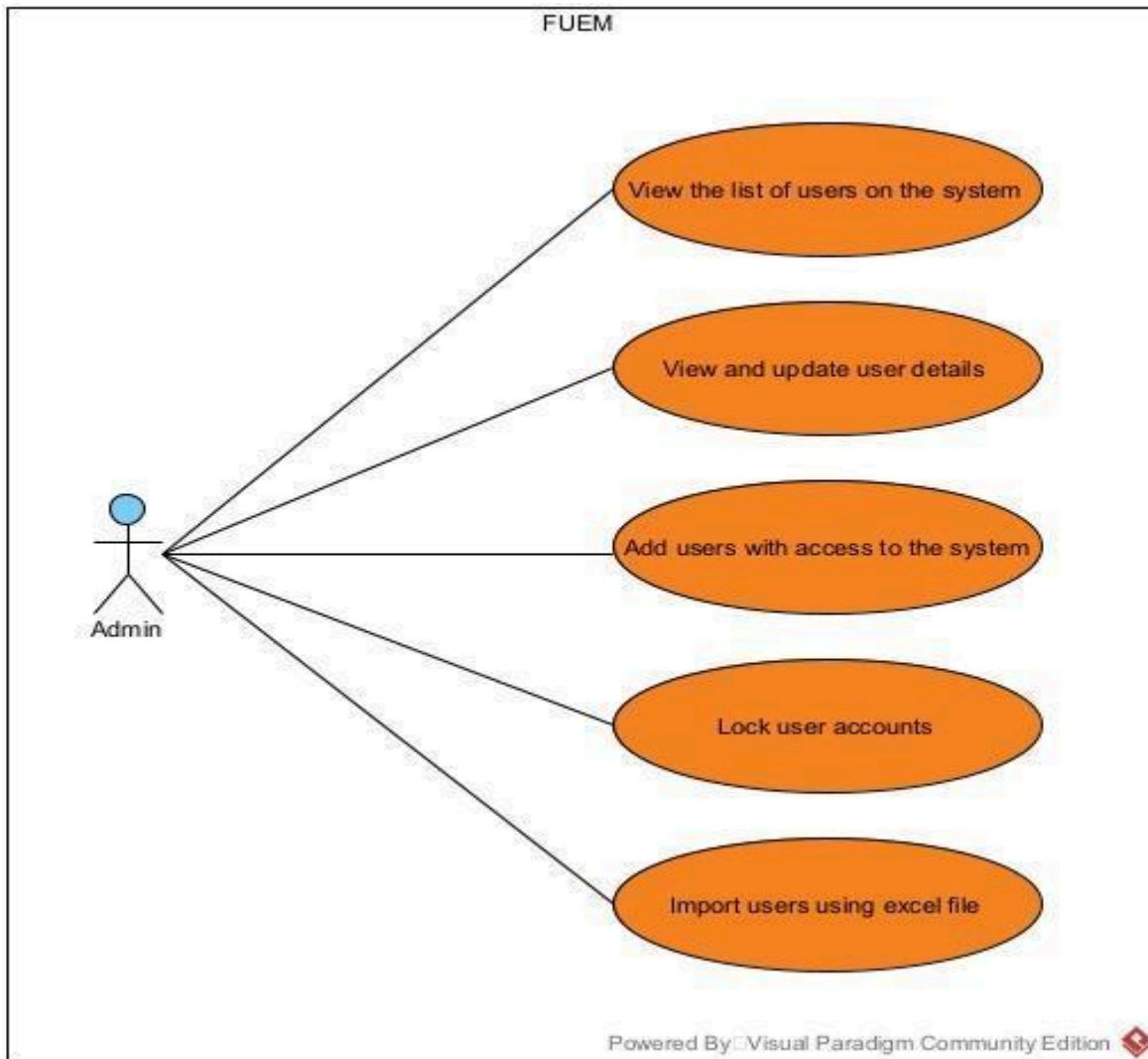


Figure 12 - Use Case Diagram For User

2.2.2 Descriptions

ID	Use Case	Actors	Use Case Description
FE-01	Sign in with Microsoft account & Google Account	Admin/Examination Dept	Allows users to access into the system
FE-02	Sign out	Admin/ Examination Dept/ IT Center/ Exam Supervisor	Allows users to exit the system
FE-03	[ZMP] Log in with zalo account	Exam Supervisors/IT Center	Allows Exam Supervisors to access to the system via Zalo Mini App
FE-05	View list of users on the system.	Admin/Examination Dept	Allows admin to view all users on the system
FE-06	View and update user details	Admin/Examination Dept	Allows admin to view and update user details
FE-07	Add users with access to the system	Admin/Examination Dept	Allows admin to add new users access to the system
FE-08	Lock user account	Admin/Examination Dept	Allows admin to lock user account from the system

ID	Use Case	Actors	Use Case Description
FE-09	Import users using Excel files	Admin/Examination Dept	Allows admin to import users using Excel files.
FE-10	View list of departments	Admin	Allows users to view list of departments
FE-11	CRUD department	Admin	Allows admins to manage department
FE-12	View list of classrooms	Admin	Allows users to view list of classrooms on the system
FE-13	CRUD classroom	Admin	Allows users to manage classroom
FE-14	Import classrooms via Excel file	Admin	Allows users to import classrooms via Excel file
FE-15	View list of students	Admin	Allows users to view list of students on the system
FE-16	CRUD student	Admin	Allows users to manage students
FE-17	Import students via Excel file	Admin	Allows users to import students via Excel file
FE-18	View list of subjects	Admin	Allows users to view list of semesters on the system
FE-19	CRUD subjects	Admin	Allows users to manage semester
FE-20	Import subjects via excel file	Admin	Ability to set the current default semester
FE-21	View list of exam types	Admin	Ability to view list of subjects on the system
FE-22	CRUD exam type	Admin	Allows users to manage subjects
FE-23	View list of exam formats	Admin	Ability to view list of exam formats
FE-24	CRUD exam format	Admin	Ability to manage exam format
FE-25	Change exam period	Admin	Ability to change exam period
FE-26	View list of semesters	Admin/Examination Dept	Ability to manage view list of semesters
FE-27	CRUD semester	Admin/Examination Dept	Ability to manage semester
FE-28	Set semester as the current default semester	Admin/Examination Dept	Ability to set semester as the current default semester
FE-29	View the list of classes in the semester	Admin/Examination Dept	Allows users to view the list of classes in the semester on the system.
FE-30	Add, edit, delete classes in the semester	Admin/Examination Dept	Ability to manage classes
FE-31	View the list of students in the class	Admin/Examination Dept	Ability to view list of students in the class on the system
FE-32	Add students to the class	Admin/Examination Dept	Ability to add students to the class

ID	Use Case	Actors	Use Case Description
FE-33	Remove students from the class	Admin/Examination Dept	Ability to remove student from the class
FE-34	View the list of exam periods in the semester	Admin/Examination Dept	Allows user to view list of exam periods in the semester
FE-35	CRUD exam period in the semester	Admin/Examination Dept	Ability to manage exam period in the semester
FE-36	Set exam period as the current default exam period	Admin/Examination Dept	Ability to set exam period as the current default exam period
FE-37	View the list of exam data import history for the exam period	Admin/Examination Dept	Allows user to view the history of the exam data imports for the exam period
FE-38	Import the list of exam rooms for the exam period FE via the Excel file	Admin/Examination Dept	Ability to import the list of exam rooms for the exam period FE via the Excel file
FE-39	Import the list of exam rooms for the exam period 2NDFE via the Excel file	Admin/Examination Dept	Ability to import the list of exam rooms for the exam period 2FE via the Excel file
FE-40	Import the list of registration quotas in the semester	Admin/Examination Dept	Ability to import the list of registration quotas in the semester
FE-41	View the list of registration quotas for the exam periods in the semester	Admin/Examination Dept	Allows users to view the list of registration quotas for the exam periods in the semester
FE-42	Update quota for the selected user	Admin/Examination Dept	Ability to update quota for the selected user
FE-43	View the list of exams in the exam period	Admin/Examination Dept/	Allows user to view the list of exam in the exam period
FE-44	View the exam schedule of a student	Admin/Examination Dept/	Allows users to view the exam schedule of a student
FE-45	View the list of exam rooms in the exam period	Admin/Examination Dept	Allows users to view the list of exams rooms in the exam period
FE-46	CRUD exam room in exam period	Admin/Examination Dept	Ability to manage exam room
FE-47	View the list of students in the exam room	Admin/Examination Dept/Exam Supervisor	Ability to view list of students in the exam room
FE-48	Add students to the exam room	Admin/Examination Dept/	Allows user to add students in the exam room
FE-49	Remove students from the exam room	Admin/Examination Dept	Ability to remove students from the exam room
FE-50	View the list of exam registrations (exam rooms, exam times, status, etc.).	Admin/Examination Dept	Allows users to view list of exam registrations
FE-51	Open/Lock allows to register to exam supervisor for the exam period	Admin/Examination Dept	Ability to open/lock register to exam supervisor for the exam period

ID	Use Case	Actors	Use Case Description
FE-52	Open/Lock allows to register to exam supervisor for the exam room	Admin/Examination Dept	Ability to open/lock register to exam supervisor for the exam room
FE-53	View exam registration details	Admin/Examination Dept	Allows users to view exam registration
FE-54	Update the exam supervisor for the exam room	Admin/Examination Dept	Ability to update the exam supervisor for the exam room
FE-55	[ZMP] View list of exam date	Exam Supervisor/IT Center	Allows exam supervisors to view list of exam date
FE-56	[ZMP] View list of exam hours for one day	Exam Supervisor/IT Center	Allows exam supervisors to view list of exam hours for one day
FE-57	[ZMP] Register to be exam supervisor	Exam Supervisor	Ability to register to be exam supervisor
FE-58	[ZMP] View list of my registration	Exam Supervisor/IT Center	Allows exam supervisors to view list of registration
FE-59	Approve registered slots that have exceeded quota	Admin/Examination Dept	Ability to approve registration slots that have exceeded the quota
FE-60	Update exam inspection and IT Support for the entire exam period	Admin/Examination Dept	Ability to update exam inspection and IT Support for the entire exam period
FE-61	Update exam inspectors, and IT Support for 1 day's exams	Admin/Examination Dept	Ability to update hallway monitors, exam inspectors, and IT support for 1 day's exams
FE-62	Update hallway supervisor for exam rooms	Admin/Examination Dept	Ability to update hallway supervisor for exam rooms
FE-63	Send exam notification email (automatic/manual)	Admin/Examination Dept	Allows users to send exam notification email
FE-64	View results and send email notification of exam viewing	Admin/Examination Dept	Ability to view results and send email notification of exam viewing
FE-65	Import exam codes for the exam period	Admin/Examination Dept	Ability to import exam codes for the exam period
FE-66	View the list of exam codes for the exam period	Admin/Examination Dept	Ability to view the list of exam codes for the exam period
FE-67	CRUD Exam code of the exam period	Admin/Examination Dept	Allows users to manage exam code for the exam period
FE-68	Send notifications about the open exam codes to the exam rooms.	Admin/Examination Dept	Allows users to send notifications about the open exam codes to the exam rooms
FE-69	Send notifications about the server being open to the exam rooms	Admin/Examination Dept	Allows users to send notification about the server being open to the exam rooms
FE-70	[ZMP] Get information about exam code and exam regulations for that subject	Exam Supervisor/IT Center	Ability to get information about the exam code and exam regulations for that subject
FE-71	View the list of exam supervisors by day	Admin/Examination Dept	Allows users to view list of exam supervisors by day

ID	Use Case	Actors	Use Case Description
FE-72	Update the status of receiving and resending paper exam documents	Admin/Examination Dept	Ability to update the status of receiving and resending paper exam documents
FE-73	Calculate payment costs for CBCT according to CB classification	Admin/Examination Dept	Ability to calculate payment costs for CBCT according to CB classification
FE-74	Export payment acceptance file according to the form	Admin/Examination Dept	Ability to export payment acceptance file according to the form
FE-75	[ZMP] Create a new issue for a candidate.	Exam Supervisor/IT Center	Ability to create a new issue for a candidate
FE-76	[ZMP] Tracking the status and feedback of the issue.	Exam Supervisor/IT Center	Ability to track the status and feedback of the issue
FE-77	[ZMP] Communicate with the handling staff about the issue.	Exam Supervisor/IT Center	Ability to communicate with the handling staff about the issue
FE-78	View the list of issue categories.	Admin/Examination Dept	Ability to view the list of issue categories
FE-79	CRUD issue categories.	Admin/Examination Dept	Ability to manage issues categories
FE-80	Automatic issues classification	Admin/Examination Dept	Ability to automatically issues classification
FE-81	Automatically suggest error handling methods	Admin/Examination Dept	Ability to automatically suggest error handling methods
FE-82	View list of issues	Admin/Examination Dept/Exam Supervisor/IT Center	Allows users to view list of the issues
FE-83	View the list of issues assigned to me	Exam Supervisor/IT Center	Allows users to view the issues assigned to me
FE-84	View list of issues by category	Exam Supervisor/IT Center	Ability to view list of issues by category
FE-85	View issue details.	Exam Supervisor/IT Center	Ability to view issue detail
FE-86	Change the status of the issue.	Exam Supervisor/IT Center	Ability to change the status of the issue
FE-87	Communicate with the exam supervisor about the issue.	Exam Supervisor/IT Center	Ability to communicate with the exam supervisor about the issue
FE-88	Create a request to transfer a student with an issue to the support room	Exam Supervisor/IT Center	Allows users to create a request to transfer a student with an issue to the support room
FE-89	Update student attendance in the exam room	Exam Supervisor/IT Center	Ability to update student attendance in the exam room
FE-90	[ZMP] View the list of students in the exam room from the exam supervisor	Exam Supervisor/IT Center	Allows user to view the list of students in the exam room from the exam supervisor
FE-91	[ZMP] Update student attendance in the exam room by the exam	Exam Supervisor/IT Center	Ability to update student attendance in the exam room by

ID	Use Case	Actors	Use Case Description
	supervisor using CCCD scanning		the exam supervisor by using CCCD scanning
FE-92	[Student] Confirm checkout exam session	Student	Allows students to confirm checkout exam session
FE-93	View notification list	Exam Supervisor/IT Center	Allows users to view notification list
FE-94	CRUD notification via Zalo/ Email	Admin/Examination Dept	Ability to manage notification via Zalo/Email
FE-95	[ZMP] View a list of notifications sent to me	Exam Supervisor/IT Center	Ability to view a list of notifications sent to me
FE-96	[ZMP] View notification details	Exam Supervisor/IT Center	Ability to view notification details
FE-97	View summary report by semester/exam period	Admin/Examination Dept	Allows to view summary report by semester/exam period
FE-98	View daily overview report	Admin/Examination Dept	Ability to view daily overview report
FE-99	Export summary report file by semester/exam period	Admin/Examination Dept	Ability to export summary report file by semester/exam period
FE-100	Export summary report file by day	Admin/Examination Dept	Ability to export summary report file by day

Table 3 - Use Case Description

3. Functional Requirements

3.1 System Functional Overview

3.1.1 Screens Flow

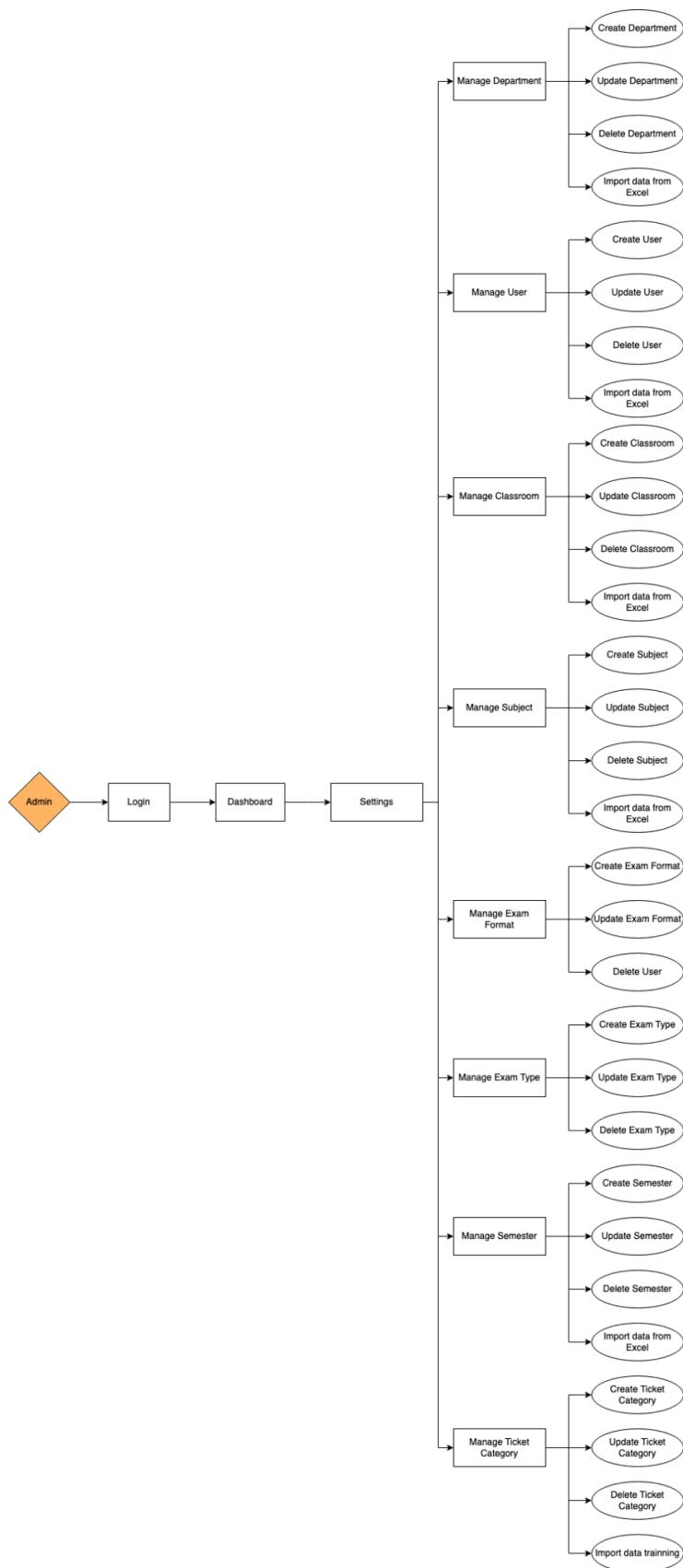


Figure 13 - Screen flow for Admin

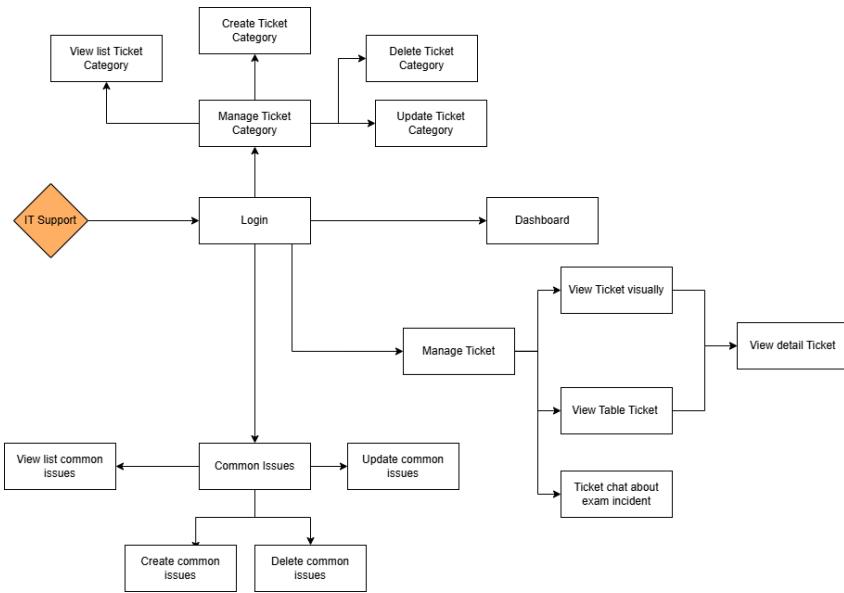


Figure 14 - Screen flow for IT Support

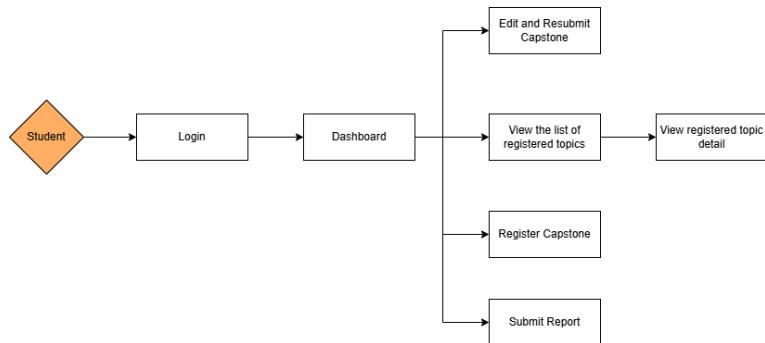


Figure 15 - Screen flow for Student

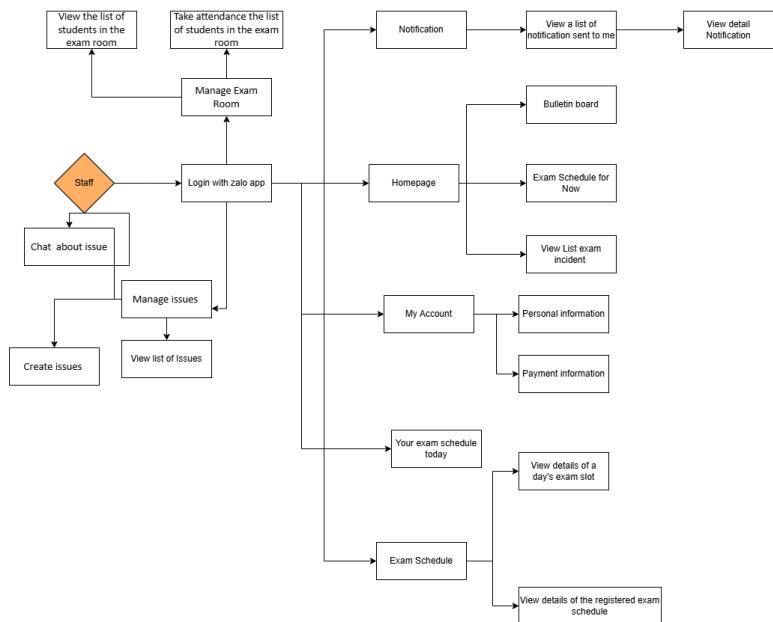


Figure 16 - Screen flow for Staff

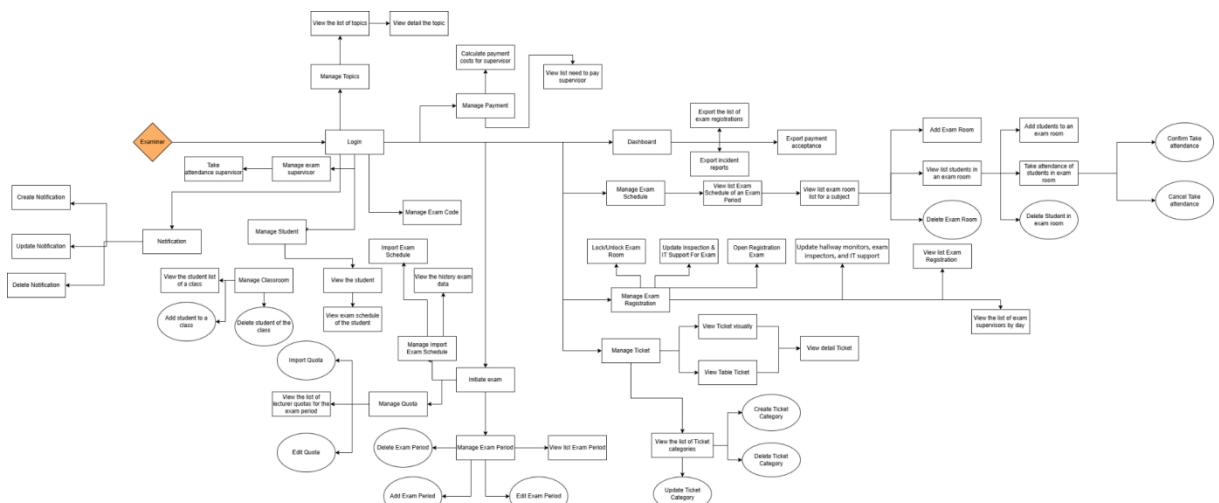


Figure 17 - Screen flow for Examiner

3.1.2 Screen Descriptions

#	Feature	Screen	Description
1	Sign in with Microsoft account	Login Screen	Allow users to log in to the system using their Microsoft account credentials.
2	Sign out	Dashboard	Enable users to securely log out from the system to protect their accounts
3	Sign in with Zalo account	Login with Zalo Screen	Allow users to log in using their Zalo account credentials.

#	Feature	Screen	Description
4	View list of users on the system.	View list Users Screen	Display a paginated list of all registered users with filtering and sorting options.
5	View and update user details	Edit User Screen	allow administrators to view and modify user information, such as name, email, and role.
6	Add users with access to the system	Add new User Screen	Provide functionality to create new user accounts with predefined roles.
7	Lock user account	Lock/Unlock User Screen	Allow administrators to deactivate a user's account to prevent system access.
8	Import users using Excel files	Import User Screen	Enable bulk user creation or updates by importing data from Excel files.
9	Update my payment information	Payment information screen	Allow users to update personal payment details, such as bank account or credit card information.
10	View list of departments	View list Departments Screen	Display a list of all departments within the system.
11	Create Department	Add Department Screen	Add a new department with a unique name and optional description.
12	Update Department	Edit Department Screen	Modify details of an existing department, such as name or description.
13	Delete Department	Delete Department Screen	Remove a department from the system, ensuring there are no dependencies.
14	View list of Rooms	View list Room Screen	Show all rooms, including their capacities and locations.
15	Create room	Add Room Screen	Add a new room with specifications like size, location, and facilities.
16	Update room	Edit Room Screen	Modify details of an existing classroom
17	Delete room	Delete Room Screen	Remove a room from the system after verifying it is not in use.
18	Import room via Excel file	Import Room Screen	Add or update multiple room using an Excel file.
19	View list of students of class	View the list student of a class Screen	Display a list of all registered students in the system.
20	Add student to a class	Add student to a class Screen	Add a new student record, including personal and academic details.
21	Delete student of the class	Delete student of the class Screen	Remove a semester from the system, ensuring no active data is linked.

#	Feature	Screen	Description
22	View list of semesters	View list of semesters Screen	Show all semesters, including start and end dates.
23	Create Semester	Add Semester Screen	Add a new semester with its academic year and time period.
24	Update Semester	Edit Semester Screen	Edit the details of an existing semester.
25	Delete Semester	Delete Semester Screen	Remove a semester from the system, ensuring no active data is linked.
26	Set semester as the current default semester	View list of semesters Screen	Designate a semester as the current active semester for all system operations.
27	View list of courses	View list of courses Screen	Display a list of available courses with filtering and sorting options.
28	Create course	Add Course Screen	Display a list of available courses with filtering and sorting options.
29	Update course	Edit Course Screen	Modify the details of an existing course.
30	Delete course	Delete Course Screen	Remove a course from the system.
31	Import course via Excel file	Import Course Screen	Bulk import course data using Excel files.
32	View list of exam types	View list of exam types Screen	Show all available types of exams, such as midterms or finals.
33	Create Exam Type	Add Exam Type Screen	Add a new exam type with specific settings.
34	Update Exam Type	Edit Exam Type Screen	Modify existing exam type information.
35	Delete Exam Type	Delete Exam Type Screen	Remove an exam type from the system.
36	View list of exam formats	View list of exam formats Screen	List the available formats for exams, such as written or oral.
37	Create Exam Format	Add Exam Format Screen	Add a new exam format.
38	Update Exam Format	Edit Exam Format Screen	Modify existing exam format details.

#	Feature	Screen	Description
39	Delete Exam Format	Delete Exam Format Screen	Remove an exam format from the system.
40	Change exam period	View list Exam Period s Screen	Update the scheduled date and time for a specific exam period.
41	View the list of classes in the semester	Manage Class room Screen	Show all classes for the current semester.
42	Add classes in the semester	Manage Class room Screen	Add new classes linked to the current semester.
43	Edit classes in the semester	Manage Class room Screen	Update the details of a class in the semester.
44	Import classes in the semester via an Excel file	Manage Class room Screen	Bulk import class data for the semester using Excel.
45	View the list of students in the class	View the list student in the class Screen	Display all students assigned to a specific class.
46	Add students to the class	Add Student to the class Screen	Assign students to a class.
47	Remove students from the class	Delete student o the class Screen	Unassign students from a class.
48	View the list of exam periods in the semester	View list of exam period Screen	List all exam periods scheduled for the semester.
49	Create exam period in the semester	Add exam period Screen	Add a new exam period.
50	Update exam period in the semester	Edit exam period Screen	Modify details of an existing exam period.
51	Delete exam period in the semester	Delete exam period Screen	Remove an exam period from the semester.
52	View the history of the exam data imports for the exam period	View the history of the exam data Screen	Display the import log of exam data for tracking changes.
53	View the list of exam rooms in the exam period	View list exam room list for a subject Screen	Display all rooms allocated for exams in a specific exam period.
54	Import the list of registration quotas in the semester	Import Quotas Screen	Bulk import quota data for exam registrations.

#	Feature	Screen	Description
55	View the list of registration quotas for the exam periods in the semester	View the list of lecturer quotas for the exam period Screen	Show available quotas for exam periods.
56	Update quota for the selected user	Edit Quota Screen	Modify the allocated quota for a user.
57	View the list of students in the exam room	View list students in an exam room Screen	Display a list of students assigned to a specific exam room.
58	Add students to the exam room	Add students to an exam room Screen	Assign students to an exam room for an upcoming exam.
59	Remove students from the exam room	Delete Student in exam room Screen	Unassign students from an exam room.
60	View the list of exams in the exam period	View list Exam of an Exam Period Screen	Show all exams scheduled within a specific exam period.
61	View the exam schedule of a student	View exam schedule of the student Screen	Display the detailed exam schedule for an individual student.
62	View the list of exam registration	View list Exam Registration Screen	Show all exam registrations, including student and supervisor assignments.
63	Open/Lock register to exam supervisor for the exam period	Update Inspection & IT Support For Exam Screen Screen	Enable or disable the registration process for exam supervisors during an exam period.
64	Open/Lock register to exam supervisor for the exam room	Lock/Unlock Exam Room Screen	Control the registration process for exam supervisors in specific exam rooms.
65	View exam registration details	View list Exam Registration Screen	Provide detailed information about exam registrations, such as student lists and room assignments.
66	Update the exam supervisor for the exam room	Update Inspection & IT Support For Exam Screen	Reassign or update the exam supervisor for a particular exam room.
67	[ZMP] View list of exam date	Exam Schedule Screen	Display the available dates for exams within the system.
68	[ZMP] View list of exam hours for one day	Exam Schedule Screen	Show the exam time slots for a selected date.
69	[ZMP] Register to be exam supervisor	Exam Schedule Screen	Allow users to register themselves as supervisors for an exam.

#	Feature	Screen	Description
70	[ZMP] View list of my registration	Exam Schedule Screen	Display all exams or tasks the user is registered for.
71	Approve registration slots that have exceeded the quota	View list Quota for Exam Period Screen	Allow administrators to manually approve registrations that exceed predefined quotas.
72	Update exam inspection and IT Support for the entire exam period	Update Inspection & IT Support For Exam Screen	Assign and update staff for inspection and technical support for all exams in a period.
73	Update hallway monitors, exam inspectors, and IT support for 1 day's exams	Update hallway monitors, exam inspectors, and IT support Screen	Manage staff assignments for specific exam days.
74	Import exam codes for the exam period	Manage Exam Code Screen	Bulk upload exam codes for use during an exam period.
75	View the list of exam codes for the exam period	Manage Exam Code Screen	Display all exam codes assigned for the current period.
76	Create Exam code of the exam period	Manage Exam Code Screen	Create new exam code for a specific exam period.
77	Update Exam code of the exam period	Manage Exam Code Screen	Modify details of an existing exam code.
78	Delete Exam code of the exam period	Manage Exam Code Screen	Remove an exam code from the system.
79	Send notifications about the open exam codes to the exam rooms	Manage Exam Code Screen	Notify relevant users about available exam codes.
80	Send notifications about the server being open to the exam rooms	Manage Exam Code Screen	Alert exam rooms about server availability for exam management.
81	[ZMP] Receive information about the exam code and exam regulations for the specific subject	Notification Screen	Provide exam supervisors with necessary details about codes and regulations.
82	[ZMP] View the list of candidates in the exam room	Notification Screen	Display the list of candidates assigned to an exam room.
83	View the list of exam supervisors by day	View the list of exam supervisors by day Screen	Display the list of candidates assigned to an exam room by day.

#	Feature	Screen	Description
84	Update the status of receiving and resending paper exam documents	Take attendance supervisor Screen	Allow supervisors to mark attendance by scanning student ID cards.
85	View the list of common issues	View Ticket visually Screen	Show all predefined issues and their solutions.
86	Create common issues and solutions	Create common issues Screen	Add a new issue type with a corresponding solution.
87	Update common issues and solutions	Update common issues Screen	Modify existing issue types or solutions.
88	Delete common issues and solutions	Delete common issues Screen	Remove an issue type from the system.
89	[ZMP] Create a new issues for a candidate	Create issues Screen	Allow exam supervisors to log an issue related to a specific student.
90	[ZMP] Tracking the status and feedback of the issue	View list of Issues Screen	Monitor the progress and responses related to logged issues.
91	[ZMP] Communicate with the handling staff about the issue	Chat about issue Screen	Enable direct communication with staff managing the issue.
92	View the list of issue categories	View the list of Ticket categories Screen	Display all categories of issues.
93	Create issue categories	Create Ticket Category Screen	Add a new category for classifying issues.
94	Update issue categories	Update Ticket Category Screen	Edit existing issue categories.
95	Delete issue categories	DeleteTicket Category Screen	Remove issue categories from the system.
96	View the list of issues	View Ticket visually Screen	Display all issues.
97	View the list of issues assigned to me	View Ticket visually Screen	Display all issues that have been specifically assigned to the current user for resolution or follow-up.
98	View the list of issues by category	View Ticket visually Screen	Show all issues grouped or filtered by their assigned categories for easier management and analysis.
99	View issue details	View detail Ticket Screen	Provide in-depth information about a specific issue, including its status, description, assignee, and any updates or resolutions.
100	Change the status of the issue	View detail Ticket Screen	Update the current status of an issue, such as marking it as "In Progress," "Resolved," or "Closed."
101	Communicate with the exam supervisor about the issue	View list students in an exam room Screen	Enable direct messaging or collaboration with the exam supervisor to discuss or resolve the issue.
102	Create a request to transfer a student with an issue to the support room	View list students in an exam room Screen	Generate a formal request to move a student with a specific issue to the designated support room for further assistance.

#	Feature	Screen	Description
103	Update student attendance in the exam room	View list students in an exam room Screen	Modify or confirm the attendance records of students in the assigned exam room.
104	[ZMP] View the list of students in the exam room from the exam supervisor	View the list of students in the exam room Screen	Allow exam supervisors to view the full list of students currently assigned to their exam room.
105	[ZMP] Update student attendance in the exam room by the exam supervisor using ID Card scanning	Take attendance the list of students in the exam room Screen	Enable exam supervisors to record student attendance by scanning their ID cards for quick and accurate updates.
106	View notification list	View notification list Screen	Show all system notifications.
107	Create Notification	Create Notification Screen	Add a new notification for users.
108	Update Notification	Update Notification Screen	Modify existing notifications.
109	Delete Notification	Delete Screen Notification	Remove notifications from the system.
110	[ZMP] View a list of notification sent to me	View a list of notification sent to me Screen	Display notifications received by the current user.
111	[ZMP] View notification details	View notification details Screen	Show details of a specific notification.
112	Calculate payment costs for supervisor according to supervisor classification	Calculate payment costs for supervisor Screen	Calculate payments for supervisors based on their roles and classifications.
113	Accept payment of wages for supervisor	View list need to pay supervisor Screen	Approve payment details and initiate the transfer process.
114	Export payment acceptance file according to form	Dashboard	Generate an exportable list of exam registrations for record-keeping.
115	Export incident reports for exams and semesters	Dashboard	Generate an exportable list of exam registrations for record-keeping.
116	Export the list of exam registrations for the exam period and semester	Dashboard	Generate an exportable list of exam registrations for record-keeping.

Table 4 - Screen Descriptions

3.1.3 Screen Authorization

Screen	Admin	IT Support	Examiner	Student	Staff
Login	X	X	X	X	
Logout	X	X	X	X	
Dashboard	X				

Screen	Admin	IT Support	Examiner	Student	Staff
Import Course	X				
Add Course	X				
View list Courses	X				
Edit Course	X				
Delete Course	X				
Edit Exam Format	X				
Add Exam Format	X				
View list Exam Formats	X				
Delete Exam Format	X				
Import Department	X				
Add Department	X				
Edit Department	X				
View list Departments	X				
Delete Department	X				
Add Exam Type	X				
View list Exam Types	X				
Edit Exam Type	X				
Delete Exam Type	X				
Import Room	X				
Edit Room	X				
Add Room	X				
Delete Room	X				
View list Rooms	X				
Add Semester	X				
Edit Semester	X				
View list Semesters	X				
Delete Semester	X				
Take attendance supervisor	X		X		
View the list student of a class	X		X		
Add student into class	X		X		
Delete student of the class	X		X		
View exam schedule of the student	X		X		
Import Exam Schedule	X		X		
Import Quota	X		X		
View the list of lecture quotas for the exam period	X		X		
Edit Quota	X		X		
View list Exam Period	X		X		
Edit Exam Period	X		X		
Add Exam Period	X		X		

Screen	Admin	IT Support	Examiner	Student	Staff
Delete Exam Period	X		X		
Import User	X				
View list Users	X				
Add new User	X				
Edit User	X				
Lock/Unlock User	X				
View list Exam Schedule of an Exam Period		X			
View list Exam Room for a subject		X		X	
Add Exam Room	X			X	
View list student in an exam room		X			
Delete Exam Room	X				
Add Student to an exam room		X		X	
Take attendance of students in exam room		X		X	
Delete Student in exam room		X		X	
Confirm Take attendance	X			X	
Cancel Take attendance	X			X	
Lock/Unlock Exam Room	X			X	
Update Inspection & IT Support For Exam		X		X	
Open Registration Exam	X			X	
Update Inspection & IT Support for exam		X		X	
View list Exam Registration	X			X	
View Ticket Visually	X	X		X	
View Table Ticket	X	X		X	
Ticket chat about exam incident		X		X	
Register Capstone					X
Submit Report					X
View Capstone Submission Status detail					X
Edit and Resubmit Capstone					X
Notification					X
Homepage Zalo					X
Personal information					X
Payment information					X
Your exam schedule today					X

Screen	Admin	IT Support	Examiner	Student	Staff
View detail of a day's exam slot					X
View details of the registered exam schedule					X
View list Exam incident resolved					X
Exam Schedule for Now					X
Bulletin board					X

Table 5 - Screen Authorization

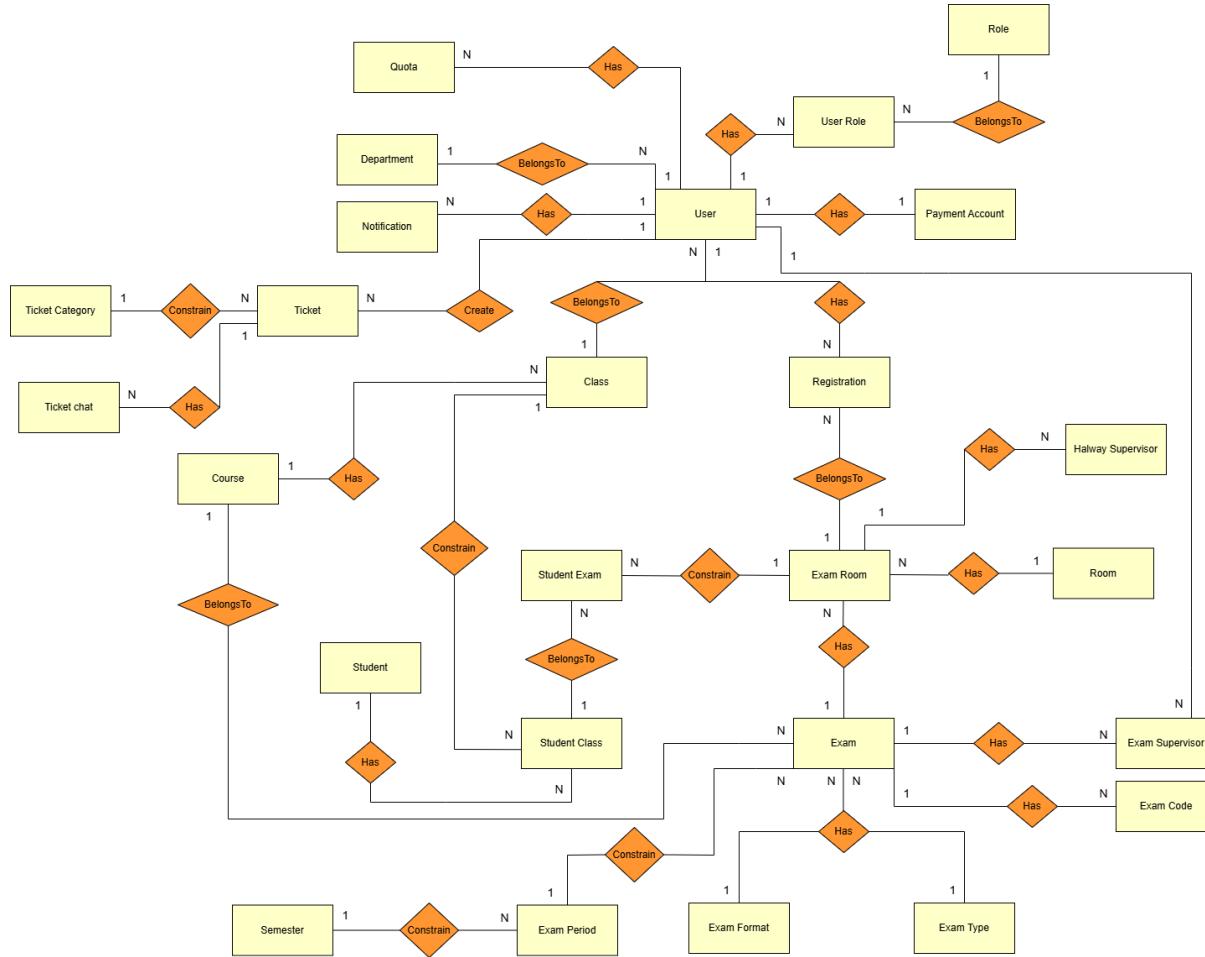
3.1.4 Non-Screen Functions

#	Feature	System Function	Description
1	Email Sending	Registration Exam	Sends email notifications to lecturers after successfully registering their exams. The email includes details such as exam title, schedule, duration, and a confirmation of the submission.
		Open Registration	Sends email announcements to lecturers informing them about the opening of exam registration periods. The email contains key details such as registration start and end dates, submission guidelines, and any relevant updates.
		Payment Invoice	Sends email notifications to lecturers with payment invoices for exam-related fees. The email provides a detailed breakdown of the charges, payment instructions, and a link to view or download the invoice.
2	Notification System	Manage Notification	Send real-time notifications to inform users about events such as frequent incidents, exam registration times, and more.
3	Notification on Zalo Platform	Send Exam Code	Automatically sends the exam code, including subject code, exam time, and location, to invigilators or lecturers via Zalo. This ensures timely and accurate delivery of essential exam details for better preparation.
		Send notify Open Server	Sends a notification via Zalo to inform relevant parties when the server for exam management is opened. This helps ensure everyone is aware and ready for system usage at the scheduled time.
4	Background Job Import Exam Schedule	Import ExamSchedule	It validates, processes, and imports exam schedules from Excel files while ensuring data accuracy and efficiency. It handles large files in chunks, logs the results, retries on failures, and integrates seamlessly with exam management modules.

#	Feature	System Function	Description
5	Reporting and Analytics	Dashboard	Automatically compile incident statistics from completed incidents.

Table 6 - Non-Screen Functions

3.1.5 Entity Relationship Diagram



Entities Description

#	Entity	Description
1	User	Entity representing a user in the FPT University system. Includes information such as name, email, password, role and related details.
2	Department	Manage departments and divisions in FPT University. Includes department name, department code and detailed description.
3	Quota	Define the criteria for the number of lecturers who must register to take exams during the semester.

4	Payment Account	Manage user payment accounts. Includes account number, bank and transaction details.
5	Role	Defines the user's role in the system. Roles can include: Administrator, Supervisor, Student.
6	User Role	Association between users and roles. Describes which users belong to which roles.
7	Class	Manage classes in the system during the semester. Including class name, lecture in charge and student list.
8	Registration	Stores the lecturer's exam registration information, including the exam room, exam subject, and status to know whether the lecturer is accepted to take the exam in that room.
9	Notification	Manage notifications sent to users. Including content, time and recipients. Some notifications such as Exam Code of each exam or exam registration notification
10	Exam	Manage exams in the system. Including exam name, date, and exam room list.
11	ExamRoom	Manage exam rooms. Includes room and exam subject information.
12	Room	Manage Room of the existing system of FPT University
13	Exam Period	Identify each payment period for each semester. Include start and end times.
14	Semester	Manage semesters during the school year. Includes information about the current semester and class roster.
15	Exam Type	Classify exams, e.g. FE, 2NFE,....
16	Exam Format	Definition of exam formats: EOS, PEA, Listening.
17	Ticket	Manage support requests from supervisors.
18	Ticket Category	Classify support requests: About exams, exam rooms, technical issues.
19	Ticket Chat	Stores a history of communications related to support requests.
20	Hallway Supervisor	Between the role of hallway monitor, exam supervisor support.
21	Exam Supervisor	Manage exam invigilator information, including invigilator list and exam shifts.
22	Student	Store student information: Name, student code, class. of FPT University
23	Student Exam	Manage the list of students taking which exams as well as check the attendance of students who are present for the exam.
24	Course	Store information about courses: Course name, Code..
25	Student Class	Manage student list in class
26	Exam Code	Manage the code to uniquely identify each exam subject.

Table 7 - Entities Description

3.2 Authentication

3.2.1 Sign in with Microsoft account & Google Account

Function trigger:

- **Navigation path:** sign-in
- **Timing Frequency:** On demand (whenever a user wants to log in to the system).

Function description:

- **Actors/Roles:** Admin, Examiner, IT Support
- **Purpose:** Allow users to log in to the system to use any feature in the system.
- **Interface:**
 - **Sign-in Screen:**
 1. “Đăng nhập với Google”: Button - A button to used to redirect to Google login page.”
 2. “Đăng nhập với Microsoft”: Button - A button to used to redirect to Google login page.
 3. “Giới thiệu”: Link - A link to redirect to About us page
 4. “Liên hệ”: Link - A link to open modal display contact information
 5. “FPT EDU”: Link - A link to redirect to fpt.edu.vn page
 - **Data processing:**
 - When a user is not logged in, the system will auto redirect to the Login page
 - The user click on “Đăng nhập với Google” button or “Đăng nhập với Microsoft” button
 - The system will redirect to the Login page of Google or Microsoft
 - The user logs in to the account
 - If the user have permission to access the system, the system will auto redirect to Dashboard
 - If user don't have permission to access the system, the system will auto redirect to Not Auth Page

Screen layout:



Figure 18 - Login Screen layout



Figure 19 - Not Auth Screen layout

Function details:

- **Data:** N/A
- **Validation:**
 - **Error Handling:** The system handles cases where the user does not have access to the system
 - Account exists in the database and is not locked
- **Business rules:** N/A
- **Normal case:** The user logs in with an available account => The system redirects to Dashboard
- **Abnormal case:** The user logs in with an account that doesn't have permission to access the system => The system displays the not auth page with the message "Oops, user <Account> don't have permission to access the platform."

3.2.2 Sign out

Function trigger:

- **Navigation path:** Click button “Đăng xuất” in the sidebar
- **Timing Frequency:** On demand (whenever a user wants to log out of the system).

Function description:

- **Actors/Roles:** Admin, Examiner, IT Support
- **Purpose:** Allow users to log out of the system, do not want to use features in the system at the current time.
- **Interface:**
 - **Logout Screen:**
 1. **“Đăng xuất”:** Button - A button used to logout”
- **Data processing:**
 - When a user is auth, user can logout to stop using any feature
 - The user clicks on “Đăng xuất” button
 - The system will logout and redirect to the Login page

Screen layout:

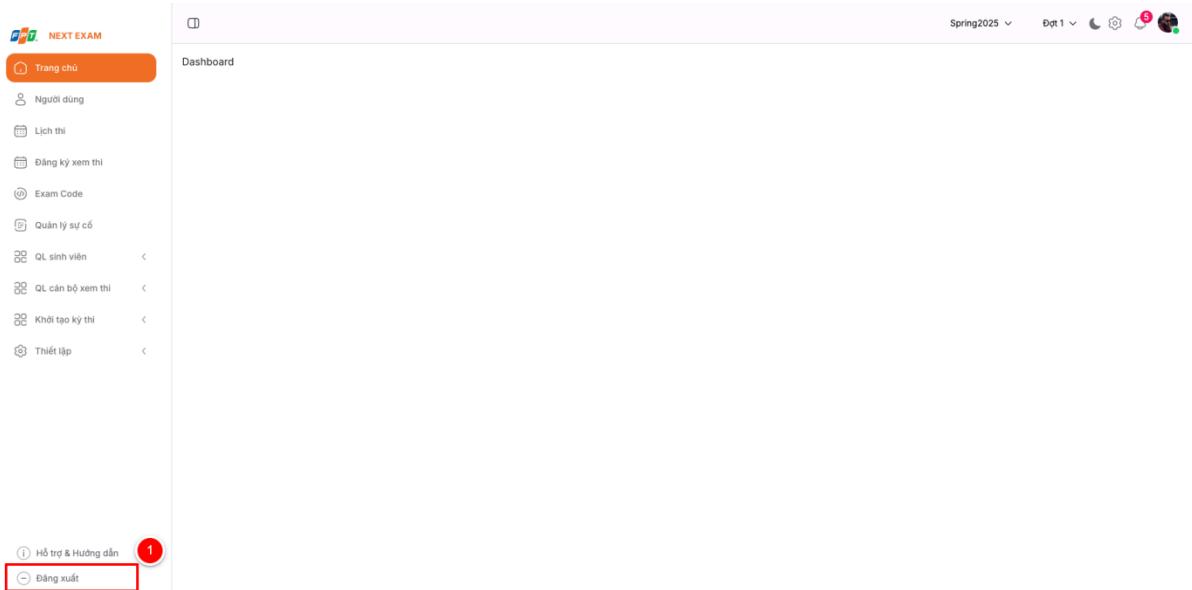


Figure 20 - Sign Out Layout

Function details:

- **Data:** Clear Cookies when logout
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** After logout, the user will be redirected to the Login screen
- **Abnormal case:** (None)

3.2.2 Sign in with zalo account

Function trigger:

- **Navigation path:** Turn on the Zalo app -> “Khám Phá”-> Mini app -> Find the name “FPT University Exam”
- **Timing demand:** On demand (whenever an user want to log in to the Zalo mini app system with their Zalo account)

Function description:

- **Actors/Roles:** user
- **Purpose:** Allow users to log in to the Zalo mini app with Zalo account.
- **Interface:**
 - **Login screen:**
 1. **“Liên kết với số điện thoại” (1):** Button - Button to connect with the user phone number which is their Zalo account in order to access the app.
 2. **Tùy chọn và thoát (2):** Button - Button to exit the app.
- **Data processing:**
 - The user must have a Zalo account.
 - The user accesses the login page by successfully finding the FPT University Exam mini app on Zalo app.
 - The user press on the “Liên kết với số điện thoại” to access the app
 - The system finds the phone number of the user who needs to be accessed in the database.
 - If the phone number exists, the user will be redirect to the dashboard of the app

- If the phone number does not exists, the system will display the message “Đã có lỗi xảy ra vui lòng thử lại sau”

Screen layout:



Figure 21 - Zalo Mini App Login Screen layout

Function details:

- **Data:** The function handles the Code and any descriptions of an existing phone number.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Successfully login into the system, redirect user to the dashboard of the app.
- **Abnormal case:** The system handles potential errors during user updating submission and displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed

3.3 User

3.3.1 View list of users on the system.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Người dùng”
- **Timing demand:** On demand (whenever an administrator want to view the list of user of the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently view all users in the system.
- **Interface:**

- **View list of users screen:**
 1. **Table Users:** Displays a structured table containing information about each exam format. Includes columns such as: Full Name, Department, Role, Phone Number, Email, Action (Edit, Lock) per row
 2. **Search bar:** A search box for users to enter a name and find specific users.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Selected:** Displays the number of rows the user has selected
 5. **Number of columns each row:** Ability to choose the number of columns each row.
- **Data processing:**
 - User clicks on the User icon on the side bar
 - The system fetches the member list for that user from the database.
 - The system displays the user list in a row-by-row format, including the full name, department, role, phone number, email, and an option like edit and lock.

Screen layout:

The screenshot shows a user interface for managing users. On the left is a sidebar with navigation links: Trang chủ, Người dùng (highlighted in orange), Lịch thi, Đăng ký xem thi, Exam Code, Quản lý sự cố, QL sinh viên, QL cán bộ xem thi, Khởi tạo kỳ thi, Thiết lập, Hỗ trợ & Hướng dẫn, and Đăng xuất. The main area is titled 'DANH SÁCH NHÂN SỰ' and contains a table of users. The table has columns: HỌ VÀ TÊN, PHÒNG BAN, VAI TRÔ, SỐ ĐIỆN THOẠI, EMAIL, and TÙY CHỌN. The data in the table is:

HỌ VÀ TÊN	PHÒNG BAN	VAI TRÔ	SỐ ĐIỆN THOẠI	EMAIL	TÙY CHỌN
Admin User	Admin Department	Quản trị viên	0828828497	admin@example.com	
Bao Pham	Staff Department	Giám thị	0828828497	BaoPG@nextexam.tech	
ThangTVB	IT	Hỗ trợ IT	0703468262	thangtvb.dev@gmail.com	

At the top right, there are buttons for 'Import từ Excel', 'Thêm người dùng mới', and user profile icons. Below the table, there are buttons for 'Số hàng mỗi trang' (10) and navigation arrows. Red numbers 1 through 5 are overlaid on the interface to point to specific UI elements: 1 points to the 'TÙY CHỌN' column header, 2 points to the search bar, 3 points to the 'Hiển thị cột' button, 4 points to the checkbox header, and 5 points to the page size dropdown.

Figure 22 - View List User Screen layout

Function details:

- **Data:**
 - The function retrieves and displays users details, including: full name, department, role, phone number, email and actions (Edit, Lock). It may also include additional information based on the applied filtering and sorting options.
 - **Search by Name:** Allows admins to search for users by name and displays matching results.
 - **Sort and Filter List:** Allows admins to sort and filter the member list based on criteria like name or description displaying the filtered and sorted results.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "User" in database exists. => Display list of user
- **Abnormal case:** There is no data from table "User" in the database. => Display message

“Không có dữ liệu”.

3.3.2 View and update user details.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Người dùng” -> Edit Icon
- **Timing demand:** On demand (whenever an administrator want to view the and manage update information of each user of the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently view each users information (role, full name, email, phone number, department gender) and be able to update information for each user in the system.
- **Interface:**
 - **Update information of users screen:**
 1. **“Phân quyền”:** Radio Button - A button allow admin to view user role and able to change it
 2. **“Họ và tên”:** Textbox - A field to display the name of the user and able to change the name of the user
 3. **“Email”:** Textbox - A field to display the email of the user and able to change email of the user
 4. **“Số điện thoại”:** Textbox - A field to display the phone number of the user and able to change phone number
 5. **“Phòng ban”:** Dropdown - a drop down to display the department of the user and able to change department
 6. **“Giới tính”:** Dropdown - a drop down to display the gender of the user and able to change gender
 7. **“Xác nhận”:** Button - a button to submit update information
- **Data processing:**
 - The user navigates to the "Danh sách nhân sự" screen and clicks the pencil icon.
 - The update information of the user screen display.
 - The user changes necessary information and clicks the “Xác nhận” button.
 - The system validates the entered information (e.g. checks for empty fields, possibly checks for file type or size).
 - If the validation is successful, the system updates the new information to the database.
 - The system displays a success message: "Chỉnh sửa người dùng thành công".
 - The new information is displayed on the user screen.

Screen layout:

The screenshot shows the 'View and Update User Information' screen. At the top, there's a header with the application logo 'NEXT EXAM' and navigation links like 'Trang chủ', 'Người dùng' (highlighted in orange), 'Lịch thi', 'Đăng ký xem thi', 'Exam Code', 'Quản lý sự cố', 'QL sinh viên', 'QL cán bộ xem thi', 'Khởi tạo kỳ thi', 'Thiết lập', 'Hỗ trợ & Hướng dẫn', and 'Đăng xuất'. The main content area has a title 'CHỈNH SỬA THÔNG TIN CỦA THANGTVB'. It displays a user profile for 'ThangTVB' with the role 'Giám thí'. Below this, there are several input fields with validation errors indicated by red numbers: 'Phân quyền*' (Role) with value '1' (error 1), 'Họ và Tên*' (Name) with value 'ThangTVB' (error 2), 'Email*' (Email) with value 'thangtvb.dev@gmail.com' (error 3), 'Số điện thoại*' (Phone Number) with value '0703468262' (error 4), 'Phòng ban*' (Department) with value 'IT' (error 5), and 'Giới tính*' (Gender) with value 'Nam' (error 6). At the bottom right is a large orange button labeled 'Xác nhận' (Confirm) with a small red number '7' above it.

Figure 23 - View and Update User Information Screen layout

Function details:

- **Data:** The function retrieves and displays users details, including: full name, department, role, phone number, email, department and gender and the ability to change user information.
- **Validation:** (None)
- **Business rules:** Each user has only one role.
- **Normal case:** Update user successfully, new data is saved to the database, the user will be redirected to the “Người dùng” screen and display message “Chỉnh sửa người dùng thành công” .
- **Abnormal case:**
 - The system handles potential errors during user updating submission and displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed

3.3.3 Add users with access to the system.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Người dùng”-> “Thêm người dùng mới” button
- **Timing demand:** On demand (whenever an administrator want to create new user of the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently create users in the system.
- **Interface:**
 - **Create new user screen:**
 1. **“Phân quyền”:** Radio Button - A button allow admin to view user role and able to change it
 2. **“Họ và tên” :** Textbox - A field to display the name of the user and able to change the name of the user
 3. **“Email”:** Textbox - A field to display the email of the user and able to change email of the user

4. “Số điện thoại”: Textbox - A field to display the phone number of the user and able to change phone number
5. “Phòng ban”: Dropdown - a drop down to display the department of the user and able to change department
6. “Giới tính”: Dropdown - a drop down to display the gender of the user and able to change gender
7. “Xác nhận”: Button - a button to submit update information

- **Data processing:**

- The user navigates to the "Danh sách nhân sự" screen and clicks the "Thêm người dùng mới" button.
- The "Tạo người dùng mới" screen display.
- The user fills in the necessary information and clicks the "Xác nhận" button.
- The system validates the entered information (e.g. checks for empty fields, possibly checks for file type or size).
- If the validation is successful, the system creates a new user and saves to the database.
- The system displays a success message: "Tạo người dùng mới thành công".
- The new information is displayed on the user screen.

Screen layout:

The screenshot shows the 'TẠO NGƯỜI DÙNG MỚI' (Create New User) form. The left sidebar lists various administrative functions: Trang chủ, Lịch thi, Đăng ký xem thi, Exam Code, Quản lý sự cố, QL sinh viên, QL cán bộ xem thi, Khởi tạo kỳ thi, Thiết lập, Hỗ trợ & Hướng dẫn, and Đăng xuất. The main form has the following fields:

- Phân quyền*** (1): Radio buttons for Quản trị viên, Khảo thí, Hỗ trợ IT, and Giám thị.
- Họ và Tên*** (2): Input field labeled 'Nhập họ và tên'.
- Email*** (3): Input field labeled 'Nhập email'.
- Số điện thoại*** (4): Input field labeled 'Nhập số điện thoại'.
- Phòng ban*** (5): Dropdown menu labeled 'Chọn phòng ban'.
- Giới tính*** (6): Dropdown menu labeled 'Chọn giới tính'.
- Tạo mới** (7): Orange button at the bottom right.

Figure 24 - Add User With Access Screen layout

Function details:

- **Data:** The function processes the information of a new user.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Create new user successfully, new data is saved to the database then redirect user to “Người dùng” screen and display message “Tạo người dùng mới thành công” include a new row with new user display on “Người dùng” screen .
- **Abnormal case:** The system handles potential errors during user updating submission and displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed

3.3.4 Lock user accounts.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Người dùng” -> Lock icon
- **Timing demand:** On demand (whenever an administrator want to lock user of the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently lock user in the system.
- **Interface:**

- **Lock users screen:**

1. “Xác nhận”: Button - Button to lock the user.
2. “Hủy bỏ”: Button - button to cancel the action.

- **Data processing:**

- The user navigates to the "Danh sách người dùng" screen and click the lock icon.
- The system finds the id of the user who needs to be locked.
- Show confirm modal User confirm lock
- The user selected for locking will be unable to access the system..

Screen layout:

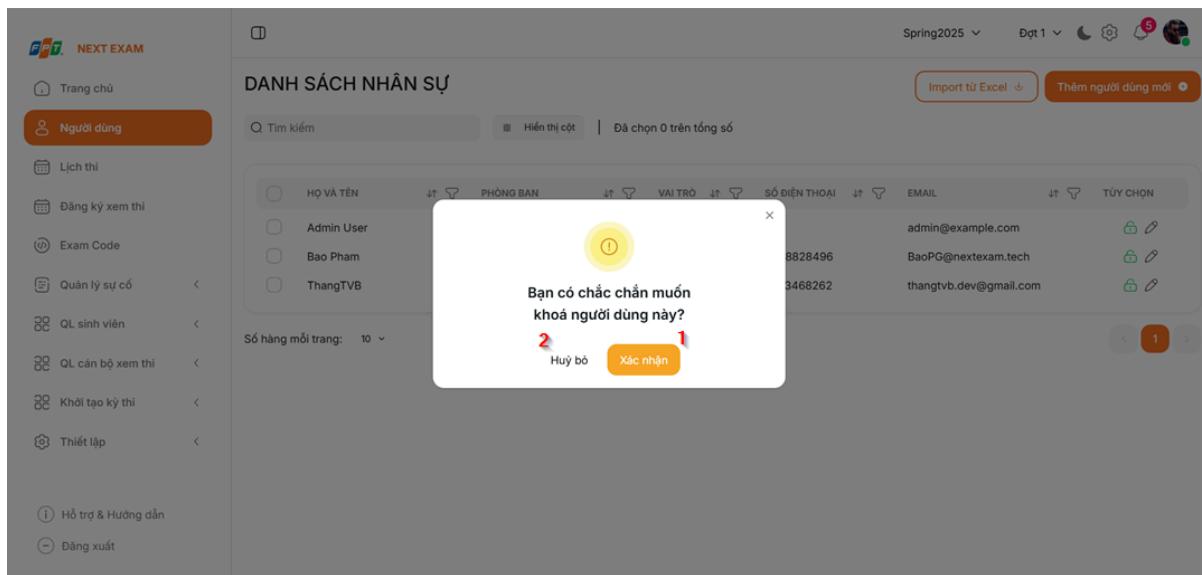


Figure 25 - Lock User Account Screen layout

Function details:

- **Data:** The function handles the Code and any descriptions of an existing user.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Successfully locking user. => That user can not access the system anymore
- **Abnormal case:** The system handles potential errors during user updating submission and displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed

3.3.5 Import users using Excel files.

Function trigger:

- **Navigation path:** “Người dùng” → “Import từ excel”
- **Timing Frequency:** On demand (whenever an admin wants to upload a list of users in the system).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to import a list of user in the system
- **Interface:**
 - **View list of Users Screen:**
 1. **[Import từ excel] button:** A button that triggers opening the importing modal when the user clicks on it
 - **Import user Screen:**
 2. **Drop Zone:** A drag-and-drop area with the text "Kéo thả hoặc chọn để tải lên file dữ liệu".
 3. **Button [Tải mẫu]:** Allows downloading the sample Excel template.
 4. **Button [Hủy]:** Cancels the upload process and closes the modal.
 5. **Button [Xác nhận]:** Submits the uploaded file for processing.
- **Data processing:**
 - The admin clicks the "Import từ Excel" button to open the modal.
 - The admin drags and drops or selects the Excel file for upload.
 - The system validates the format and data in the Excel file against the template.
 - If validation passes:
 - The system inserts the data into the "users" table in the database.
 - A success message is displayed, and the user table is refreshed with the new data.
 - If validation fails:
 - The system displays an error message with details of the validation errors.

Screen layout:

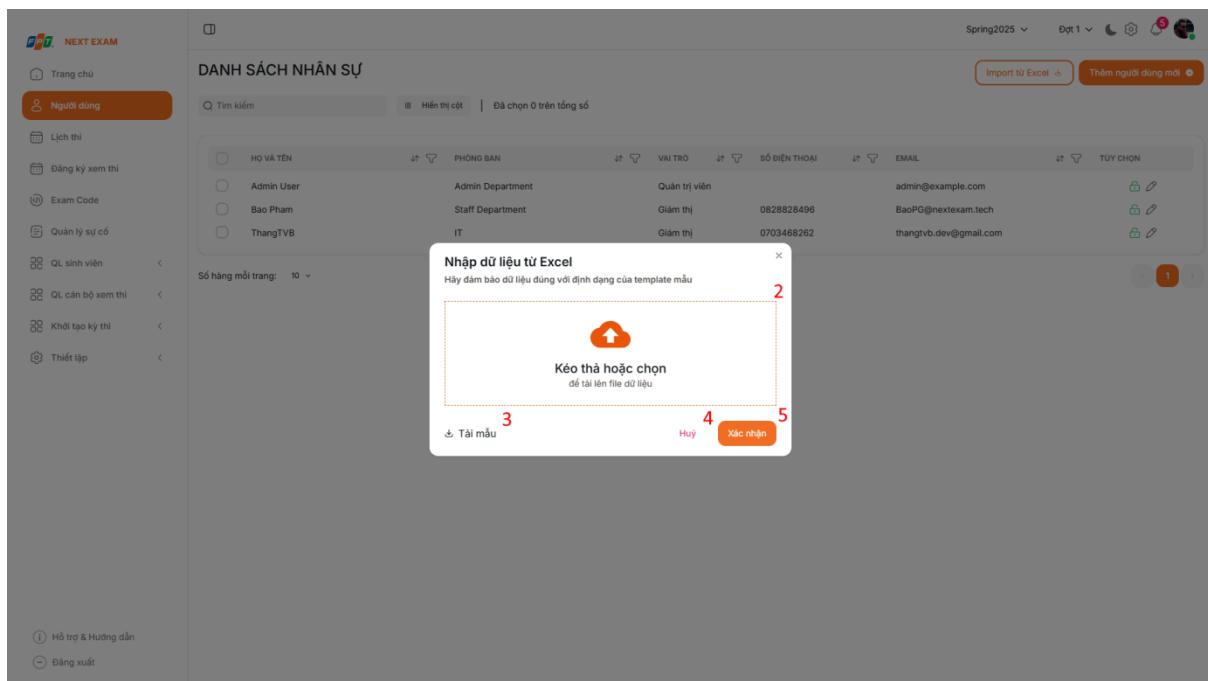


Figure 26 - Import User By Excel Screen layout

Function details:

- **Data:**
 - Excel file containing user data in the specified format.
- **Validation:**
 - The file must be in Excel format (.xlsx or .xls).
 - The data must follow the structure and constraints defined in the sample template (e.g., required fields, valid department/role values).
- **Business rules:**
 - The system must prevent duplicate entries based on unique identifiers (e.g., email or username).
- **Normal case:** If the file is valid and the data is successfully processed, the system displays a success message and updates the user table.
- **Abnormal case:** If the file is invalid or contains errors, the system displays an error message highlighting the specific issues.

3.4 System configuration

3.4.1 View list of departments

Function trigger:

- **Navigation path:** "Thiết Lập" → "Phòng ban"
- **Timing Frequency:** On demand (whenever an admin wants to view the list of departments in the system).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to quickly and efficiently view all of the Departments
- **Interface:**
 - **View list of Department Screen:**
 1. **Table Department:** Displays a structured table containing information about each Department. Includes columns such as Department code, Department name, Description, Action (Edit, Delete) per row
 2. **Search bar:** A search box for users to enter a name and find a specific Department.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Selected:** Displays the number of rows the user has selected
 - **Data processing:**
 - Admin clicks on the "Thiết lập" icon and selects "Phòng ban"
 - The system will get the list of exam formats from the "department" table in the database.
 - The system displays the Departments list in a row-by-row format, including the exam format name, description, and an option like edit and delete.

Screen layout:

Figure 27 - View List Of Department Screen layout

Function details:

- Data:** The function retrieves and displays department details, including: Department code, department name, description, action (Edit, Delete). It may also include additional information based on the applied filtering and sorting options.
- Validation:** (None)
- Business rules:** (None)
- Normal case:** Data from table "department" in database exists. => Display list of departments
- Abnormal case:** There is no data from table "department" in the database. => Display message "Không có dữ liệu".

3.4.2 Create department.

Function trigger:

- Navigation path:** "Thiết Lập" → "Phòng ban" → "Tạo phòng ban"
- Timing Frequency:** On demand (whenever an admin wants to create a new department in the system).

Function description:

- Actors/Roles:** Admin
- Purpose:** Allows admin to create a new department in the system
- Interface:**
 - Create a new Department Screen:**
 - Field [Mã phòng ban]:** A field that is used to input the code of the department.
 - Field [Tên phòng ban]:** A field that is used to input the name of the department.
 - Field [Mô tả]:** A field that is used to input the description of the department.
 - Button [Hủy]:** A button that handle the cancellation of users.

5. **Button [Tạo]:** A button that handles the submission of creating a new department.

- **Data processing:**

- Admin clicks on [**Tạo phòng ban**] button at the [**View list of Department**] page, and fill all of the fields, then click [**Tạo**] inside the [**TẠO MỚI PHÒNG BAN**] modal to submit the creation of a new semester
- The system will validate the input data and then insert into the “department” table in the database.
- The system will display a succession message after the input data is completely inserted into the database as well as refresh the table.

Screen layout:

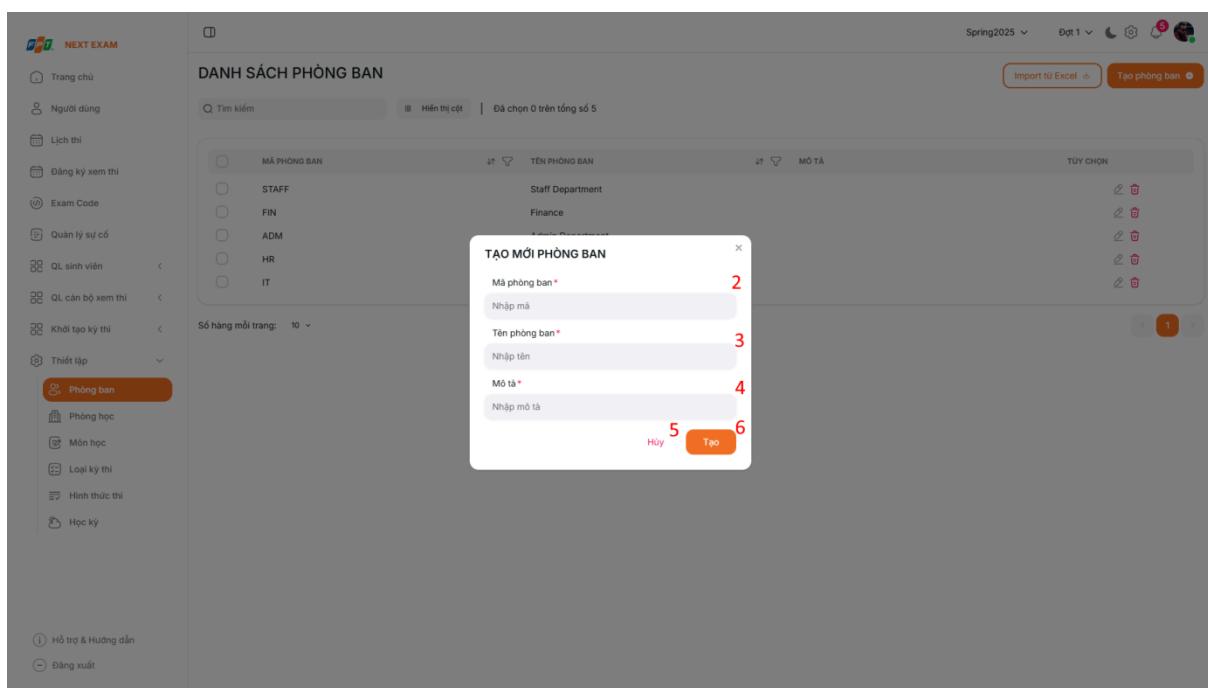


Figure 28 - Create Department Screen layout

Function details:

- **Data:** (None)
- **Validation:**
 - **Department code:** Must not be empty and should be unique
 - **Department name:** Must not be empty
- **Business rules:** (None)
- **Normal case:** If the input data passes all validation checks, and the Department is successfully added, the system will show a succession message.
- **Abnormal case:** If one of the validations is not passed, an error message will be shown.

3.4.3 View and Update department.

Function trigger:

- **Navigation path:** “Thiết Lập” → “Phòng ban” → “Chỉnh sửa”(Edit icon in each row of the table)
- **Timing Frequency:** On demand (whenever an admin wants to update a department in the system).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to update a specified department in the system
- **Interface:**
 - **Update a Department Screen:**
 1. **Field [Mã phòng ban]:** A field that is used to input the code of the department.
 2. **Field [Tên phòng ban]:** A field that is used to input the name of the department.
 3. **Field [Mô tả]:** A field that is used to input the description of the department.
 4. **Button [Hủy]:** A button that handle the cancellation of users.
 5. **Button [Cập nhật]:** A button that handles the submission of updating a department.
- **Data processing:**
- The admin clicks on the **[Chỉnh sửa]** button for a specific semester in the **[View list of Department]** page.
 - The **[CHỈNH SỬA PHÒNG BAN]** modal appears.
 - The admin makes changes to the fields as required and clicks **[Cập nhật]** to save the updates.
 - The system validates the input data and updates the changes in the “department” table in the database.
 - A success message is displayed after the input data is completely updated in the database. The table is then refreshed.

Screen layout:

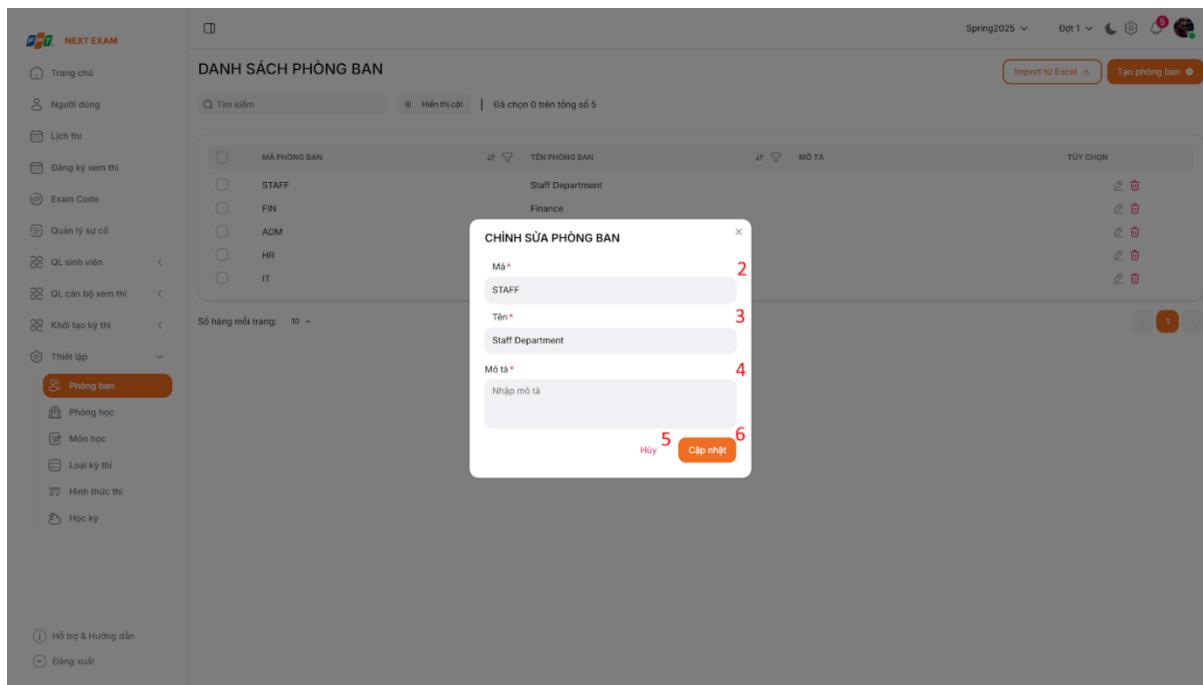


Figure 29 - View And Update Department Information Screen layout

Function details:

- **Data:** The old data got from the row inside the table
- **Validation:**
 - **Department code:** Must not be empty and should be unique
 - **Department name:** Must not be empty
 - **Description:** Must not be empty
- **Business rules:** (None)
- **Normal case:** If the input data passes all validation checks and the department is successfully updated, the system will show a success message.
- **Abnormal case:** If one of the validations is not passed, an error message will be shown.

3.4.4 Delete department.

Function trigger:

- **Navigation path:** "Thiết Lập" → "Phòng ban" → "Xóa" (Delete icon in each row of the table)
- **Timing Frequency:** On demand (whenever an admin wants to delete a department in the system).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to delete a specified department in the system
- **Interface:**
 - **Delete a Department Screen:**
 1. **Button [Hủy bỏ]:** Cancels the deletion process and closes the modal.
 2. **Button [Xóa]:** Confirms the deletion of the department.
- **Data processing:**

- The admin clicks on the delete icon for a specific semester in the [View list of Departments] page.
- The system displays the confirmation modal.
- If the admin clicks [Xóa], the system validates and permanently deletes the department from the “department” table in the database.
- A success message is displayed after the department is successfully deleted. The table is refreshed to reflect the changes.
- If the admin clicks [Hủy bỏ], the modal closes without making any changes

Screen layout:

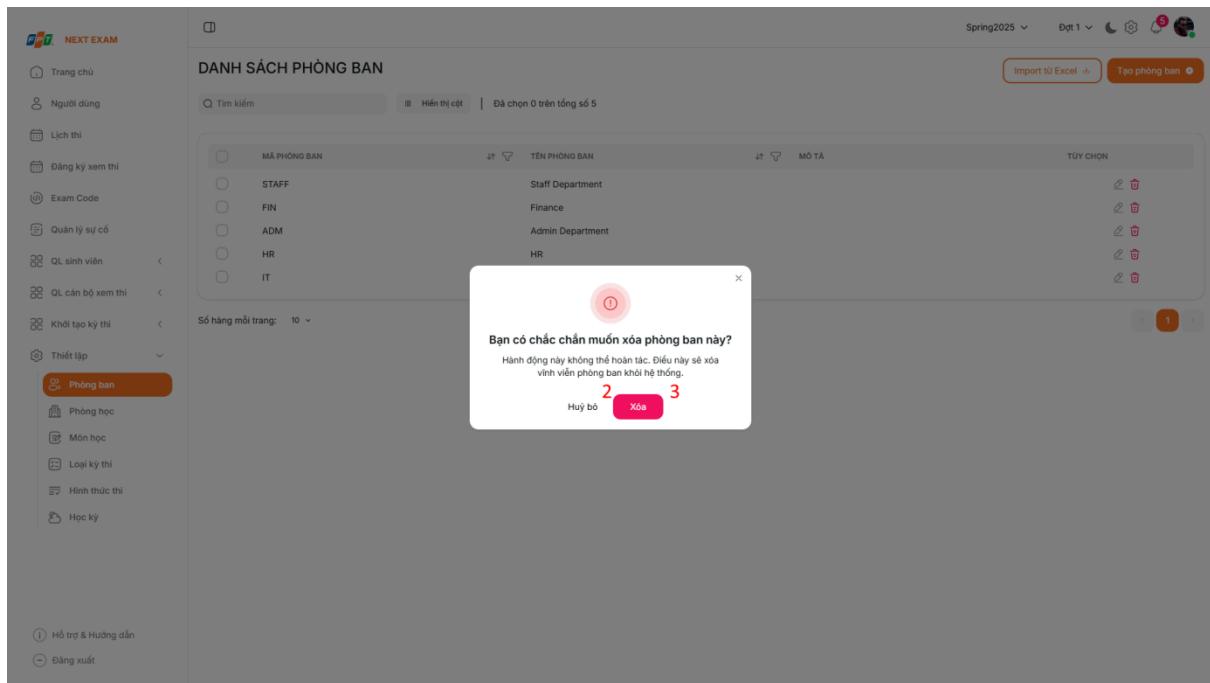


Figure 30 - Delete Department Screen layout

Function details:

- Data:** (None)
- Validation:** (None)
- Business rules:** (None)
- Normal case:** If the semester is successfully deleted, the system displays a success message.
- Abnormal case:** If the semester cannot be deleted due to dependencies or errors, the system shows an error message.

3.4.5 View list of classrooms.

Function trigger:

- Navigation path:** “Thiết Lập” -> “Phòng học”
- Timing Frequency:** It is on demand (whenever an admin wants to view the list of classrooms in a system).

Function description:

- Actors/Roles:** Admin

- **Purpose:** Allows admin to quickly and efficiently view all available classrooms, ensuring easy management of classrooms
- **Interface:**
 - **View list of classrooms Screen:**
 - Table Classrooms:** Displays a structured table containing information about each classroom. Includes columns such as Room name, Building, Action (Edit, Delete) per row
 - Search bar:** A search box for users to enter a name and find a specific classroom.
 - Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 - Selected:** Displays the number of rows the user has selected
 - Rows per page:** Display the number of rows the user wants to see.
 - Pagination:** Navigate to other data pages.
- **Data processing:**
 - Admin clicks on the “Thiết lập” icon and selects "Phòng học"
 - The system will get the list of classrooms from the "Rooms" table in the database.
 - The system displays the classrooms list in a row-by-row format, including the room name, building, and an option like edit and delete.

Screen layout:

PHÒNG HỌC	TÒA NHÀ
Alpha 287	Gamma
Gamma 302	Alpha
Gamma 303	Gamma
Gamma 304	Gamma
Gamma 305	Gamma
Gamma 306	Gamma
Gamma 307	Gamma
Gamma 308	Gamma
Gamma 311	Gamma
Gamma 312	Gamma

Figure 31 - View list of rooms

Function details:

- **Data:** The function retrieves and displays room details, including: Room name, Building, Actions (Edit, Delete). It may also include additional information based on the applied filtering and sorting options.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Rooms" in database exists. => Display list of classrooms.
- **Abnormal case:** There is no data from table "Rooms" in the database. => Display message “Không có dữ liệu”.

3.4.6 Create a classroom.

Function trigger:

- **Navigation path:** "Thiết Lập" -> "Phòng học" -> "Thêm mới"
- **Timing Frequency:** On demand (whenever an examiner wants to create new classrooms).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Provides examiners with the ability to create new classrooms, support customization, and manage and organize classrooms for a variety of needs.
- **Interface:**
 - **Create a new classroom Screen:**
 1. **"Phòng học"**: Text field - A field entering the name of the classroom.
 2. **"Tòa nhà"**: Dropdown - A field for choosing the building of the classroom includes "Alpha", "Beta", "Gamma".
 3. **"Lưu"**: Button - A button to submit the new classroom.
 4. **"Huỷ"**: Button to clear all content on the page and start over.
 - **Data processing:**
 - The user navigates to the "Phòng học" screen and clicks the "Thêm mới" button.
 - The "Thêm mới" screen is displayed.
 - The user enters the name and building
 - The user clicks the "Lưu" button.
 - The system validates the entered information (e.g. checks for empty fields, duplicate rooms).
 - If the validation is successful, the system sends the exam format to the server.
 - The system displays a success message: "Thêm mới phòng học thành công."
 - The new classroom is added to the classrooms list on the "Room" table.

Screen layout:

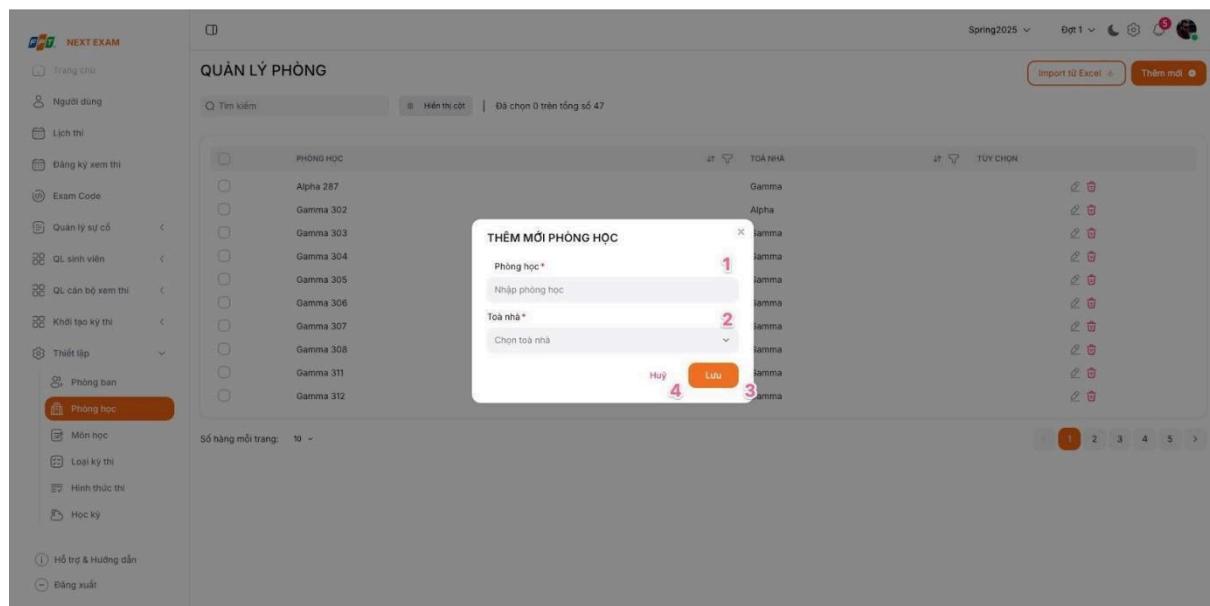


Figure 32 - Create Classroom Modal

Function details:

- **Data:** The function processes the room name and building.

- **Validation:**
 - **Error Handling:** The system handles potential errors during classroom submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
 - **"Phòng học":** This field is required.
 - **"Building":** This field is required.
 - Room name and Building is not exist in database
- **Business rules:** Each building just has one classroom name
- **Normal case:** Valid input provided (unique classroom name, filled fields) => The system creates the classroom, saves it in the database, and displays: "Thêm mới phòng học thành công.".
- **Abnormal case:** Classroom name already exists => The system displays appropriate error messages "Phòng học đã tồn tại."

3.4.7 View and Update classroom.

Function trigger:

- **Navigation path:** "Thiết lập" -> "Phòng học" -> Edit Icons
- **Timing Frequency:** On demand (whenever an examiner wants to edit an existing exam format).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow Admin to update classroom to suit their needs
- **Interface:**
 - **Update classroom Screen:**
 1. **"Phòng học":** Text field - A field that displays the class name of the class selected to update.
 2. **"Tòa nhà":** Dropdown - A field that displays the class name of the class selected to update includes "Alpha", "Beta", "Gamma".
 3. **"Lưu"** Button - A button to submit an updated classroom.
 4. **"Huỷ"**: Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Phòng học" screen and clicks on the edit icon for the row the user wants
 - The "Cập nhập phòng học" screen is displayed.
 - The classroom name and building are edited
 - The user clicks on the "Lưu" button.
 - The system validates the entered information (e.g. checks for empty fields).
 - If the validation is successful, the system sends the classroom to the server.
 - The system displays a success message: "Cập nhật phòng học thành công.".
 - The classroom selected for editing will be updated and the new classroom will be displayed on the classrooms table.

Screen layout:

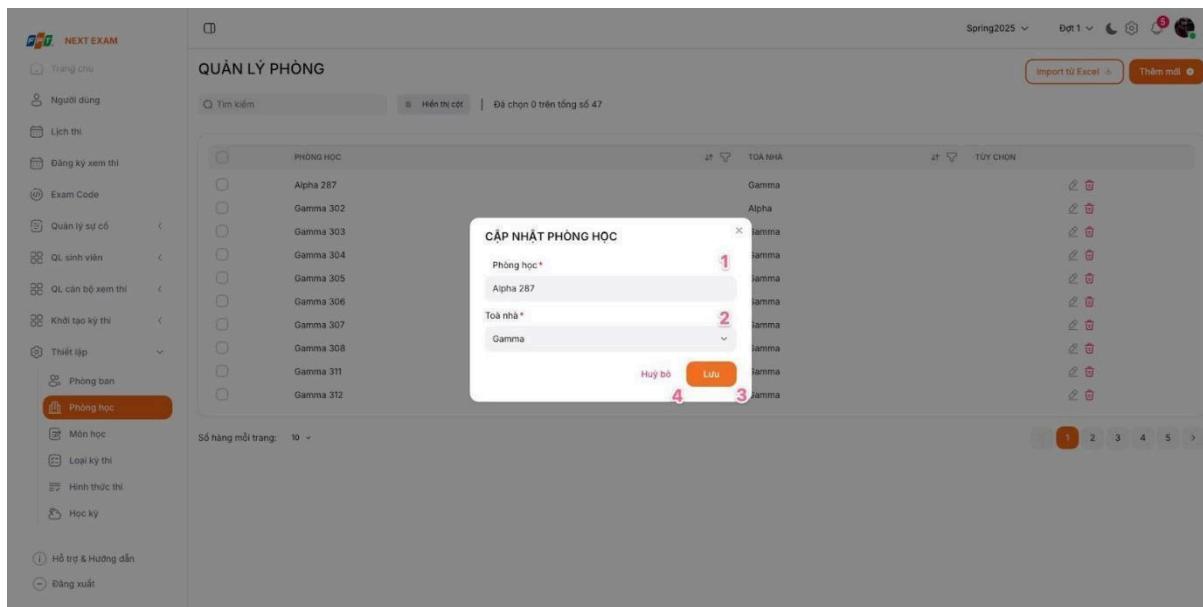


Figure 33 - Update Classroom Modal

Function details:

- **Data:** The function handles the classroom name and building of an existing classroom.
- **Validation:**
 - **Error Handling:** The system handles potential errors during classroom submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
 - **"Phòng học":** This field is required.
 - **"Building":** This field is required.
 - Room name and Building is not exist in database
- **Business rules:** Each building just has one classroom name
- **Normal case:** Valid input provided (unique classroom name, filled fields) => The system updates the classroom, saves it in the database, and displays: "Cập nhật phòng học thành công."

Abnormal case: Classroom name already exists => The system displays appropriate error messages "Phòng học đã tồn tại."

3.4.8 Delete classroom.

Function trigger:

- **Navigation path:** "Thiết Lập" → "Phòng học" → "Xóa"(Delete icon in each row of the table)
- **Timing Frequency:** On demand (whenever an admin wants to delete a classroom in the system).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to delete a specified classroom in the system
- **Interface:**
 - **Delete a Department Screen:**
 3. **Button [Hủy bỏ]:** Cancels the deletion process and closes the modal.
 4. **Button [Xóa]:** Confirms the deletion of the department.
- **Data processing:**

- The admin clicks on the delete icon for a specific semester in the [View list of Classrooms] page.
- The system displays the confirmation modal.
- If the admin clicks [Xóa], the system validates and permanently deletes the classroom from the “room” table in the database.
- A success message is displayed after the classroom is successfully deleted. The table is refreshed to reflect the changes.
- If the admin clicks [Hủy bỏ], the modal closes without making any changes

Screen layout:

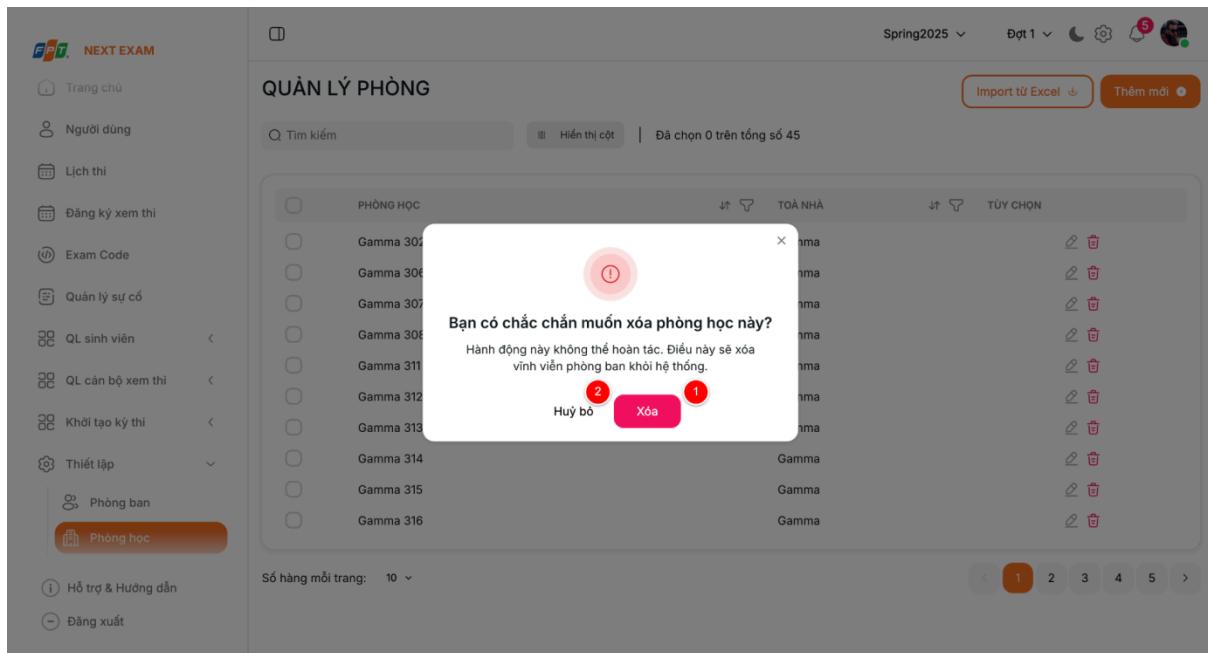


Figure 34 - Delete Classroom Modal

Function details:

- Data:** (None)
- Validation:** (None)
- Business rules:** (None)
- Normal case:** If the classroom is successfully deleted, the system displays a success message “Xoá phòng học thành công”.
- Abnormal case:** If the semester cannot be deleted due to dependencies or errors, the system shows an error message: “Xoá phòng học thất bại”

3.4.9 Import classrooms via Excel file.

Function trigger:

- Navigation path:** “Phòng học” → “Import từ excel” button
- Timing Frequency:** On demand (whenever an admin wants to upload a list of classrooms in the system).

Function description:

- Actors/Roles:** Admin
- Purpose:** Allows admin to import a list of classrooms in the system
- Interface:**

- **View list of Classroom Screen:**
 1. **[Import từ excel] button:** A button that triggers opening the importing modal when the user clicks on it
- **Import user Screen:**
 2. **Drop Zone:** A drag-and-drop area with the text "Kéo thả hoặc chọn để tải lên file dữ liệu".
 3. **Button [Tải mẫu]:** Allows downloading the sample Excel template.
 4. **Button [Hủy]:** Cancels the upload process and closes the modal.
 5. **Button [Xác nhận]:** Submits the uploaded file for processing.
- **Data processing:**
 - The admin clicks the "Import từ Excel" button to open the modal.
 - The admin drags and drops or selects the Excel file for upload.
 - The system validates the format and data in the Excel file against the template.
 - If validation passes:
 - The system inserts the data into the "rooms" table in the database.
 - A success message is displayed, and the user table is refreshed with the new data.
 - If validation fails:
 - The system displays an error message with details of the validation errors.

Screen layout:

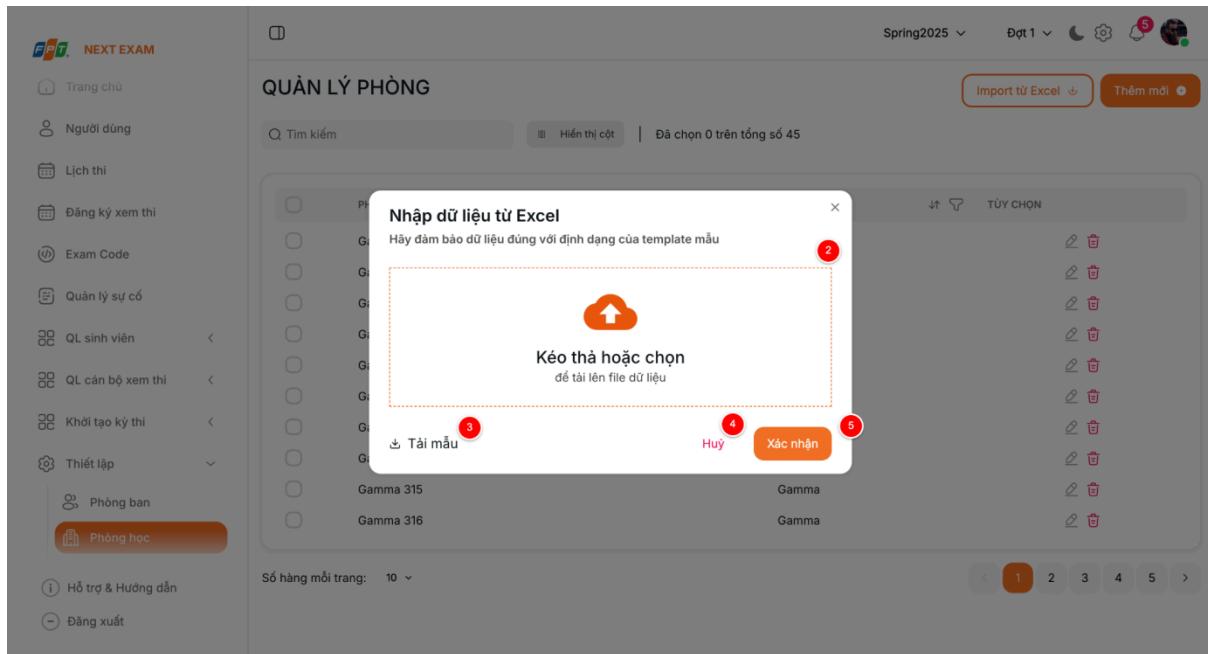


Figure 35 - Import Classroom By Excel Modal

Function details:

- **Data:**
 - Excel file containing classroom data in the specified format.
- **Validation:**
 - The file must be in Excel format (.xlsx).
 - The data must follow the structure and constraints defined in the sample template
 - Column "ROOM" is required
 - Column "BUILDING" is required

- **Business rules:**
 - 1 building just have only one room name, cannot duplicate.
- **Normal case:** If the file is valid and the data is successfully processed, the system displays a success message “Import phòng học thành công” and updates the rooms table.
- **Abnormal case:**
 - If the file is invalid or contains errors, the system displays a table of highlighting the specific issues with error message "Import phòng học thất bại"
 - If the file contains errors, some room is imported successfully, the system displays a table of highlighting the specific issues with warning message "Một số phòng học không thể import"

3.4.10 View list of students.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Quản lý sinh viên” -> “Sinh Viên”
- **Timing demand:** On demand (whenever an administrator want to view the list of students of the system)

Function description:

- **Actors/Roles:** Admin & Examiner
- **Purpose:** Allow admin to quickly and efficiently view all students in the system.
- **Interface:**
 - **View list of users screen:**
 1. **Table Students:** Displays a structured table containing information about each exam format. Includes columns such as: Student Code, Student Name, Action (View Exam Schedule) per row
 2. **Search bar:** A search box for users to enter a name and find specific students.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Number of columns each row:** Ability to choose the number of columns each row.
- **Data processing:**
 - User clicks on the “QL Sinh Viên” icon and choose “Sinh Viên” on the side bar
 - The system fetches the students list for that user from the database.
 - The system displays the students list in a row-by-row format, including the student code, student name, and an option to view the exam schedule.

Screen layout:

Figure 36 - View List Of Student Screen Layout

Function details:

- **Data:**
 - The function retrieves and displays department details, including: Student Code, Student name, actions (View Exam Schedule). It may also include additional information based on the applied filtering and sorting options.
 - **Search by Name:** Allows admins to search for students by name or by student code and displays matching results.
 - **Sort and Filter List:** Allows admins to sort and filter the member list based on criteria like name or description displaying the filtered and sorted results.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Students" in database exists. => Display list of Student
- **Abnormal case:** There is no data from table "Students" in the database. => Display message "Không có dữ liệu".

3.4.11 Create students.

3.4.12 View and Update student.

3.4.13 Delete student.

3.4.14 Import students via Excel file.

Function trigger:

- **Navigation path:** "Quản lý sinh viên" -> "Sinh viên"
- **Timing Frequency:** On-demand (whenever users want to import a batch of students from an Excel file)

Function description:

- **Actors/Roles:** Administrator
- **Purpose:** Allows administrators to quickly import a list of students from an Excel file to save time and reduce manual entry errors.
- **Interface:**

- ***View list of subject lists Screen:***

1. "**Import from Excel**" **Button:** A functional button that allows users to upload an Excel file containing the student list.

2. **Upload Area:** Displays a file upload.

3. "**Confirm Import**" **Button:** Allows users to confirm and proceed with importing the data into the system.

3. "**Cancel Import**" **Button:** Allows users to confirm and cancel with importing the data into the system.

- **Data processing:**

- The admin clicks the "Import from Excel" button and selects a file from their device.
- The system reads the content of the Excel file and displays a preview table.
- Upon confirmation, the system validates the data and saves it to the **Students** table in the database.
- After the import process, the system displays the result: success or failure (with detailed error messages if applicable).

Screen layout:

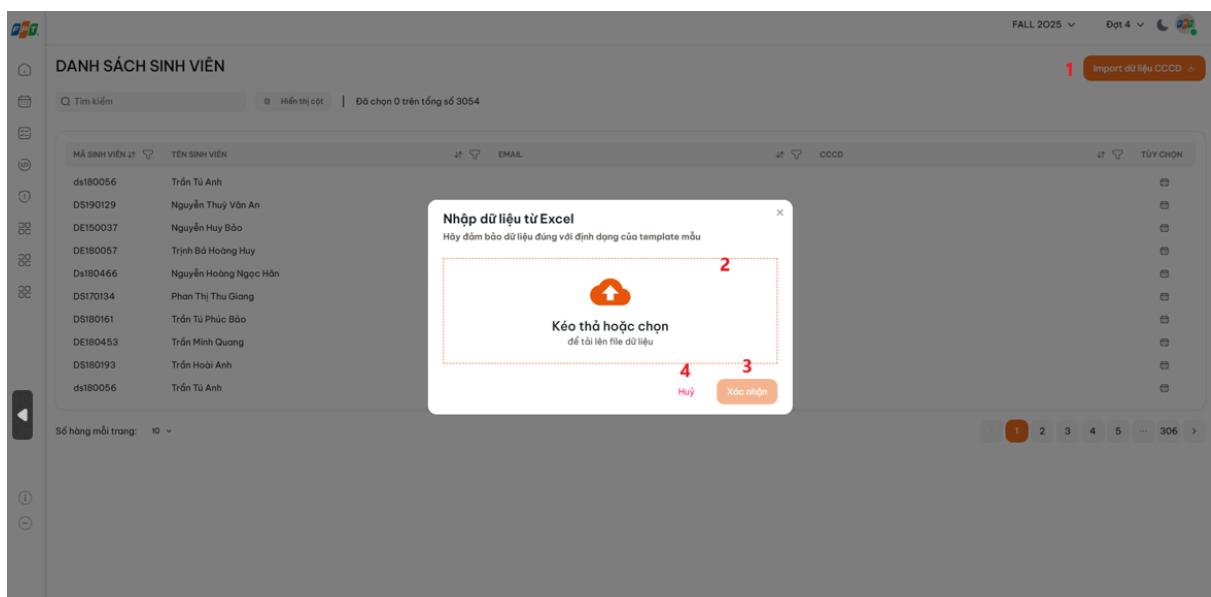


Figure 37 - Import Student Information Screen Layout

Function details:

- **Data:** The function retrieves and displays exam format details, including: Subject StudentId, Student Name, Email, CitizenId, View ExamSchedule of the studentId. It may also include additional information based on the applied filtering and sorting options.
- **Validation:**
 - **Duplicate Student ID Check:** Do not allow import if the student ID already exists.
 - **Valid Email:** Ensure the email format is correct.
 - **Error messages must be shown line-by-line** if issues occur during import.
- **Business rules:** (None)
- **Normal case:** System successfully imports the student list. Displays message: "Import

successful."

- **Abnormal case:**

- **Empty file** → Displays message: "File contains no data."
- **Invalid file format** → Displays error: "Invalid file."
- **Some rows contain errors** → Displays a detailed error table, while valid rows are still imported.

3.4.15 View list of subjects.

Function trigger:

- **Navigation path:** "Thiết Lập" -> "Môn học"
- **Timing Frequency:** On demand (whenever a user wants to view the list of subjects).

Function description:

- **Actors/Roles:** Administrator
- **Purpose:** Allows admin to quickly and efficiently view all available subjects, ensuring easy management of subjects
- **Interface:**
 - **View list of subject lists Screen:**
 - **Table subject list:** Displays a structured table containing information about each subject list. Includes columns such as: Subject Code, Subject Name, Exam Regulation, and Actions (Edit, Delete) per row.
 - **Search bar:** A search box for users to enter a name and find a specific subject list.
 - **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 - **Selected:** Displays the number of rows the user has selected
- **Data processing:**
 - Admin clicks on the "Thiết lập" icon and selects "Môn học"
 - The system fetches the subject data from the database
 - The system displays the subject list in a table format, including relevant details such as Subject Code, Subject Name, and Exam Regulation.

Screen layout:

Figure 38 - View list of subject lists screen

Function details:

- Data:** The function retrieves and displays exam format details, including: Subject Name, Subject Code, Subject Regulation, Actions (Edit, Delete). It may also include additional information based on the applied filtering and sorting options.
- Validation:**
 - Search by Name or Code:** Allows users to search for subjects based on entered keywords.
 - Sort and Filter List:** Users can sort or filter subjects based on specific criteria, such as name or code.
- Business rules:** (None)
- Normal case:** Data from table "Subjects" in database exists. => Display list of subjects
- Abnormal case:** There is no data from table "Subjects" in the database. => Display message "Không có dữ liệu".

3.4.16 Create subject.

Function trigger:

- Navigation path:** "Thiết Lập" -> "Môn học" -> "Tạo mới"
- Timing Frequency:** On demand (whenever an examiner wants to create a new subject).

Function description:

- Actors/Roles:** Examiner
- Purpose:** Allows admin to create new subjects, enabling customization and efficient organization of the system.
- Interface:**
 - "Tạo môn học mới" Screen:**
 - "Mã môn":** A text field for entering the unique code for the subject.

- “**Tên môn**”: A text field for entering the subject name.
 - “**Quy chế thi**”: A rich text editor to enter and format the exam regulation details.
 - “**Hủy**”: Clears all input fields and resets the form.
 - “**Tạo**”: Submits the new subject details.
- **Data processing:**
 - The user navigates to the "Create Subject" screen.
 - The "Create Subject" form is displayed.
 - The user enters details (code, name, and exam regulation).
 - The user clicks the "Save" button.
 - The system validates the entered data (e.g., checks for empty fields).
 - If validation passes, the system saves the subject to the database and displays a success message: "Subject created successfully."

Screen layout:

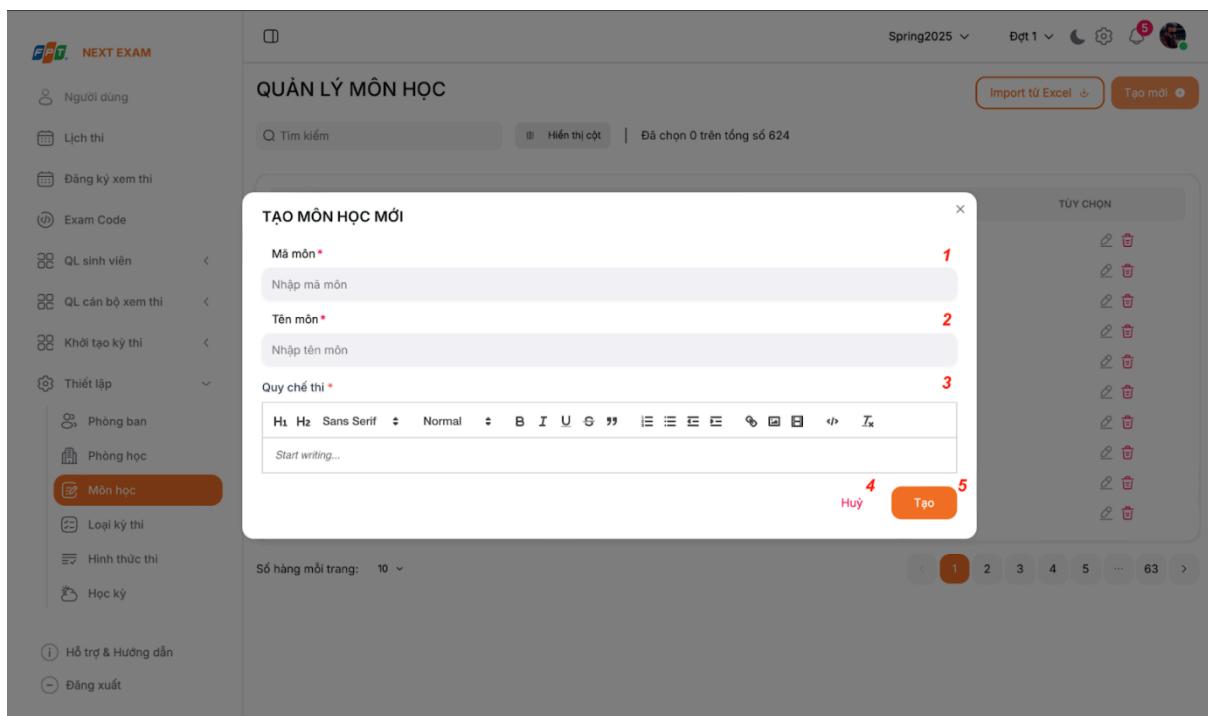


Figure 39 - Create subject screen

Function details:

- **Data:** The function processes the subject code, subject name and subject regulation
- **Validation:**
 - **Error Handling:** Displays appropriate messages for errors, such as "Subject code already exists" or "Please fill in all required fields."
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique Subject Code, filled fields). => The system creates the subject, saves it in the database, and displays: "Subject created successfully."
- **Abnormal case:** Subject Code is missing or already exists => The system displays appropriate error messages "Subject code already exists."

3.4.17 View and Update subject.

Function trigger:

- **Navigation path:** “Thiết Lập” -> “Môn học” -> “Chỉnh sửa” icon
- **Timing Frequency:** On demand (whenever an examiner wants to edit an existing subject list).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allow admin to update subject to suit their needs
- **Interface:**
 - **Update subject Screen:**
 - “Mã môn”: A text field pre-filled with the current subject code (editable).
 - “Tên môn”: A text field pre-filled with the current subject name (editable).
 - “Quy chế thi”: A rich text editor pre-filled with the current regulation details.
 - “Xác nhận”: Submits the updated subject details.
 - “Hủy”: Clears all changes and resets the form.
- **Data processing:**
 - The user navigates to the "Quản lý môn học" screen and clicks the edit icon for a specific subject.
 - The "Chỉnh sửa môn học" form is displayed with pre-filled data.
 - The user modifies the required fields and clicks "Xác nhận."
 - The system validates the data and saves the updates to the database.
 - A success message is displayed: "Cập nhật môn học thành công."

Screen layout:

The screenshot displays the 'Chỉnh sửa Môn học' (Edit Subject) screen. The main interface includes:

- Mã môn***: ENG303 (highlighted with a red '1')
- Tên môn***: Business environment (highlighted with a red '2')
- Quy chế thi***: Rich text editor containing 'Himn' (highlighted with a red '3')
- Xác nhận** (Confirm) button (highlighted with a red '4')
- Hủy** (Cancel) button (highlighted with a red '5')

The background shows a sidebar with categories like 'Người dùng', 'Lịch thi', 'Đăng ký xem thi', 'Exam Code', 'QL sinh viên', 'QL cán bộ xem thi', 'Khởi tạo ký thi', 'Thiết lập' (selected), 'Phòng ban', 'Phòng học', 'Môn học' (highlighted with a red box), 'Loại kỳ thi', 'Hình thức thi', 'Học kỳ', 'Hỗ trợ & Hướng dẫn', and 'Đăng xuất'. The top right corner shows 'Spring2025', 'Đợt 1', and other system icons.

Figure 40 - Update subject screen

Function details:

- **Data:** The function handles the Code and any descriptions of an existing subject.
- **Validation:**
 - **Error Handling:** Displays appropriate messages for errors, such as "Invalid data entered" or "Update failed, please try again."
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique Subject Code, filled fields) => The system creates the subject, saves it in the database, and displays: "Subject created successfully."
- **Abnormal case:** Subject Code is missing or already exists => The system displays appropriate error messages "Subject code already exists."

3.4.18 Delete subject.

Function trigger:

- **Navigation path:** "Thiết Lập" -> "Môn học" -> "Xóa môn học" icon
- **Timing Frequency:** On demand (whenever an examiner wants to delete an existing subject list).

Function description:

- **Actors/Roles:** admin
- **Purpose:** Allow admin to delete subject to suit their needs
- **Interface:**
 - **Delete Subject Screen:**
 - "Hủy bỏ": Button to clear all content on the page and start over
 - "Xóa": Button to delete the subject.
- **Data processing:**
 - The user navigates to the "Subject List" screen and clicks on the delete icon for the row the user wants
 - The system finds the id user wants to delete
 - Show confirm modal User confirms delete
 - The subject selected for deleting will be updated and the new subject list will be displayed on the "Subject List" table.

Screen layout:

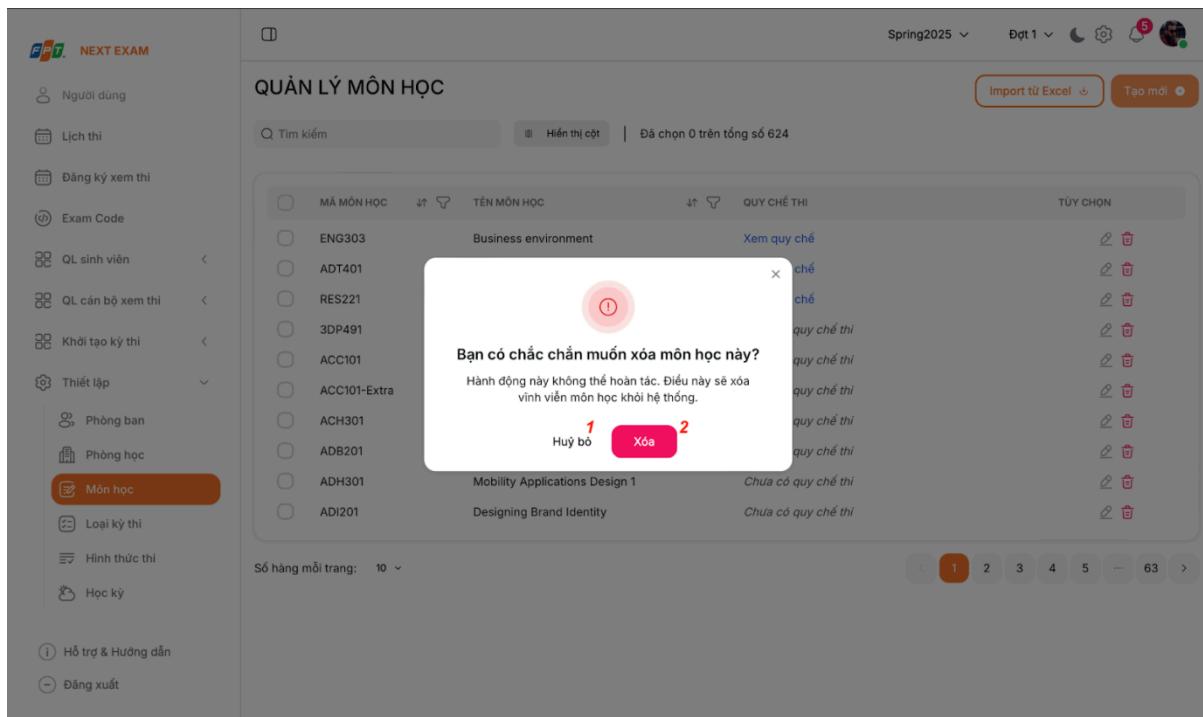


Figure 41 - Confirmation Modal delete for a subject

Function details:

- **Data:** The function handles the code and any name of an existing subject.
- **Validation:**
 - **Error Handling:** Displays a message if the deletion fails, such as "Deletion failed, please try again."
- **Business rules:** (None)
- **Normal case:** A valid subject ID is selected, and the user confirms deletion. => The subject is deleted, and the updated list is displayed with a success message.
- **Abnormal case:** The subject ID does not exist => The system displays: "Deletion failed, please try again."

3.4.19 Import subjects via Excel file.

Function trigger:

- **Navigation path:** "Thiết Lập" -> "Môn học" -> "Import từ Excel"
- **Timing Frequency:** On demand (whenever a user wants to bulk upload subjects).

Function description:

- **Actors/Roles:** Administrator
- **Purpose:** Allows users to upload a list of subjects from an Excel file to save time and reduce manual data entry.
- **Interface:**
 - **Import Subjects Modal:**
 - **Hướng dẫn:** "Hãy đảm bảo dữ liệu đúng với định dạng excel mẫu."
 - **Kéo thả để chọn file:** Drag and drop or click to select an Excel file for upload.

- “**Tải mẫu**”: Provides a downloadable sample Excel file to guide users.
- “**Hủy**”: Cancels the upload process.
- “**Xác nhận**”: Initiates the import process.
- **Data processing:**
 - The user clicks "Import from Excel" in the Subject Management screen.
 - The system displays the "Import Subjects" modal.
 - The user uploads an Excel file.
 - The system validates the uploaded file format and checks for errors (e.g., missing columns, incorrect data types).
 - If validation passes, the system saves the subjects to the database and displays a success message: "Subjects imported successfully."
 - If validation fails, the system displays an error message detailing the issue.

Screen layout:

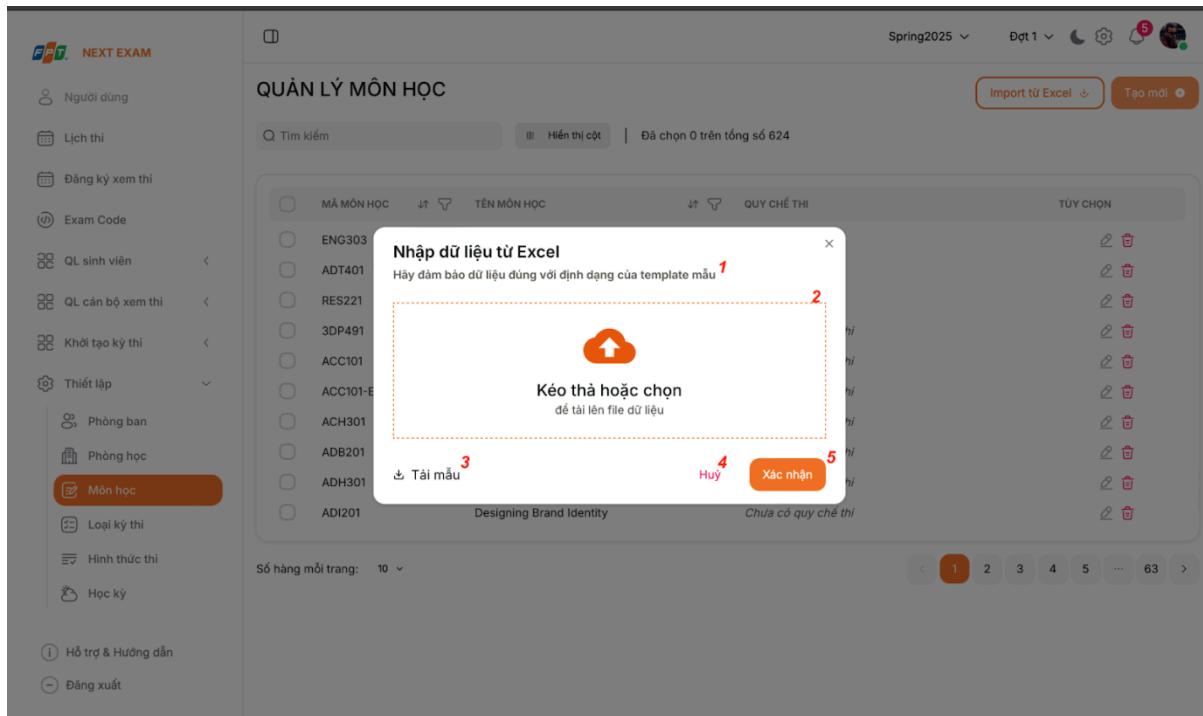


Figure 42 - Import data from Excel

Function details:

- **Validation:**
 - **Error Handling:** Displays appropriate error messages for issues such as "Invalid file format" or "Missing required fields."
 - **Template Matching:** Ensures the uploaded file matches the provided template.
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique Subject Code, filled fields) => The system creates the subject, saves it in the database, and displays: "Subject created successfully."
- **Abnormal case:** The subject ID does not exist => The system displays: "Deletion failed, please try again."

3.4.20 View list of exam types.

Function trigger:

- **Navigation path:** “Thiết Lập” -> “Loại kỳ thi”
- **Timing Frequency:** On demand (whenever an admin wants to view the list of exam types).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to view and manage the list of exam types in the system.
- **Interface:**

- **View list of exam types Screen:**

- **Table subject list:** Displays a structured table containing information about each exam type list. Includes columns such as: Exam type name, Exam description, and Actions (Edit, Delete).
- **[Tìm kiếm]:** A search box for users to enter a name and find a specific exam type list.
- **[Hiển thị cột]:** A component have columns allows users to show or hide specific columns in the table for a customized view.
- **Selected:** Displays the number of rows the user has selected

- **Data processing:**

- User clicks on the Setting icon and selects "Loại kỳ thi."
- The system fetches the exam type data from the database.
- The system displays the exam type list in a table format, including relevant details such as “Loại bài thi” and “Mô tả”.

Screen layout:

The screenshot shows the 'QUẢN LÝ LOẠI KỲ THI' (Manage Exam Types) screen. At the top right, there are buttons for 'Spring2025', 'Đợt 1', and a notification badge with the number 5. Below the header is a search bar labeled 'Tim kiếm' (Search) and a 'Hiển thị cột' (Show columns) button. A message indicates 'Đã chọn 0 trên tổng số 2' (0 selected out of 2 total). The main area contains a table with the following data:

LOẠI BÀI THI	MÔ TẢ	TÙY CHỌN	
FE	FE		
2NDFE	2NDFE		

Below the table, there is a dropdown for 'Số hàng mỗi trang' (Number of items per page) set to 10, and a page navigation area showing page 1 of 1.

The left sidebar lists various administrative functions: Người dùng, Lịch thi, Đăng ký xem thi, Exam Code, QL sinh viên, QL cán bộ xem thi, Khởi tạo kỳ thi, Thiết lập, Phòng ban, Phòng học, Môn học, Loại kỳ thi (which is highlighted in orange), Hình thức thi, and Học kỳ. At the bottom of the sidebar are links for Hỗ trợ & Hướng dẫn and Đăng xuất.

Figure 43 - View list of exam types screen

Function details:

- **Validation:**
 - **Search by “Loại kỳ thi” or “Mô tả”:** Allows admin to search for exam types based on entered keywords.
 - **Sort and Filter List:** Users can sort or filter exam types based on specific criteria, such as name or description.
- **Business rules:** (None)
- **Normal case:** Data from table "ExamType" in database exists. => Display list of exam type
- **Abnormal case:** There is no data from table "ExamType" in the database. => Display message "Không có dữ liệu".

3.4.21 Create exam type.

Function trigger:

- **Navigation path:** "Thiết Lập" -> "Loại kỳ thi" -> "Tạo mới"
- **Timing Frequency:** On demand (whenever an examiner wants to create a new exam type).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to create new exam type, enabling customization and efficient organization of the system.
- **Interface:**
 - **Create new Exam type Screen:**
 - **[Mã loại kỳ thi]:** A text field for entering the unique code for the subject.
 - **[Mô tả]:** A rich text editor to enter and format the exam type description details.
 - **[Lưu]:** Submits the new exam type details.
 - **[Huỷ]:** Clears all input fields and resets the form.
- **Data processing:**
 - The user navigates to the "Loại kỳ thi" screen.
 - The "Thêm loại kỳ thi" form is displayed.
 - The user enters details (code and description).
 - The user clicks the "Lưu" button.
 - The system validates the entered data (e.g., checks for empty fields).
 - If validation passes, the system saves the subject to the database and displays a success message: "Tạo loại kỳ thi thành công"

Screen layout:

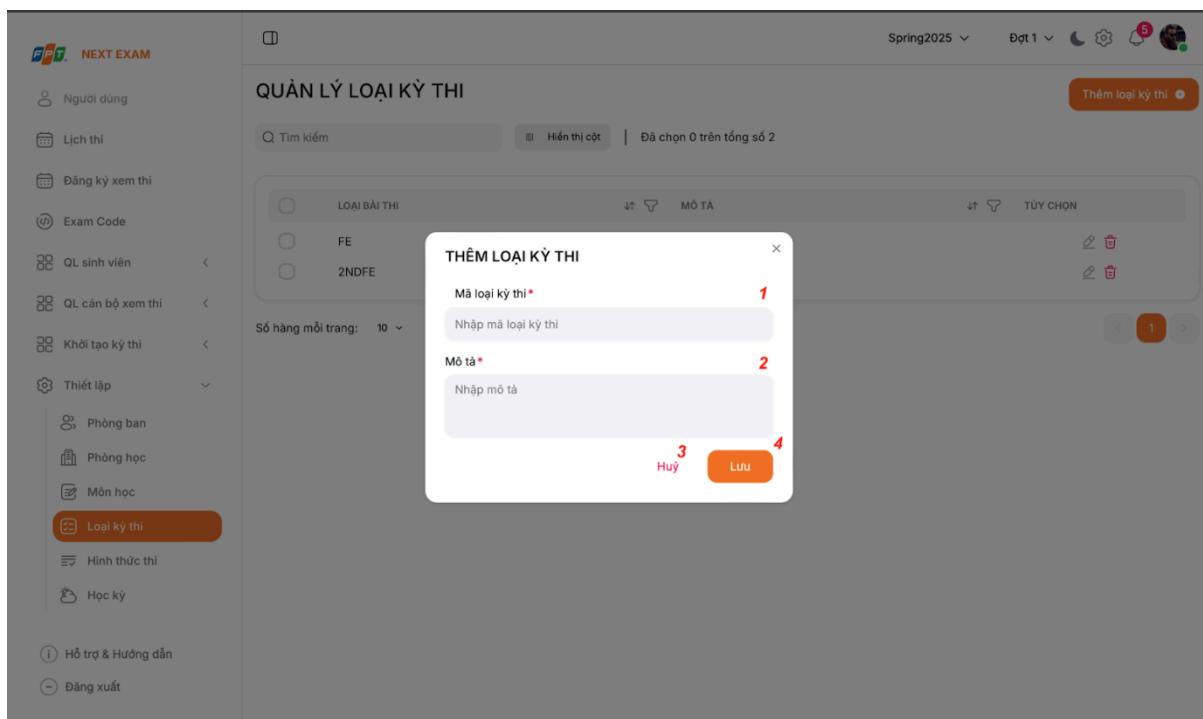


Figure 44 - Create exam type screen

Function details:

- **Data:** The form include: “Mã loại kỳ thi”, “Mô tả”.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam type submission and displays the message "An error occurred, please try again later" if needed.
 - “Mã loại kỳ thi” is required
 - “Mô tả” is required
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique Exam Type Code, filled fields). => The system creates the exam type, saves it in the database, and displays: "Thêm loại kỳ thi thành công"
- **Abnormal case:**
 - “Mã loại kỳ thi” already exists => The system displays appropriate error messages "Mã loại kỳ thi đã tồn tại"
 - “Mã loại kỳ thi” is null => The system displays appropriate error messages "Mã loại kỳ thi là bắt buộc"
 - “Mô tả” is null => The system displays appropriate error messages "Mô tả loại kỳ thi là bắt buộc"

3.4.22 View and Update exam type.

Function trigger:

- **Navigation path:** Dashboard-> Thiết lập -> Loại kỳ thi thi -> Edit Icons
- **Timing Frequency:** On demand (whenever an examiner wants to edit an existing exam type).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow Admin to update exam types to suit their needs
- **Interface:**
 - **Update exam format Screen:**
 1. **[Mã kỳ thi]:** Text field for editing the code (pre-filled with the current code).
 2. **[Mô tả]:** Text field for editing the description(pre-filled with the current description).
 3. **[Cập nhật]:** Button to update the exam format.
 4. **[Huỷ bỏ]:** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Loại kỳ thi" screen and clicks on the edit icon for the row the user wants
 - The "Cập nhập loại kỳ thi" screen is displayed.
 - The code and description are edited
 - The user clicks on the "Cập nhập" button.
 - The system validates the entered information (e.g. checks for empty fields).
 - If the validation is successful, the system sends the exam format to the server.
 - The system displays a success message: "Cập nhật loại kỳ thi thành công".
 - The exam format selected for editing will be updated and the new Exam Type will be displayed on the "Exam Type" table.

Screen layout:

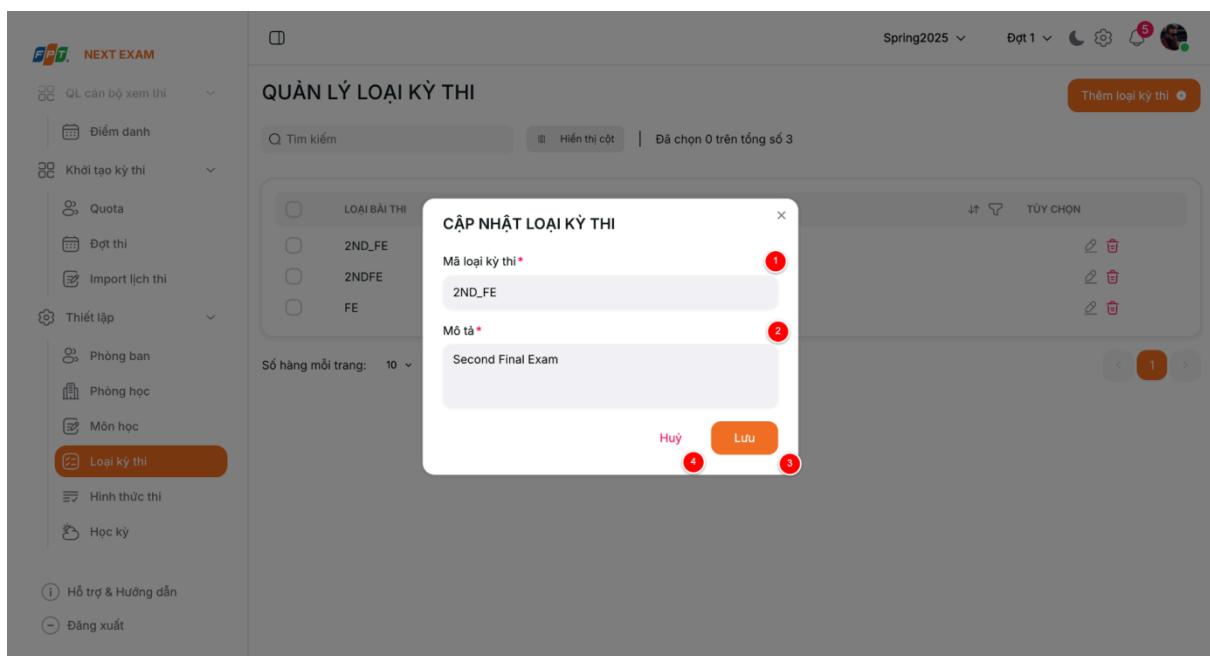


Figure 45 - Update Exam type Modal

Function details:

- **Data:** The function handles the Code and any descriptions of an existing exam type.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam type submission and displays the message "An error occurred, please try again later" if needed.
 - Code field is required.
 - Description field is required

- **Business rules:** (None)
- **Normal case:** Valid input provided (unique code, filled fields) => The system updates the code, saves it in the database, and displays: "Cập nhật loại kỳ thi thành công."
- **Abnormal case:**
 - "Mã loại kỳ thi" already exists => The system displays appropriate error messages "Mã loại kỳ thi đã tồn tại"
 - "Mã loại kỳ thi" is null => The system displays appropriate error messages "Mã loại kỳ thi là bắt buộc"
 - "Mô tả" is null => The system displays appropriate error messages "Mô tả loại kỳ thi là bắt buộc"

3.4.23 Delete exam type.

Function trigger:

- **Navigation path:** "Thiết Lập" -> "Loại kỳ thi" -> "Delete" icon
- **Timing Frequency:** On demand (whenever an examiner wants to delete an existing exam type list).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow Admin to delete exam type to suit their needs
- **Interface:**
 - **Delete Exam type Screen:**
 - **[Xác nhận]:** Button to delete the exam type.
 - **[Huỷ]:** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Loại kỳ thi" screen and clicks on the delete icon for the row the user wants.
 - The system finds the ID the user wants to delete.
 - Show confirm modal User confirm delete.
 - The exam type selected for deletion will be updated and the new exam type list will be displayed on the "Exam Types" table.

Screen layout:

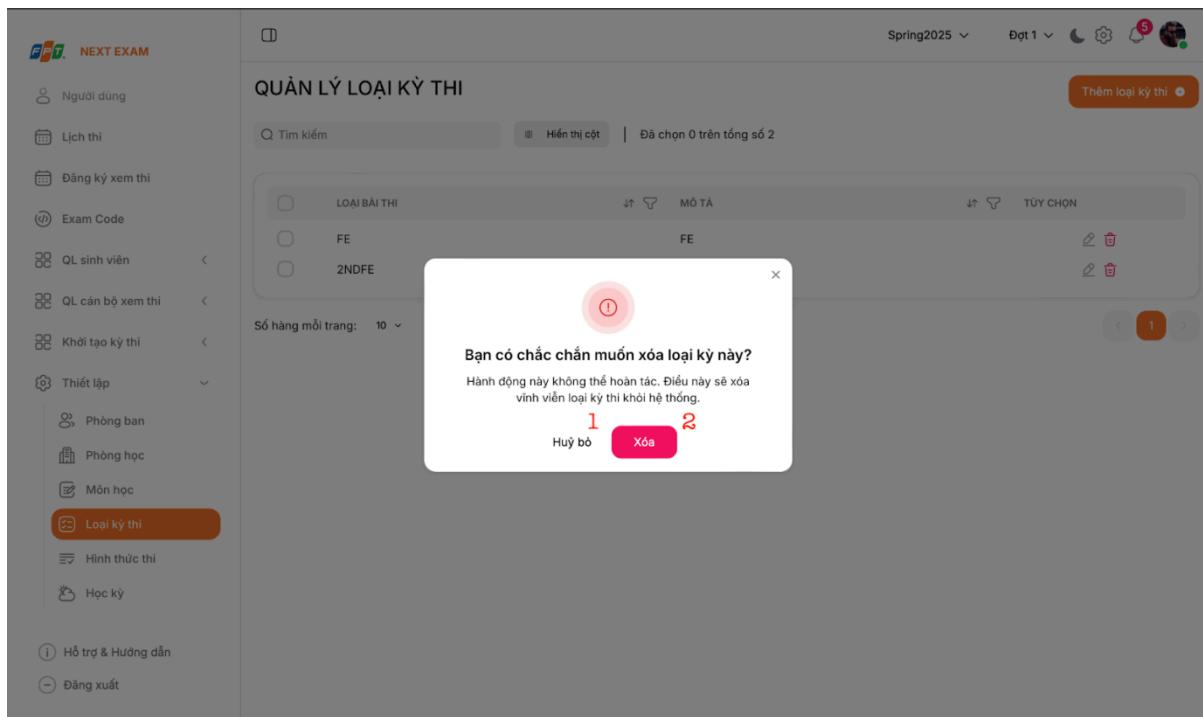


Figure 46 - Confirmation Modal delete for an exam type

Function details:

- **Data:** After delete exam type, selected exam type is deleted in database.
- **Validation:**
 - **Error Handling:** Displays a message if the deletion fails, such as "Có lỗi xảy ra, vui lòng thử lại sau"
- **Business rules:** (None)
- **Normal case:** A valid exam type ID is selected, and the user confirms deletion. \Rightarrow The exam type is deleted, and the updated list \Rightarrow Display message “Xoá loại kỳ thi thành công”
- **Abnormal case:** N/A

3.4.24 View list of exam formats.

Function trigger:

- **Navigation path:** “Thiết Lập” \rightarrow “Hình thức thi”
- **Timing Frequency:** On demand (whenever an admin wants to view the list of exam formats in a system).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to quickly and efficiently view all available exam formats, ensuring easy management of exam formats
- **Interface:**
 - **View list of exam formats Screen:**
 1. **Table Exam Format:** Displays a structured table containing information about each exam format. Includes columns such as Exam Format Name, Description, Action (Edit, Delete) per row

2. **Search bar:** A search box for users to enter a name and find a specific Exam Format.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Selected:** Displays the number of rows the user has selected
 5. **Rows per page:** Display the number of rows the user wants to see.
 6. **Pagination:** Navigate to other data pages.
- **Data processing:**
 - Admin clicks on the “Thiết lập” icon and selects "Hình thức thi"
 - The system will get the list of exam formats from the "ExamFormat" table in the database.
 - The system displays the Exam Formats list in a row-by-row format, including the exam format name, description, and an option like edit and delete.

Screen layout:

The screenshot shows a software interface for managing exam formats. On the left is a sidebar with various administrative functions. The main area is titled 'QUẢN LÝ LOẠI KỲ THI'. It displays a table with three columns: 'LOẠI BÀI THI', 'MÔ TẢ', and 'TỰ CHỌN'. The table contains three rows: 'FE', 'FE', and '2NDFE'. At the top right of the main area, there's a button labeled 'Thêm loại kỳ thi'. Below the table, it says 'Số hàng mỗi trang: 10' and shows page numbers '6' and '1' at the bottom right. The sidebar has several sections: Lớp học, Sinh viên, QL cán bộ xem thi, Điểm danh, Khởi tạo kỳ thi, Quota, Đợt thi, Import lịch thi, Thiết lập, Phòng ban, Phòng học, Môn học, Loại kỳ thi (which is highlighted in orange), Hình thức thi, and Học kỳ. At the bottom of the sidebar, there are links for Hỗ trợ & Hướng dẫn and Đăng xuất.

Figure 47 - View list of exam formats

Function details:

- **Data:** The function retrieves and displays exam format details, including: Exam Format Name, Description Actions (Edit, Delete). It may also include additional information based on the applied filtering and sorting options.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "ExamFormat" in database exists. => Display list of exam formats
- **Abnormal case:** There is no data from table "ExamFormat" in the database. => Display message “Không có dữ liệu”.

3.4.25 Create exam format.

Function trigger:

- **Navigation path:** “Thiết Lập” -> “Hình thức thi” -> “Thêm mới”

- **Timing Frequency:** On demand (whenever an examiner wants to create a new exam format).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Provides examiners with the ability to create new exam formats, support customization, and manage and organize exams for a variety of needs.
- **Interface:**
 - **Create new exam format Screen:**
 1. **[Code]:** Text field for entering the code of the exam format.
 2. **[Mô tả]:** Text field for entering the description of the exam format.
 3. **[Lưu]:** Button to submit the new exam format.
 4. **[Huỷ]:** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Hình thức thi" screen and clicks the "Thêm mới" button.
 - The "Thêm mới" screen is displayed.
 - The user enters the code and description
 - The user clicks the "Lưu" button.
 - The system validates the entered information (e.g. checks for empty fields, possibly checks for file type or size).
 - If the validation is successful, the system sends the exam format to the server.
 - The system displays a success message: "Exam format added successfully".
 - The new Exam Format is added to the Exam Format list on the "Exam format" table.

Screen layout:

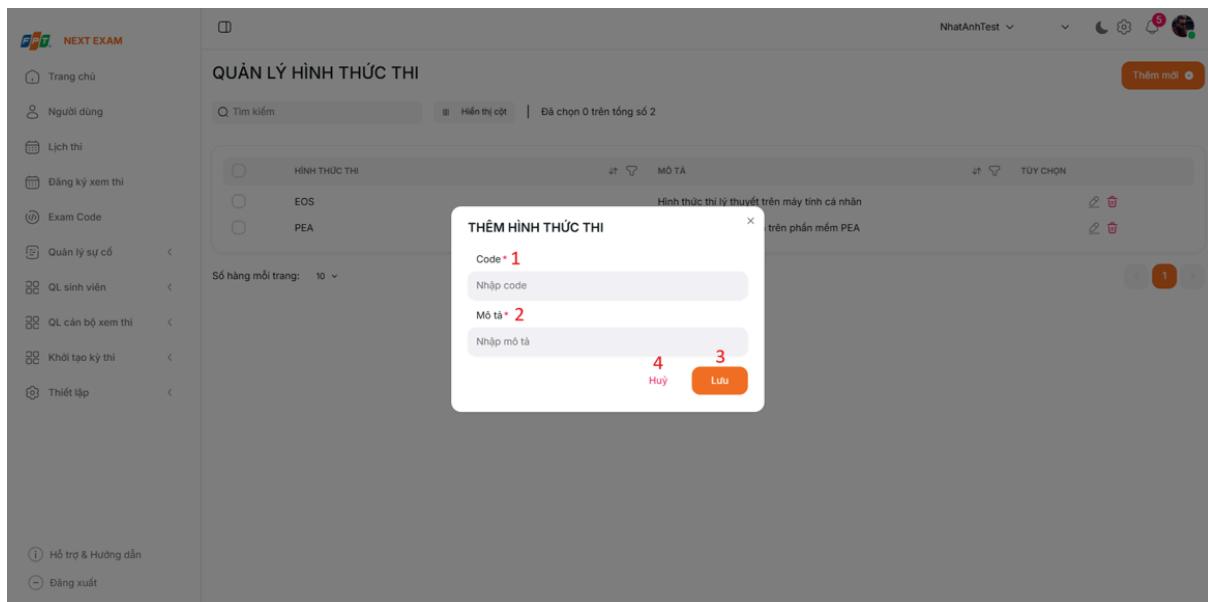


Figure 48 - Create Exam format Modal

Function details:

- **Data:** The function processes the Code and any description.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam format submission and displays the message "An error occurred, please try again later" if needed.
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique code, filled fields) => The system creates the exam

period, saves it in the database, and displays: "Exam format created successfully."

- **Abnormal case:** Title is missing or already exists => The system displays appropriate error messages "Exam format code already exists."

3.4.26 View and Update exam format.

Function trigger:

- **Navigation path:** Dashboard-> Thiết lập -> Hình thức thi -> Edit Icons
- **Timing Frequency:** On demand (whenever an examiner wants to edit an existing exam format).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow Admin to update exam formats to suit their needs
- **Interface:**
 - **Update exam format Screen:**
 1. **[Code]:** Text field for editing the code (pre-filled with the current code).
 2. **[Mô tả]:** Text field for editing the description(pre-filled with the current description).
 3. **[Cập nhật]:** Button to update the exam format.
 4. **[Huỷ]:** Button to clear all content on the page and start over.
 - **Data processing:**
 - The user navigates to the "Hình thức thi" screen and clicks on the edit icon for the row the user wants
 - The "Cập nhập hình thức thi" screen is displayed.
 - The code and description are edited
 - The user clicks on the "Cập nhập" button.
 - The system validates the entered information (e.g. checks for empty fields).
 - If the validation is successful, the system sends the exam format to the server.
 - The system displays a success message: "Cập nhật hình thức thi thành công".
 - The exam format selected for editing will be updated and the new Exam Format will be displayed on the "Exam Format" table.

Screen layout:

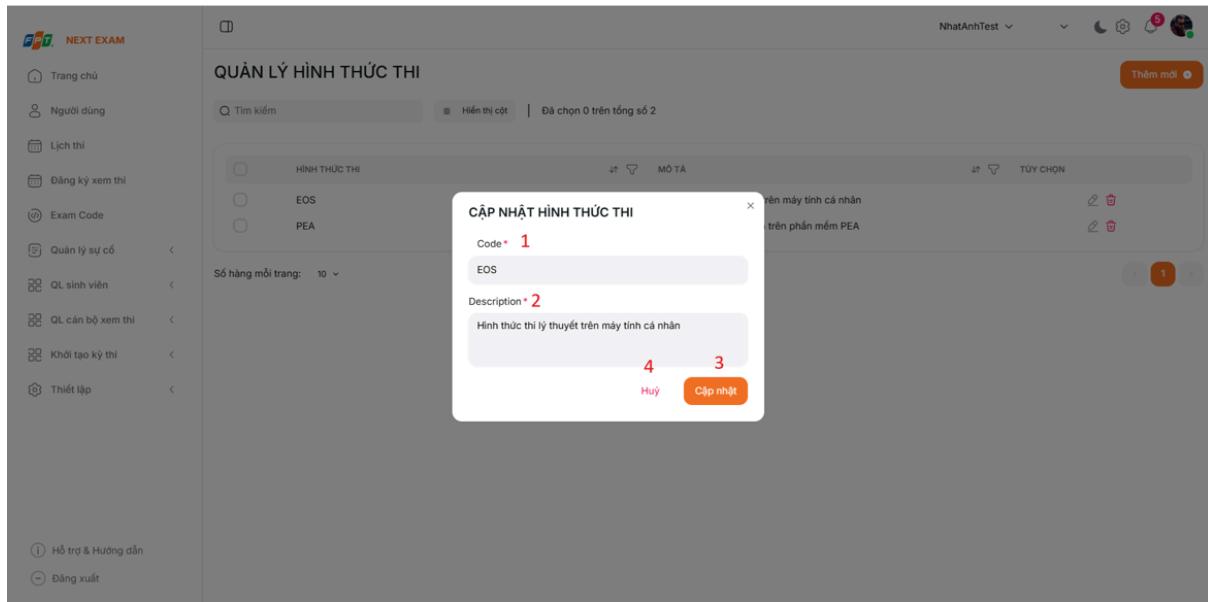


Figure 49 - Update Exam format Modal

Function details:

- **Data:** The function handles the Code and any descriptions of an existing exam format.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam format submission and displays the message "An error occurred, please try again later" if needed.
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique code, filled fields) => The system updates the code, saves it in the database, and displays: "Exam format updated successfully."
- **Abnormal case:** Title is missing or already exists => The system displays appropriate error messages "Exam format already exists."

3.4.27 Delete exam format.

Function trigger:

- **Navigation path:** Dashboard-> Thiệp lập-> Hình thức thi-> Delete Icon
- **Timing Frequency:** On demand (whenever an examiner wants to delete an existing exam format).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow Examiners to delete exam formats to suit their needs
- **Interface:**
 - **Delete exam format Screen:**
 1. **[Xoá]:** Button to delete the exam format.
 2. **[Huỷ bỏ]:** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Quản lý hình thức thi" screen and clicks on the delete icon for the row the user wants
 - The system finds the user wants delete

- Show confirm modal User confirm delete
- The exam format selected for deleting will be updated and the new Exam Format will be displayed on the "Exam Format" table.

Screen layout:

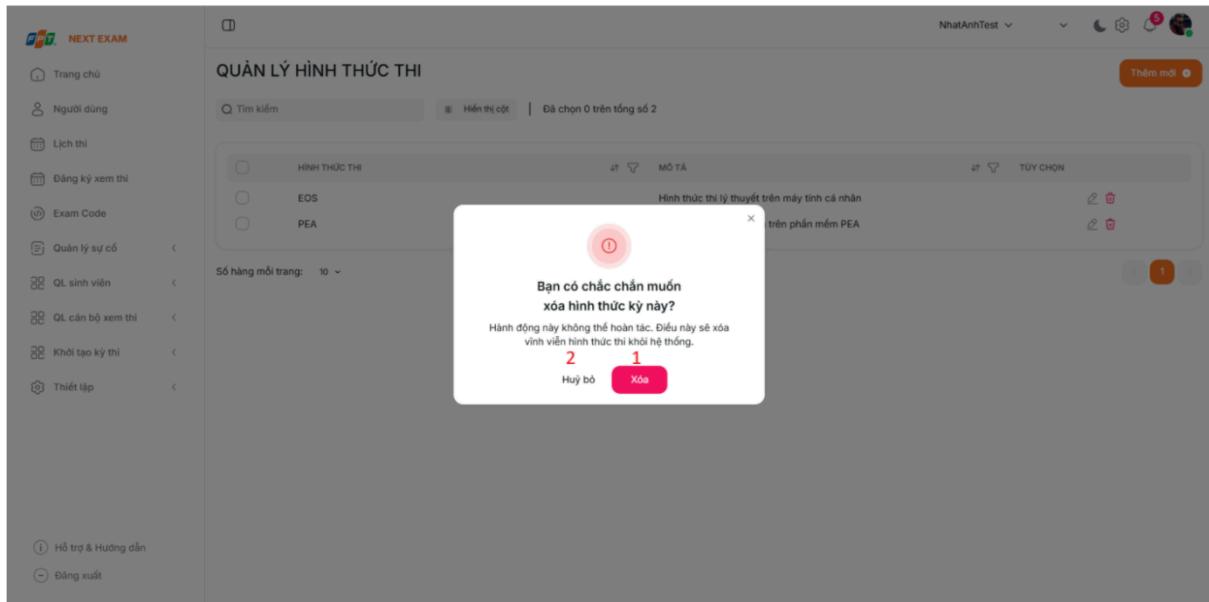


Figure 50 - Confirmation Modal delete for an Exam Format

Function details:

- **Data:** The function handles the Code and any descriptions of an existing exam format.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam format submission and displays the message "An error occurred, please try again later" if needed.
- **Business rules:** (None)
- **Normal case:** A valid ExamFormatId is selected, and the user confirms deletion=> The ExamFormatId is deleted, and the updated list is displayed with a success message.
- **Abnormal case:** The ExamFormatId does not exist => The system displays: "Deletion failed, please try again."

3.4.28 Switch semester in header bar

Function trigger:

- **Navigation path:** "Trang chủ" -> Header semester dropdown
- **Timing Frequency:** On demand (whenever an admin wants to switch the current semester to view the information of the semester in the past).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to switch the current semester to view the information of the semester in the past.
- **Interface:**
 - **Set current semester checked:**
 1. **"Kỳ học"** : Dropdown- a dropdown to switch the current semester.

- **Data processing:**

- The user navigates to the semester dropdown on the header and chooses the semester they want to view data in the past.
- The system changes the set of data of the semester that the user wants to view.
- Show the correct semester code on the header of the system.

Screen layout:

MÃ KỲ HỌC	NGÀY BẮT ĐẦU	NGÀY KẾT THÚC	KỲ HỌC HIỆN TẠI	TÙY CHỌN
Summer2025	22/02/2025	30/03/2025	<input type="radio"/>	
Spring2025	26/02/2025	30/04/2025	<input checked="" type="radio"/>	

Figure 51 - Switch semester in header bar

Function details:

- **Data:** The function handles the code of an existing semester.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** A valid semester code is selected -> The system changes the set of data of the semester that the user wants to view.
- **Abnormal case:** Do not have any exam period in that semester -> Display message “Chưa khai báo đợt thi”

3.4.29 Switch exam period in header bar

Function trigger:

- **Navigation path:** “Trang chủ” -> Header exam period dropdown
- **Timing Frequency:** On demand (whenever an admin wants to switch the exam period to view the information of the exam period data).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to switch the exam period to view the information.
- **Interface:**
 - **Switch exam period checked:**
 1. “Đợt thi” : Dropdown- a dropdown to switch the exam period.
- **Data processing:**

- The user navigates to the exam period dropdown on the header and chooses the exam period they want to view.
- The system changes the set of data of the exam period that the user wants to view.
- Show the correct exam period name on the header of the system.

Screen layout:

TÊN ĐỢT THI	NGÀY BẮT ĐẦU	NGÀY KẾT THÚC	ĐỢT THI HIỆN TẠI	TÙY CHỌN
Đợt 2	03/03/2025	03/03/2025	<input checked="" type="checkbox"/>	
Đợt 1	26/02/2025	29/03/2025	<input type="checkbox"/>	

Figure 52 - Switch exam period in header bar

Function details:

- Data:** The function handles the code of an existing exam period.
- Validation:** The exam period must exist on the system.
- Business rules:** (None)
- Normal case:** A valid exam period is selected -> The system changes the set of data of the semester that the user wants to view.
- Abnormal case:** (None)

3.5 Semester configuration

3.5.1 View list of semesters.

Function trigger:

- Navigation path:** “Trang chủ” -> “Thiết lập” -> “Học kỳ”
- Timing demand:** On demand (whenever an administrator want to view the list of semesters of the system)

Function description:

- Actors/Roles:** Admin
- Purpose:** Allow admin to quickly and efficiently view all semesters in the system.
- Interface:**
 - View list of users screen:**
 - Table Semester:** Displays a structured table containing information about each semester format. Includes columns such as: Semester Code, Start Date, End Date, Action (Set current semester, delete, update) per row

2. **Search bar:** A search box for users to enter a name and find specific semesters.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Selected:** Displays the number of rows the semesters has selected
 5. **Number of columns each row:** Ability to choose the number of columns each row.
- **Data processing:**
 - User clicks on the “Thiết lập” icon and choose “Học kỳ” on the side bar
 - The system fetches the semesters list for that semester from the database.
 - The system displays the semester list in a row-by-row format, including the semester code, start date, end date and an option to set the current semester lock or update the semester.

Screen layout:

MÃ KỲ HỌC	NGÀY BẮT ĐẦU	NGÀY KẾT THÚC	KỲ HỌC HIỆN TẠI	TÙY CHỌN
4 Summer2025	22/02/2025	28/02/2025	<input type="radio"/>	
5 Spring2025	26/02/2025	30/04/2025	<input checked="" type="radio"/>	

Figure 53 - View list of semesters screen

Function details:

- **Data:**
 - The function retrieves and displays department details, including: Semester Code, Start Date, End Date, actions (Set current semester, delete, update). It may also include additional information based on the applied filtering and sorting options.
 - **Search by Name:** Allows admins to search for semesters by name or by semester code and displays matching results.
 - **Sort and Filter List:** Allows admins to sort and filter the semester list based on criteria like name or description displaying the filtered and sorted results.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Semesters" in database exists. => Display list of Semester
- **Abnormal case:** There is no data from table "Semesters" in the database. => Display message "Không có dữ liệu".

3.5.2 Create semester.

Function trigger:

- **Navigation path:** “Thiết Lập” -> “Học kỳ” -> “Tạo mới”
- **Timing Frequency:** On demand (whenever an examiner wants to create a new semester).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to create new semesters, enabling customization and efficient organization of the system.
- **Interface:**
 - **Create new semester modal:**
 1. “Mã học kỳ”: A text field for entering the unique code for the semester.
 2. “Bắt đầu”: A date picker trigger for choosing the start date of the semester.
 3. “Kết thúc”: A date picker trigger for choosing the end date of the semester.
 4. “Hủy”: Clears all input fields and resets the form.
 5. “Tạo mới”: Submits the new semester details.
 - **Data processing:**
 - The user click on the “Tạo mới” button.
 - The “Tạo học kỳ mới” form is displayed.
 - The user enters details (“Mã học kỳ”, “Bắt đầu”, “Kết thúc”).
 - The user clicks the “Tạo mới” button.
 - The system validates the entered data (e.g., checks for empty fields).
 - If validation passes, the system saves the semester to the database and displays a success message: “Tạo học kỳ mới thành công.”

Screen layout:

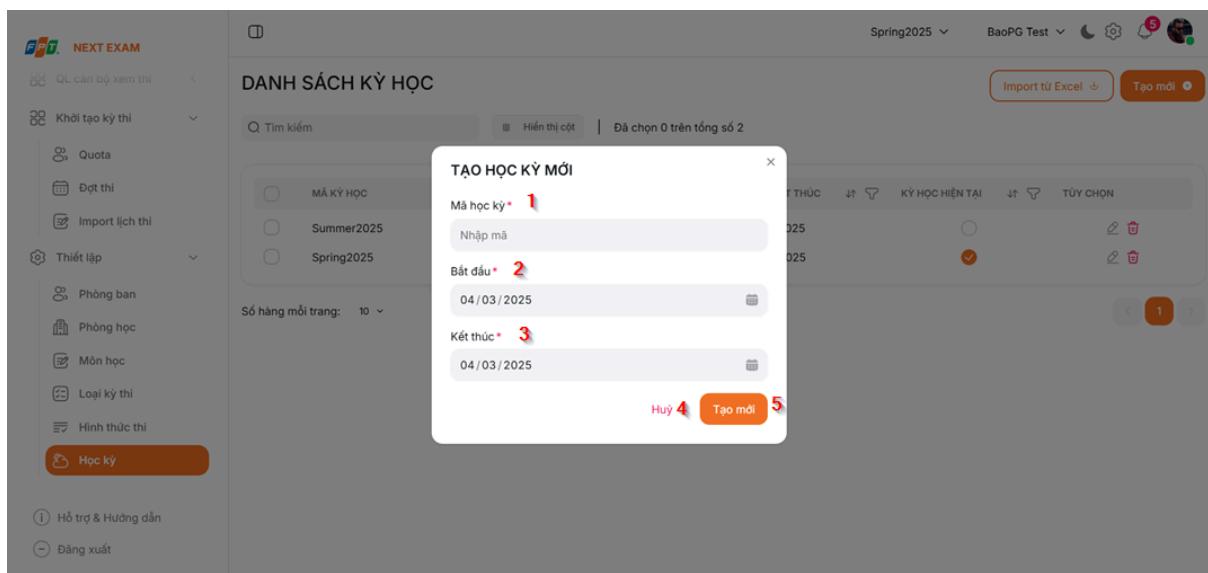


Figure 54 - Create semester screen

Function details:

- **Data:** The function processes the “Mã học kỳ”, “Bắt đầu”, “Kết thúc”
- **Validation:**

- **Error Handling:** Displays appropriate messages for errors, such as "Mã học kỳ đã tồn tại" or "Trường này là bắt buộc."
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique "Mã học kỳ", filled fields). => The system creates the semester, saves it in the database, and displays: "Tạo học kỳ mới thành công."
- **Abnormal case:**
 - "Mã học kỳ" is missing or already exists => The system displays appropriate error messages "Mã học kỳ đã tồn tại."
 - "Kết thúc" is before "Bắt Đầu" => The system displays appropriate error messages "Ngày bắt đầu phải trước ngày kết thúc".

3.5.3 View and Update semester.

Function trigger:

- **Navigation path:** "Thiết Lập" -> "Học kỳ" -> Edit Icon
- **Timing demand:** On demand (whenever an administrator want to manage update information of each semester of the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently be able to update information for each semester in the system.
- **Interface:**
 - **Update information of users modal:**
 1. **"Mã học kỳ":** Textbox - A field to display the name of the semester code and able to change the name.
 2. **"Bắt đầu":** Date picker - A field that allows users to select a start date from a calendar popup.
 3. **"Kết thúc":** Date picker - A field that allows users to select an end date from a calendar popup.
 4. **"Hủy":** Button - a button to cancel updating progress.
 5. **"Lưu":** Button - a button to submit update information.
- **Data processing:**
 - The user navigates to the "Danh sách kỳ học" screen and clicks the pencil icon.
 - The update information of the semester modal display.
 - The user changes necessary information and clicks the "Lưu" button.
 - The system validates the entered information (e.g. checks for empty fields, possibly checks for file type or size).
 - If the validation is successful, the system updates the new information to the database.
 - The system displays a success message: "Chỉnh sửa học kỳ thành công".
 - The new information is displayed on the user screen.

Screen layout:

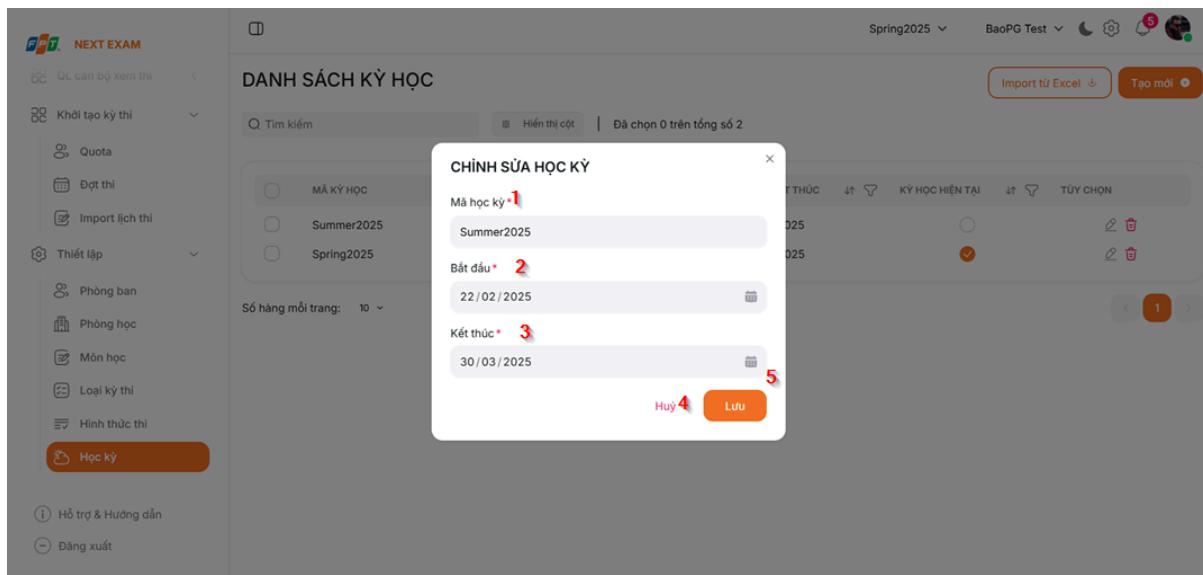


Figure 55 - Update semester information

Function details:

- Data:** The function retrieves and displays users details, including: full name, department, role, phone number, email, department and gender and the ability to change semester information.
- Validation:** (None)
- Business rules:** (None).
- Normal case:** Update semester successfully, new data is saved to the database and display message “Chỉnh sửa học kỳ thành công” .
- Abnormal case:**
 - The system handles potential errors during semester updating submission and displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed

3.5.4 Delete semester.

Function trigger:

- Navigation path:** “Trang chủ” -> “Thiết lập” -> “Học kỳ” -> delete icon
- Timing Frequency:** On demand (whenever an admin wants to delete an existing semester).

Function description:

- Actors/Roles:** Admin
- Purpose:** Allow admin to delete semester to suit their needs
- Interface:**
 - Delete semester modal:**
 - “Hủy bỏ”:** Button - a button to cancel the deleting semester progress.
 - “Xóa”:** Button - a button to confirm deleting semesters.
- Data processing:**
 - The user navigates to the "Danh sách kỳ học" screen and clicks on the delete icon for the row the user wants
 - The system find the semester id that user wants delete
 - Show confirm modal Semester confirm delete

- The semester selected for deletion will be updated and the list semester will be displayed on the "Semester" table.

Screen layout:

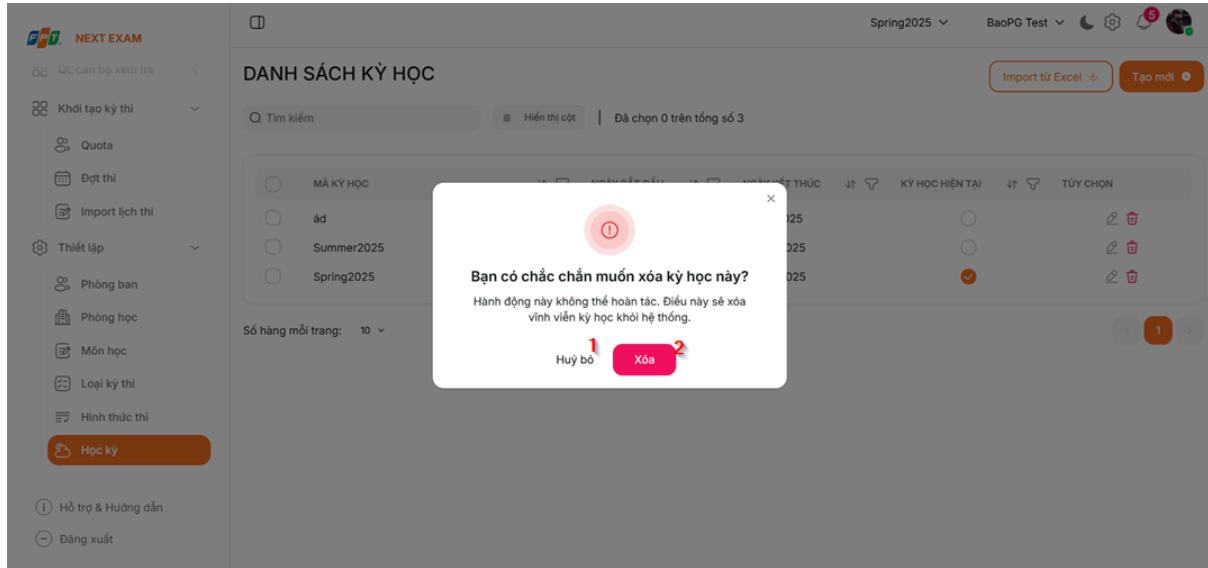


Figure 56 - Delete semester

Function details:

- Data:** The function handles the Code of an existing classroom.
- Validation:**
 - Error Handling:** The system handles potential errors during classroom submission and displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed.
- Business rules:** (None)
- Normal case:** A valid semesterID is selected, and the user confirms deletion. -> The semesterID is deleted, and the updated list is displayed with a success message.
- Abnormal case:** The semester Id does not exist => The system displays: "Đã có lỗi xảy ra, vui lòng thử lại sau."

3.5.5 Set semester as the current default semester.

Function trigger:

- Navigation path:** "Trang chủ" -> "Thiết lập" -> "Học kỳ" -> checked button
- Timing Frequency:** On demand (whenever an admin wants to change the current semester).

Function description:

- Actors/Roles:** Admin
- Purpose:** Allow admin to set the current semester to suit their needs.
- Interface:**
 - Set current semester checked:**
 - "Kỳ học hiện tại": Checked - a checked button to set the current semester progress.
- Data processing:**
 - The user navigates to the "Danh sách kỳ học" screen and check on the checked button for the row the user wants
 - The system change the current semester that user wants to change

- Show the correct semester code on the header of the system.

Screen layout:

Figure 57 - Set current semester

Function details:

- **Data:** The function handles the code of an existing semester.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** A valid semester code is selected → The system updates the current semester to all and displays a successful message.
- **Abnormal case:** (None).

3.5.6 View the list of classes in the semester

Function trigger:

- **Navigation path:** Dashboard-> Quản lý sinh viên -> Lớp học
- **Timing Frequency:** On demand (whenever the examiner wants to see the list of classes in the system versus the classrooms in the buildings).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allows examiners to quickly and efficiently view all available classrooms , ensuring easy management of classrooms
- **Interface:**
 - **View list of classrooms screen:**
 - Table classrooms:** Displays a structured table containing information about each classroom. Includes columns such as: Name class, name course, semester, Action (Edit, Delete) per row
 - Search bar:** A search box for users to enter a name and find a specific classroom.
 - Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.

4. **Rows per page:** Display the number of rows the user wants to see.
 5. **Pagination:** Navigate to other data pages.
 6. **Selected:** Displays the number of rows the user has selected
- **Data processing:**
 - User clicks on the Student management and selects "Classroom"
 - The system fetches the list of classrooms from the database.
 - The system displays the classroom list in a row-by-row format, including the classroom name, course name ,semester and an option like edit and delete.

Screen layout:

The screenshot shows a software application window titled 'DANH SÁCH LỚP HỌC'. The left sidebar contains a navigation menu with various options like 'Exam Code', 'Quản lý sự cố', 'QL sinh viên', 'Lớp học' (highlighted in orange), 'Sinh viên', etc. The main content area displays a table with 112 items. The columns are labeled 'LỚP HỌC', 'MÔN HỌC', and 'HỌC KỲ'. The table includes rows such as SE17A03, VNR202, Spring2025; MC18D01, WMC201, Spring2025; A11B, DPL302m, Spring2025; IA17A, VNR202, Spring2025; BEN17B, ELT401, Spring2025; GD17A01, VNR202, Spring2025; A11B02, DBI202, Spring2025; SE17C, SDN302, Spring2025; MKT17A01, VNR202, Spring2025; BJ18B, JSC301, Spring2025. At the bottom, there is a pagination control showing 'Số hàng mỗi trang: 10' and a page number '4'.

Figure 58 - View list of classroom

Function details:

- **Data:** The function retrieves and displays classroom details, including: classroom name, course name ,semester and an option like edit and delete. It may also include additional information based on the applied filtering and sorting options.
- **Validation:**
 - **Search by Name:** Allows users to search for a classroom by name and displays matching results.
 - **Sort and Filter List:** Allows users to sort and filter the list based on criteria like name or description displaying the filtered and sorted results.
- **Business rules:** (None)
- **Normal case:** Data from table "Classroom" in database exists. => Display list of subjects
- **Abnormal case:** There is no data from table "Classroom" in the database. => Display message "Không có dữ liệu".

3.5.7 Add class in the semester

Function trigger:

- **Navigation path:** Dashboard-> Setting icon -> "QL sinh viên"-> "Lớp học"-> "Thêm lớp học"
- **Timing Frequency:** On demand (whenever an examiner wants to create a new classroom).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Provides examiners with the ability to create new classrooms, support customization, and manage and organize exams for a variety of needs.
- **Interface:**
 - **Create new classroom Screen:**
 1. **[Mã lớp học]:** Text field for entering the code of the classroom.
 2. **[Môn học]:** Dropdown field for selecting the course name of the classroom.
 3. **[Lưu]:** Button to submit the new classroom.
 4. **[Huỷ]:** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Classroom" screen and clicks the "Create New" button.
 - The "Thêm lớp học" screen is displayed.
 - The user enters the code and course name
 - The user clicks the "Save" button.
 - The system validates the entered information (e.g. checks for empty fields, possibly checks for file type or size).
 - If the validation is successful, the system sends the classroom information to the server.
 - The system displays a success message: "Thêm mới lớp học thành công".
 - The new Classroom is added to the classroom list on the "Classroom" table.

Screen layout:

The screenshot shows the 'DANH SÁCH LỚP HỌC' (List of Classes) screen in the NEXT EXAM application. On the left, there is a sidebar with various navigation options: Trang chủ, Người dùng, Lịch thi, Đăng ký xem thi, Exam Code, Quản lý sự cố, QL sinh viên, Lớp học (highlighted in orange), Sinh viên, QL cán bộ xem thi, Điểm danh, Khởi tạo kỳ thi, Quota, Đợt thi, Hỗ trợ & Hướng dẫn, and Bảng xuất. The main area displays a table of existing classes with columns: LỚP HỌC, MÔN HỌC, HỌC KỲ, and TÙY CHỌN. A modal dialog titled 'THÊM LỚP HỌC MỚI' (Add New Class) is open in the center. It contains fields for 'Mã lớp học' (Class Code) with value '1', 'Nhập mã lớp học' (Enter class code), 'Môn học' (Subject) with value '2', and dropdowns for 'HỌC KỲ' (Semester) with value 'Spring2025' and 'TÙY CHỌN'. At the bottom of the modal are buttons labeled 'Huỷ' (Cancel) and 'Lưu' (Save). The table below the modal shows rows for SE17A03, MC18D01, AI18B, IA17A, BEN17B, GDT17A01, AI19B02, SE17C, MKT17A01, and BJ18B, along with their respective MÔN HỌC (VNR202, JSC301), HỌC KỲ (Spring2025, Spring2025, Spring2025, Spring2025, Spring2025, Spring2025, Spring2025, Spring2025, Spring2025, Spring2025), and TÙY CHỌN (checkboxes). The footer of the screen includes a page number 'Số hàng mỗi trang: 10' and a navigation bar with pages 1 through 12.

Figure 59 - Add class in the semester screen layout

Function details:

- **Data:** The function processes the proposal Code and course name.
- **Validation:**
 - **Error Handling:** The system handles potential errors during classroom submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
- **Business rules:** (None)

- **Normal case:** Valid input provided (unique classroom Code, filled fields) => The system creates the classroom, saves it in the database, and displays: "Thêm mới lớp học thành công."
- **Abnormal case:** Classroom Code is missing or already exists => The system displays appropriate error messages "Lớp học đã tồn tại"

3.5.8 Edit class in the semester

Function trigger:

- **Navigation path:** Dashboard-> Setting icon -> “QL sinh viên”-> “Lớp học”-> Edit Icons
- **Timing Frequency:** On demand (whenever an examiner wants to edit an existing classroom).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allow Examiners to update classroom to suit their needs
- **Interface:**
 - **Update classroom screen:**
 1. **[Mã lớp học]:** Text field for editing the code (pre-filled with the current code).
 2. **[Môn học]:** Dropdown field for editing the description (pre-filled with the current course name).
 3. **[Lưu]:** Button to update the classroom.
 4. **[Huỷ]:** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Classroom" screen and clicks on the edit icon for the row the user wants
 - The "Update" screen is displayed.
 - The code and course name are edited
 - The user clicks on the "Lưu" button.
 - The system validates the entered information (e.g. checks for empty fields).
 - If the validation is successful, the system sends the classroom to the server.
 - The system displays a success message: "Cập nhật lớp học thành công".
 - The classroom selected for editing will be updated and the new Classroom will be displayed on the "Classroom" table.

Screen layout:

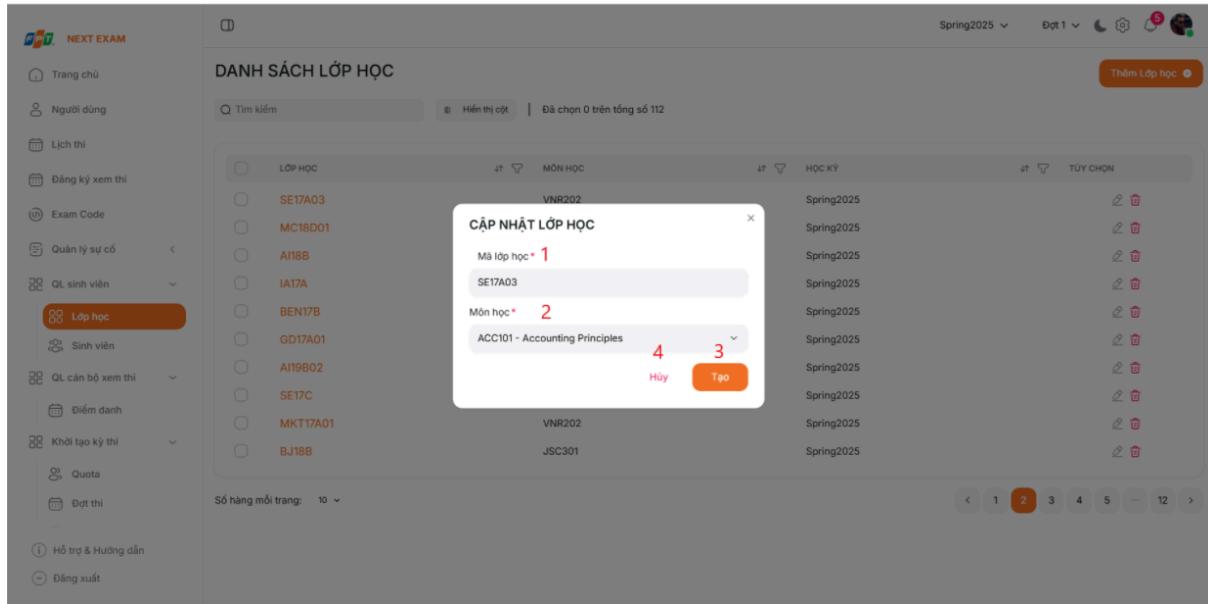


Figure 60 - Edit class in the semester screen layout

Function details:

- **Data:** The function handles the Code and course of an existing exam format.
- **Validation:**
 - **Error Handling:** The system handles potential errors during classroom submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique classroom Code, filled fields) => The system updates the classroom , saves it in the database, and displays: "Cập nhật lớp học thành công"
- **Abnormal case:** Classroom Code is missing or already exists => The system displays appropriate error messages "Lớp học đã tồn tại"

3.5.9 Delete class in the semester

Function trigger:

- **Navigation path:** Dashboard-> Setting icon -> “QL sinh viên”-> “Lớp học”-> Delete Icon
- **Timing Frequency:** On demand (whenever an examiner wants to delete an existing classroom).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allow Examiners to delete classroom to suit their needs
- **Interface:**
 - **Delete classroom screen:**
 1. [Xoá]: Button to delete the classroom.
 2. [Huỷ bỏ]: Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Classroom" screen and clicks on the delete icon for the row the user wants
 - The system finds the user wants delete

- Show confirm modal User confirm delete
- The classroom selected for deletion will be updated and the listclassroom will be displayed on the "Classroom" table.

Screen layout:

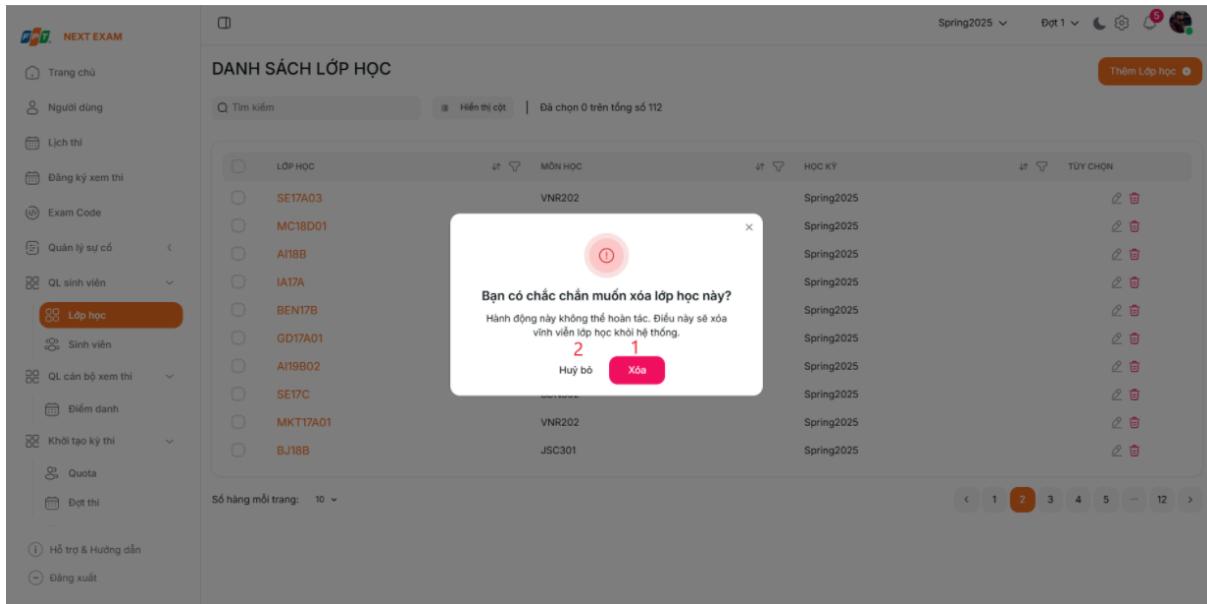


Figure 61 - Delete class in the semester screen layout

Function details:

- **Data:** The function handles the Code and course name of an existing classroom.
- **Validation:**
 - **Error Handling:** The system handles potential errors during classroom submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
- **Business rules:** (None)
- **Normal case:** A valid classroomID is selected, and the user confirms deletion.=> The classroomID is deleted, and the updated list is displayed with a success message "Xoá lớp học thành công".
- **Abnormal case:** The classroomID does not exist => The system displays: "Xoá lớp học thất bại"

3.5.10 View the list of students in the class

Function trigger:

- **Navigation path:** Dashboard-> Quản lý sinh viên-> Lớp học -> Tên lớp học
- **Timing Frequency:** On demand (whenever the admin wants to see the list of students in the classrooms).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows admin to quickly and efficiently view all available student in student
- **Interface:**
 - **View list of student screen:**
 1. **Table students:** Displays a structured table containing information about each classroom. Includes columns such as: Student Id, name student, Action (Delete) per row

2. **Search bar:** A search box for users to enter a name and find a specific student name.
3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
4. **Rows per page:** Display the number of rows the user wants to see.
5. **Pagination:** Navigate to other data pages.
6. **Selected:** Displays the number of rows the user has selected

- **Data processing:**

- User clicks on the Student management, selects "Classroom" and clicks the Classroom name.
- The system fetches the list of students of a classroom from the database.
- The system displays the classroom list in a row-by-row format, including the student Id, name student, Action (Delete).

Screen layout:

MSSV	Tên	Hành động
DA180043	Trần Nguyễn Khánh Linh	
DS180600	Đào Thị Cẩm Tú	
DS190074	Lê Trần Tuấn Minh	
DS190253	Võ Đoàn Trinh	
DS190614	Nguyễn Thảo Nguyên	

Figure 62 - View list of student in the classroom

Function details:

- **Data:** The function retrieves and displays list student details, "Mã sinh viên", "Tên sinh viên", Hành động (Delete). It may also include additional information based on the applied sorting options.
- **Validation:**
 - **Search by column "Tên":** Allows users to search for a student by name and displays matching results.
 - **Sort and Filter List:** Allows users to sort the list based on criteria like name displaying sorted results.
- **Business rules:** (None)
- **Normal case:** A valid "Mã sinh viên" is selected, and the user confirms deletion=> The student with "Mã sinh viên" is deleted, and the updated list is displayed with a success message.
- **Abnormal case:** The studentID does not exist => The system displays: "Xóa sinh viên thất bại"

3.5.11 Add students to the class

Function trigger:

- **Navigation path:** Dashboard → Quản lý sinh viên → Lớp học → Tên lớp học → Thêm sinh viên
- **Timing Frequency:** On demand (whenever the admin wants to add students to a classroom).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the admin to add one or multiple students to a specific classroom easily and efficiently.
- **Interface:**
 - **Add student screen:**
 1. “Thêm sinh viên” button: Initiates the process of adding students to a classroom.
 2. “Danh sách mã sinh viên” field: A multiline input field where the admin can enter or paste multiple student IDs to add at once. Each ID is separated by a new line or comma.
 3. “Thêm mới” button: Confirms and adds the entered student IDs to the class.
 - **Data processing:**
 - Admin navigates to Student Management, selects "Classroom", clicks on the classroom name, and then clicks the “Thêm sinh viên” button.
 - Admin navigates to Student Management, selects "Classroom", clicks on the classroom name, and then clicks the “Thêm sinh viên” button.
 - The admin enters student IDs manually or selects students from the list.
 - Upon clicking the “Thêm mới” button, the system validates the inputs and adds the valid students to the selected classroom.
 - The student list is updated, and a success message is shown.

Screen layout:

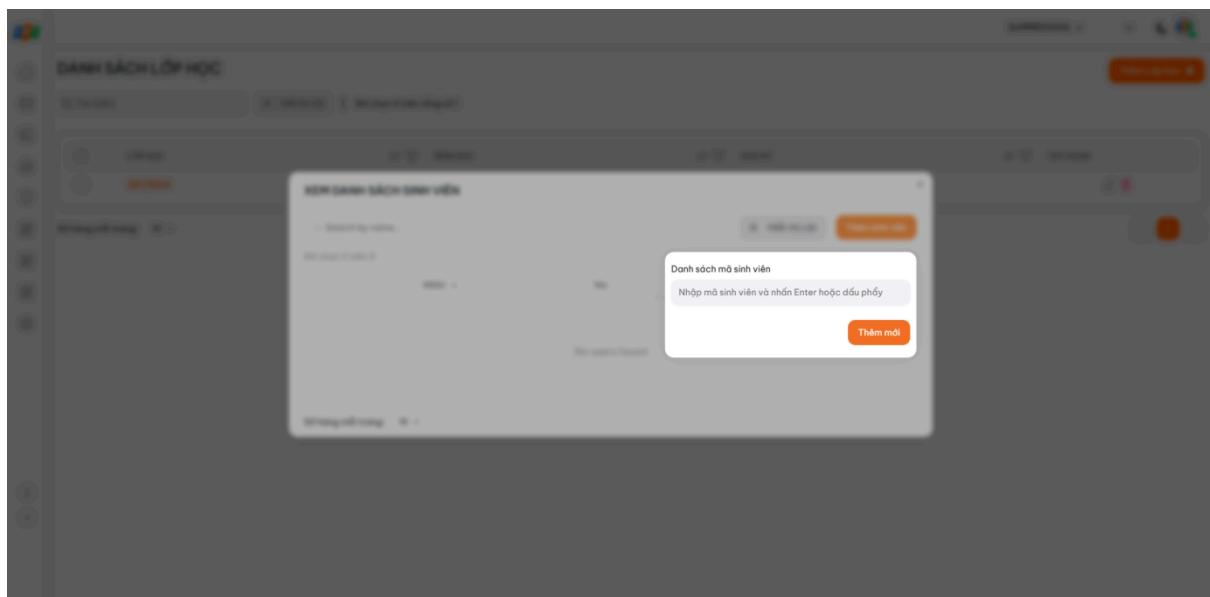


Figure 63 - Add student to classroom screen layout

Function details:

- **Data:** Retrieves a list of students not currently assigned to the selected classroom, including

Student ID and Name.

- **Validation:**
 - **Student already in class:** Prevents adding a student who is already part of the class.
 - **Invalid or empty student ID:** Displays a message if a student ID is not found or the input is empty.
- **Business rules:** (None)
- **Normal case:** Valid students are entered → Admin clicks “Thêm mới” → Students are added → System displays: “Thêm mới học sinh thành công.”
- **Abnormal case:** No student IDs entered → System displays: “Không được để trống trường này.”

3.5.12 Remove students from the class

Function trigger:

- **Navigation path:** Dashboard → Quản lý sinh viên → Lớp học → Tên lớp học
- **Timing Frequency:** On demand (whenever the admin wants to remove students from a classroom).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the admin to remove one or multiple students from a specific classroom quickly and efficiently.
- **Interface:**
 - **View list of students screen (extended with removal functionality):**
 1. **Delete icon button:** Delete specified student from class
 2. **“Hủy bỏ” button:** Cancel delete student process
 3. **“Xóa” button:** Confirms and deletes the selected student from the class.
- **Data processing:**
 - Admin navigates to the class list and views the list of students.
 - Admin can remove students by clicking the “Delete” button on a specific student row.
 - System validates the student IDs and removes them from the classroom.
 - Updated list is displayed with a confirmation message.

Screen layout:

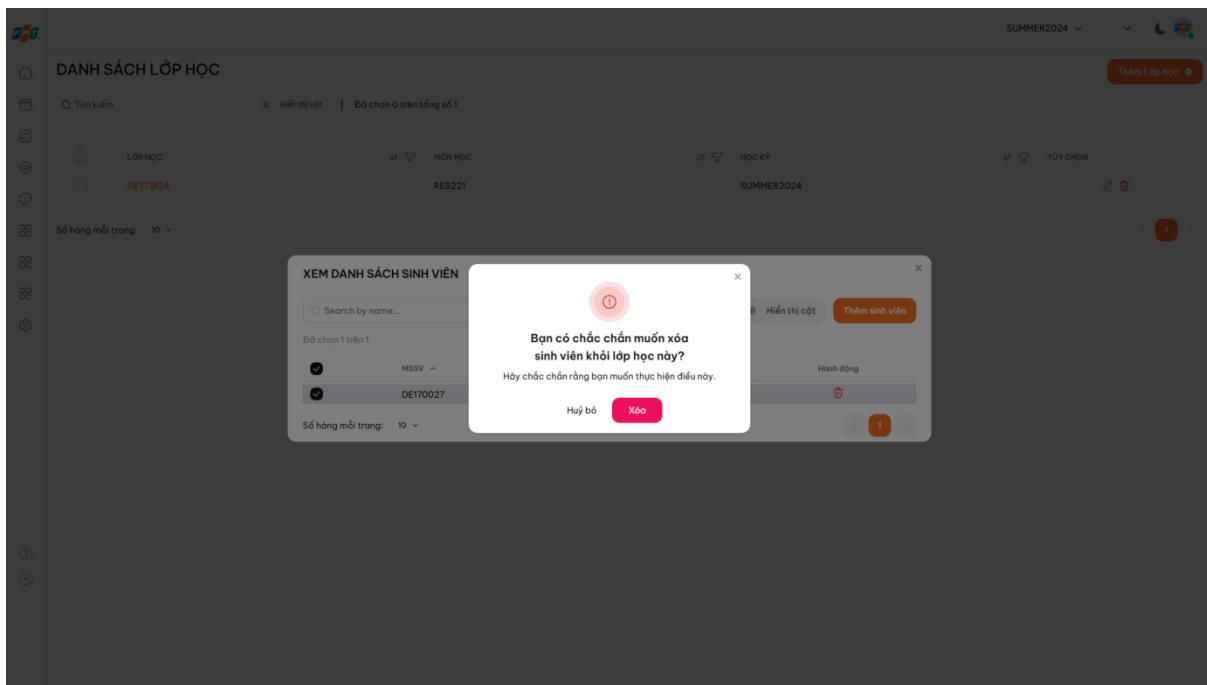


Figure 64 - Remove student from classroom screen layout

Function details:

- **Data:** Retrieves the current list of students assigned to the selected classroom.
- **Validation:**
 - **Student ID must exist** in the class to be removed.
 - **Confirmation required:** Prevents accidental deletions by asking for confirmation.
- **Business rules:** (None)
- **Normal case:** Student(s) selected and confirmed for removal → System removes them from the class and displays: “**Xóa học sinh thành công.**”
- **Abnormal case:** Student ID not found in class → System displays: “**Xóa học sinh thất bại**”
-

3.5.13 View the list of exam supervisors by day

Function trigger:

- **Navigation path:** Dashboard → Quản lý cán bộ coi thi → Điểm danh → Switch to view list of exam supervisors by day
- **Timing Frequency:** On demand (whenever the admin wants to view the exam supervisors assigned on a specific day).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the admin to view which supervisors (giám thị) are scheduled for exam duty on a given date. Helps with daily monitoring and quick adjustments if necessary.
- **Interface:**
 - **View list of exam supervisors by day screen:**
 1. **Date picker:** Allows the admin to select a specific date to view supervisor assignments.
 2. **Table of supervisors:** Displays structured data about the supervisors assigned for that day. Columns include: Cán bộ, Mã môn, Phân loại, Phòng thi, Thời gian, Trạng thái nhận, trạng thái bàn giao

3. **Search bar:** Filter the list by supervisor name or ID
 4. **Hidden Columns:** Allows user to toggle visibility of columns
 5. **Rows per page:** Set the number of visible records per page
 6. **Pagination:** Navigate through multiple pages of data.
 7. **Selected count:** Show how many rows (supervisors) are currently selected.
- **Data processing:**
 - Admin selects a date using the date picker.
 - The system retrieves the list of supervisors scheduled for that date from the database.
 - The system displays the supervisor list in tabular form.

Screen layout:

DANH SÁCH GIÁM THỊ PHÒNG THI

Tim kiem 3 Chon ngày 04 / 09 / 2025 1 Hiện thị cột 4 Đã chọn 0 trên tổng số 4 7

CÁN BỘ	MÃ MÔN	PHẦN LOẠI	PHÒNG THI	THỜI GIAN	TRANG THÁI NHẬN	TRANG THÁI BẢN GIAO
ThangTVB minhthangqhen	SSG104	FE	GAMMA 302	07:30 - 08:00 09/04/2025	<input checked="" type="radio"/> Chưa nhận	<input checked="" type="radio"/> Chưa bản giao
ThangTVB minhthangqhen	IEI301	FE	GAMMA 201	10:50 - 11:50 09/04/2025	<input checked="" type="radio"/> Chưa nhận	<input checked="" type="radio"/> Chưa bản giao
ThangTVB minhthangqhen	VNR202	FE	GAMMA 302	09:10 - 10:10 09/04/2025	<input checked="" type="radio"/> Chưa nhận	<input checked="" type="radio"/> Chưa bản giao
ThangTVB minhthangqhen	SSG104	FE	GAMMA 302	08:20 - 08:50 09/04/2025	<input checked="" type="radio"/> Chưa nhận	<input checked="" type="radio"/> Chưa bản giao

Số hàng mỗi trang: 10 5

6

Figure 65 - View the list of exam supervisors by day screen layout

Function details:

- **Data:** Retrieves and displays supervisor assignment data for a selected date.
- **Validation:**
 - **Search by name or ID**
 - **Sort and filter options**
- **Business rules:** (None)
- **Normal case:** Valid date with assigned supervisors → System displays full list of exam supervisors.
- **Abnormal case:** No supervisors scheduled for selected date → System displays: "Không có dữ liệu"

3.6 Initialize exam configuration

3.6.1 View the list of exams period in the semester

Function trigger:

- **Navigation path:** Dashboard-> Khởi tạo kỳ thi -> Đợt thi
- **Timing Frequency:** On demand (whenever an examiner wants to view the list of Exam Period in a system).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allows examiners to quickly and efficiently view all available exam periods, ensuring easy management of exam periods
- **Interface:**
 - **View list of exam formats Screen:**
 1. **Table Exam Period:** Displays a structured table containing information about each exam format. Includes columns such as: Exam period Name, Start day, End day, Set current button ,Action (Edit, Delete) per row
 2. **Search bar:** A search box for users to enter a name and find a specific Exam period.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Selected:** Displays the number of rows the user has selected
 5. **Rows per page:** Display the number of rows the user wants to see.
 6. **Pagination:** Navigate to other data pages.
- **Data processing:**
 - User clicks on the Initialize exam icon and selects " Exam Period"
 - The system fetches the Exam period list from the database.
 - The system displays the Exam Period list in a row-by-row format, including the exam period Name, Start day, End day, Set current button ,Action (Edit, Delete) per row

Screen layout:

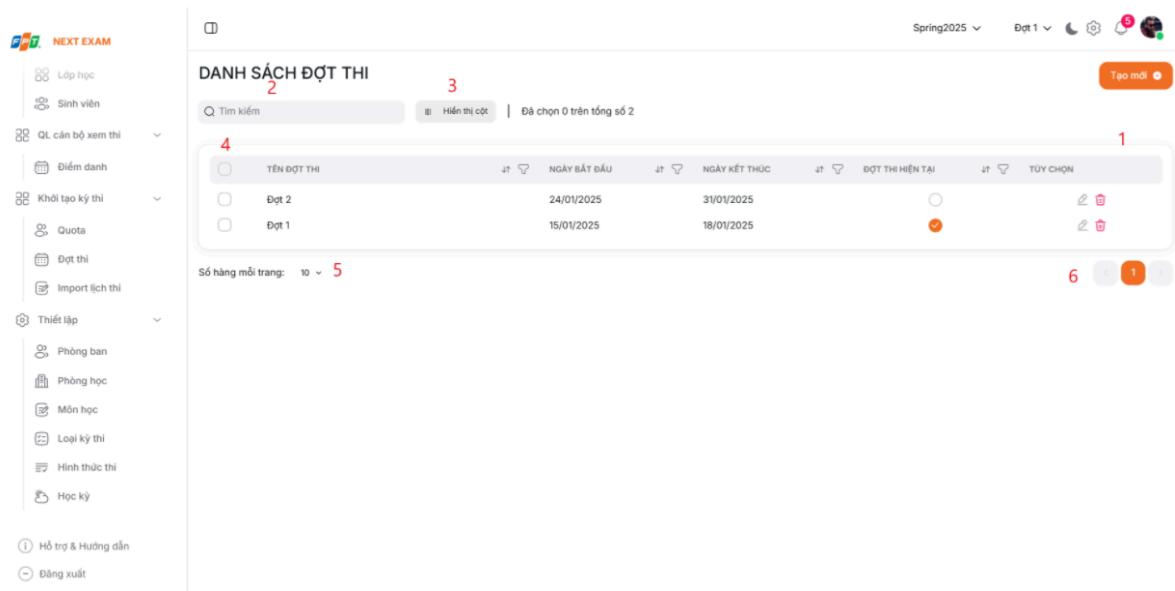


Figure 66 - View the list of exams period in the semester

Function details:

- **Data:** The function retrieves and displays exam period details, including: Exam period Name, Start day, End day, Set current button ,Action (Edit, Delete). It may also include additional information based on the applied filtering and sorting options.
- **Validation:**
 - **Search by Name:** Allows users to search for exam periods by name and displays matching results.

- **Sort and Filter List:** Allows users to sort and filter the member list based on criteria like name or description displaying the filtered and sorted results.
- **Business rules:** (None)
- **Normal case:** Data from table "Danh sách đợt thi" in database exists. => Display list of exam period
- **Abnormal case:** There is no data from table "Danh sách đợt thi" in the database. => Display message "Không có dữ liệu".

3.6.2 Create exam period

Function trigger:

- **Navigation path:** Dashboard-> Thiết lập -> Đợt thi-> Tạo mới
- **Timing Frequency:** On demand (whenever an examiner wants to create a new Exam period).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Provides Admin with the ability to create new exam periods, support customization, and manage and organize exams for a variety of needs.
- **Interface:**
 - **Create new exam format Screen:**
 1. **Tiêu đề (Input):** Text field for entering the code of the exam period.
 2. **Bắt đầu (Datepicker):** Date Picker start day of the exam period.
 3. **Kết thúc (Datepicker):** Date Picker end day of the exam period.
 4. **Tạo mới (button):** Button to submit the new exam period.
 5. **Hủy (button):** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Danh sách đợt thi" screen and clicks the "Tạo mới" button.
 - The "Tạo mới" screen is displayed.
 - The user enters the title, start day and end day
 - The user clicks the "Tạo mới" button.
 - The system validates the entered information (e.g. checks for empty fields, possibly checks for file type or size).
 - If the validation is successful, the system sends the exam period to the server.
 - The system displays a success message: "Tạo đợt thi thành công".
 - The new Exam period is added to the Exam period list on the "Danh sách đợt thi" table.

Screen layout:

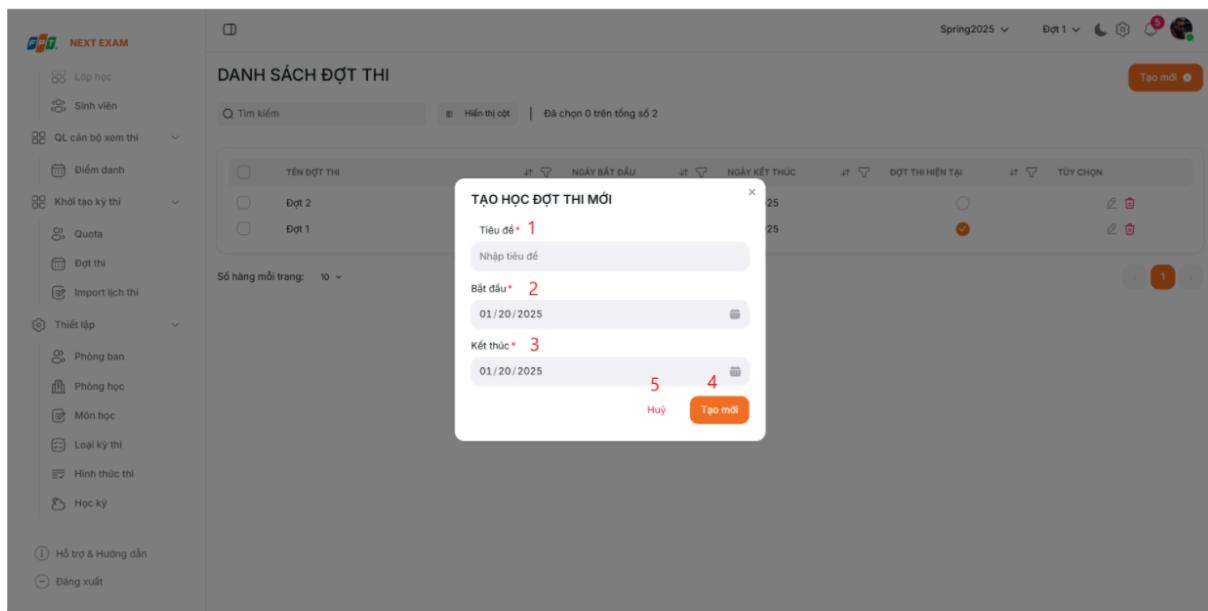


Figure 67 - Create exam period modal

Function details:

- **Data:** The function processes the title, start day and end day.
- **Validation:**
 - The system will verify that the selected exam period exists and is available for selection.
 - A confirmation prompt may appear, ensuring that the examiner intends to set the chosen period as the current one.
 - If successful, a confirmation message will be shown to the examiner, indicating that the exam period has been set as current.
 - If the action fails (e.g., due to a conflict or system issue), an error message will be displayed, and the system will prevent the examiner from proceeding further.
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique title, filled fields) => The system creates the exam period, saves it in the database, and displays: "Tạo đợt thi thành công."
- **Abnormal case:** Title is missing or already exists => The system displays appropriate error messages "Đã xảy ra lỗi vui lòng thử lại"

3.6.3 Update exam period

Function trigger:

- **Navigation path:** Dashboard-> Setting icon -> Exam period-> Edit Icons
- **Timing Frequency:** On demand (whenever an examiner wants to edit an existing exam period).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allow Examiners to update exam period to suit their needs
- **Interface:**
 - **Update exam format Screen:**
 1. **Tiêu đề(Input):** Text field for entering the code of the exam period.
 2. **Bắt đầu (Datepicker):** Date Picker start day of the exam period.

3. **Kết thúc (Datepicker):** Date Picker end day of the exam period.
4. **Tạo mới (button):** Button to submit the new exam period.
5. **Hủy (button):** Button to clear all content on the page and start over..

- **Data processing:**

- The user navigates to the "Exam Period" screen and clicks on the edit icon for the row the user wants
- The "Save" screen is displayed.
- The title , start day and end day are edited
- The user clicks on the "save" button.
- The system validates the entered information (e.g. checks for empty fields).
- If the validation is successful, the system sends the exam period to the server.
- The system displays a success message: "Exam Period Edited Successfully".
- The exam period selected for editing will be updated and the new Exam Period will be displayed on the "Exam Period" table.

Screen layout:

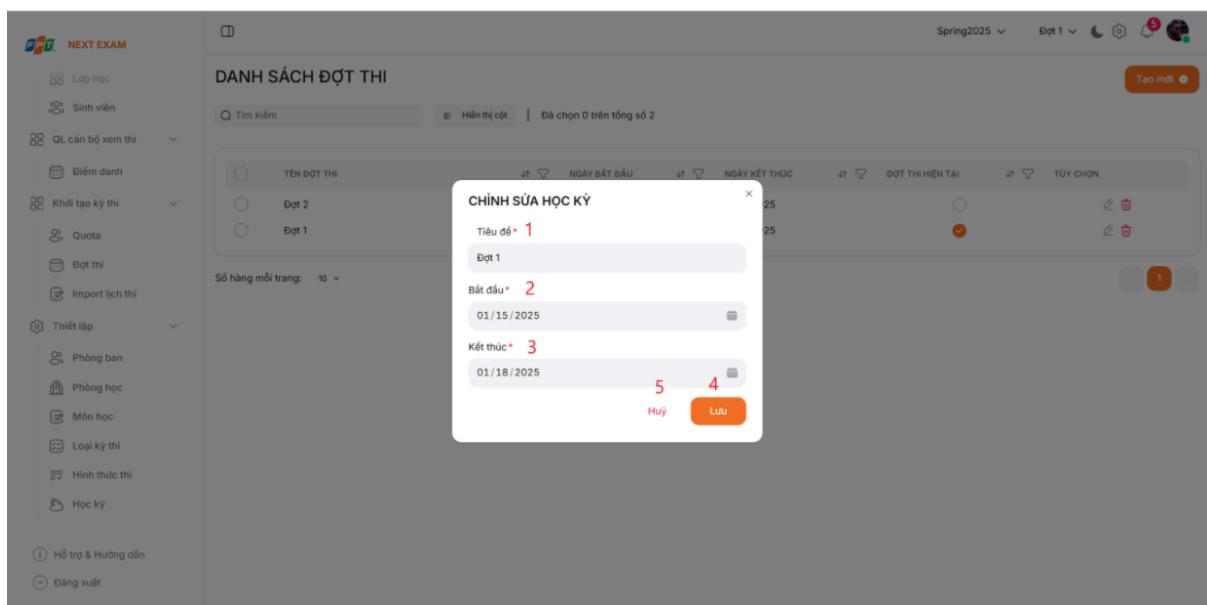


Figure 68 - Update exam period modal

Function details:

- **Data:** The function handles the title, start day and end day of an existing exam period.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam format submission and displays the message "An error occurred, please try again later" if needed.
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique title, filled fields) => The system updates the exam period , saves it in the database, and displays: "Tạo đợt thi thành công."
- **Abnormal case:** Title is missing or already exists => The system displays appropriate error messages "Đã tồn tại đợt thi."

3.6.4 Delete exam period

Function trigger:

- **Navigation path:** Dashboard-> Setting icon -> Exam Format -> Delete Icon

- **Timing Frequency:** On demand (whenever an examiner wants to delete an existing exam period).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allow Examiners to delete exam periods to suit their needs
- **Interface:**
 - **Delete exam period screen:**
 1. **Xóa (Button):** Button to delete the exam period.
 2. **Hủy (Button):** Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Danh sách đợt thi" screen and clicks on the delete icon for the row the user wants
 - The system finds the ID of the user wants to delete
 - Show confirm modal. User confirms delete
 - The exam format selected for deleting will be updated and the new Exam period will be displayed on the "Danh sách đợt thi" table.

Screen layout:

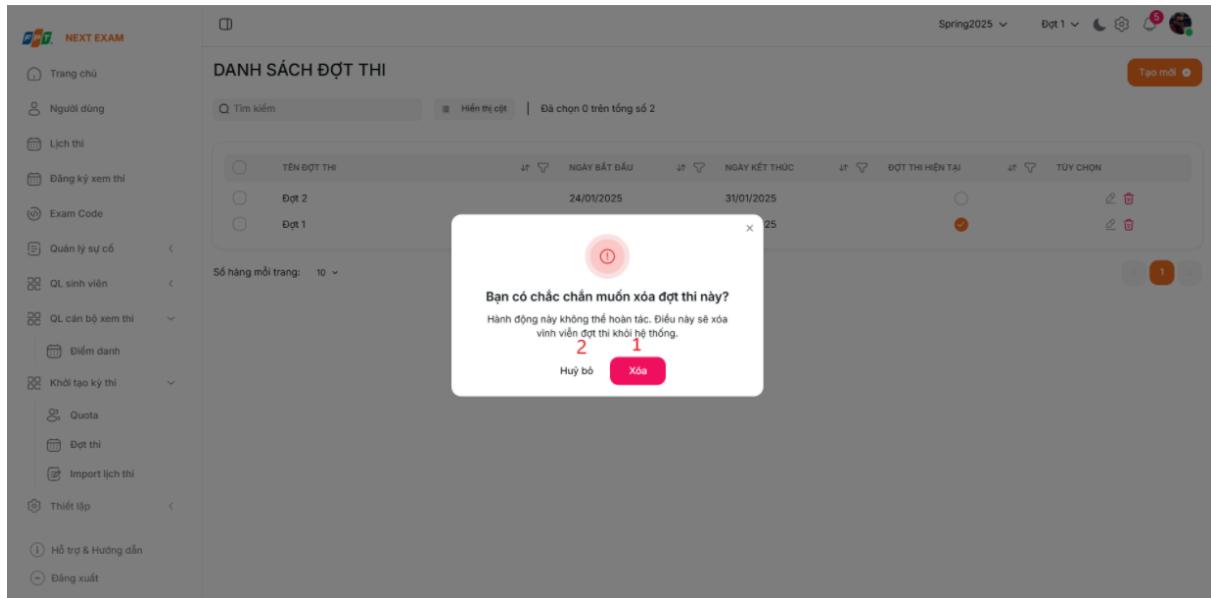


Figure 69 - Delete exam period modal

Function details:

- **Data:** The function handles the deletion of an existing exam period.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam period submission and displays the message "Đã xảy ra lỗi vui lòng thử lại" if needed.
- **Business rules:** (None)
- **Normal case:** A valid examperiodID is selected, and the user confirms deletion => The examperiodID is deleted, and the updated list is displayed "Xóa đợt thi thành công".
- **Abnormal case:** The examperiodID does not exist => The system displays: "Đã xảy ra lỗi vui lòng thử lại"

3.6.5 Set current exam period

Function trigger:

- **Navigation path:** Dashboard-> Setting icon -> Exam Period
- **Time Frequency:** On demand (whenever the examiner wants to apply the exam period current to the system).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:**
- **Interface:**
 - **Set exam period current screen:**
 - **Đợt thi hiện tại:** Shows the currently active exam period (if any).
 - **Đợt thi hiện tại (Checkbox Button):** A clickable button that the examiner can use to select and set the current exam period.
- **Data processing:**
 - User clicks set exam period current button:
 - The system exam period current in database
 - The Table displays selected current exam period

Screen layout:

TÊN ĐỢT THI	NGÀY BẮT ĐẦU	NGÀY KẾT THÚC	ĐỢT THI HIỆN TẠI	TÙY CHỌN
Đợt 2	24/01/2025	31/01/2025	<input type="radio"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
Đợt 1	15/01/2025	18/01/2025	<input checked="" type="radio"/>	<input type="checkbox"/> <input type="checkbox"/>

Figure 70 - Set current exam period

Function details:

- **Data:**
 - The function retrieves a list of available exam periods from the system. These are shown in the interface, allowing the examiner to select which period they want to set as "current."
 - Once selected, the system updates the status of the chosen exam period to reflect its new active/current status.
- **Validation:**
 - The system will verify that the selected exam period exists and is available for selection.
- **Business rules:** (None)
- **Normal case:** Data from table "Exam period" in database exists. => Set current success =
- **Abnormal case:** There is no data from table "Exam period" in the database. => Display message "Không có dữ liệu".

3.6.6 View the list of exam data import history for the exam period

Function trigger:

- **Navigation path:** Dashboard-> Khởi tạo kỳ thi -> Import lịch thi
- **Timing Frequency:** On demand (whenever an examiner wants to review the history of exam data imports for a specific exam period).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allows examiners to view a detailed history of all import activities related to exam data for each exam period, facilitating auditing, tracking changes, and ensuring data transparency.
- **Interface:**
 - **View list of exam formats Screen:**
 1. **Table Exam Period:** Displays a structured table containing information about each exam format. Includes columns such as: Exam period Name, Start day, End day, Set current button ,Action (Edit, Delete) per row
 2. **Search bar:** A search box for users to enter a name and find a specific Exam period.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Selected:** Displays the number of rows the user has selected
 5. **Rows per page:** Display the number of rows the user wants to see.
 6. **Pagination:** Navigate to other data pages.
 - **Data processing:**
 - User navigates to the *Exam Period* section and selects “View Import History”.
 - The system retrieves the relevant import history records from the database.
 - The system renders a table displaying the import history, including key details for each import session.

Screen layout:

DANH SÁCH PHÒNG BAN

TIẾN TRÌNH	NỘI DUNG LỐI	TRẠNG THÁI
<input checked="" type="checkbox"/>	N/A	Thành công
<input type="checkbox"/>	IMPORT_FE_SCHEDULE	

Số hàng mỗi trang: 10

Import dữ liệu Final Đợt 6 Import dữ liệu 2NDFE

Figure 71 - View the list of exam data import history for the exam period

Function details:

- **Data:** The function retrieves and displays exam data import history details, including: Process Name, Error Content, Status. It may also include additional information based on the applied filtering and sorting options.
- **Validation:**
 - **Sort and Filter:** Support for sorting by date, status, and name; filtering by date range or import result.
- **Business rules:** (None)
- **Normal case:** Data from table "Exam period" in database exists. => Display list of file import Template Up Fap
- **Abnormal case:** There is no data from table "Danh sách import" in the database. => Display message "Không có dữ liệu".

3.6.7 Import the list of exam rooms for the exam period FE via the Excel file

Function trigger:

- **Navigation path:** "Khởi tạo kỳ thi" -> "Import lịch thi"
- **Timing Frequency:** On-demand (whenever users want to import a batch of exam rooms from an Excel file for a specific exam period).

Function description:

- **Actors/Roles:** Administrator
- **Purpose:** Allows administrators to import exam room lists in bulk via Excel to streamline exam setup and reduce manual input errors.
- **Interface:**
 - **View Import the list of exam rooms for the exam period FE via the Excel file:**
 1. **"Import from Excel" Button:** A functional button enabling users to upload an Excel file containing exam room information.
 2. **Upload area:** Excel file import area
 3. **"Download Template" Button:** Enables users to download a sample Excel file with the correct format required for import.
 4. **"Confirm Import" Button:** Allows users to confirm and proceed with importing validated data into the system.
 5. **"Cancel Import" Button:** Allows users to cancel and proceed with importing validated data into the system.
- **Data processing:**
 - The admin clicks the "Import from Excel FE" button and selects an Excel file from their device.
 - Upon clicking "Confirm Import", the system:
 - Validates the data and inserts valid records into the ExamRoom table linked to the selected Exam Period
 - The system shows an import result message: success or failure (with detailed line-by-line errors if applicable).

Screen layout:

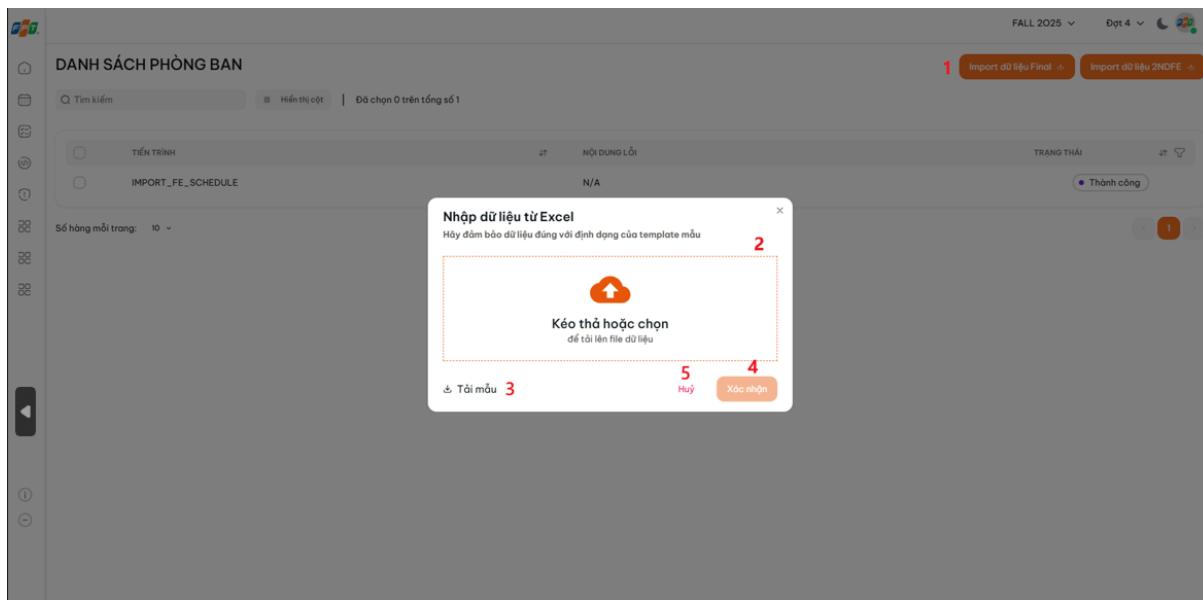


Figure 72 - Import the list of exam rooms for the exam period FE via the Excel file

Function details:

- **Data:** The function retrieves and displays exam format details, including: Name Process, Error detail, status. It may also include additional information based on the applied filtering and sorting options.
- **Validation:**
 - **Required Fields Check:** All fields must be filled and match the expected format.
 - **Error Handling:**
 - If errors are found, detailed messages must be displayed per row.
 - Valid rows are still imported unless otherwise specified by business logic.
- **Business rules:** Generate 30% of exam rooms based on the total room count for each course.
- **Normal case:** Valid Excel file is uploaded → Data is successfully imported → System displays message: “Dữ liệu đang được xử lý.”
- **Abnormal case:**
 - **Empty file** → Displays message: “Đã xảy ra lỗi vui lòng thử lại”
 - **Invalid file format** → Displays error: “Đã xảy ra lỗi vui lòng thử lại.”
 - **Some rows contain errors** → Displays a detailed error table, while valid rows are still imported.

3.6.8 Import the list of exam rooms for the exam period 2ND FE via the Excel file

Function trigger:

- **Navigation path:** “Khởi tạo kỳ thi” -> “Import lịch thi”
- **Timing Frequency:** On-demand (whenever users want to import a batch of exam rooms from an Excel file for a specific exam period).

Function description:

- **Actors/Roles:** Administrator
- **Purpose:** Allows administrators to import exam room lists in bulk via Excel to streamline exam setup and reduce manual input errors.
- **Interface:**
 - **View Import the list of exam rooms for the exam period 2ND FE via the Excel file:**

1. **"Import from Excel" Button:** A functional button enabling users to upload an Excel file containing exam room information.
 2. **Upload area:** Excel file import area
 3. **"Download Template" Button:** Enables users to download a sample Excel file with the correct format required for import.
 4. **"Confirm Import" Button:** Allows users to confirm and proceed with importing validated data into the system.
 5. **"Cancel Import" Button:** Allows users to cancel and proceed with importing validated data into the system.
- **Data processing:**
 - The admin clicks the “Import from Excel FE” button and selects an Excel file from their device.
 - Upon clicking “Confirm Import”, the system:
 - Validates the data Inserts valid records into the ExamRoom table linked to the selected Exam Period
 - The system shows an import result message: success or failure (with detailed line-by-line errors if applicable).

Screen layout:

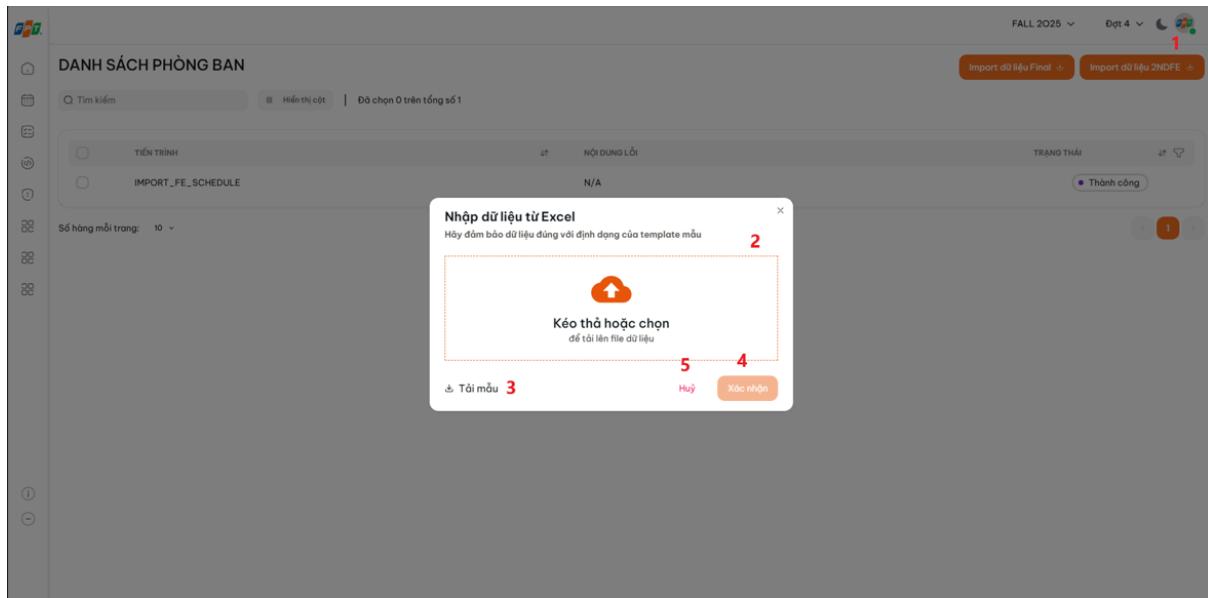


Figure 73 - Import the list of exam rooms for the exam period 2ND FE via the Excel file

Function details:

- **Data:** The function retrieves and displays exam format details, including: Name Process, Error detail, status. It may also include additional information based on the applied filtering and sorting options.
- **Validation:**
 - **Required Fields Check:**
All fields must be filled and match the expected format.
 - **Error Handling:**
 - If errors are found, detailed messages must be displayed per row.
 - Valid rows are still imported unless otherwise specified by business logic.
- **Business rules:** Select 30% of the imported exam rooms from the data template up fap FE for update.

- **Normal case:** Valid Excel file is uploaded → Data is successfully imported → System displays message: “Dữ liệu đang được xử lý.”
- **Abnormal case:**
 - **Empty file** → Displays message: “Đã xảy ra lỗi vui lòng thử lại”
 - **Invalid file format** → Displays error: “Đã xảy ra lỗi vui lòng thử lại.”
 - **Some rows contain errors** → Displays a detailed error table, while valid rows are still imported.

3.6.9 Import the list of registration quotas in the semester

Function trigger:

- **Navigation path:** “Khởi tạo kỳ thi” -> “Quota”
- **Timing Frequency:** On-demand (whenever users want to import a batch of registration quotas from an Excel file for a specific semester).

Function description:

- **Actors/Roles:** Administrator
- **Purpose:** Allows administrators to quickly import a list of registration quotas by course/subject in bulk via an Excel file, streamlining the quota setup process and minimizing manual errors.
- **Interface:**
 - **View Import Registration Quotas:**
 1. **"Import dữ liệu" Button:** A functional button enabling users to upload an Excel file containing exam room information.
 2. **Upload area:** Excel file import area
 3. **"Xác nhận" Button:** Allows users to confirm and proceed with importing validated data into the system.
 4. **"Hủy" Button:** Allows users to cancel and proceed with importing validated data into the system.
- **Data processing:**
 - The admin clicks the “Import from Excel” button and selects an Excel file from their local device.
 - The system reads and previews the content of the Excel file.
 - Upon clicking “Confirm Import”, the system performs:
 - **Validation:** Ensures data integrity and format.
 - **Insertion:** Valid data is saved into the **RegistrationQuota** table for the selected semester.
 - After processing, the system displays the import result message with success or failure details, including row-specific error messages if applicable.

Screen layout:

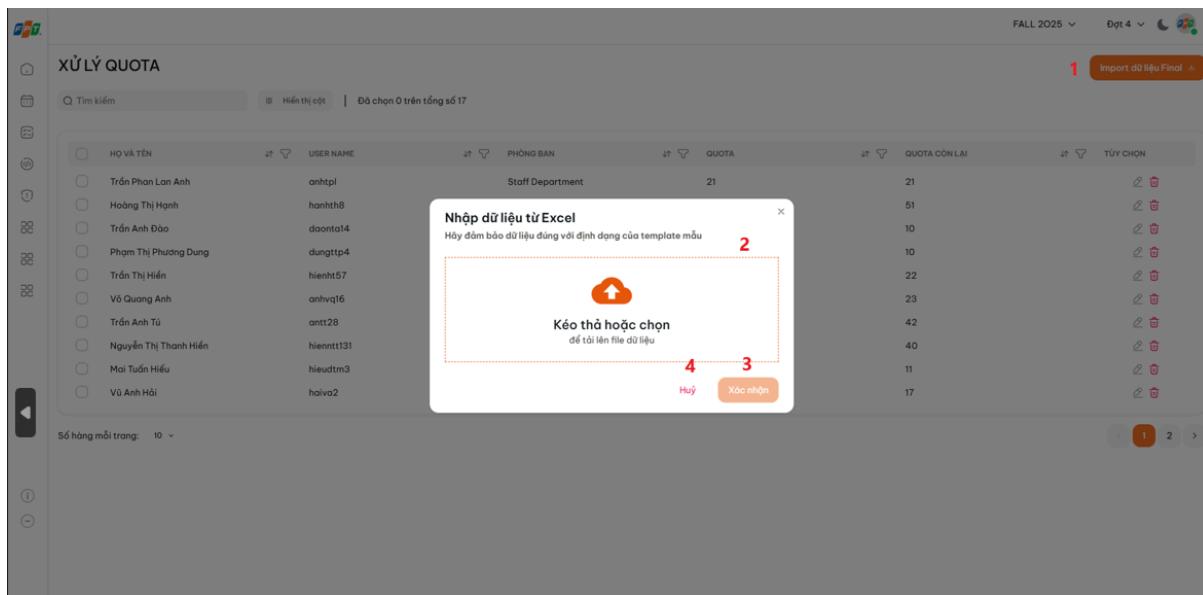


Figure 74 - Import the list of registration quotas in the semester

Function details:

- **Data:** The function retrieves and displays exam format details, including: Name Process, Error detail, status. It may also include additional information based on the applied filtering and sorting options.
- **Validation:**
 - **Required Fields Check:** All columns must be provided and filled in the correct format.
 - **Registration Quota Must Be a Number:** Ensure that the quota is a valid, non-negative integer.
 - **Error Handling:**
 - If errors are detected, display detailed messages for each affected row.
 - Valid rows are still imported, unless restricted by specific business logic.
- **Business rules:** (None)
- **Normal case:** Valid file: Excel file contains correct format and valid data → System displays: “Import successful.”
- **Abnormal case:**
 - **Empty file** → Displays message: “File contains no data.”
 - **Invalid file format** → Displays error: “Invalid file.”
 - **Some rows contain errors** → Displays a detailed error table, while valid rows are still imported.

3.6.10 View the list of registration quotas for the exam periods in the semester

Function trigger:

- **Navigation path:** Khởi tạo kỳ thi -> Quota
- **Timing Frequency:** On demand (whenever the admin wants to view and manage registration quotas for all exam periods within a semester).

Function description:

- **Actors/Roles:** Administrator, Examiner
- **Purpose:**
 - Allows administrators to view and manage the list of registration quotas associated with each exam period during the semester.
 - Provides insight into the current registration status and helps in resource planning.

- **Interface:**

- **View Registration Quotas Screen**

1. **Table Exam:** Displays a structured table containing information about each quota. Includes columns such as: Name, UserName, department, quota, remaining quota
2. **Search bar:** A search box for users to enter a name and find a specific username.
3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
4. **Selected:** Displays the number of rows the user has selected
5. **Rows per page:** Display the number of rows the user wants to see.
6. **Pagination:** Navigate to other data pages.

- **Data processing:**

- Admin navigates to *Khởi tạo kỳ thi* → *Quota*.
- Admin selects a specific semester or exam period from a dropdown or filter.
- The system fetches and displays the registration quota information for all exams in that semester.
- Admin can interact with the table to:
 - Sort by quota and registered count.
 - Search for specific subject names.
 - Customize visible columns.

Screen layout:

HỌ VÀ TÊN	USER NAME	PHÒNG BAN	QUOTA	QUOTA CÒN LẠI	TỰ CHỌN
Trần Phan Lan Anh	onhtpl	Staff Department	21	21	<input type="checkbox"/>
Hoàng Thị Hạnh	hanhth8	Staff Department	51	51	<input type="checkbox"/>
Trần Anh Đào	daonta14	HR	10	10	<input type="checkbox"/>
Phạm Thị Phương Dung	dungtp4	HR	10	10	<input type="checkbox"/>
Trần Thị Hiện	hienht57	HR	22	22	<input type="checkbox"/>
Võ Quang Anh	anhvq16	IT	23	23	<input type="checkbox"/>
Trần Anh Tú	antt28	IT	42	42	<input type="checkbox"/>
Nguyễn Thị Thanh Hiền	hiennntt31	IT	40	40	<input type="checkbox"/>
Mai Tuấn Hiếu	hieudtm3	IT	11	11	<input type="checkbox"/>
Vũ Anh Hải	haiva2	Finance	17	17	<input type="checkbox"/>

Figure 75 - View the list of registration quotas for the exam periods in the semester

Function details:

- **Data:** The system retrieves the list of exams associated with the selected exam period, including exam metadata.
- **Validation:**
 - **Search by name/subject/ID:** Filters results to matching quota of name.
 - **Sort and filter:** Enables sorting the exam list by name, username, quota.
- **Business rules:** (None)
- **Normal case:** The selected semester contains valid exam periods and quotas →

The system displays the list of exams and their registration quotas with all relevant metrics.

- **Abnormal case:** No exam periods or quotas found for the selected semester →
The system displays the message: “Không có dữ liệu chỉ tiêu đăng ký trong học kỳ này.”

3.6.11 Update quota for the selected user

Function trigger:

- **Navigation path:** “Khởi tạo kỳ thi” -> “Quota”
- **Timing Frequency:** On demand (whenever an admin or examiner wants to update the registration quota for a specific user in a selected exam period).

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Provides Admin, examiners with the ability to create new exam rooms, support customization, and manage and organize exam rooms for a variety of needs.
- **Interface:**
 - **Update Quota Modal Screen:**
 1. **“Chọn người dùng” (Edit Icon):** Allows selection from a list of users who are eligible to be assigned a quota (typically registered students).
 2. **“Quota” (Input Field):** An input box for entering the number of slots/quota to assign to the selected user.
 3. **“Cập nhật” (Button):** Confirms and submits the quota update for processing.
 4. **“Huỷ” (Button):** Clears the form and allows the user to reset the inputs
- **Data processing:**
 - The user navigates to the “Khởi tạo kỳ thi” screen and selects the “Edit Icon” option next to a specific exam room or user.
 - The “Update Quota” modal opens.
 - The user selects the desired user from the dropdown.
 - The user inputs the new quota value in the input field.
 - The user clicks the “Cập nhật” button.
 - The system:
 - Validates the quota value and user eligibility.
 - Updates the data in the user quota table.
 - Displays a success message if the update is successful.

Screen layout:

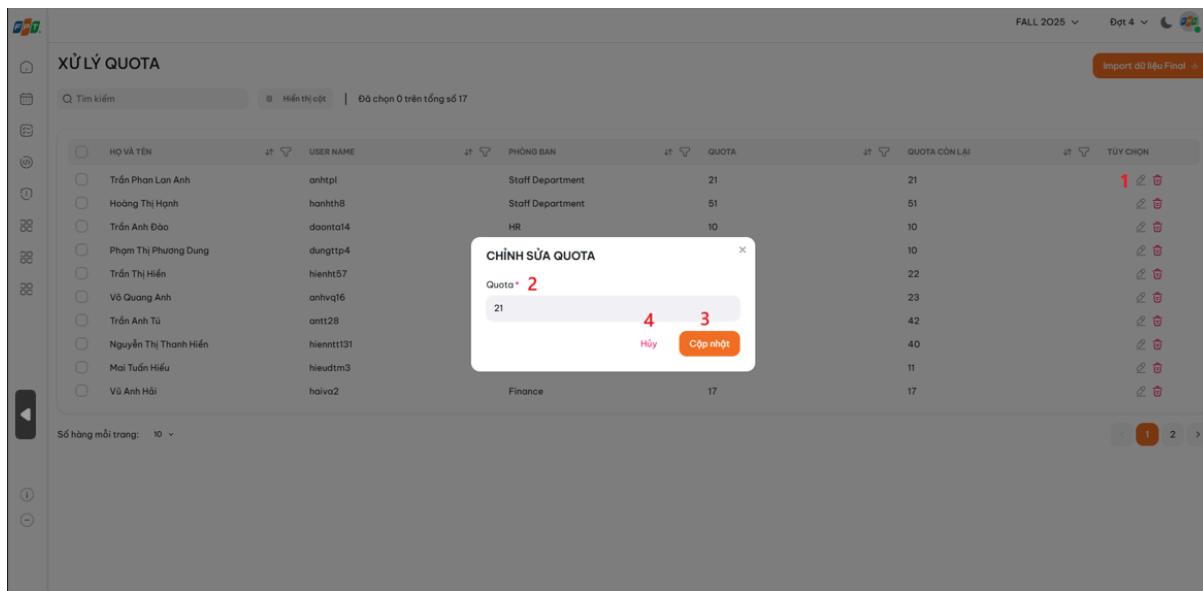


Figure 76 - Update quota for the selected user

Function details:

- **Data:** The function handles and updates quota details for each user,
- **Validation:**
 - **Required Fields:**
 - “Chọn người dùng” must be selected.
 - “Chỉ tiêu đăng ký” must be a valid number greater than or equal to 0.
 - **Format Check**
 - Ensure that quota is an integer.
 - **Error Handling:**
 - If any error occurs during the update (e.g., invalid input, database issue), the system will show the message:
“Cập nhập quota đã xảy ra lỗi”
- **Business rules:**
 - Exam room is not exist with same exam
 - Student must study at this subject
- **Normal case:** Valid input provided (unique room, filled fields) => The system creates the exam room and add student into this exam room, and displays: "Thêm mới phòng thi thành công.".
- **Abnormal case:**
 - Students do not study this subject => The system displays a list of error messages "DE170027: Sinh viên không tham gia học môn EXE101."
 - Student Code is wrong in format => The system displays list of error message "DE170027: Mã sinh viên không hợp lệ"

3.6.11 View the list of exams in the exam period

Function trigger:

- **Navigation path:** Dashboard-> Lịch thi

- **Timing Frequency:** On demand (whenever the admin wants to view exams within a selected exam period).

Function description:

- **Actors/Roles:** All
- **Purpose:** Allows the admin to view and manage the list of exams associated with a specific exam period.
- **Interface:**
 - **View list of exam formats Screen:**
 7. **Table Exam:** Displays a structured table containing information about each exam. Includes columns such as: Mã môn, Kỳ thi, bắt đầu, kết thúc
 8. **Search bar:** A search box for users to enter a name and find a specific Exam.
 9. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 10. **Selected:** Displays the number of rows the user has selected
 11. **Rows per page:** Display the number of rows the user wants to see.
 12. **Pagination:** Navigate to other data pages.
 - **Data processing:**
 - Admin selects a specific exam period from the list
 - The system fetches all exams associated with that exam period
 - The exams are displayed in tabular format with relevant details.

Screen layout:

MÃ MÔN	KỲ THI	BẮT ĐẦU	KẾT THÚC	TÙY CHỌN
FBB201	FE	01/04/2025 14:30	01/04/2025 15:30	Xem phòng thi
IAP301	FE	04/04/2025 07:30	04/04/2025 08:30	Xem phòng thi
HOD401	FE	31/03/2025 16:10	31/03/2025 17:10	Xem phòng thi
EVN201	FE	02/04/2025 14:30	02/04/2025 15:30	Xem phòng thi
DSR301m	FE	04/04/2025 10:50	04/04/2025 11:50	Xem phòng thi
SEMI01	FE	29/03/2025 09:10	29/03/2025 11:20	Xem phòng thi
ELT301	FE	30/03/2025 13:00	30/03/2025 14:30	Xem phòng thi
VNC104	FE	31/03/2025 10:50	31/03/2025 11:50	Xem phòng thi
ENB301	FE	31/03/2025 07:30	31/03/2025 08:30	Xem phòng thi
MCO201m	FE	04/04/2025 09:10	04/04/2025 10:10	Xem phòng thi

Figure 77 - View the list of exams in the exam period

Function details:

- **Data:** The system retrieves the list of exams associated with the selected exam period, including exam metadata.
- **Validation:**
 - **Search by name/subject/ID:** Filters results to matching exams.

- **Sort and filter:** Enables sorting the exam list by date, subject, name, etc.
- **Business rules:** (None)
- **Normal case:** The exam period contains valid exam data → System displays the list of exams for that period with all relevant information.
- **Abnormal case:** No exams found for the selected period → System displays: “Không có dữ liệu”

3.6.12 View the exam schedule of a student

Function trigger:

- **Navigation path:** “Trang chủ” -> “QL sinh viên” -> “Sinh viên” -> “Xem lịch thi”
- **Timing demand:** On demand (whenever an administrator want to view the exam schedule of a student on the system)

Function description:

- **Actors/Roles:** Admin/ Examination Dept
- **Purpose:** Allow admin to quickly and efficiently view the exam schedule on the system.
- **Interface:**
 - **View list of exam schedule of a student screen:**
 1. **Table exam schedule:** Displays a structured table containing information about each semester format. Includes columns such as: “STT”, “Mã môn”, “Môn thi”, “Ngày thi”, “Phòng thi”, “Thời gian”, “Hình thức”, “Loại” per row
- **Data processing:**
 - User clicks on the calendar icon on the “Danh sách sinh viên” screen.
 - The system fetches the exam schedule list of the chosen student for that semester from the database.
 - The system displays the exam schedule list in a row-by-row format, including the “STT”, “Mã môn”, “Môn thi”, “Ngày thi”, “Phòng thi”, “Thời gian”, “Hình thức”, “Loại”.

Screen layout:

Lịch thi của Lê Minh Thư 1

STT	MÃ HỌC	MÔN THI	NGÀY THI	PHÒNG THI	THỜI GIAN	HÌNH THỨC	LOẠI
1	ENP102	Phonetics and Phonology	27/03/2025	Gamma 305	10:35 - 12:30	EOS	FE
2	ENP102	Phonetics and Phonology	23/03/2025	Gamma 305	10:35 - 12:30	EOS	FE
3	ENP102	Phonetics and Phonology	27/03/2025	Gamma 305	00:30 - 12:30	EOS	FE

DS180238 Lê Minh Thư
 DS180196 Kiều Thị Thu Phương
 DS180201 Trần Thủ Vy
 DS180153 Dương Thị Thảo Nhí
 DS180212 Phòng Hoàng Uyên Phương
 DS180199 Dương Thị Bé Ngọc
 DS180056 Trần Tú Anh
 DS180194 Nguyễn Hồi Thương

Số hàng mỗi trang: 10

Figure 78 - View the exam schedule of a student

Function details:

- **Data:** The function retrieves and displays exam schedule of the chosen student details,

including: "STT", "Mã môn", "Môn thi", "Ngày thi", "Phòng thi", "Thời gian", "Hình thức", "Loại".

- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Schedule" in database exists. => Display list of exam schedule of a student
- **Abnormal case:** There is no data from table "Exam Schedule" in the database. => Display message "Không có dữ liệu".

3.6.13 View the list of exam rooms in the exam period

Function trigger:

- **Navigation path:** Dashboard -> Lịch thi -> Xem phòng thi
- **Timing Frequency:** On demand (whenever the admin wants to view the list of exam rooms associated with a specific exam period).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows users to view detailed information about exam rooms assigned to a specific exam period, ensuring transparency and logistical readiness.
- **Interface:**
 - **View list of exam formats Screen:**
 1. **The exam room card list of exam:** Display necessary information about exam room
- **Data processing:**
 - Admin selects a specific exam period from the exam schedule screen.
 - The system retrieves all exam rooms assigned to that exam period from the database.
 - The list is displayed in a table, showing all relevant room details.

Screen layout:



Figure 79 - View the list of exam rooms in the exam period

Function details:

- **Data:** The function retrieves exam room data associated with the selected exam.
- **Validation:**
 - **Exam does not contain any exam room:** This play an empty list of cards
- **Business rules:** (None)
- **Normal case:** Valid exam period with assigned rooms → System displays the list of rooms with complete data.
- **Abnormal case:** No exam rooms found for the selected period → System displays: "Không có dữ liệu"

3.6.14 Create exam room in exam period

Function trigger:

- **Navigation path:** "Lịch thi" -> "Xem phòng thi" -> "Thêm phòng thi"
- **Timing Frequency:** On demand (whenever an examiner wants to create a new exam room).

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Provides Admin, examiners with the ability to create new exam rooms, support customization, and manage and organize exam rooms for a variety of needs.
- **Interface:**
 - **Create a new exam room Screen:**
 5. **"Thêm phòng thi"** : Dropdown - A field for choosing the room of the exam, including a list of rooms without rooms are displaying .
 6. **"Danh sách mã sinh viên"**: Input - A field for input list of student code such as: DE170027,DE170028
 7. **"Thêm mới"**: Button - A button to submit the new exam room..
 8. **"Huỷ"**: Button to clear all content on the page and start over.
- **Data processing:**
 - The user navigates to the "Lịch thi" screen and clicks the "Thêm phòng thi" button.

- The "Thêm mới phòng thi" screen is displayed.
- The user choose the room and input list of student code
- The user clicks the "Thêm mới" button.
- The system validates the entered information (check student code format and the student code status).
- If the validation is successful, the system sends the exam room to the server.
- The system displays a success message: "Thêm mới phòng thi thành công.".
- The new exam room is added to the exam room list on the "ExamRoom" table and the new list of student is added to the "StudentExam" table

Screen layout:

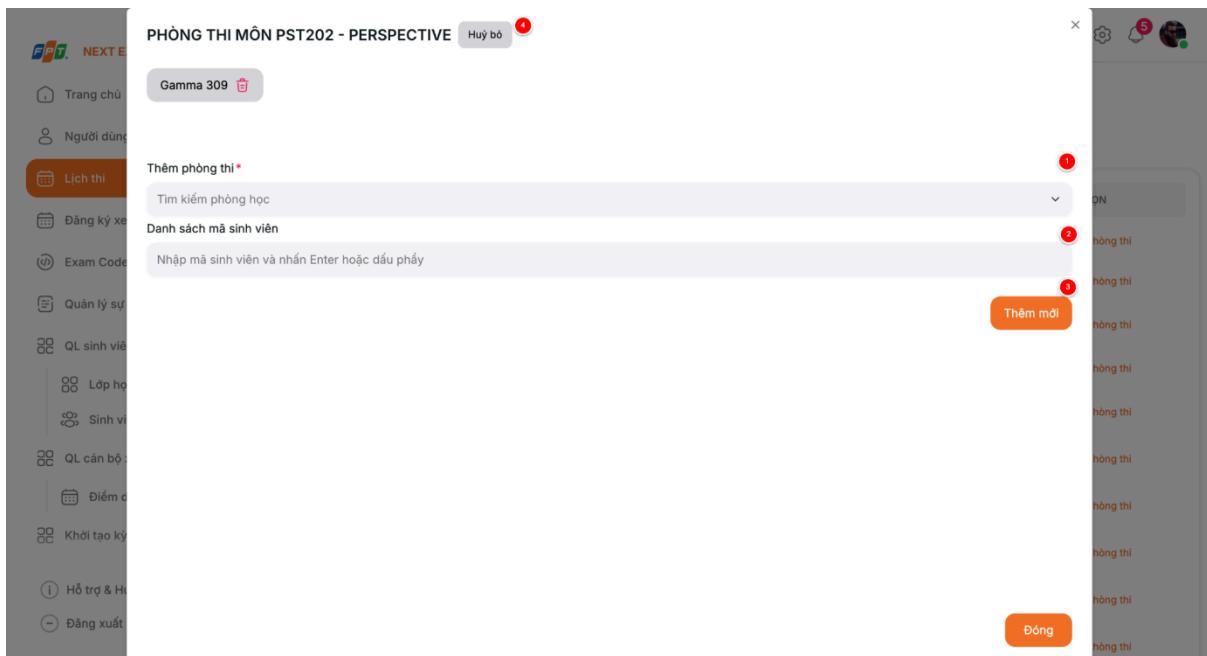


Figure 80 - Create Classroom Modal

Function details:

- **Data:** The function processes the exam room and student of this exam room.
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam room submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
 - **"Thêm phòng thi":** This field is required.
 - **"Danh sách sinh viên":** This field is required.
- **Business rules:**
 - Exam room is not exist with same exam
 - Student must study at this subject
- **Normal case:** Valid input provided (unique room, filled fields) => The system creates the exam room and add student into this exam room, and displays: "Thêm mới phòng thi thành công.".
- **Abnormal case:**
 - Students do not study this subject => The system displays a list of error messages "DE170027: Sinh viên không tham gia học môn EXE101."
 - Student Code is wrong in format => The system displays list of error message "DE170027: Mã sinh viên không hợp lệ"

3.6.15 Delete exam room in exam period

Function trigger:

- **Navigation path:** "Lịch thi" -> "Xem phòng thi" -> Click icon delete
- **Timing Frequency:** On demand (whenever admin, examiner wants to delete an existing exam room).

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Allow Admin, Examiners to delete exam room to suit their needs
- **Interface:**
 - **Delete exam room Model:**
 1. **Delete:** Button to delete the exam room.
 2. **Cancel:** Button to close the modal.
- **Data processing:**
 - The user navigates to the "Xem phòng thi" screen and clicks on the delete icon for the row the user wants
 - The system find id user wants delete
 - Show confirm modal Exam room confirm delete
 - The exam room selected for deleting will be updated and refresh list

Screen layout:

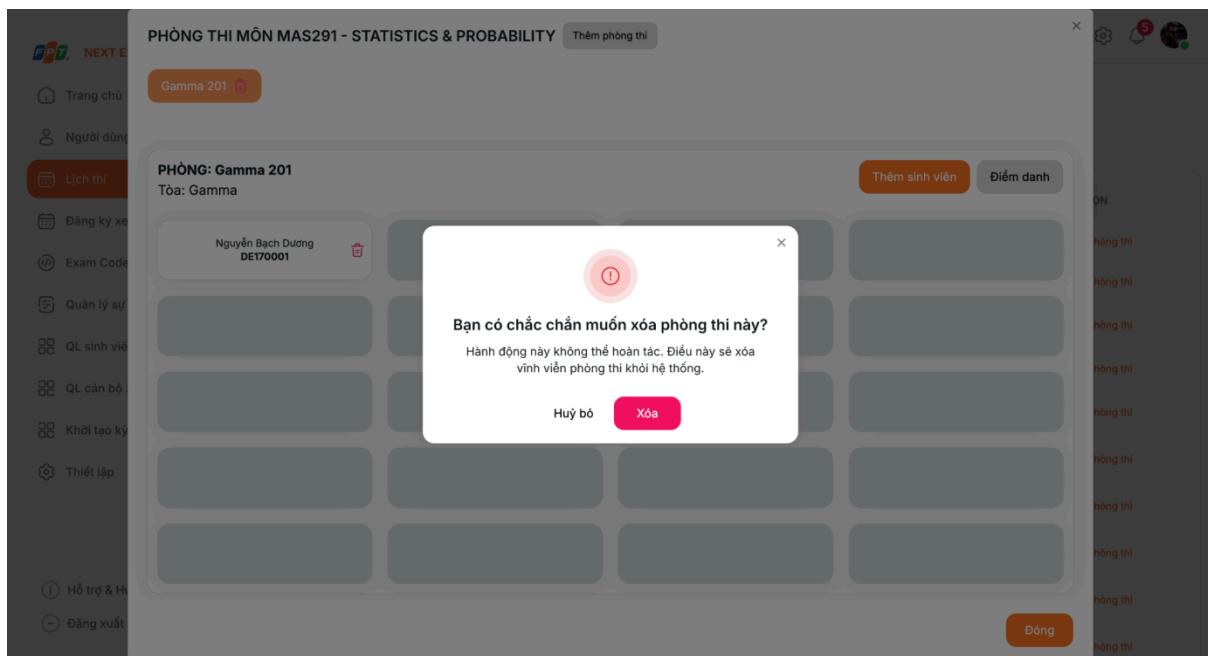


Figure 81 - Confirmation Modal delete for an Exam Room

Function details:

- **Data:** After deleting, exam room will remove out of the list, delete in database
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam format submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
- **Business rules:** (None)

- **Normal case:** A valid Exam room is selected, and the user confirms deletion => The Exam room is deleted, and the updated list is displayed with a success message “Xoá phòng thi thành công”.
- **Abnormal case:** The Exam room does not exist => The system displays: "Phòng thi không tồn tại."

3.6.16 View the list of students in the exam room

Function trigger:

- **Navigation path:** “Lịch thi” -> “Xem phòng thi” -> Select an exam room
- **Timing Frequency:** On demand (whenever the admin wants to view the list of students assigned to a specific exam room)

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Provides Admin, examiners with the ability to view list of students in exam room
- **Interface:**
 - **Add student into exam room Modal:**
 1. **Seat list of students in exam room:** Displays student details
- **Data processing:**
 - User selects an exam period and clicks on a specific exam room.
 - The system fetches the list of students assigned to that exam room.
 - Data is displayed in a structured table with relevant student information.

Screen layout:

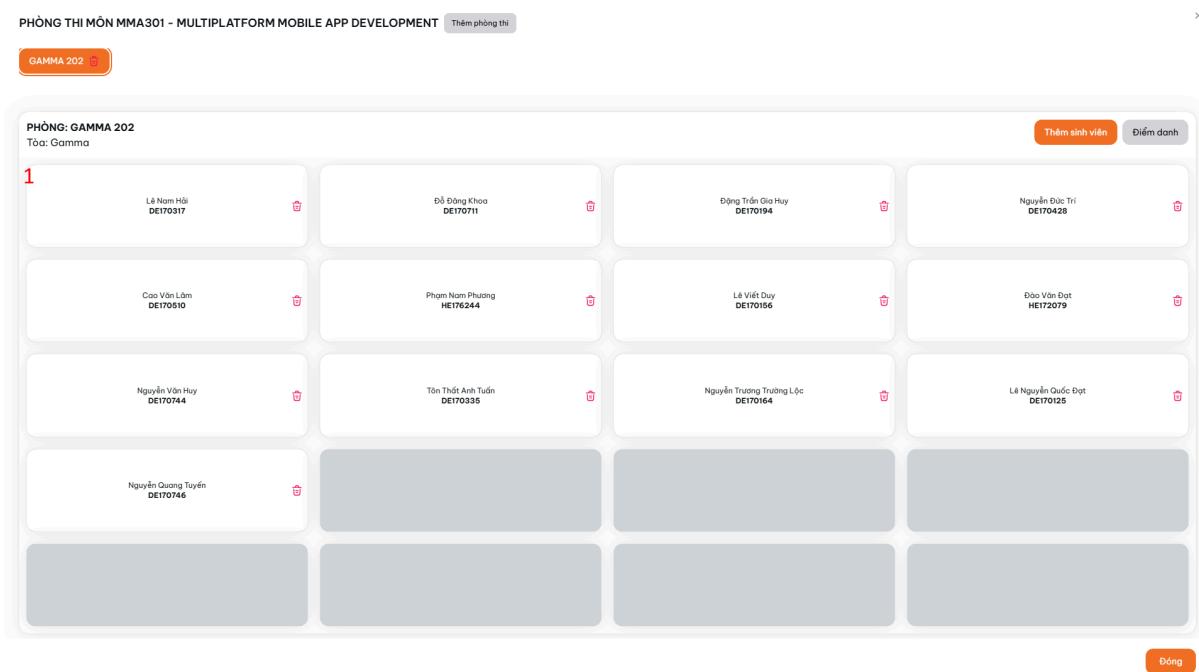


Figure 82 - View the list of students in the exam room

Function details:

- **Data:** Retrieves and displays student information assigned to the selected exam room.
- **Validation:**
 - **Empty exam room:** Show an exam room with empty seats

- **Business rules:**
 - Student must study at this subject
- **Normal case:** Room has assigned students → Display full list of students in that exam room.
- **Abnormal case:** Room does not have students → Show an empty exam room.

3.6.17 Add students to the exam room

Function trigger:

- **Navigation path:** “Lịch thi” -> “Xem phòng thi” -> “Thêm sinh viên”
- **Timing Frequency:** On demand (whenever an examiner wants to add a student into the exam room).

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Provides Admin, examiners with the ability to add student into exam room
- **Interface:**
 - **Add student into exam room Modal:**
 2. “Danh sách mã sinh viên”: Input - A field for input list of student code such as: DE170027,DE170028
 3. “Thêm mới”: Button - A button to submit the new exam room..
- **Data processing:**
 - The user navigates to the "Lịch thi" screen and clicks the "Thêm sinh viên" button.
 - The "Thêm sinh viên" screen is displayed.
 - The user choose the room and input list of student code
 - The user clicks the "Thêm mới" button.
 - The system validates the entered information (check student code format and the student code status).
 - If the validation is successful, the system sends the list student to the server.
 - The system displays a success message: "Thêm sinh viên thành công.".
 - The new student is added into the exam room list on the "StudentExam" table.

Screen layout:

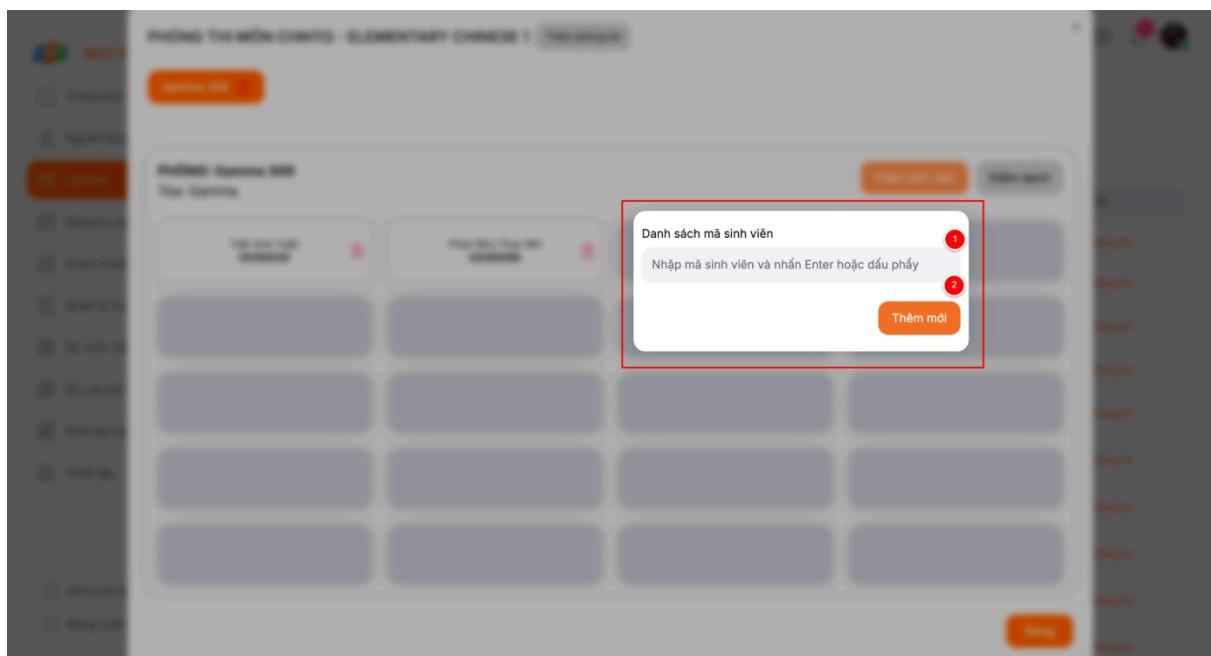


Figure 83 - Add student into Exam Room Modal

Function details:

- **Data:** The function processes students in this exam room.
- **Validation:**
 - **Error Handling:** The system handles potential errors during student exam submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
 - **"Danh sách sinh viên":** This field is required.
- **Business rules:**
 - Student must study at this subject
- **Normal case:** Valid input provided => The system creates the exam room and add student into this exam room, and displays: "Thêm mới phòng thi thành công.".
- **Abnormal case:**
 - Students do not study this subject => The system displays a list of error messages "DE170027: Sinh viên không tham gia học môn EXE101."
 - Student Code is wrong in format => The system displays list of error message "DE170027: Mã sinh viên không hợp lệ"

3.6.18 Remove students from the exam room**Function trigger:**

- **Navigation path:** "Lịch thi" -> "Xem phòng thi" -> Click icon delete
- **Timing Frequency:** On demand (whenever admin, examiner wants to delete an existing exam room).

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Allow Admin, Examiners to delete exam room to suit their needs
- **Interface:**
 - **Delete exam room Model:**
 3. **Delete:** Button to delete the exam room.
 4. **Cancel:** Button to close the modal.
- **Data processing:**
 - The user navigates to the "Xem phòng thi" screen and clicks on the delete icon for the row the user wants
 - The system find id user wants delete
 - Show confirm modal Exam room confirm delete
 - The exam room selected for deleting will be updated and refresh list

Screen layout:

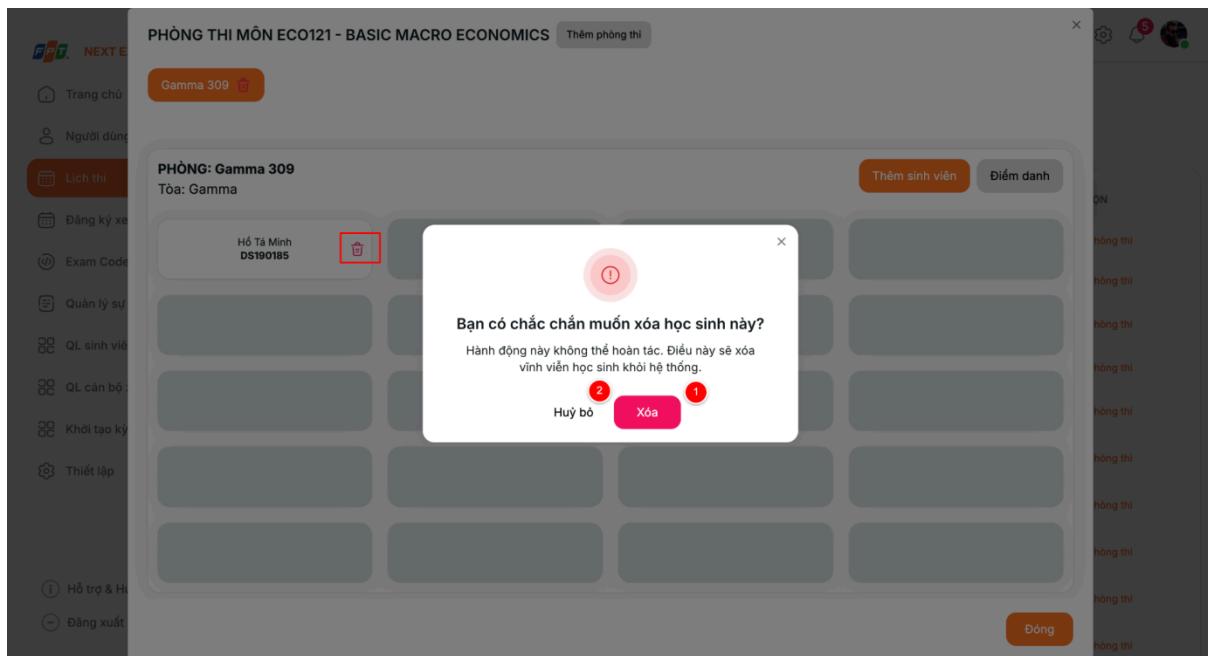


Figure 84 - Confirmation Modal delete an student out of exam

Function details:

- **Data:** After deleting, student will remove out of the list, delete in database
- **Validation:**
 - **Error Handling:** The system handles potential errors during delete student and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
- **Business rules:** (None)
- **Normal case:** A valid student is selected, and the user confirms deletion. => The student is deleted, and the updated list is displayed with a success message "Xoá sinh viên thành công".
- **Abnormal case:** The student does not exist => The system displays: "Sinh viên không tồn tại."

3.7 Exam supervisor registration

3.7.1 View the list of exam registrations (exam rooms, exam times, status, etc.).

Function trigger:

- **Navigation path:** Dashboard-> Đăng ký xem thi
- **Timing Frequency:** On demand (whenever the admin, examiner wants to manage exam registration list, registration status of exam rooms).

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Allows admin to manage exam registration list, registration status of exam rooms.
- **Interface:**
 - **View the list of exam registrations screen:**
 1. **Header of calendar:**
 - a. Today title
 - b. Left Combo button: previous icon, next icon, "Hôm nay", "Tuần", "Ngày"
 - c. Right combo button: "Giám thị", "Chọn ngày"
 2. **Calendar:**
 - a. 2 column part: "Phòng học" & Time

- b. Each row is exam schedule of each room
3. **Exam Item:** Each container is a exam include
- a. Time of exam: 13:30 - 14:30
 - b. Course code: ENM312
 - c. Account exam supervisor (If have): LongNX6
4. **Color of exam item:**
- a. Blue: Exam do not have any exam supervisor (status approved) or has least 1 exam supervisor (status rejected)
 - b. Yellow: Exam has least 1 exam supervisor (status pending)
 - c. Gray: Exam is locked
5. **Icon of exam item:**
- a. Icon User: Exam had exam hallway supervisor
6. **Footer of calendar**
- a. Number of record by status
 - b. Number of exam rooms has an exam hallway supervisor/ total exam room.
- **Data processing:**
 - User clicks on the "Đăng ký xem thi"
 - The system fetches the list of exam rooms with the supervisor from the database.
 - The system displays the exam room list in a Calendar

Screen layout:

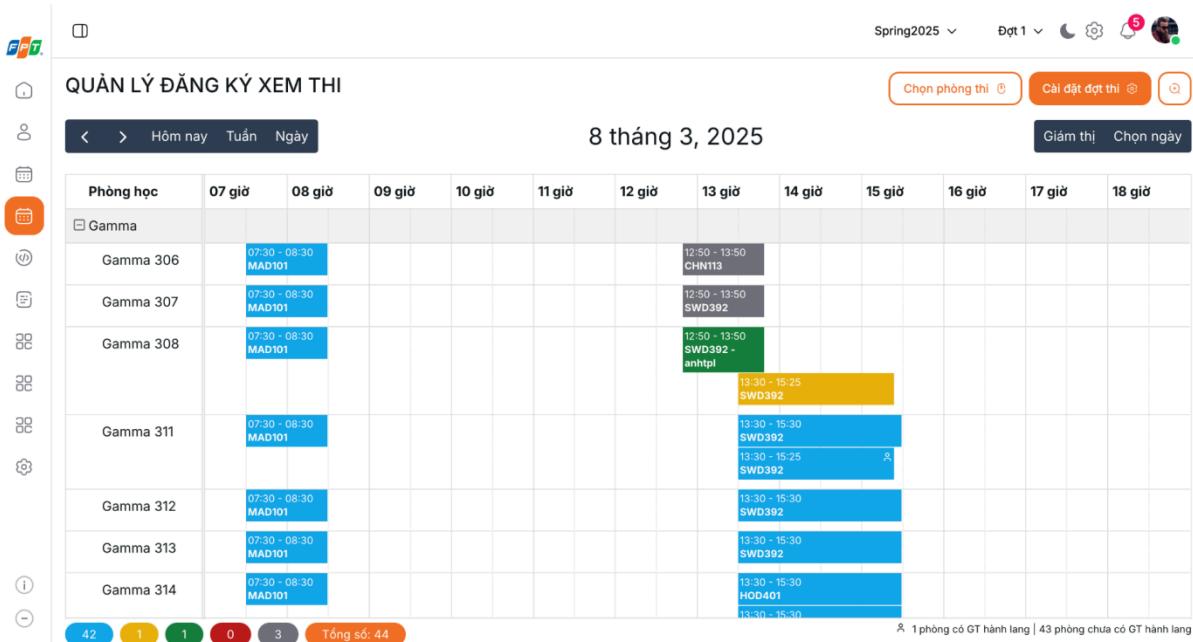


Figure 85 - View the list of exam registrations

Function details:

- **Data:**
 - **Header of calendar:**
 - Today title
 - **Calendar:** 2 column part: "Phòng học" & Time
 - "Phòng học": List of the room has exam
 - "Time": From 7 AM to 6 PM, duration is 30 mins
 - **Exam Item:** Each container is a exam include

- Time of exam: startTime and endTime in “Exam Table”
- Course code: Course code in “Course” Table
- Account exam supervisor (If have): “Username” in “Registration” table
- **Color of exam item:**
 - Blue:
 - Approved: Status = 2 in “Registration” table
 - Rejected: Status = 3 in “Registration” table
 - Rejected: Cancel = 3 in “Registration” table
 - Yellow: Status = 1 in “Registration” table
 - Gray: Exam is locked => “IsRegistrable” in “ExamRoom” table
- **Icon of exam item:**
 - Icon User: Exam had exam hallway supervisor => “ExamSupervisor” table
- **Footer of calendar**
 - Number of record by status
 - Number of exam room has exam hallway supervisor/ total exam room.
- **Validation:** N/A
- **Business rules:** (None)
- **Normal case:** Exam period exists at least 1 exam => Display data similar with layout and data is similar with Data
- **Abnormal case:** Exam period doesn't have any exam => “Không có dữ liệu”

3.7.2 Open/Lock allows to register to exam supervisor for the exam period

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> “Cài đặt đợt thi”
- **Timing demand:** On demand (whenever an administrator want to open/lock allows to register to exam supervisor for the exam period on the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently be able to pen/lock allows to register to exam supervisor for the exam period on the system.
- **Interface:**
 - **Exam settings modal:**
 1. **“Đóng/Mở đăng ký”:** Switch- A switch button to set open/lock register to exam supervisor.
 2. **“Đăng ký tự do”:** Radio button - A button allows all instructors to apply freely.
 3. **“Đăng ký theo bộ môn”:** Radio button - A button to assign to departments to choose registration.
 4. **“Cập nhật”:** Button - a button to approve updating progress.
- **Data processing:**
 - The user navigates to the “Quản lý đăng ký xem thi” screen and clicks “Cài đặt đợt thi” button.
 - The exam settings modal display.
 - The user switches the status of the register, chooses how to register and clicks the “Cập nhật” button.
 - The system will now allow users to register to the exam supervisor for the exam period.

- The system displays a success message: "Mở / Đóng cho phép đăng ký xem thi thành công".

Screen layout:

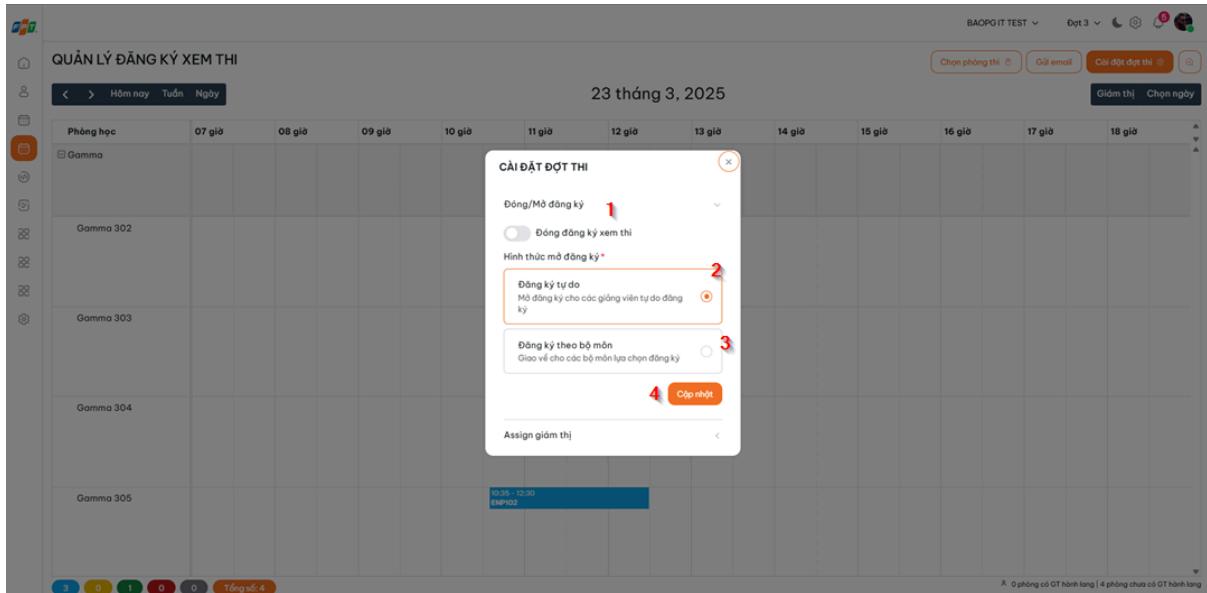


Figure 86 - Open/Lock allows to register to exam supervisor for the exam period

Function details:

- Data:** The function retrieves and displays status of the register to exam supervisor, form register and the ability to open / lock to register to exam supervisor.
- Validation:** (None)
- Business rules:** (None).
- Normal case:** Open/Lock allows to register to exam supervisors successfully, new data is saved to the database and display message “Mở/Đóng cho phép đăng ký xem thi thành công” .
- Abnormal case:** The system handles potential errors during open/lock allows to register to exam supervisors displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed

3.7.3 Open/Lock allows to register to exam supervisor for the exam room

Function trigger:

- Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> “Chọn phòng thi” -> Click chọn phòng thi hiện có trên hệ thống
- Timing demand:** On demand (whenever an administrator want to open/lock allows to register to exam supervisor for the exam room on the system)

Function description:

- Actors/Roles:** Admin
- Purpose:** Allow admin to quickly and efficiently be able to pen/lock allows to register to exam supervisor for the exam room on the system.
- Interface:**
 - “Quản lý đăng ký xem thi” screen:**
 - “Phòng học”:** Display the exam room name.
 - “Thời Gian”:** Display the exam time of the exam room.

3. “Thông tin môn thi”: Display the exam information.
 4. “Assign giám thị hành lang”: Display the username of the user who registered as exam supervisor.
 5. “Khóa/Mở phòng thi”: Button - A button to approve or reject to register an exam supervisor for the chosen exam room.
 6. “Hủy”: Button - A button to cancel chosen exam room process.
- **Data processing:**
 - The user navigates to the "Quản lý đăng ký xem thi" screen, clicks on the “Chọn phòng thi” button and choose the specific exam room.
 - Click “Khóa/Mở phòng thi” button to Open/Lock exam room.
 - The system will allow/block the user to register to exam supervisor for the exam room
 - The system displays a success message: "Khóa/Mở trạng thái thành công".

Screen layout:

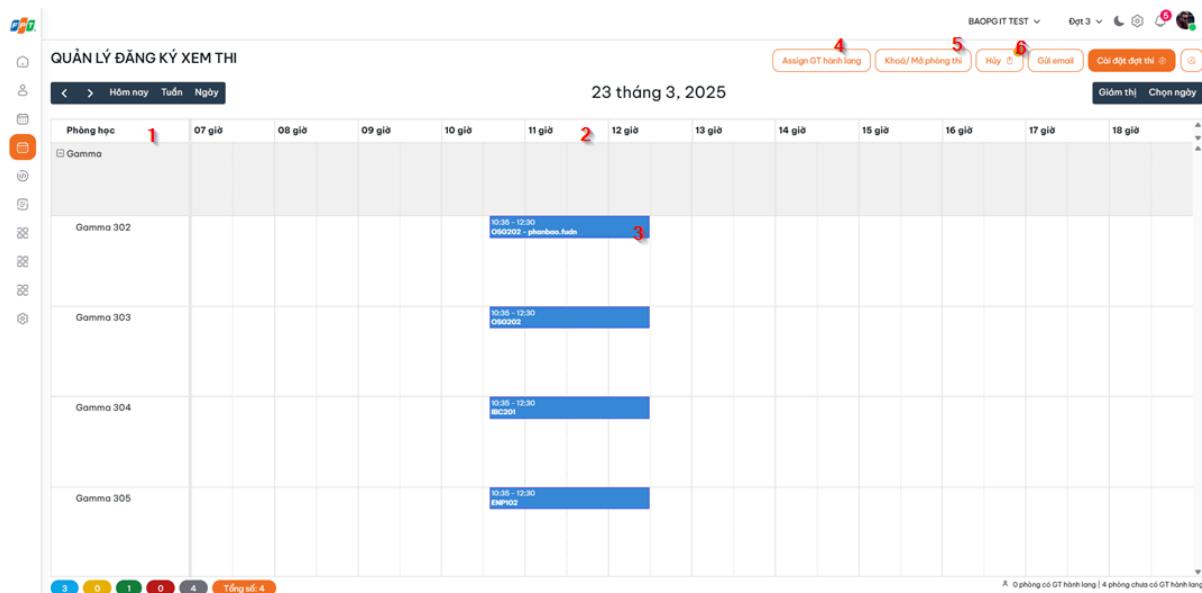


Figure 87 - Open/Lock allows to register to exam supervisor for the exam room

Function details:

- **Data:** The function retrieves and displays status of the register to exam supervisor, form register and the ability to open/lock to register to exam supervisor for the exam room.
- **Validation:** (None)
- **Business rules:** (None).
- **Normal case:** Open/Lock allows to register to exam supervisors for the exam room successfully, new data is saved to the database and display message “Mở/Dóng phòng thi thành công” .
- **Abnormal case:** The system handles potential errors during open/lock allows to register to exam supervisors for the exam rooms displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed

3.7.4 View exam registration details

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> chọn phòng thi hiện có

- **Timing demand:** On demand (whenever an administrator want to view exam registration details on the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently be able to view exam registration details on the system.
- **Interface:**
 - **Exam room details information modal:**
 1. “Phòng Thi”: Display the name of the chosen exam room.
 2. “Môn Học”: Display the subject of the chosen exam room.
 3. “Thời Gian”: Display the exam time of the chosen exam room.
 4. “Giám thị hành lang”: Display the name of the corridor supervisor.
 5. “Họ và tên”: Display the full name of the user who registered as exam supervisor
 6. “Username”: Display the username of the user who registered as exam supervisor.
 7. “Trạng thái”: Button - A button to approve or reject to register an exam supervisor for the chosen exam room.
- **Data processing:**
 - The user navigates to the "Quản lý đăng ký xem thi" screen and clicks on the specific exam room.
 - The system fetches the exam room information from the database.
 - The exam room details information modal display, including the “Phòng thi”, “Môn học”, “Thời gian”, “Giám thị hành lang”, “Họ và tên”, “Username”, “Trạng thái” and an option to assign corridor supervisor and change status of users register as exam supervisor.

Screen layout:

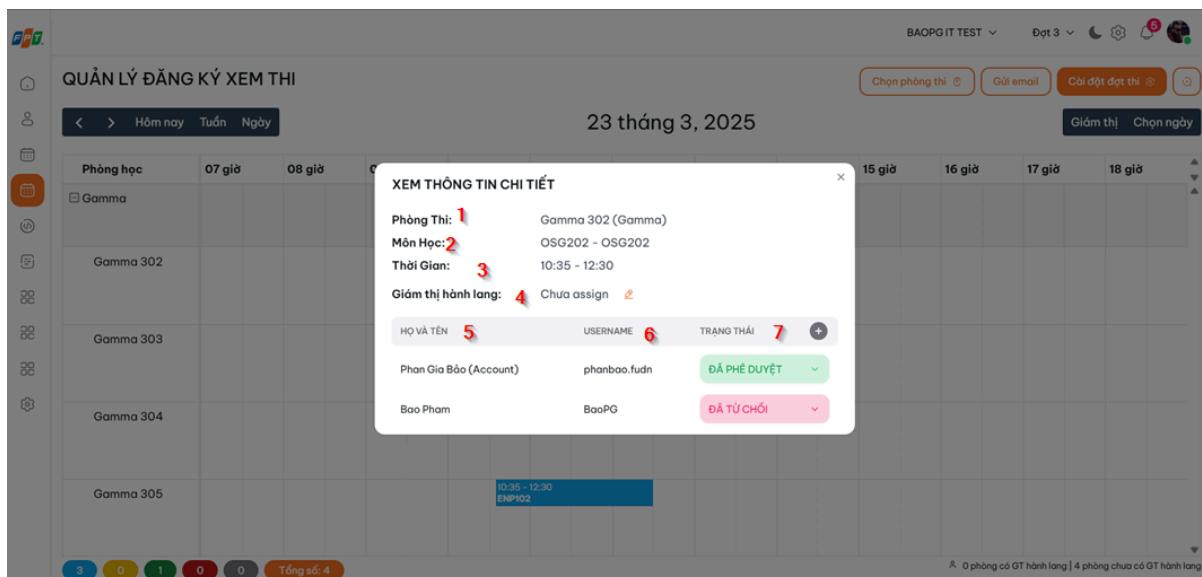


Figure 88 - View exam registration details

Function details:

- **Data:** The function retrieves and displays exam room details, including: Phòng thi”, “Môn

học”, “Thời gian”, “Giám thị hành lang”, “Họ và tên”, “Username”, “Trạng thái”.

- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Room" in database exists. => Display information of the chosen room
- **Abnormal case:** There is no data from table "Exam Room" in the database. => Display message “Không có dữ liệu”.

3.7.5 Update the exam supervisor for the exam room

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi”
- **Timing Frequency:** On demand (whenever an admin or examiner wants to update the exam supervisor for the exam room).

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Provides Admin, examiners with the ability to update the exam supervisor for the exam room.
- **Interface:**
 - “Xem thông tin chi tiết” Modal:
 1. “Phòng thi”: Displays the name of the exam room
 2. “Môn Học”: Display the name of the subject.
 3. “Thời gian”: Display the start time and end time of the exam.
 4. “Giám thị hành lang” Display the name of the exam hallway supervisor
 5. “Họ và tên”: Display the name of the exam supervisor
 6. “Username”: Display the username of the exam supervisor
 7. “Trạng thái”: Dropdown - A dropdown to set the status of the exam supervisor.
- **Data processing:**
 - The user navigates to the "Quản lý xem thi" screen and selects the specific exam room.
 - The “Xem thông tin chi tiết” modal opens.
 - The user selects the desired user from the dropdown.
 - The user inputs the new status in the input field.

Screen layout:

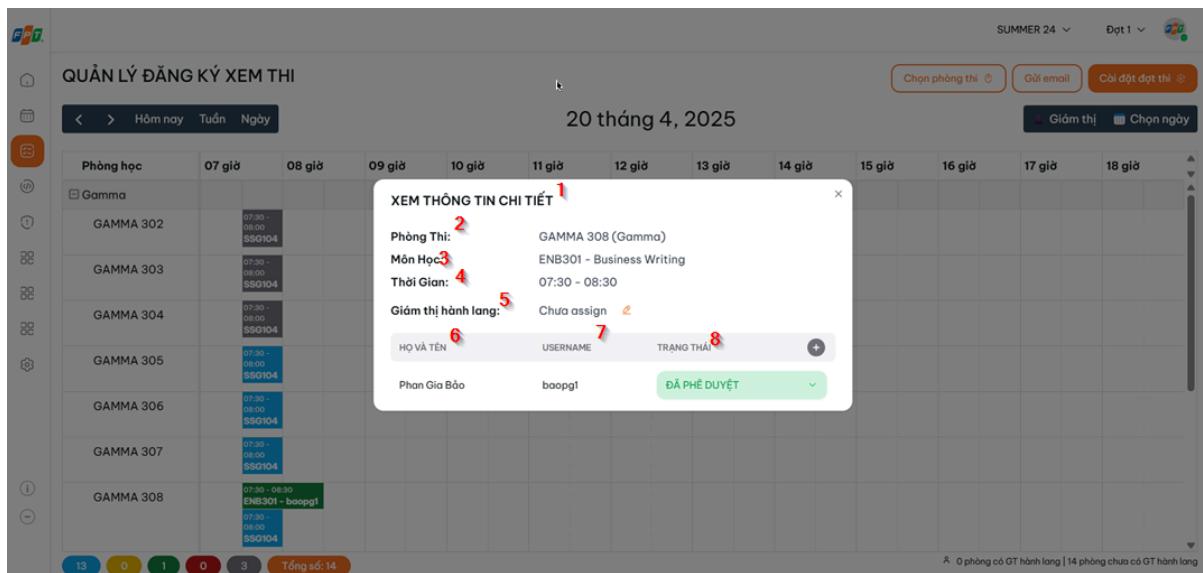


Figure 89 - Update the exam supervisor for the exam room

Function details:

- Data:** The function handles and updates the exam supervisor for the exam room,
- Validation:** Must login as admin/ exam department and have at least 1 exam supervisor register
- Business rules:** (None)
- Normal case:** User update new status for exam supervisor register -> Display message “Cập nhật trạng thái thành công”
- Abnormal case:**
 - Data in exam supervisor is not exist => The system displays list of error message "Không có"

3.7.6 [ZMP] View list of exam dates

Function trigger:

- Navigation path:** “Trang chủ” -> “Lịch thi”
- Timing demand:** On demand (whenever an exam supervisor want to view the list of exam dates on the system)

Function description:

- Actors/Roles:** Exam supervisor
- Purpose:** Allow exam supervisors to quickly and efficiently view the exam schedule on the system.
- Interface:**
 - “Lịch thi” screen:**
 - “Lịch coi thi đã đăng ký”:** Displays the list of exam dates which were successfully registered.
- Data processing:**
 - User clicks on the calendar icon “Lịch thi” on the taskbar.
 - The system fetches the exam date list of that exam supervisor for that semester from the database.
 - The system displays the exam date in correct format “dd/MM/yyyy”.

Screen layout:



Figure 90 - View list of exam dates

Function details:

- **Data:** The function retrieves and displays exam schedule details in correct format "dd/MM/yyyy"
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Schedule" in database exists. => Display exam schedule were registered
- **Abnormal case:** There is no data from table "Exam Schedule" in the database. => Display message "Không có dữ liệu".

3.7.7 [ZMP] View a list of exam hours for one day

Function trigger:

- **Navigation path:** "Trang chủ" -> "Lịch thi" -> Click on specific exam schedule
- **Timing demand:** On demand (whenever an exam supervisor want to view the list of exam hours for one day on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently view the list of exam hours for one day on the system.

- **Interface:**

- “**Lịch thi tháng MM/yyyy” screen:**

1. **Week day:** Display the day of the week including and status of exam slots available or not.
2. **Number of remaining registration:** Displays the number of users remaining registration slots.
3. **“Bắt đầu”:** Display the exam start time.
4. **“Kết thúc”:** Display the exam end time.
5. **Slot remaining:** Display the remaining slots can be registered.
6. **Quantity pending confirmation:** Display the number of users who are waiting for confirmation.
7. **“Thêm”:** Button - A button to add a user to a queue to confirm registration.

- **Data processing:**

- User clicks on the calendar icon “Lịch thi” on the taskbar and chooses a specific exam date.
- The system fetches the chosen exam date information on that date of that semester from the database.
- The system displays the list exam on that date in correct format, including the week day, “Bắt đầu”, “Kết thúc”, number of remaining registration, slot remaining, quantity pending confirmation.

Screen layout:



Figure 91 - View a list of exam hours for one day

Function details:

- **Data:** The function retrieves and displays the list exam on that date in correct format, including the week day, "Bắt đầu", "Kết thúc", number of remaining registration, slot remaining, quantity pending confirmation.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Examine" in database exists. => Display exam schedule information were registered
- **Abnormal case:** There is no data from table "Exam Examine" in the database. => Display message "Không có slot thi trong ngày này".

3.7.8 [ZMP] Register to be exam supervisor selected slots

Function trigger:

- **Navigation path:** "Trang chủ" -> "Lịch thi" -> Click on specific exam date on the schedule -> Click "Thêm" button -> Click "Xác nhận" button
- **Timing demand:** On demand (whenever an exam supervisor want to register to be exam supervisor by selected slots on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently register to be exam supervisor by selected slots.
- **Interface:**
 - **"Lịch thi tháng MM/yyyy" screen:**
 1. **Number of remaining registration:** Displays the number of users remaining registration slots.
 2. **"Bắt đầu":** Display the exam start time.
 3. **"Kết thúc":** Display the exam end time.
 4. **Slot remaining:** Display the remaining slots can be registered.
 5. **Quantity pending confirmation:** Display the number of users who are waiting for confirmation.
 6. **"Thêm":** Button - A button to add a user to a queue to confirm registration.
 7. **"Hủy":** Button - A button to cancel registration.
 8. **"Xác nhận"** Button - A button to confirm registration.
 - **Data processing:**
 - User clicks on the calendar icon "Lịch thi" on the taskbar and chooses a specific exam date on the schedule.
 - The system fetches the chosen exam date information and there are still slots available for that semester from the database.
 - The system displays the list exam on that date in correct format, including the "Bắt đầu", "Kết thúc", number of remaining registration, slot remaining, quantity pending confirmation.

Screen layout:



Figure 92 - Register to be exam supervisor selected slots

Function details:

- **Data:** The function retrieves and displays the list exam on that date in correct format, including the “Bắt đầu”, “Kết thúc”, number of remaining registration, slot remaining, quantity pending confirmation.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Examine" in database exists. => Display exam schedule information are waiting for registration
- **Abnormal case:** There is no data from table "Exam Examine" in the database. => Display message “Không có slot thi nào trong ngày này”.

3.7.9 [ZMP] View list of my registrations

Function trigger:

- **Navigation path:** “Trang chủ” -> “Lịch thi” -> Click on specific exam date on the “Lịch coi thi đã đăng ký”
- **Timing demand:** On demand (whenever an exam supervisor want to view list of registrations on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently view the list of registrations on the system.
- **Interface:**

- “**Lịch coi thi ngày dd/MM**” screen:
 1. **Number of slots registration:** Displays the number of registration slots.
 2. “**Lịch coi thi ngày dd/MM**”: Displays the date the user wants to view exam information.
 3. “**Phòng**”: Display the exam room.
 4. “**Thời gian**”: Display the exam length.
 5. “**Ngày**”: Display the exam date .
- **Data processing:**
 - User clicks on the calendar icon “Lịch thi” on the taskbar and chooses a specific exam date on the “Lịch thi đã đăng ký”.
 - The system fetches the chosen exam date information that was already registered and there are still slots available for that semester from the database.
 - The system displays the list exam on that date in correct format, including the number of slots registration, “Phòng”, “Thời gian”, “Ngày”, “Lịch coi thi ngày dd/MM”.

Screen layout:

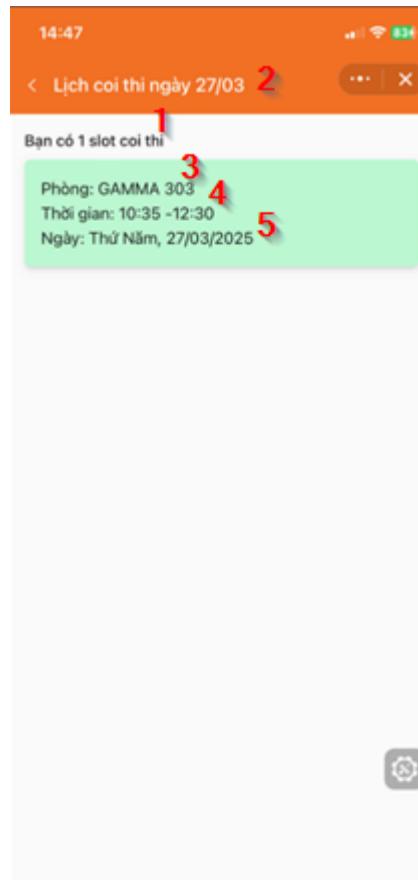


Figure 93 - View list of my registrations

Function details:

- **Data:** The function retrieves and displays the list exam on that date in correct format, including the number of slots registration, “Phòng”, “Thời gian”, “Ngày”, “Lịch coi thi ngày dd/MM”.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Examine" in database exists. => Display exam schedule

information are already registered.

- **Abnormal case:** There is no data from table "Exam Examine" in the database. => Display message “Không có slot thi nào trong ngày này”.

3.7.10 Approve registered slots that have exceeded quota

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> Choose the schedule that have a exceeded quota registration -> Change status
- **Timing demand:** On demand (whenever an administrator want to approve registered slots that have exceeded quota on the system)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently approve registered slots that have exceeded quota on the system.
- **Interface:**
 - ***View exam details information modal:***
 1. **Table registered slots:** Displays a structured table containing information about each semester format. Includes columns such as: “Họ và tên”, “Username”, “Trạng thái” per row.
 2. **“Họ và tên”:** Display the name of users who registered as exam supervisors.
 3. **“Username”:** Display the username of users who registered as exam supervisors.
 4. **“Trạng thái”:** Display the status of the registered slots include “Đang chờ”, “Đã phê duyệt”, “Đã từ chối”.
 - **Data processing:**
 - User clicks on the schedule that has an exceeded quota registration on the “Quản lý đăng ký xem thi” screen.
 - The system fetches the exam details information of the chosen exam for that semester from the database.
 - The system displays the exam schedule list in a row-by-row format, including the “Họ và tên”, “Username”, “Trạng thái” per row.

Screen layout:

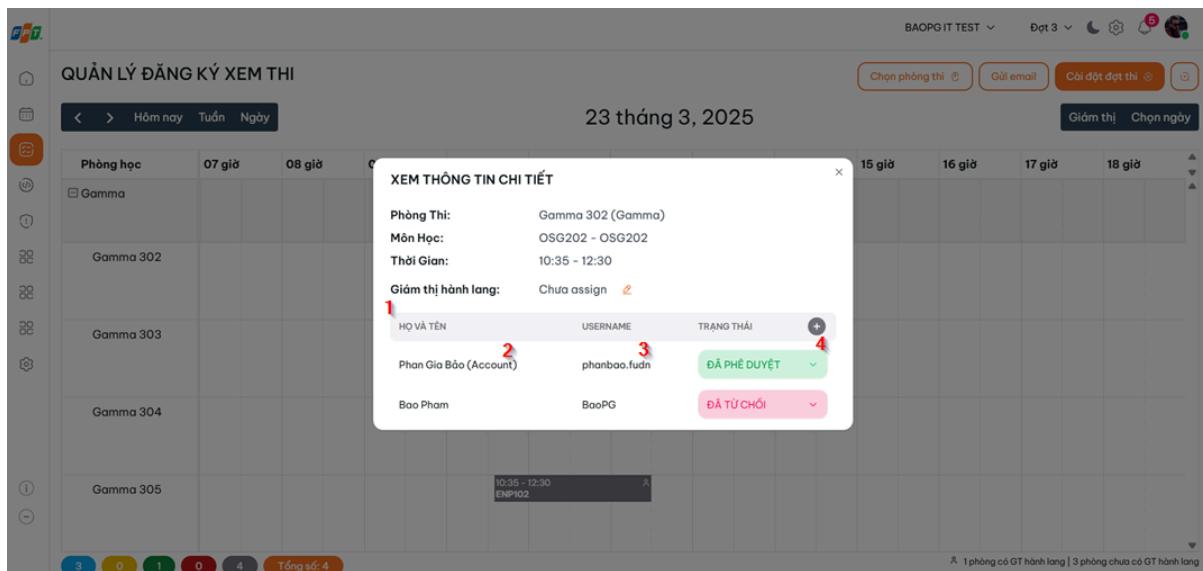


Figure 94 - Approve registered slots that have exceeded quota

Function details:

- Data:** The function retrieves and displays exam details information of the chosen exam, including: "Họ và tên", "Username", "Trạng thái".
- Validation:** (None)
- Business rules:** (None)
- Normal case:** Data from table "Exam Schedule" in database exists. => Display list of exam details in correct format.
- Abnormal case:** There is no data from table "Exam Schedule" in the database. => Display message "Không có dữ liệu".

3.7.11 Update exam inspection and IT Support for the entire exam period

Function trigger:

- Navigation path:** "Trang chủ" -> "Đăng ký xem thi" -> Click "Cài đặt đợt thi" button -> Switch to "Assign giám thi" tab
- Timing demand:** On demand (whenever an administrator want to update exam inspection and IT Support for the entire exam period on the system)

Function description:

- Actors/Roles:** Admin
- Purpose:** Allow admin to quickly and efficiently update exam inspection and IT Support for the entire exam period on the system.
- Interface:**
 - Exam settings modal:**
 - "Thanh tra kỳ thi":** Drop down - a drop down to view list and assign exam inspection.
 - "IT Support":** Drop down - a drop down to view list and assign IT support
 - "Cập nhật":** Button - a button to confirm update exam inspection and IT support
- Data processing:**

- User clicks on the “Cài đặt phòng thi” button on the “Quản lý đăng ký xem thi” screen.
- The exam settings modal display and the user switches to the “Assign giám thị” tab.
- The user click the “Thanh tra kỳ thi” and “IT Support” drop down to choose exam inspection and IT support for the entire exam period.
- The user clicks the “Cập nhật” button to confirm the updated exam inspection and IT support for the entire exam period.
- The system displays a success message: “Cập nhật giám thị cho đợt thi thành công”.

Screen layout:

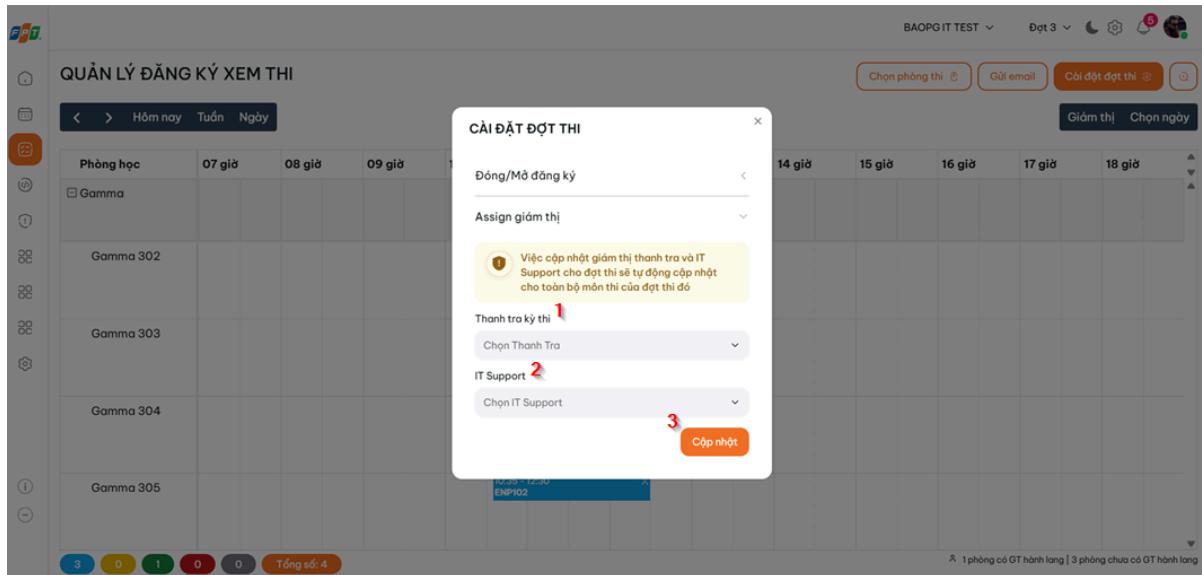


Figure 95 - Update exam inspection and IT Support for the entire exam period

Function details:

- **Data:** The function retrieves and displays exam details information of the chosen exam, including: “Thanh tra kỳ thi”, “IT support”.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table “Exam Settings” in database exists. => Display list of exam details in correct format.
- **Abnormal case:** (None).

3.7.12 Update exam inspectors, and IT Support for 1 day's exams

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> Choose exam date -> Click “Giám Thị” button
- **Timing demand:** On demand (whenever an administrator want to update hallway monitors, exam inspection and IT Support for 1 day's exams on the system)

Function description:

- **Actors/Roles:** Admin

- **Purpose:** Allow admin to quickly and efficiently update hallway monitors, exam inspection and IT Support for 1 day's exams on the system.
- **Interface:**
 - **Exam supervisor in specific date table:**
 1. “Môn học”: Display the subject name.
 2. “Hình thức thi”: Display exam form
 3. “Thời gian”: Display exam length and date.
 4. “Thanh tra”: Drop down - a drop down to view list and choose exam inspectors
 5. “IT Support”: Drop down - a drop down to view list and choose IT Support.
 6. “Lưu”: Button - a button to confirm and update exam inspectors and IT Support.
- **Data processing:**
 - User clicks on the “Giám thị” button on the “Quản lý đăng ký xem thi” screen.
 - The system fetches the exam list of the chosen date for that semester from the database.
 - The user click the “Thanh tra kỳ thi” and “IT Support” drop down to choose exam inspection and IT support for the entire exam period.
 - The user clicks the “Cập nhật” button to confirm the updated exam inspection and IT support for the entire exam period.
 - The system displays a success message: "Cập nhật giám thị cho đợt thi thành công".

Screen layout:

The screenshot shows a software interface for managing exam settings. At the top, there is a header: "GIÁM THỊ KỲ THI NGÀY 23/03/2025". Below the header, there is a table with five columns: "MÔN HỌC" (Subject), "HÌNH THỨC THI" (Exam Form), "THỜI GIAN" (Time), "THANH TRA" (Examination Supervisor), and "IT SUPPORT". The table contains three rows of data:

MÔN HỌC	HÌNH THỨC THI	THỜI GIAN	THANH TRA	IT SUPPORT
IBC201 - Cross Cultural Management and Negotiation	FE - EOS	23/03/2025 - 10:35 - 12:30	Chọn Thanh Tra	Chọn IT Support
OSG202 - OSG202	FE - EOS	23/03/2025 - 10:35 - 12:30	Chọn Thanh Tra	Chọn IT Support
ENP102 - Phonetics and Phonology	FE - EOS	23/03/2025 - 10:35 - 12:30	Chọn Thanh Tra	Chọn IT Support

Below the table, there is a large grid representing exam slots. The grid has columns labeled "Gamma 304" and "Gamma 305". Each column contains several blue bars representing exam sessions. The first session in both columns is labeled "IBC201" and "OSG202" respectively. The second session in both columns is labeled "ENP102". At the bottom of the grid, there is a summary bar showing "Tổng số: 4". In the top right corner of the main window, there is a red number "6" indicating pending changes. To the right of the main window, there is a smaller floating window showing a list of exam slots with the same information as the main grid.

Figure 96 - Update exam inspectors, and IT Support for 1 day's exams

Function details:

- **Data:** The function retrieves and displays exam details information of the chosen exam, including: “Môn học”, “Hình thức thi”, “Thời gian”, “Thanh tra kỳ thi”, “IT support”.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Settings" in database exists. => Display list of exam details in correct format.

- **Abnormal case:** (None).

3.7.13 Update hallway supervisor for exam rooms

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> Choose an exam -> Click edit button of “Giám thị hành lang”
- **Timing demand:** On demand (whenever an administrator want to update hallway supervisor of an exam room)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allow admin to quickly and efficiently update hallway supervisor of an exam room
- **Interface:**
 - **Update hallway supervisor for exam rooms screen:**
 1. **Edit icon button:** Click for starting update hallway supervisor for exam room process
 2. **User autocomplete:** For selecting a user as a hallway supervisor
 3. **“Hủy” button:** For cancel process
 4. **“Lưu” button:** Confirms and saves the new assignment of the hallway supervisor
- **Data processing:**
 - Admin selects an exam period and a specific exam room
 - Admin clicks the edit icon next to the hallway supervisor field
 - System shows the user autocomplete input for selection
 - Admin selects a user → Clicks “Lưu”
 - System updates the selected hallway supervisor in the database for the corresponding exam room
 - Updated data is reflected immediately on the screen

Screen layout:

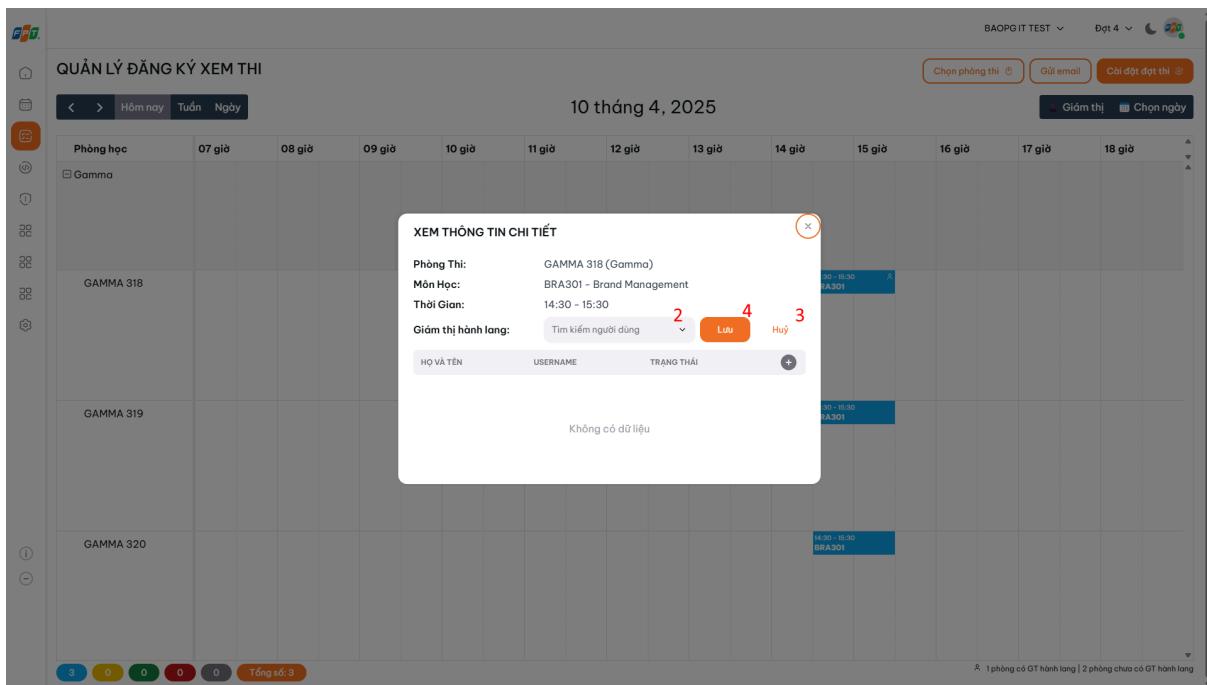


Figure 97 - Update hallway supervisor for exam rooms

Function details:

- **Data:** The system retrieves a list of users eligible to be hallway supervisors. When updated, it stores the selected user's ID in the exam room assignment record for that day.
- **Validation:**
 - Ensure that a valid user is selected before allowing the save
 - Prevent duplicate hallway assignments for the same user at the same time (if applicable)
- **Business rules:**
 - A hallway supervisor must be a registered user with proper permissions
 - A user cannot be assigned as a hallway supervisor to more than one exam room during the same time slot
- **Normal case:** A valid user is selected → System updates hallway supervisor → Success message is displayed and new data appears on screen
- **Abnormal case:**
 - No user selected → Display warning: “Vui lòng chọn giám thị hành lang”
 - Database update fails → Display error: “Cập nhật thất bại, vui lòng thử lại”

3.7.14 Send exam notification email (automatic/manual)

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> Click “Gửi email” button
- **Timing demand:** On demand (whenever an administrator want to send emails automatically or manually)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the admin to send exam-related notifications to all exam supervisors scheduled on a selected date. Supports both immediate (manual) and scheduled (automatic) email delivery.

- **Interface:**

- **Send exam notification email screen:**

1. **List of dates:** contains all dates that have exam
2. **Ghi chú:** is the notes for the notification inside email body
3. **“Hình thức gửi” select field:** is the way user want to send email (auto/manual)
4. **Time to sent:** is the time for automatically sending email
5. **“Xác nhận” button:** confirms sending email

- **Data processing:**

- Admin selects an exam date
- Admin enters optional notes
- Admin selects delivery method (manual/automatic)
- If automatic: Admin selects a send time
- Clicks “Xác nhận”
- System sends or schedules the email(s) to all assigned exam supervisors for that day
- Email body includes exam schedule, location, session info, and any provided notes

Screen layout:

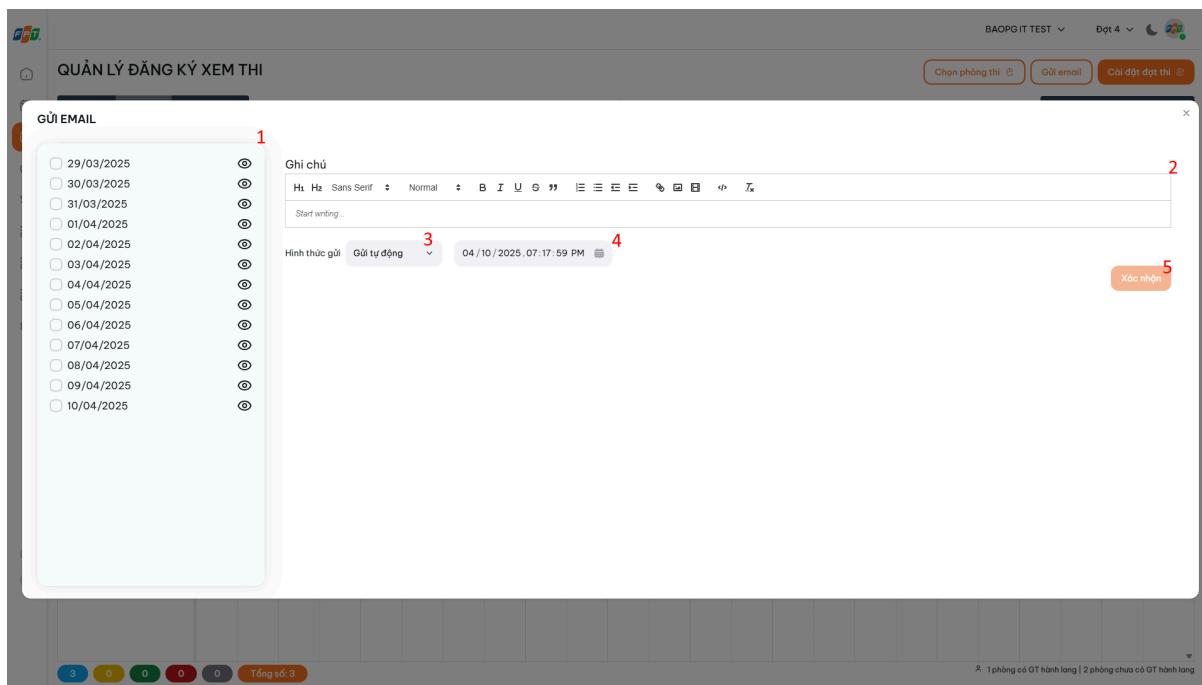


Figure 98 - Send exam notification email (automatic/manual)

Function details:

- **Data:** The function fetches exam supervisor assignments for the selected date and sends them email notifications.
- **Validation:**
 - Require date selection
 - If “Tự động” is selected, require valid future time
 - Display error if no supervisors are assigned to the selected date
- **Business rules:**
 - Only supervisors assigned for the selected date receive emails
 - Scheduled emails are sent using a background job or cron-like system

- Email logs (timestamp, status) should be stored for tracking
- **Normal case:** All supervisors have valid emails → Emails sent/scheduled successfully → System displays success message “**Email đã được gửi thành công**” (or scheduled if automatic)
- **Abnormal case:**
 - No supervisors found for the selected date → Display: “**Không có giám thị nào được phân công trong ngày này**”
 - Email sending fails → Display: “**Gửi email thất bại, vui lòng thử lại**”

3.7.15 View results and send email notification of exam viewing

Function trigger:

- **Navigation path:** “Trang chủ” -> “Đăng ký xem thi” -> Click “Gửi email” button -> Click “Xem kết quả gửi email” icon button
- **Timing demand:** On demand (whenever an administrator want to view the result of sending email)

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the admin to view the list of exam rooms and email sending status.
- **Interface:**
 - **View results of email notification screen:**
 1. **Table of exam room list:** Displays a structured table with rows representing each exam room and relevant email sending info
 2. **Search bar:** Allows filtering by room name, or supervisor name
 3. **Hidden columns:** Allows customizing visible columns for clarity
 4. **Row per page:** Controls how many exam rooms are displayed at once
 5. **Pagination:** Enables navigation through multiple pages of email results
- **Data processing:**
 - Admin navigates to the email send result screen
 - The system fetches log records of all email notifications sent for exam viewing on the selected date
 - Data is displayed in tabular format with details for each room and email status
 - Admin may search or filter to inspect specific rooms or statuses

Screen layout:

Figure 99 - View results and send email notification of exam viewing

Function details:

- **Data:** The system retrieves email logs related to exam viewing notifications, including which room was notified, which supervisors were included, and the result of each email attempt (sent, failed, pending).
- **Validation:**
 - Ensure data displayed is for a valid exam session or date
 - If no data is found, display “Không có dữ liệu gửi email cho ngày này”
- **Business rules:** (none)
- **Normal case:** Valid email logs exist for the selected date → System displays list of exam rooms with email statuses (e.g., “Đã gửi”, “Chưa gửi”, “Chưa được đăng ký”)
- **Abnormal case:**
 - No email logs found → Display: “Không có dữ liệu”
 - Email system is unreachable → Display: “Không thể kết nối đến hệ thống gửi email”

3.8 Exam Code configuration

3.8.1 Import exam codes for the exam period

Function trigger:

- **Navigation path:** “Quản lý sinh viên” -> “Exam code”
- **Timing Frequency:** On-demand (whenever the admin wants to import a batch of exam codes for a specific exam period from an Zip file)

Function description:

- **Actors/Roles:** Administrator
- **Purpose:**
 - Allows the administrator to import a list of exam codes from an Excel file into the system.

- Helps save time and minimize manual data entry errors during the exam preparation process.
- **Interface:**
 - **Import Exam Codes for the Exam Period:**
 1. "Import dữ liệu từ file Zip" Button: A functional button enabling users to upload an Excel file containing exam room information.
 2. Upload area: Excel file import area
 3. "Tải về" Button: Enables users to download a sample Excel file with the correct format required for import.
 4. "Xác nhận" Button: Allows users to confirm and proceed with importing validated data into the system.
 5. "Hủy" Button: Allows users to cancel and proceed with importing validated data into the system.
- **Data processing:**
 - The admin selects a specific exam period from the list.
 - Clicks the “Import from Excel” button and selects an Excel file.
 - The admin clicks “Confirm Import” to proceed.
 - The system validates the data:
 - Checks for duplicate exam codes.
 - Verifies field formats and exam period existence.
 - If valid, the data is saved to the exam code table and linked to the selected exam period.
 - The system shows the result:

Screen layout:

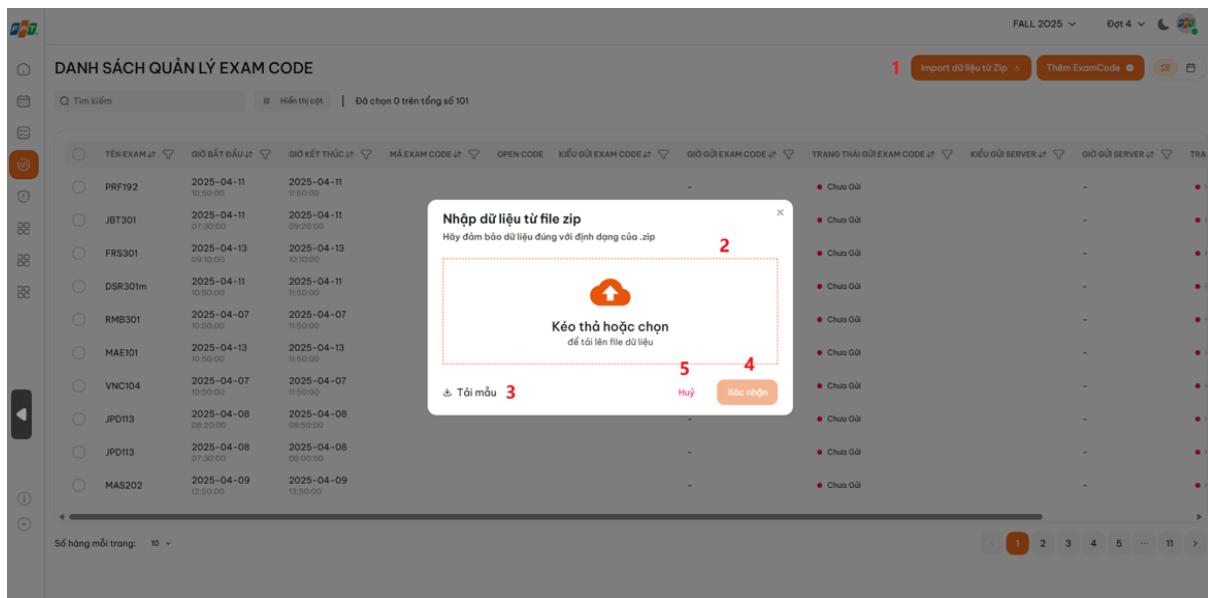


Figure 100 - Import exam codes for the exam period

Function details:

- **Data:** The function retrieves and displays exam format details, including: Subject StudentId, Student Name, Email, CitizenId, View ExamSchedule of the studentId. It may also include additional information based on the applied filtering and sorting options.
- **Validation:**

- Exam codes must be unique within the same subject and exam period.
 - Duplicate exam codes are rejected during import.
- Business rules:
 - When importing exam codes, display a warning if an exam already has an existing exam code.
 - Display a warning if two exams belong to the same course but are scheduled in different time slots.
- Normal case: The Excel file is valid → Admin confirms → Data is imported. Message displayed: “Import dữ liệu thành công”
- Abnormal case:
 - Empty file → Displays message: “Đã xảy ra lỗi vui lòng thử lại”
 - Invalid file format → Displays error: “Đã xảy ra lỗi vui lòng thử lại”
 - Some rows contain errors → Displays a detailed error table, while valid rows are still imported.

3.8.2 View the list of exam codes for the exam period

Function trigger:

- Navigation path: Dashboard-> Initialize exam icon -> Exam Period
- Timing Frequency: On-demand (whenever an examiner wants to view the list of exam codes for a selected exam period)

Function description:

- Actors/Roles: Examiner
- Purpose: Enables examiners to view and manage all exam codes associated with a specific exam period, supporting efficient exam setup and organization.
- Interface:
 - **View list of exam code Screen:**
 1. **Table Exam code :** Displays a table containing details of each exam code in the selected exam period.
 2. **Search bar:** Allows users to search for exam codes by subject name, subject code, or exam code.
 3. **Hidden Columns:** A component that has columns allows users to show or hide specific columns in the table for a customized view.
 4. **Selected:** Displays the number of rows the user has selected
 5. **Rows per page:** Display the number of rows the user wants to see.
 6. **Pagination:** Navigate to other data pages.
 7. **Switch view table or date:** Allows users to quickly switch between data table display modes or specific time periods
- Data processing:
 - The examiner clicks the **Exam Code**
 - The system fetches the list of exam codes associated with all or a specific exam period from the database.
 - The retrieved data is displayed in a structured table format.
 - The examiner can search, filter, sort, or perform actions (e.g., Edit/Delete) on individual exam codes.

Screen layout:

DANH SÁCH QUẢN LÝ EXAM CODE

Q. Tìm kiếm **2** | **3** | **4** | **5** | **6** | **7**

1	TEN EXAM JT	GIỜ BẮT ĐẦU JT	GIỜ KẾT THUC JT	MÃ EXAM CODE JT	OPEN CODE	KIỂU GỬI EXAM CODE JT	GIỎ GỬI EXAM CODE JT	TRẠNG THÁI GỬI EXAM CODE JT	KIỂU GỬI SERVER JT	GIỎ GỬI SERVER JT	TRẠNG THÁI SERVER JT
	PRF192	2025-04-11 10:00:00	2025-04-11 10:00:00			-	-	Chưa Gửi	-	-	*
	JBT301	2025-04-11 07:30:00	2025-04-11 09:30:00			-	-	Chưa Gửi	-	-	*
	FRS301	2025-04-13 08:00:00	2025-04-13 10:00:00			-	-	Chưa Gửi	-	-	*
	D5R301m	2025-04-11 10:00:00	2025-04-11 11:00:00			-	-	Chưa Gửi	-	-	*
	RMB301	2025-04-07 10:00:00	2025-04-07 11:00:00			-	-	Chưa Gửi	-	-	*
	MAE101	2025-04-13 10:00:00	2025-04-13 11:00:00			-	-	Chưa Gửi	-	-	*
	VNC104	2025-04-07 10:00:00	2025-04-07 11:00:00			-	-	Chưa Gửi	-	-	*
	JPD113	2025-04-08 08:20:00	2025-04-08 08:50:00			-	-	Chưa Gửi	-	-	*
	JPD113	2025-04-06 07:30:00	2025-04-06 08:00:00			-	-	Chưa Gửi	-	-	*
	MA8202	2025-04-09 12:00:00	2025-04-09 13:00:00			-	-	Chưa Gửi	-	-	*

Số hàng mỗi trang: **10** | **6** | **7** | **1** | **2** | **3** | **4** | **5** | **11** | **>**

Figure 101 - View the list of exam codes for the exam period

Function details:

- Data:** The function retrieves and displays exam period details, including: Exam period Name, Start day, End day, Set current button ,Action (Edit, Delete). It may also include additional information based on the applied filtering and sorting options.
- Validation:**
 - Search by Name:** Allows users to search for exam periods by name and displays matching results.
 - Sort and Filter List:** Allows users to sort and filter the member list based on criteria like name or description displaying the filtered and sorted results.
- Business rules:** (None)
- Normal case:** Exam codes exist in the database → The system displays them in the table view.
- Abnormal case:** No exam codes are found for the selected period → System displays: "Không có dữ liệu" (No data available)

3.8.3 Create Exam code of the exam period

Function trigger:

- Navigation path:** "Lịch thi" -> "Xem phòng thi" -> "Thêm phòng thi"
- Timing Frequency:** On demand (whenever Admin or Examiner wants to create a new exam code for a subject within the current exam period))

Function description:

- Actors/Roles:** Admin, Examiner
- Purpose:** Allows Admins and Examiners to create a unique Exam Code for a specific exam in an exam period. The Exam Code will later be used to organize exam rooms and manage student participation.
- Interface:**
 - Create a new exam code Screen:**
 - "Thêm Exam Code" Button:** Open modal create exam code

2. “Exam” (Dropdown): A dropdown to select the subject for which the exam code is being generated (only subjects without an existing exam code are displayed).
3. “Exam code” (Input): A field to input a list of student codes separated by commas who are expected to take the exam.
4. “Exam code list” (list): The system will validate each exam code before sending it to the server.
5. **Lưu (button)**: Submits the form to create a new exam code
6. **Huy bỏ (button)**: Resets all fields in the form.

- **Data processing:**

- The user navigates to Exam code
- Clicks on Create Exam Code.
- The Create Exam Code screen is displayed.
- The user selects a subject and inputs a list of student codes.
- Click the Create Exam Code button.
- System validates:
 - Format of student codes.
 - Whether students are enrolled in the selected subject.
- If validation passes:
 - System generates a unique exam code for that subject.
 - Saves the exam code to the database.
 - Inserts records into StudentExam linking students to the subject and exam code.
 - Displays message: "Exam code created successfully."

Screen layout:

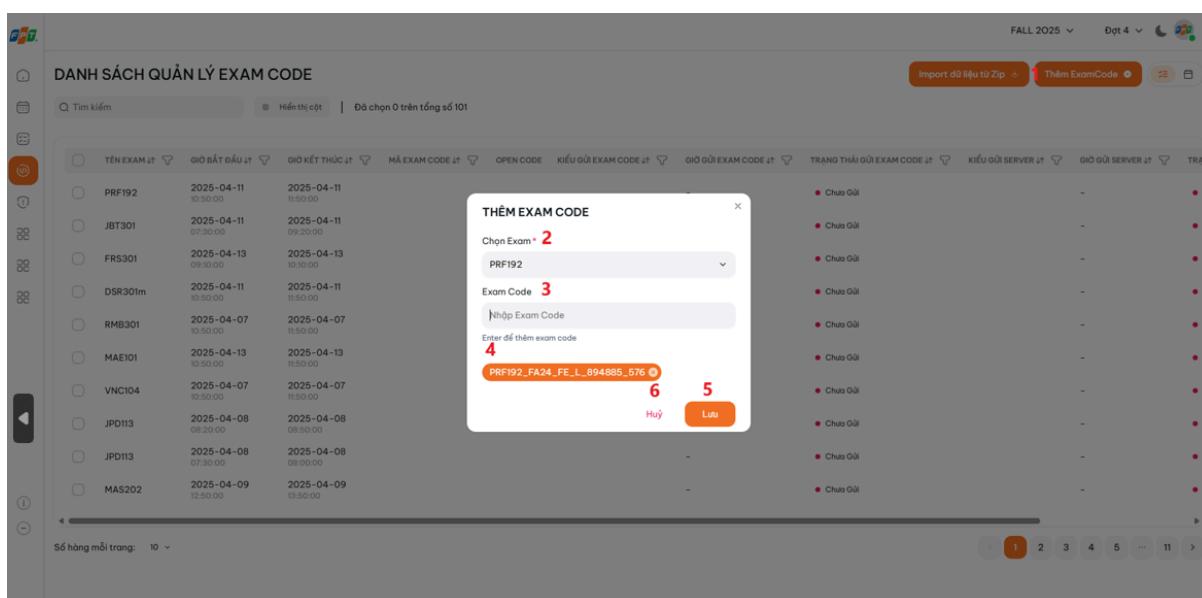


Figure 102 - Create Exam Code Modal

Function details:

- **Data:** Exam ID, list of exam codes, generated exam code..

- **Validation:**
 - **Error Handling:** On server error: "An error occurred. Please try again later."
- **Business rules:**
 - Each exam can only have **one** exam code per exam period.
 - Exam code must be **unique** per exam code and exam period.
- **Normal case:**
 - A subject without an exam code is selected.
 - The exam code is valid and unique.
 - The system creates the exam code and assigns students successfully.
 - Message: "*Tạo ExamCode thành công*"
- **Abnormal case:**
 - **Subject already has an exam code:** "This subject already has an exam code assigned."
 - **Duplicate exam code:**
"Exam code already exists."
 - **Missing required fields:**
 - "Please select a subject."
 - "Exam code is required."
 - **System/server error:**
 - "An error occurred. Please try again later."

3.8.4 View and Update Exam code of the exam period

Function trigger:

- **Navigation path:** Dashboard-> Setting icon -> Exam period-> Edit Icons
- **Timing Frequency:** On demand (whenever an Examiner wants to edit an existing exam period).

Function description:

- **Actors/Roles:** Examiner
- **Purpose:** Allow Examiners to update the exam code of an existing exam period to suit their needs
- **Interface:**
 - **Update exam format Screen:**
 1. **Edit icon:** Open Modal Update exam code
 2. **Exam Code:** Text field to update the **exam code** (pre-filled with the current code)
 3. **Phương thức gửi Examcode:** Select to update the method for delivering the exam code, pre-filled with the current value.
 4. **Phương thức gửi thông báo server:** Select to update the server notification method, pre-filled with the current value.
 5. **Xác nhận:** Button to submit the updated exam code
 6. **Hủy bỏ:** Button to clear all fields and reset the form
- **Data processing:**
 - The user navigates to the "Exam Period" screen and clicks the edit icon for the desired row
 - The Update Exam Code screen is displayed
 - The user edits the title, start day, end day, and exam code

- The user clicks the Save button
- The system validates the entered data:
- All fields must be filled
- The exam code must be unique
- If validation is successful:
 - The system sends the updated information to the server
 - A success message is displayed: "Exam Period Updated Successfully"
- The updated exam period is shown in the "Exam Period" table

Screen layout:

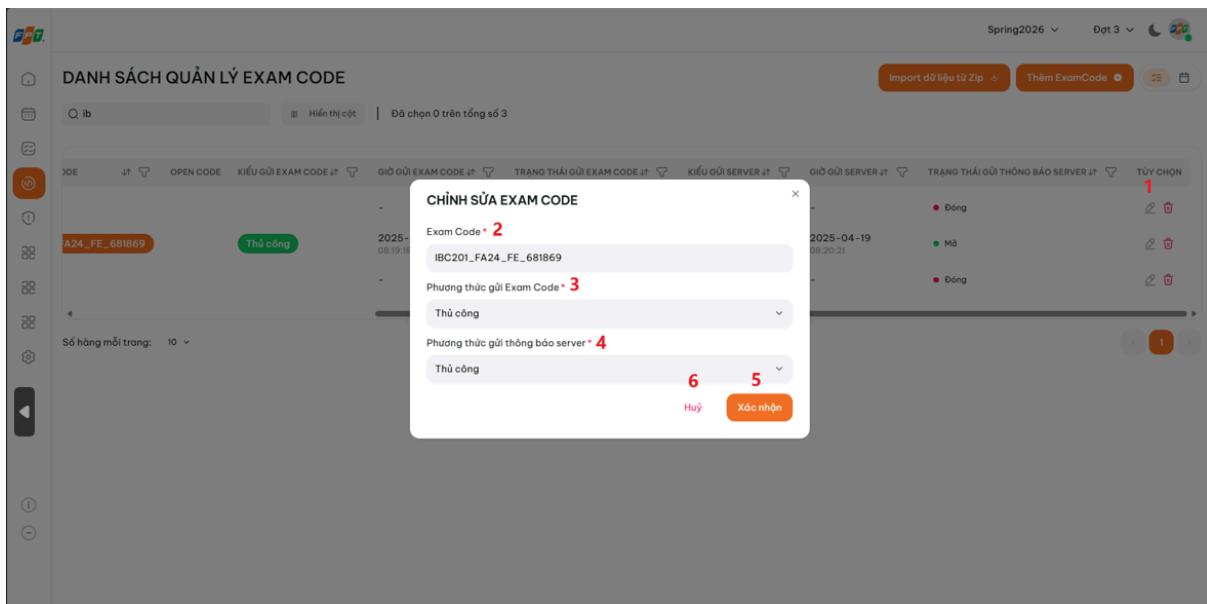


Figure 103 - View and Update Exam code of the exam period

Function details:

- **Data:** The function handles the title, start day and end day of an existing exam period.
- **Validation:**
 - All fields must be filled
 - Exam code must be unique
- **Business rules:** (None)
- **Normal case:** All input is valid and unique System updates the exam period and displays: "Exam Period Updated Successfully"
- **Abnormal case:** Missing or duplicate exam code System displays: "Exam code already exists." or other relevant messages

3.8.5 Delete Exam code of the exam period

Function trigger:

- **Navigation path:** "Exam code" -> Click icon delete
- **Timing Frequency:** On demand (whenever Admin or Examiner wants to delete an existing exam code)

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Allow Admins and Examiners to delete an exam code from an exam period when it is no longer needed

- **Interface:**
 - **Delete exam code Model:**
 1. **Delete Icon:** Open confirm delete modal
 2. **Xóa:** Button to delete the exam room.
 3. **Hủy bỏ:** Button to close the modal.
- **Data processing:**
 - The user navigates to the "Exam code" screen and clicks on the delete icon for the row the user wants
 - The system find id user wants delete
 - Show confirm modal Exam code confirm delete
 - The exam code selected for deleting will be updated and refresh list

Screen layout:

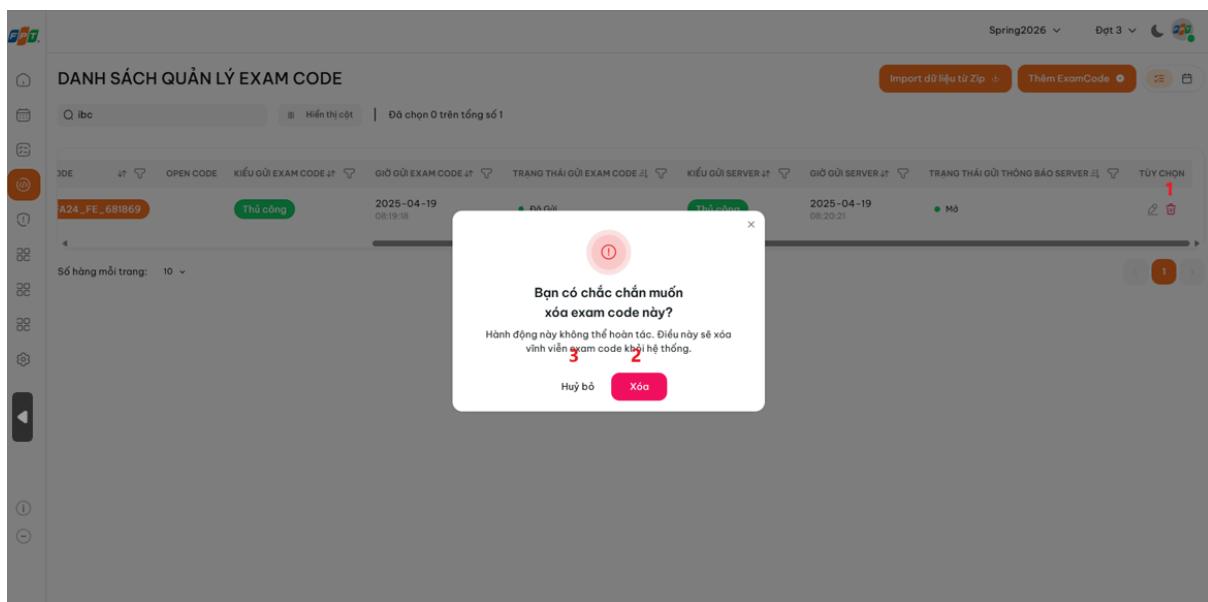


Figure 104 - Confirmation Modal delete for an Exam Room

Function details:

- **Data:** After deleting, exam code will remove out of the list, delete in database
- **Validation:**
 - **Error Handling:** The system handles potential errors during exam code submission and displays the message "Có lỗi xảy ra, vui lòng thử lại sau" if needed.
- **Business rules:** (None)
- **Normal case:**
 - A valid exam code is selected and confirmed for deletion
 - The system deletes the code and displays: "Xoá Exam code thành công"
- **Abnormal case:**
 - The exam code does not exist
 - The system shows: "Exam code này không tồn tại"

3.8.6 Send notifications about the open exam codes to the exam rooms.

Function trigger:

- **Navigation path:** "Exam code" -> "Selected one row"
- **Timing Frequency:** On-demand (when Admin or Examiner wants to send exam code notifications)

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Allow Admin or Examiner to send notifications about currently active exam codes to the exam rooms associated with the ongoing exam session.
- **Interface:**
 - **View Send notifications about the open exam codes to the exam rooms:**
 - Selection:** Allows selecting one or more exam code rows.
 - Manual Action:** "Send Notification" button to trigger the action immediately.
 - Auto-Action:** "Send Notification" button send.
- **Data processing:**
 - User navigates to the "Exam Code" screen.
 - Selects one or more active exam codes to notify.
 - Clicks the "Gửi Exam Code" button.
 - A confirmation modal appears asking the user to confirm the notification action.
 - Upon confirmation:
 - The system retrieves the list of exam rooms linked to the selected exam codes.
 - Sends notifications to those rooms.
 - Displays a success message and refreshes the list if necessary.

Screen layout:

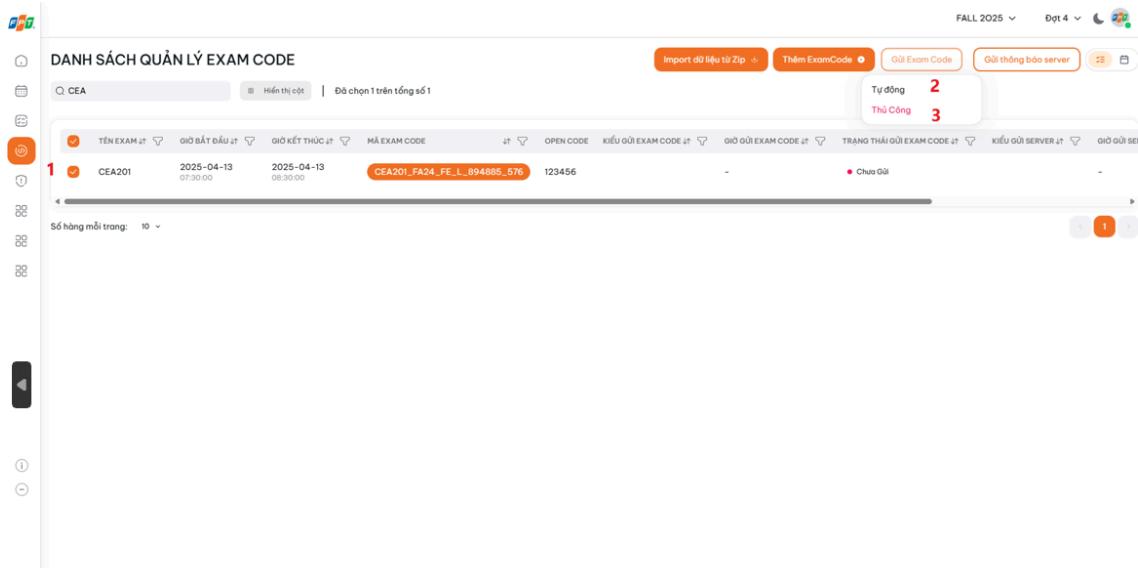


Figure 105 - Send notifications about the open exam codes to the exam rooms.

Function details:

- Data: Selected exam codes are used to notify the corresponding exam rooms.
- Validation: Ensure selected exam codes are still active.
- Error Handling: If an error occurs during sending, display:
"An error occurred. Please try again later."

Business rules: (None)

Normal case:

- A valid exam code is selected, and the user confirms the action.
- System sends the notification and displays:
"Notification sent successfully."

Abnormal case:

- The selected exam code no longer exists.
- System displays: "This exam code does not exist."

3.8.7 Send notifications about the server being open to the exam rooms

Function trigger:

- **Navigation path:** "Exam code"-> "Selected one row"
- **Timing Frequency:** On-demand (when Admin or Examiner wants to send exam code notifications)

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** : Allow Admin or Examiner to send notifications about currently active exam codes to the exam rooms associated with the ongoing exam session.
- **Interface:**
 - **View send notifications about the server being open to the exam rooms**
 1. **Selection:** Allows selecting one or more exam code rows.
 2. **Manual Action:** "Send Notification" button to trigger the action immediately.
 3. **Auto-Action:** "Send Notification" Will display the settings modal for sending notifications how many minutes in advance
- **Data processing:**
 - User navigates to the "Exam Code" screen.
 - Selects one or more active exam codes to notify.
 - Click the "Send Notification" button.
 - A confirmation modal appears asking the user to confirm the notification action.
 - Upon confirmation:
 - The system retrieves the list of exam rooms linked to the selected exam codes.
 - Send notifications to those rooms.
 - Displays a success message and refreshes the list if necessary.

Screen layout:

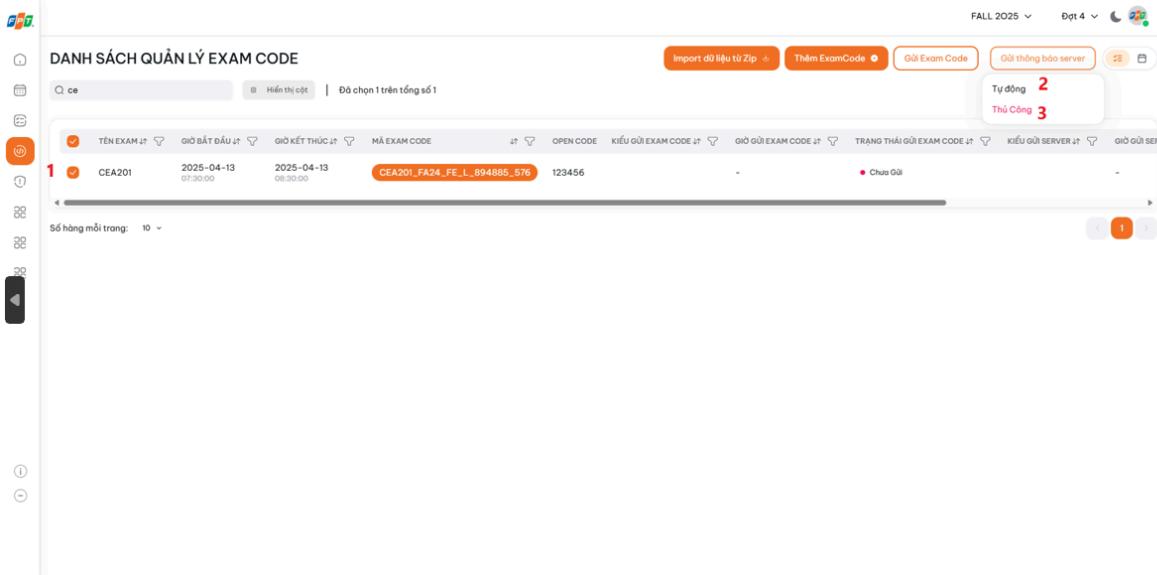


Figure 106 - Send notifications about the server being open to the exam rooms

Function details:

- Data: Selected exam codes are used to notify the corresponding exam rooms.
- Validation: Ensure selected exam codes are still active.
- Error Handling: If an error occurs during sending, display:
"An error occurred. Please try again later."

Business rules: (None)

Normal case:

- A valid exam code is selected, and the user confirms the action.
- System sends the notification and displays:
"Notification sent successfully."

Abnormal case:

- The selected exam code no longer exists.
- System displays:
"This server does not exist."

3.8.8 [ZMP] Get information about exam code and exam regulations for that subject

Function trigger:

- **Navigation path:** "Trang chủ" -> "Xem thi" -> Choose exam slot -> "Thông tin chung" tab
- **Timing demand:** On demand (whenever an exam supervisor want to get information about the exam code and exam regulations for that subject on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently get information about the exam code and the exam regulations for that subject on the system.
- **Interface:**
 - **Exam room details information:**
 1. "Phòng": Display the exam room.
 2. "Thời gian": Display exam length
 3. "Exam name": Display the exam name
 4. "Exam code": Display the exam code

- 5. “**Thời gian mở dự kiến**”: Display expected opening exam code time.
- 6. “**Trạng thái gửi mã**”: Display the exam code status.
- 7. “**Trạng thái server**”: Display the server exam status.
- **Data processing:**
 - User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “Thông tin chung” tab.
 - The system fetches the exam list of the chosen date for that semester from the database.
 - The user clicks the specific exam slot to view exam room information like exam code and exam regulations.

Screen layout:

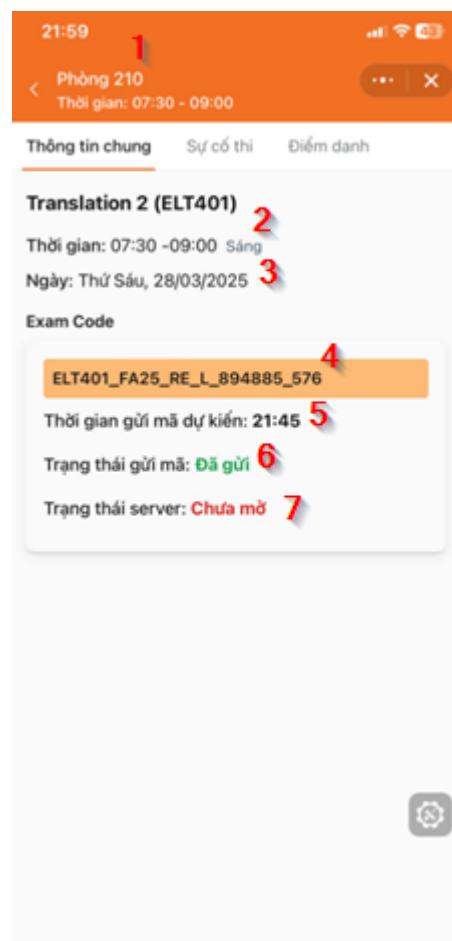


Figure 107 - Get information about exam code and exam regulations for that subject

Function details:

- **Data:** The function retrieves and displays exam details information of the chosen exam including exam code and exam regulations.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam Information" in database exists. => Display list of exam details in correct format.
- **Abnormal case:** (None).

3.9 Check attendance exam supervisor

3.9.1 View the list of exam supervisors by day

3.9.2 Update the status of receiving and resending paper exam documents

Function trigger:

- **Navigation path:** Dashboard → Quản lý cán bộ coi thi → Điểm danh
- **Timing Frequency:** On demand (whenever the admin wants to set the status of receiving and resending paper exam documents).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the admin to set the status of receiving and resending paper exam documents.
- **Interface:**
 - **Update the status of receiving and resending screen:**
 1. “Trạng thái nhận”: To set the status of receiving
 2. “Trạng thái bàn giao”: To set the status of resending
- **Data processing:**
 - Admin selects a date using the date picker. The system retrieves the list of supervisors scheduled for that date from the database.
 - The system displays the supervisor list in tabular form.
 - Admin selects an exam supervisor for setting the status of receiving and resending

Screen layout:

The screenshot shows a web-based application interface titled "DANH SÁCH GIÁM THỊ PHÒNG THI". At the top, there are search filters for "Tìm kiếm" (Search), "Chọn ngày" (Select date) set to "04/09/2025", and "Hiển thị cột" (Show columns). A message indicates "Đã chọn 0 trên tổng số 4". The main content area displays a table with the following columns: CÁN BỘ (Supervisor), MÃ MÔN (Subject ID), PHẦN LOẠI (Type), PHÒNG THI (Exam Room), THỜI GIAN (Time), TRẠNG THÁI NHẬN (Status Received), and TRẠNG THÁI BÀN GIAO (Status Resending). The table lists four entries, each with a checkbox next to the supervisor name. The "TRẠNG THÁI NHẬN" column contains four radio buttons labeled "Chưa nhận" (Not received), and the "TRẠNG THÁI BÀN GIAO" column also contains four radio buttons labeled "Chưa bàn giao" (Not handed over). Red boxes labeled "1" and "2" highlight the "Chưa nhận" and "Chưa bàn giao" options respectively. At the bottom left, there is a dropdown for "Số hàng mỗi trang" (Number of items per page) set to "10".

Figure 108 - Update the status of receiving and resending paper exam documents

Function details:

- **Data:** Retrieves and displays supervisor assignment data.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Set status successful → System displays success message “Nhận thành công”

or “Bàn giao thành công” and fetch the table

- **Abnormal case:** Set status failed → System displays error message “Nhận thất bại” or “Bàn giao thất bại”

3.9.3 Calculate payment costs for Exam supervisors

Function trigger:

- **Navigation path:** Dashboard → Quản lý cán bộ coi thi → Chi phí
- **Timing Frequency:** On demand (whenever the admin wants to check payment information for exam supervisors).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Enables the admin or finance department to view detailed payment costs for exam supervisors, including how much each supervisor is entitled to based on exam sessions assigned.
- **Interface:**
 - **View list of payment costs screen:**
 1. **Table of supervisors:** Displays structured data about the supervisors payment cost in an exam period. Columns include: Tên cán bộ, tên người dùng, vị trí xem thi, tổng số giờ
 2. **Search bar:** Filter by supervisor name or username.
 3. **Hidden Columns:** Show/hide specific columns.
 4. **Rows per page:** Choose how many rows to display.
 5. **Pagination:** Navigate between pages.
 - **Data processing:**
 - Admin selects a date exam period.
 - The system fetches all supervisor assignment data and calculates costs based on the number of sessions and per-session rate.
 - Display the results in a tabular format, including totals.

Screen layout:

The screenshot shows a web-based application interface for managing exam supervisors. At the top, there are navigation links and a search bar labeled "Tìm kiếm". Below the search bar is a table titled "DANH SÁCH GIÁM THỊ PHÒNG THI". The table has columns for: TÊN CÁN BỘ, TÊN NGƯỜI DÙNG, GIÁM THỊ XEM THI, GIÁM THỊ HÀNH LANG, THANH TRA, HỖ TRỢ IT, and TỔNG SỐ GIỜ. The data in the table is as follows:

TÊN CÁN BỘ	TÊN NGƯỜI DÙNG	GIÁM THỊ XEM THI	GIÁM THỊ HÀNH LANG	THANH TRA	HỖ TRỢ IT	TỔNG SỐ GIỜ
Trần Phan Lan Anh	onhtpl	0	2	0	0	2
Trần Anh Tú	amt28	0	0	0	0	0
Phan Gia Bảo (Account)	phanbao.fudn	0.5	0	0	0	0.5

At the bottom left, there is a note "Số hàng mỗi trang: 10". On the right side of the table, there are several icons: a red circle with the number 1, a red circle with the number 5, and a red circle with the number 4. The top right corner of the table has a red box with the number 1. The top right of the entire screen also has a red box with the number 5.

Figure 109 - Calculate payment costs for Exam supervisors

Function details:

- **Data:** The function retrieves assignment data, calculates payments.
- **Validation:**
 - **Search by name or username**
 - **Sort by total amount, name, or session count**
- **Business rules:** (None)
- **Normal case:** Valid supervisor and session data exist → System displays list with calculated totals.
- **Abnormal case:** No assignment/payment data for selected filter → System displays: “Không có dữ liệu”

3.9.3 Export payment acceptance file according to the form

Function trigger:

- **Navigation path:** Dashboard → Quản lý cán bộ coi thi → Chi phí → “Xuất file” button
- **Timing Frequency:** On demand (whenever the admin wants to export the payment data).

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Enables the admin or finance department to export payment costs for exam supervisors, including how much each supervisor is entitled to based on exam sessions assigned.
- **Interface:**
 - **View list of payment costs screen:**
 1. **“Xuất file” button:** To export the payment data as excel file
- **Data processing:**
 - Admin clicks on the “Xuất file” button
 - The system fetches all supervisor assignment data and exports all payment data based on the number of sessions and per-session rate.

Screen layout:

TÊN CÁN BỘ	TÊN NGƯỜI DÙNG	GIÁM THỊ XEM THI	GIÁM THỊ HÀNH LANG	THANH TRA	HỖ TRỢ IT	TỔNG SỐ GIỜ
Trần Phan Lan Anh	anhtpl	0	2	0	0	2
Trần Anh Tú	anitt28	0	0	0	0	0
Phan Gia Bảo (Account)	phanbao.fudn	0.5	0	0	0	0.5

Figure 110 - Export payment acceptance file according to the form

Function details:

- **Data:** The function retrieves assignment data, calculates payments.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Valid supervisor and session data exist → System displays list with calculated totals.
- **Abnormal case:** No assignment/payment data for selected filter → System displays: “Không có dữ liệu”

3.10 Issues Management

3.10.1 [ZMP] Create a new issue for a candidate.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Xem thi” -> Choose exam slot -> “Sự cố thi” tab -> “Tạo sự cố thi”
- **Timing demand:** On demand (whenever an exam supervisor want to create a new issue for a candidate on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently create a new issue for a candidate on the system.
- **Interface:**
 - **“Tạo yêu cầu xử lý sự cố” screen:**
 1. **“Sinh viên”:** Drop down - A drop down to view a list and choose a student.
 2. **“Phân loại”:** Enum - Display type of issues
 3. **“Hình ảnh”:** Image - Place to upload image
 4. **“Mô tả vấn đề”:** Textbox - A textbox to input description of issue.
 5. **“Gửi yêu cầu”:** Send issue request
- **Data processing:**
 - User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “Sự cố” tab. Click “Tạo sự cố” button.
 - The system displays issue request form include “Sinh viên”, “Phân loại”, “Hình ảnh”, “Mô tả vấn đề” .
 - The user fills in all the details and clicks the "Gửi yêu cầu" button
 - The system validates the entered data (e.g., checks for empty fields).
 - If validation passes, the system saves the semester to the database and displays a success message: "Gửi yêu cầu thành công"

Screen layout:

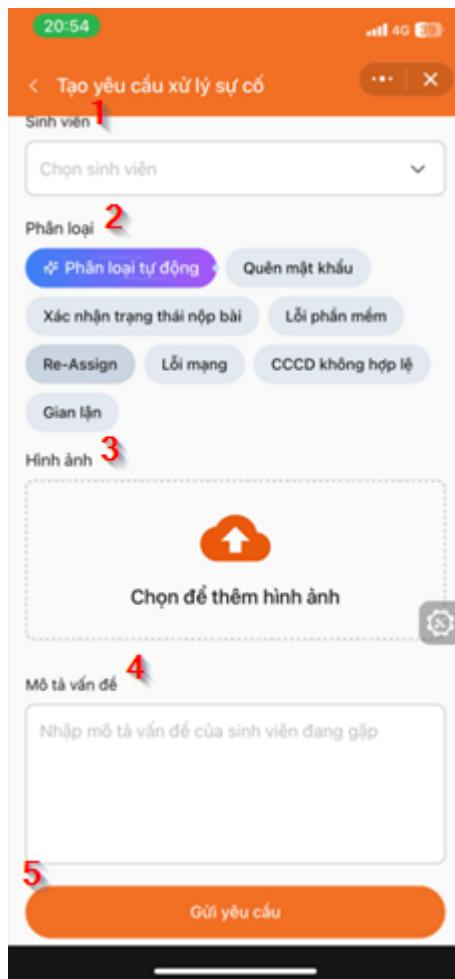


Figure 111 - Create a new issue for a candidate.

Function details:

- **Data:** The function retrieves and displays notification list information for the user.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Valid input provided (filled fields). => The system creates the request issue, saves it in the database, send it to IT support and displays: "Tạo yêu cầu sự cố thành công."
- **Abnormal case:** User does not fill enough required fields. => Display message: "Có lỗi xảy ra khi tạo".

3.10.2 [ZMP] Tracking the status and feedback of the issue.

Function trigger:

- **Navigation path:** "Trang chủ" -> "Xem thi" -> Choose exam slot -> "Sự cố thi" tab -> Choose issue
- **Timing demand:** On demand (whenever an exam supervisor want to tracking the status and feedback of the issue on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently track the status and feedback of the issue on the system.

- **Interface:**
 - “**Chi tiết sự cố**” screen:
 1. “**Mã sự cố**”: Text - Display issue code.
 2. “**Phân loại**”: Text - Display issue type
 3. “**Sinh viên**”: Text - Display the full name and student code of the student
 4. “**Mô tả vấn đề**”: Text - Display the issue description
 5. “**Trao đổi**”: Button - A button to translate with It Support
 6. “**Chuyển trạng thái**”: Button - A button to change the status of the issue
- **Data processing:**
 - User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “**Sự cố**” tab. Click on the issue.
 - The system displays issue information include “**Mã sự cố**”, “**Phân loại**”, “**Sinh viên**”, “**Mô tả vấn đề**”.

Screen layout:



Figure 112 - Tracking the status and feedback of the issue

Function details:

- **Data:** The function tracks the status and feedback of the issue on the system.
- **Validation:** Must have at least 1 issue in the database
- **Business rules:** (None)
- **Normal case:** (None)
- **Abnormal case:** If there are no issue have been created yet, display “Chưa có sự cố nào

được tạo”

3.10.3 [ZMP] Communicate with the handling staff about the issue.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Xem thi” -> Choose exam slot -> “Sự cố thi” tab -> Choose issue -> Click “Trao đổi” button
- **Timing demand:** On demand (whenever an exam supervisor want to communicate with the handling staff about the issue on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently communicate with the handling staff about the issue on the system.
- **Interface:**
 - **“Trao đổi” screen:**
 1. **“Chat box”:** Text - Display user message.
 2. **“Nhập tin nhắn”:** Textbox - Place to input message
 3. **“Hình ảnh”:** Button - A button to import issues image
 4. **“Gửi”:** Button - A button to send message
- **Data processing:**
 - User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “Sự cố” tab. Click on the issue and click “Trao đổi” button.
 - The system displays issue information include “Chat box”, “Nhập tin nhắn”, “Hình ảnh”, “Gửi” .

Screen layout:

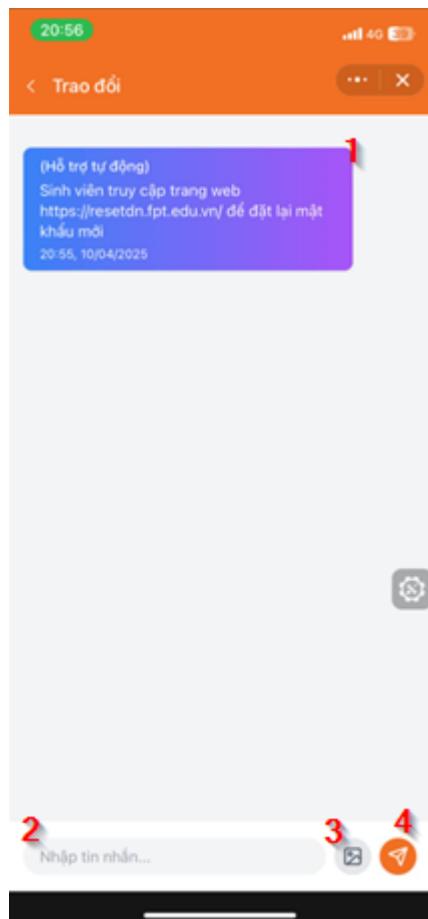


Figure 113 - Communicate with the handling staff about the issue.

Function details:

- **Data:** The function allows the exam supervisor to communicate with the handling staff about the issue on the system.
- **Validation:** Must have at least 1 issue in the database
- **Business rules:** (None)
- **Normal case:** (None)
- **Abnormal case:** If there are no issue have been created yet, display “Chưa có sự cố nào được tạo”

3.10.4 View the list of issue categories.

Function trigger:

- **Navigation path:** “Trang chủ” -> “Thiết lập” -> “Loại sự cố”
- **Timing demand:** On demand (whenever a user want to view the list of issues categories on the system)

Function description:

- **Actors/Roles:** Admin/ Exam Department
- **Purpose:** Allow users to quickly view the list of issue categories on the system
- **Interface:**
 - **“Danh sách loại sự cố” screen:**
 1. **“Tên loại sự cố”:** Display the name of the issues
 2. **“Mã loại sự cố”:** Display the issues code.
 3. **“Loại sự cố”:** Display the issues type.

4. “Mô tả”: Display the description of the issues.
5. “Tùy chọn”: Option to Edit - Delete issues.
6. “Import từ Excel”: button - A button to import data from excel file
7. “Tạo loại sự cố”: button - A button to create new issues.
8. “Import dữ liệu training”: button - A button to import training data
9. Search bar: A search box for users to enter a name and find specific users.
10. Hidden Columns: A component that has columns allows users to show or hide specific columns in the table for a customized view.
11. Selected: Displays the number of rows the user has selected
12. Number of columns each row: Ability to choose the number of columns each row.

- Data processing:

- User clicks on the “Thiết lập” button on the sidebar and choose “Loại sự cố”
- The system fetches the issued information from the database.
- The issues display, including the “Tên loại sự cố”, “Mã loại sự cố”, “Loại sự cố”, “Mô tả” and an option to update and delete the issues.

Screen layout:

DANH SÁCH LOẠI SỰ CỐ				
1	2	3	4	5
Quên mật khẩu	FORGOT_PASSWORD	Sinh viên tự xử lý	Sinh viên truy cập trang web https://resetdn.ftp.edu.vn/ để đặt lại mật khẩu mới	
Xác nhận trạng thái nộp bài	VERIFY_EXAM_SUBMISSION	Xác nhận trạng thái nộp bài	P.Khảo thí sẽ check bài làm và thông báo kết quả, vui lòng không điểm danh sinh viên này cho tới khi có kết quả sự cố	
Lỗi phần mềm	SOFTWARE_ERROR	Sinh viên tự xử lý	Sinh viên chủ động restart lại máy tính, copy nhặt phần mềm EOS mới tại link https://lmsdn.ftp.edu.vn/hd/eos/	
Re-Assign	REASSIGN	Phòng khảo thí xử lý		
Lỗi mạng	NETWORK_ERROR	Sinh viên tự xử lý	Sinh viên quên mạng đã kết nối và thực hiện kết nối lại wifi Exam	
CCCD không hợp lệ	INVALID_ID_CARD	CCCD không hợp lệ	Chuyển sinh viên qua phòng sự cố để xử lý	
Gian lận	CHEATING_ATTEMPT	Gian lận	Giám thị hànlang sẽ có một đề kiểm tra sớm nhất có thể	

Số hàng mỗi trang: 10 12

Figure 114 - View the list of issue categories.

Function details:

- **Data:** The function retrieves and displays a list of student checkout exam sessions.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Issues" in database exists. => Display list of information in correct format.
- **Abnormal case:** Data from table "Issues" in database does not exist. => Display message: “Không có sự cố nào trong đợt thi”.

3.10.5 Create issue categories.

Function trigger:

- **Navigation path:** “Thiết Lập” -> “Loại sự cố” -> “Tạo loại sự cố”

- **Timing Frequency:** On demand (whenever an examiner wants to create a new issue category).

Function description:

- **Actors/Roles:** Admin/ Exam Department
- **Purpose:** Allows admin to create new issues
- **Interface:**

- **Create new semester modal:**

1. “Mã loại sự cố”: A text field for entering the unique code for the issue categories.
2. “Tên loại sự cố”: A text field for entering the name for the issue categories.
3. “Phân loại”: A dropdown field for choosing the type of issue categories.
4. “Mô tả”: A text field for entering the description of the issue categories.
5. “Hủy”: Clears all input fields and resets the form.
6. “Tạo mới”: Submits the new semester details.

- **Data processing:**

- The user click on the “Tạo loại sự cố” button.
- The “Tạo mới loại sự cố” form is displayed.
- The user enters details (“Mã loại sự cố”, “Tên loại sự cố”, “Phân loại”, “Mô tả”).
- The user clicks the “Tạo mới” button.
- The system validates the entered data (e.g., checks for empty fields).
- If validation passes, the system saves the semester to the database and displays a success message: “Tạo loại sự cố mới thành công.”

Screen layout:

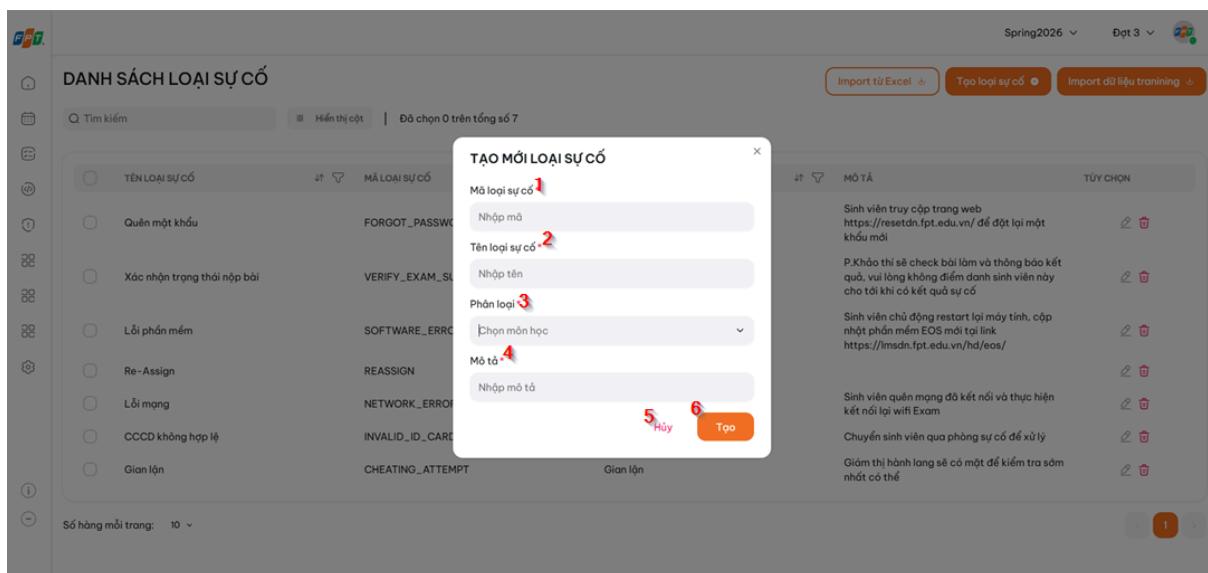


Figure 115 - Create issue categories screen

Function details:

- **Data:** The function processes the “Mã loại sự cố”, “Tên loại sự cố”, “Phân loại”, “Mô tả”
- **Validation:**
 - **Error Handling:** Displays appropriate messages for errors, such as "Mã loại sự cố đã tồn tại" or "Trường này là bắt buộc."
- **Business rules:** (None)
- **Normal case:** Valid input provided (unique “Mã loại sự cố”, filled fields). => The system

creates the semester, saves it in the database, and displays: "Tạo sự cố mới thành công."

- **Abnormal case:**

- “Mã loại sự cố” is missing or already exists => The system displays appropriate error messages "Mã loại sự cố đã tồn tại."

3.10.6 View and update issue category.

Function trigger:

- **Navigation path:** “Thiết Lập” -> “Loại sự cố” -> Click pencil button
- **Timing Frequency:** On demand (whenever an examiner wants to update an issue category).

Function description:

- **Actors/Roles:** Admin/ Exam Department
- **Purpose:** Allows admin to create new issues
- **Interface:**
 - “Chỉnh sửa loại sự cố” modal:
 1. “Mã loại sự cố”: A text field for entering the unique code for the issue categories.
 2. “Tên loại sự cố”: A text field for entering the name for the issue categories.
 3. “Phân loại”: A dropdown field for choosing the type of issue categories
 4. “Mô tả”: A text field for entering the description of the issue categories.
 5. “Hủy”: Clears all input fields and resets the form.
 6. “Cập nhật”: Submits the new semester details.
- **Data processing:**
 - The user navigates to the "Danh sách loại sự cố" screen and clicks the pencil icon.
 - The update information of the issue categories modal display.
 - The user changes necessary information and clicks the “Cập nhật” button.
 - The system validates the entered information (e.g. checks for empty fields, possibly checks for file type or size).
 - If the validation is successful, the system updates the new information to the database.
 - The system displays a success message: "Chỉnh sửa loại sự cố thành công".
 - The new information is displayed on the user screen.

Screen layout:

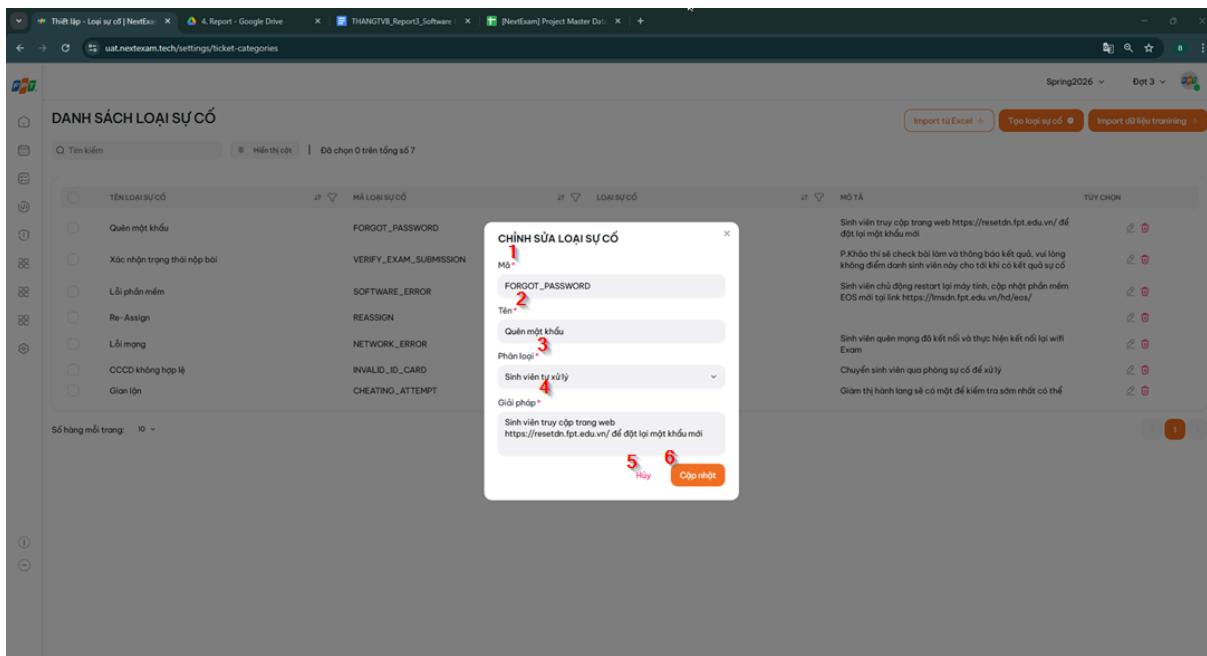


Figure 116 - View and update issue category

Function details:

- Data:** The function processes the “Mã loại sự cố”, “Tên loại sự cố”, “Phân loại”, “Mô tả”
- Validation:** (None)
- Business rules:** (None)
- Normal case:** Valid input provided (unique “Mã loại sự cố”, filled fields). => The system creates the semester, saves it in the database, and displays: "Tạo sự cố mới thành công."
- Abnormal case:**
 - “Mã loại sự cố” is missing or already exists => The system displays appropriate error messages "Mã loại sự cố đã tồn tại."

3.10.7 Delete issue category

Function trigger:

- Navigation path:** “Trang chủ” -> “Thiết lập” -> “Loại sự cố” -> delete icon
- Timing Frequency:** On demand (whenever an admin wants to delete an existing issue category).

Function description:

- Actors/Roles:** Admin/ Exam Department
- Purpose:** Allow admin to delete issue categories to suit their needs
- Interface:**
 - Delete semester modal:**
 - “Hủy bỏ”: Button - a button to cancel the deleting issue categories.
 - “Xóa”: Button - a button to confirm deleting issue categories.
- Data processing:**
 - The user navigates to the "Danh sách loại sự cố" screen and clicks on the delete icon for the row the user wants
 - The system finds the issue categories id that user wants delete

- Show confirm modal issue categories confirm delete
- The issue categories selected for deletion will be updated and the list issue categories will be displayed on the "IssueCategory" table.

Screen layout:

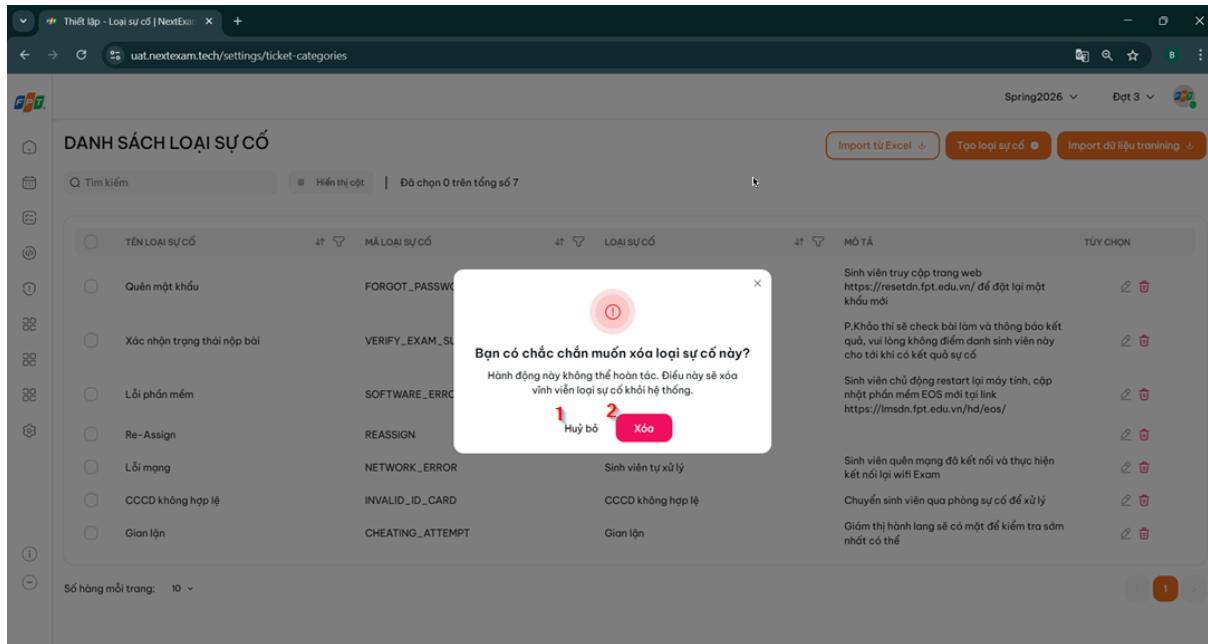


Figure 117 - Delete issue categories

Function details:

- **Data:** The function handles the code of an existing issue category.
- **Validation:**
 - **Error Handling:** The system handles potential errors during classroom submission and displays the message "Đã có lỗi xảy ra, vui lòng thử lại sau" if needed.
- **Business rules:** (None)
- **Normal case:** A valid issueCategoryID is selected, and the user confirms deletion. -> The issueCategoryID is deleted, and the updated list is displayed with a success message.
- **Abnormal case:** The semester Id does not exist => The system displays: "Đã có lỗi xảy ra, vui lòng thử lại sau."

3.10.8 Automatic issues classification

Function trigger:

- **Navigation path:** "Trang chủ" -> "Xem thi" -> Choose exam slot -> "Sự cố thi" tab -> Tạo sự cố button
- **Timing demand:** On request, support supervisors to automatically classify incidents through descriptions

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently create and resolve issues.
- **Interface:**
 - **View automatic issues classification:**
 1. "Sinh viên": Select the list of students with the problem
 2. "Phân loại": Classify the problem
 3. "Hình ảnh": Upload the problem image

4. “Mô tả vấn đề”: Describe the problem
5. “Gửi yêu cầu”: Send the problem information to the test

- **Data processing:**

- User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “Sự cố thi” tab.
- User click “Tạo sự cố thi” button. After redirect Page “Tạo sự cố”

Screen layout:



Figure 118 - Automatic issues classification

Function details:

- **Data:** This function will retrieve and display detailed information of the submitted incident then AI will analyze it.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Description data is provided by the user.
=> System processes the text, runs classification using the ML model, and displays the predicted issue type in the correct format (e.g., “Connectivity Issue”, “App Crash”, “Device Error”, etc.).

- **Abnormal case:** (None).

3.10.9 Automatically suggest error handling methods

Function trigger:

- **Navigation path:** “Trang chủ” -> “Xem thi” -> Choose exam slot -> “Sự cố thi” tab -> Choose ticket
- **Timing demand:** Support supervisors to automatically classify incidents through descriptions

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently resolve issues.
- **Interface:**
 - **Exam room details information:**
 1. “Thông tin sự cố”: View id ticket
 2. “Status”: Incident status
 3. “Phân loại”: Text Ai Incident classification
 4. “Danh sách sinh viên”: Students associated with the incident
 5. “Mô tả vấn đề sự cố”: Incident description
 6. “Hình ảnh”: Image of the incident
 7. “Hỗ trợ tự động”: Suggested resolution from AI
- **Data processing:**
 - User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “Sự cố thi” tab.
 - User click “Tạo sự cố thi” button. After redirect Page “Tạo sự cố”
 - Redirect resolution AI suggestion

Screen layout:



Figure 119 - Automatically suggest error handling methods

Function details:

- Data:** Based on the Description field (incident description) provided in the ticket, the system leverages AI to analyze the content and suggest appropriate error-handling methods. Additional information such as the exam code and exam regulations may also be referenced if necessary.
- Validation:** The Description field must not be empty and should contain clear, relevant information.
- Business rules:** (None)
- Normal case:**
 - The Description is clear and informative.**
 - The AI processes the input and displays a suggestion in the AI Suggestion field.**
- Abnormal case:**
 - Missing or unclear Description → Display an error message prompting the user to re-enter the content.
 - AI cannot generate a suggestion → Show a message like "Unable to generate a

- suggestion. Please handle it manually ."
- System error or AI service interruption → Display a technical error and log the issue for further review.

3.10.10 View list of issues

Function trigger:

- **Navigation path:** "Quản lý sự cố"
- **Timing demand:** On-demand (whenever the Exam supervisor wants to check issue reports related to a specific exam period)

Function description:

- **Actors/Roles:** Admin, Examiner
- **Purpose:** Allow exam supervisors to **view a list of reported issues** (e.g., description). Supports **issue resolution workflow** and **exam preparation monitoring**.
- **Interface:**
 - **View list of issues:**
 1. **Switch view:** Display issues using different views (grid/list/by exam room).
 2. **Search phrase:** Search for issues in exam rooms using keywords.
 3. **Date filter:** Filter issues by the date they occurred or were reported.
 4. **ActionView My issues:** Show issues reported by or assigned to me.
 5. **List Issues Category:** Display issues grouped by category (e.g., password, re-assign).
 6. **List Issues:** Display a list of all reported issues during the exam.
- **Data processing:**
 - The exam supervisors redirect "Quản lý sự cố"
 - The system retrieves and displays the **list of issues**.
 - The exam supervisors can **sort, filter, and search** through issues.
 - Exam supervisors may view details or update issue statuses directly.

Screen layout:

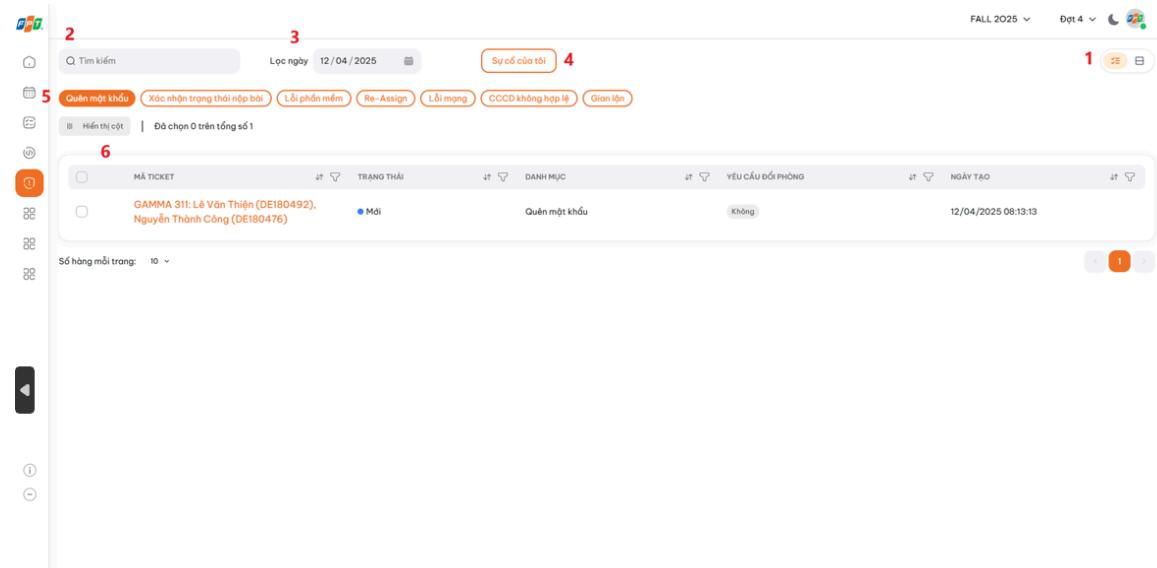


Figure 120 - View list of issues

Function details:

- **Data:** The function retrieves and displays exam details information of the chosen exam including exam code and exam regulations.
- **Validation:** Only issues within the selected exam period are shown and Invalid filters or empty result sets return a message like: "No issues found."
- **Business rules:**
 - If an issue is already resolved, show a label and disable further actions.
 - Admin can reassign or reopen resolved issues if necessary.
 - If no issues exist for the selected filters, show: "No issues reported."
- **Normal case:** Admin filters → sees issue list → takes action (view/sort/search).
- **Abnormal case:**
 - No issues → Table with data null

3.10.11 View the list of issues assigned to me**Function trigger:**

- **Navigation path:** "Quản lý sự cố" → "Sự cố của tôi"
- **Timing demand:** On-demand (whenever the user wants to view the list of issues assigned to them)

Function description:

- **Actors/Roles:** IT Support
- **Purpose:**
 - Allows IT Support to view a list of issues that have been assigned to them for tracking and resolution.
 - Enhances issue management by clarifying responsibility and supporting efficient workflows.
- **Interface:**
 - **The list of issues assigned to me:**
 1. **Switch view:** Display issues using different views (grid/list/by exam room).
 2. **Search phrase:** Search for issues in exam rooms using keywords.
 3. **Date filter:** Filter issues by the date they occurred or were reported.
 4. **Action View My issues:** Show issues reported by or assigned to me.
 5. **List Issues Category:** Display issues grouped by category (e.g., password, re-assign).
 6. **List Issues:** Display a list of all reported issues during the exam.
- **Data processing:**
 - The user logs in → The system identifies the current user's ID.
 - The system retrieves and displays all issues where **Assigned = current user**.
 - The user can apply filters, sort, or search the list.

Screen layout:

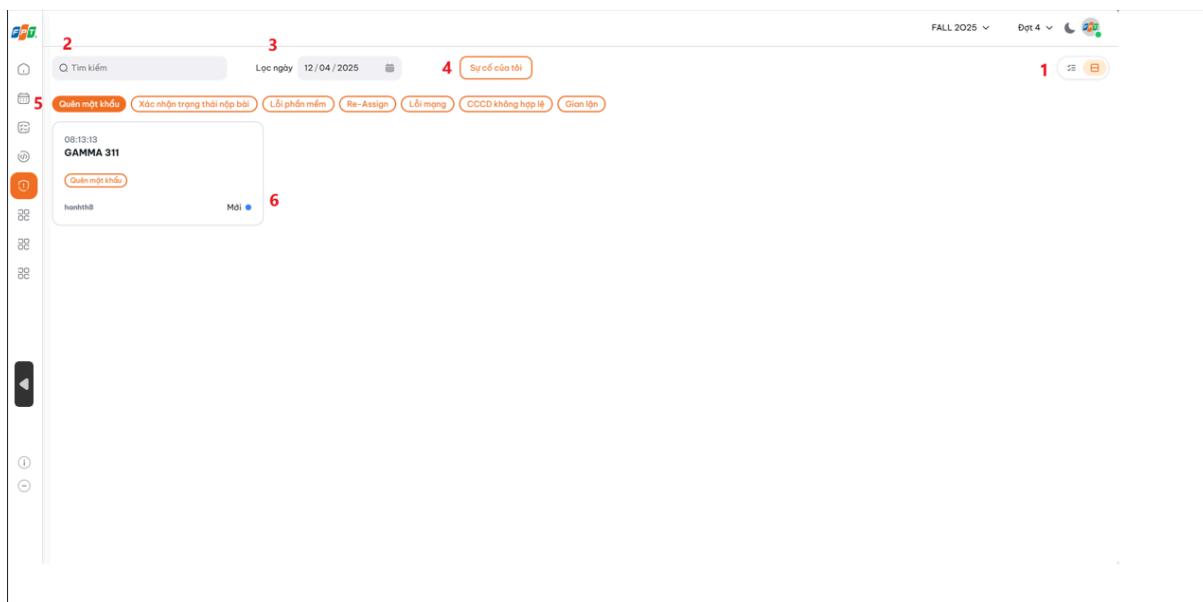


Figure 121 - View the list of issues assigned to me

Function details:

- **Data:** The function retrieves and displays all issues assigned to the current user, including: Issue ID, student information, description, status, creation and update dates Priority or deadlines, if applicable
- **Validation:** Only issues assigned to the logged-in user are shown
- **Business rules:** (None)
- **Normal case:** The user accesses the feature → views the assigned issues → takes action if necessary.
- **Abnormal case:** (None)

3.10.12 View list of issues by category

Function trigger:

- **Navigation path:** “Quản lý sự cố” → “Sự cố của tôi”
- **Timing demand:** On-demand (whenever the user wants to view the list of issues by category)

Function description:

- **Actors/Roles:** Exam supervisor, IT Support
- **Purpose:**
 - Allows IT Support and Exam Supervisors to **view and manage issues grouped by category**, helping them to prioritize and handle recurring types of problems more efficiently.
 - Facilitates issue tracking and classification to support better decision-making and reporting
- **Interface:**
 - **View list of issues by category**
 1. **Switch view:** Display issues using different views (grid/list/by exam room).
 2. **Search phrase:** Search for issues in exam rooms using keywords.
 3. **Date filter:** Filter issues by the date they occurred or were reported.
 4. **Action View My issues:** Show issues reported by or assigned to me.

5. **List Issues Category:** Display issues grouped by category (e.g., password, re-assign).
 6. **List Issues:** Display a list of all reported issues during the exam.
- **Data processing:**
 - All reported issues are retrieved and grouped by category.
 - Users can filter, sort, or search based on category, date, or keyword.

Screen layout:

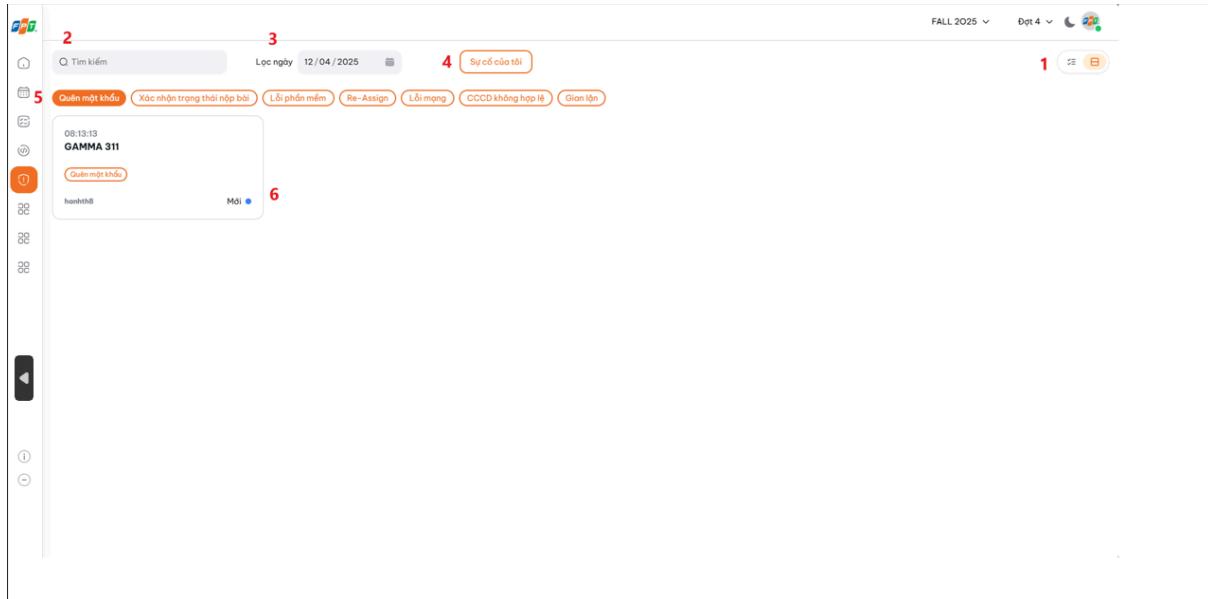


Figure 122 - View list of issues by category

Function details:

- **Data:** The function retrieves and displays all issues assigned to the current user, including: Ticket ID, Exam room, description, status,
- **Validation:** All issues are grouped strictly by predefined categories.
- **Business rules:** (None)
- **Normal case:** The user opens the page → selects a category → views and manages issues.
- **Abnormal case:** No issues in a selected category → Display: “Không tìm thấy phân loại.”

3.10.13 View issue details.

Function trigger:

- **Navigation path:** “Quản lý sự cố” → “Sự cố của tôi”
- **Timing demand:** On-demand — whenever the user wants to check details of a specific reported issue.

Function description:

- **Actors/Roles:** IT Support, Exam Supervisor
- **Purpose:**
 - Allow users to view detailed information about a specific issue.
 - Help IT Support and Exam Supervisors understand the problem context, affected students, exam room, and status to take appropriate actions.
 - Enable better collaboration and tracking for incident resolution.
- **Interface:**

- **The list of issues assigned to me:**

- 1: **Status**: Display issues using different views (grid/list/by exam room).
- 2: **Search phrase**: Search for issues in exam rooms using keywords.
- 3: **Date filter**: Filter issues by the date they occurred or were reported.
- 4: **Action View My issues**: Show issues reported by or assigned to me.
- 5: **List Issues Category**: Display issues grouped by category (e.g., password, re- assign).
- 6: **List Issues**: Display a list of all reported issues during the exam.

- **Data processing:**

- The system retrieves full issue details using the issue ID.
- Displays all associated metadata
- Supports inline editing or actions such as

Screen layout:

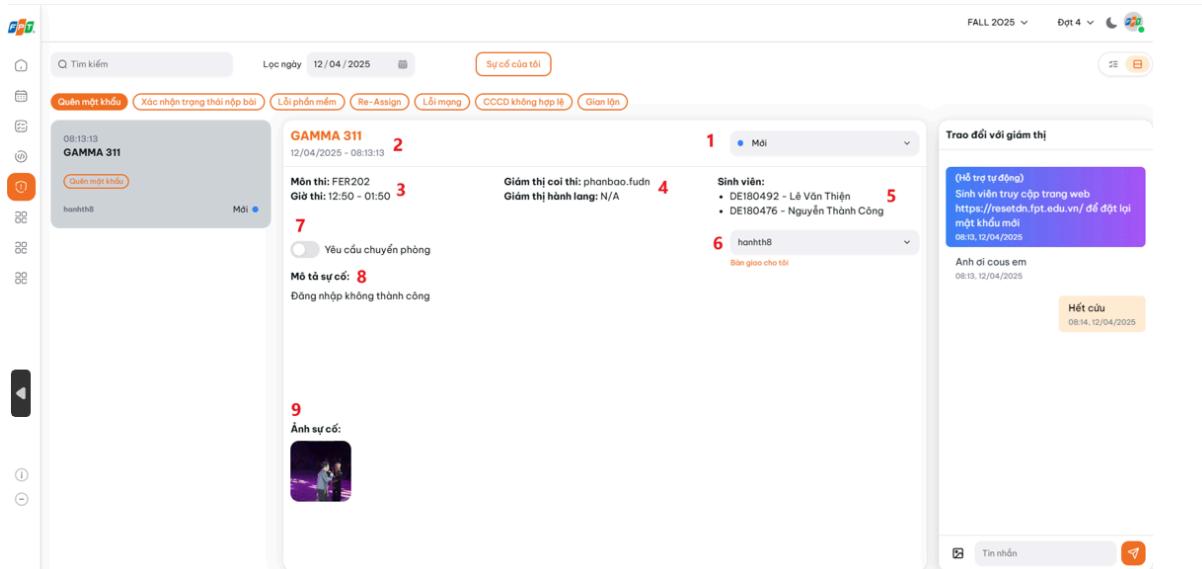


Figure 123 - View issue details.

Function details:

- **Data:** Issue ID, student information, description, status, creation and update dates
Priority or deadlines, if applicable
- **Validation:** All issues are grouped strictly by predefined categories (e.g., Login Issue, Device Issue, Re-Assign Request, etc.).
- **Business rules:** (None)
- **Normal case:**
 - The user opens the issue management page
 - Selects a category from the list
 - Views, filters, and manages all related issues under that category
- **Abnormal case:** No issues in a selected category → Display: “Không tìm thấy loại sự cố.”

3.10.14 Change the status of the issue.

Function trigger:

- **Navigation path:** “Quản lý sự cố” → “Sự cố của tôi”

- **Timing demand:** On demand — users can change the issue status at any time during the issue lifecycle

Function description:

- **Actors/Roles:** Exam supervisor, IT Support
- **Purpose:**
 - Allow authorized users to update the status of an issue based on its progress
 - Enable real-time collaboration and tracking between exam supervisors and IT support staff
 - Ensure all issues are properly categorized (e.g., New → In Progress → Resolved → Closed)
- **Interface:**
 - *Dropdown menu or a set of status buttons to allow selection from the following statuses:*
 - *Mới*
 - *Đang chờ*
 - *Đang xử lý*
 - *Đã giải quyết*
 - *Đã huỷ*
 - *Mở lại*
- **Data processing:**
 - When a user selects a new status and confirms the change
 - The system validates the user's role and permissions.
 - Only users assigned to or involved in the issue can update its status.
 - The selected status value is updated in the database.
 - The system automatically logs:
 - Who changed the status
 - When the status was changed
 - Previous and new status values
 - All relevant users (e.g., assigned supervisor or IT support) are notified of the change.
 - The new status is reflected in:
 - The issue detail view
 - The list of assigned issues

Screen layout:

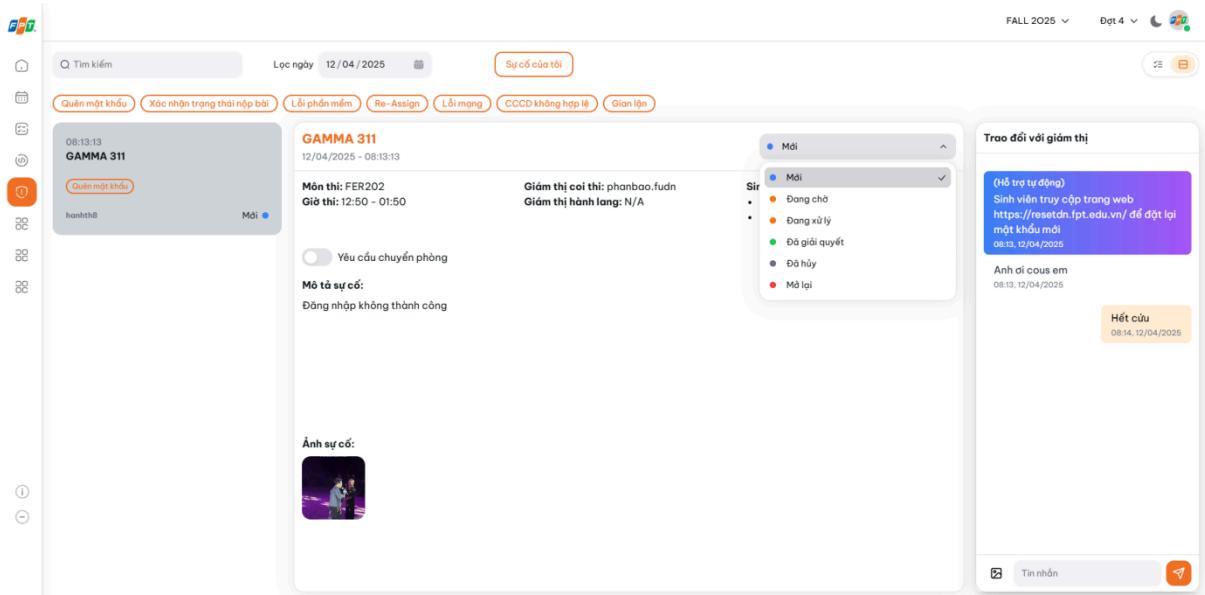


Figure 124 - Change the status of the issue.

3.10.15 Communicate with the exam supervisor about the issue.

Function trigger:

- **Navigation path:** “Quản lý sự cố” → “Select an issue” → “Trao đổi với giám thị” tab
- **Timing demand:** On-demand (whenever IT Support or Exam Supervisor wants to communicate about a specific issue)

Function description:

- **Actors/Roles:** Exam supervisor, IT Support
- **Purpose:**
 - Enables **real-time or asynchronous communication** between IT Support and the Exam Supervisor regarding a specific issue.
 - Reduces delays in issue resolution through **instant clarification and updates**, similar to a chat or messaging system.
 - Keeps all communication **centralized within the issue context** for future reference and auditing.
- **Interface:**
 - **The list of issues assigned to me:**
 - Switch view:** Display issues using different views (grid/list/by exam room).
 - Search phrase:** Search for issues in exam rooms using keywords.
 - Date filter:** Filter issues by the date they occurred or were reported.
 - Action View My issues:** Show issues reported by or assigned to me.
 - List Issues Category:** Display issues grouped by category (e.g., password, re-assign).
 - List Issues:** Display a list of all reported issues during the exam.
- **Data processing:**
 - All reportWhen a user selects an issue → the system fetches all communication history tied to that issue ID.
 - Messages are time stamped and linked to the sender's identity (role, name).
 - When a new message is sent:

- It is saved to the communication log.

Screen layout:

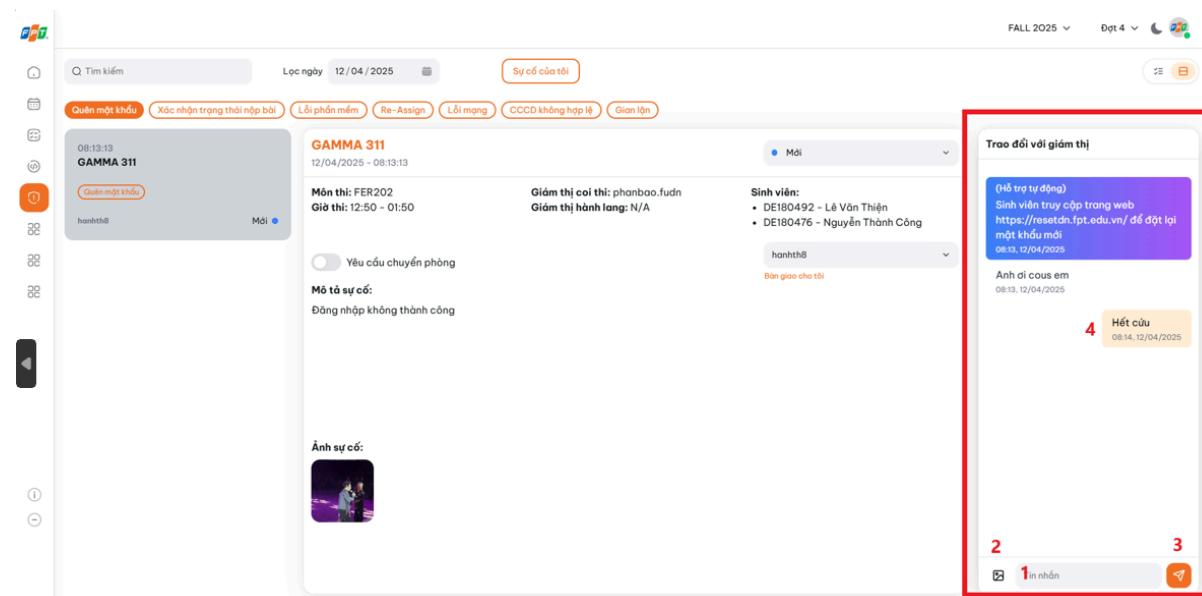


Figure 125 - Communicate with the exam supervisor about the issue.

Function details:

- **Data:** The function retrieves and displays all issues assigned to the current user, including: Issue ID, student information, description, status, creation and update dates Priority or deadlines, if applicable
- **Validation:**
 - Only users assigned to or involved in the issue can send/read messages
 - Empty messages cannot be sent
 - Attachments must follow system image(size/type)
- **Business rules:** (None)
- **Normal case:** The IT Support opens an issue → sends a message to the Supervisor asking for clarification → Supervisor responds → both parties resolve the issue collaboratively.
- **Abnormal case:** (None)

3.10.16 Create a request to transfer a student with an issue to the support room

Function trigger:

- **Navigation path:** “Quản lý xử lý” →
- **Timing demand:** On request (whenever the IT Support or Exam Supervisor wants to move a student's room due to an incident)

Function description:

- **Actors/Roles:** Exam supervisor, IT Support
- **Purpose:**
 - Allow users to request room transfers for students
 - Change exam room in real time, fast and simple
 - Move students to another exam room quickly
- **Interface:**

- **The list of issues assigned to me:**
 1. “Yêu cầu chuyển phòng” **Toggle switch**: Request to change room
 2. “Yêu cầu chuyển phòng” **button**: Confirm change room
 3. “Hủy bỏ” **button**: Cancel event change room
- **Data processing:**
 -

Screen layout:

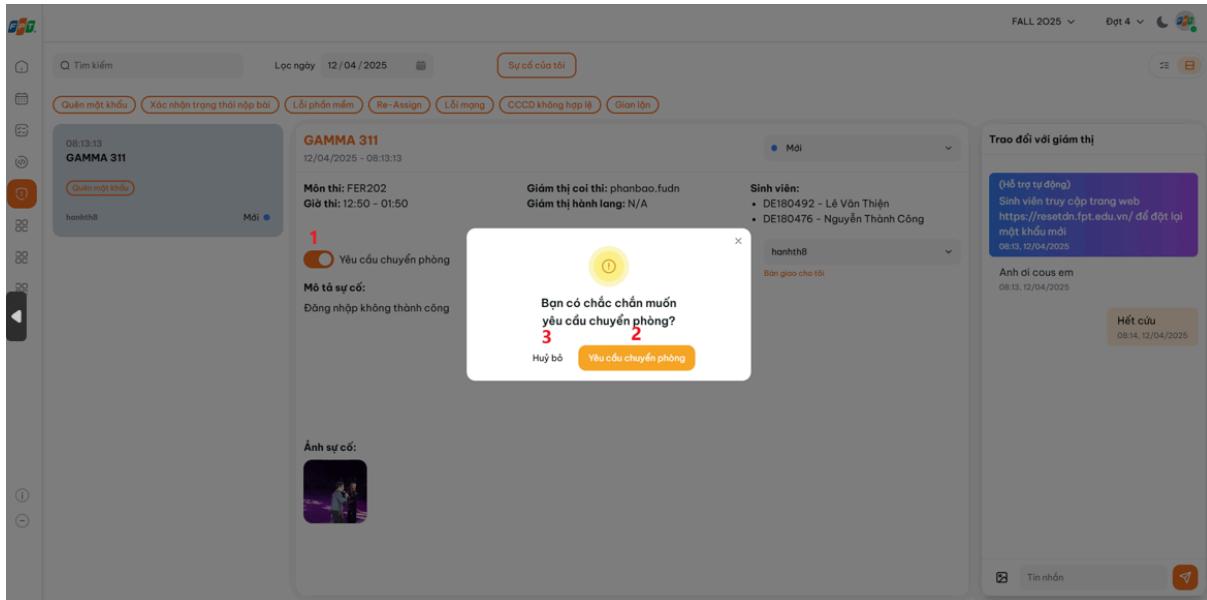


Figure 126 - Create a request to transfer a student with an issue to the support room.

Function details:

- **Data:** The system retrieves and displays a list of issues assigned to the currently logged-in user.
- **Validation:**
 - Error when request failed
 - Error when clicking to change room
- **Business rules:** (None)
- **Normal case:** Click on change room and it will update the room change status.
- **Abnormal case:** (None)

3.10.17 Export summary report file by semester/exam period

Function trigger:

- **Navigation path:** “Quản lý xí nghiệp” → Select view table
- **Timing demand:** On request (whenever the IT Support or Exam Supervisor wants to export a summary of incidents for a semester or exam period)

Function description:

- **Actors/Roles:** Exam supervisor, IT Support
- **Purpose:**
 - Allow users to export a summary report of recorded incidents
 - Support monitoring and evaluation of incident handling per semester/exam period
 - Facilitate statistical review, auditing, and historical data storage
- **Interface:**

- **Export summary report file :**
 1. “Table” Toggle switch: Switch UI to table view
 2. “Export data” dropdown button: List options export
 3. “Học kỳ” button: Export data by semester
 4. “Đợt thi” button: Export data by period
- **Data processing:**
 - The system retrieves a list of incidents based on the selected **semester** and/or **exam period**.
 - Once the "Export Summary Report" button is clicked, the system **generates and returns an Excel file (.xlsx)** containing the filtered incident data.

Screen layout:

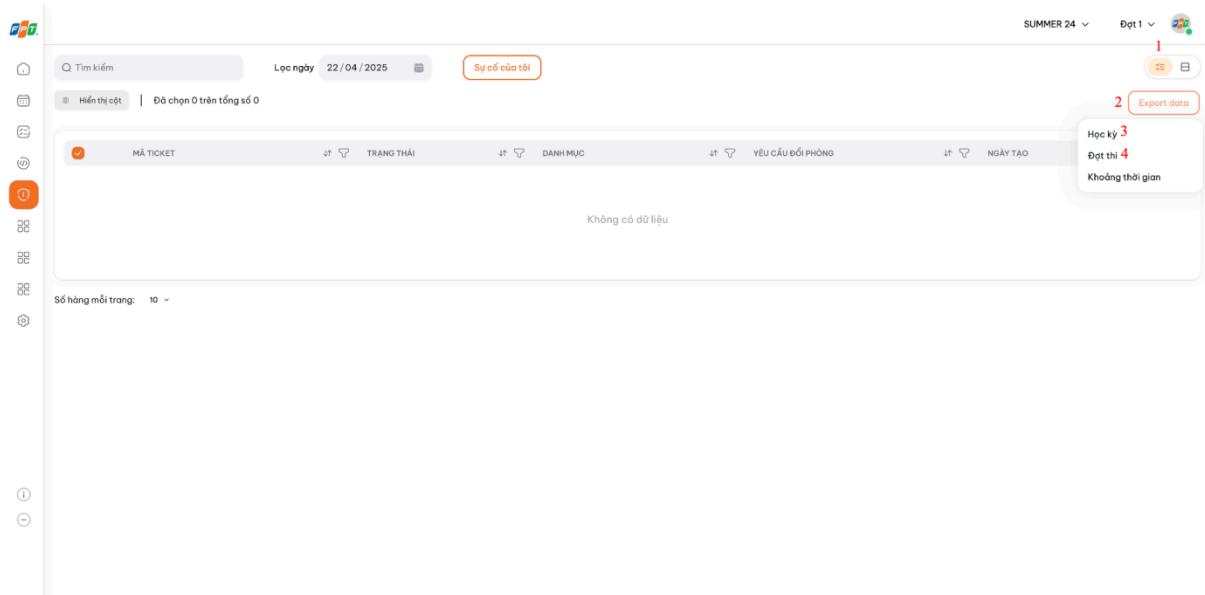


Figure 127 - Export summary report file by semester/exam period

Function details:

- **Data:** The system will retrieve and get data then create an excel file.
- **Validation:**
 - Error if no semester or exam period is selected
 - Error if the export process fails
- **Business rules:** (None)
- **Normal case:** User selects a semester or exam period → Clicks “Export Data” → Clicks “options” → System exports the file successfully -> “Export file thành công” success message
- **Abnormal case:**
 - Semester/exam period not selected → System displays an error-> “Không thể export file, vui lòng thử lại sau” toast message
 - Export fails → System shows an error message -> “Không thể export file, vui lòng thử lại sau” toast message

3.10.18 Export summary report file by day

Function trigger:

- **Navigation path:** “Quản lý xưởng” → Select view table

- **Timing demand:** On request (whenever the IT Support or Exam Supervisor wants to export a summary of incidents for a specific date range)

Function description:

- **Actors/Roles:** Exam supervisor, IT Support
- **Purpose:**
 - Allow users to export a summary report of incidents
 - View and analyze incident data by a specific date range
 - Support monitoring, statistical reporting, and archival of incident handling activities
- **Interface:**
 - **The Modal export data date range:**
 1. **From Date and To Date** pickers: Select the date range to filter incidents
 2. **“Export” Button:** Generate and download an Excel (.xlsx) file containing the filtered data
 3. **“Hủy” Button:** Cancel the export action
- **Data processing:**
 - The system retrieves all incidents that occurred within the selected date range.
 - The system generates and **returns an Excel file (.xlsx)** with the filtered incident information.

Screen layout:

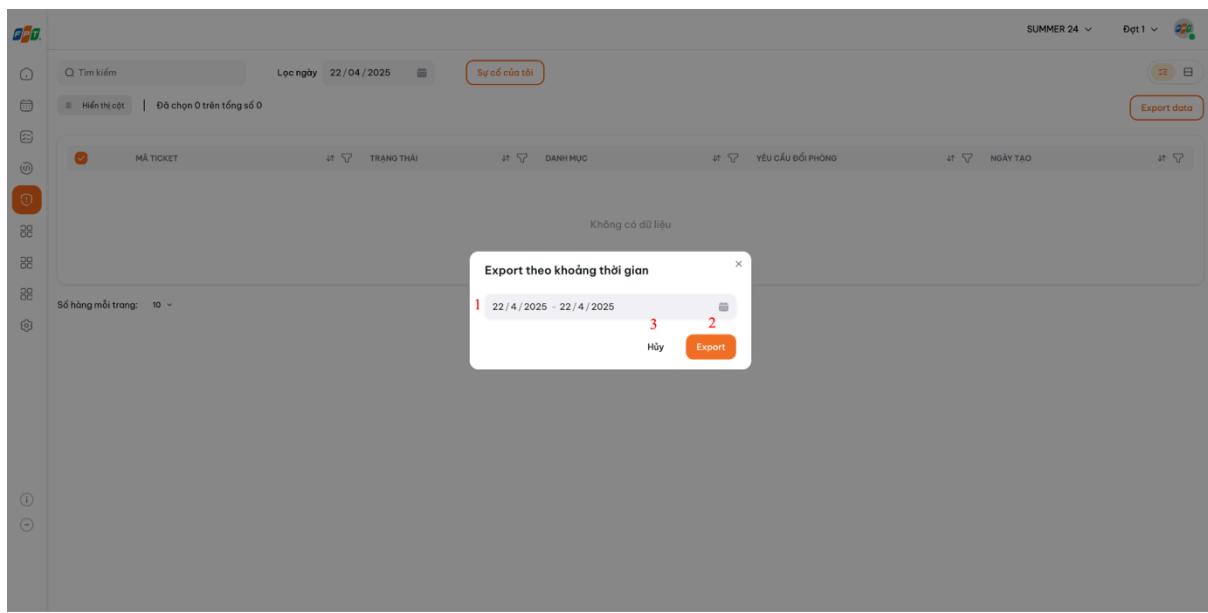


Figure 128 - Export summary report file by day

Function details:

- **Data:**
 - Incidents are filtered by the selected date range.
 - Only incidents assigned to the currently logged-in user (if role-based filtering is applied).
- **Validation:**
 - Show error if no date range is selected
 - Show error if export fails
- **Business rules:** (None)
- **Normal case:** User selects a valid date range → Clicks “Export Summary Report” → System

generates and downloads the Excel file successfully-> “Export file thành công ” success message

- **Abnormal case:**

- No date range selected → Show validation error -> “Không thể export file, vui lòng thử lại sau” toast message
- Export process fails → Show system error message -> “Không thể export file, vui lòng thử lại sau” toast message

3.10.19 Chat with AI about exam issues

Function trigger:

- **Navigation path:** “Trang chủ” -> “Xem thi” -> Click on specific exam slots -> Switch to tab “Sự cốc thi” -> Click “Chatbot” button
- **Timing Frequency:** On demand – Whenever the user needs to chat with AI chatbot about the exam issues for more details

Function description:

- **Actors/Roles:** Exam Supervisor
- **Purpose:** Allows the Exam Supervisor to chat with AI Chatbot for more details about some specific exam issues
- **Interface:**
 - **Chat with AI**
 1. **“Nhập mô tả sự cốc của bạn”:** Text field - A field for user to enter exam issue.
 2. **Send:** Button - A button to submit a question.
 3. **“Ấn vào đây để tạo sự cốc”:** Button - A button to create new exam issues.
 4. **User history chat:** User history questions.
 5. **Chatbot answer:** AI history answer.
 - **Data processing:**
 - Users ask AI about the exam issues
 - Data about the questions exists -> AI answers the questions according to the data in the database.
 - Data about the questions not exists -> AI answers “Không tìm thấy lỗi phù hợp với mô tả của lỗi. Vui lòng tạo sự cốc gửi lên phòng hỗ trợ”

Screen layout:



Figure 137 - View list of issues by category

Function details:

- Data:** The function retrieves and displays all the chat history between AI and user, allows users to ask AI about their issues in the exam rooms.
- Validation:** All issues' information must have data in databases.
- Business rules:** (None)
- Normal case:** The user asks AI specific questions about the exam issues → AI answers the questions if data exists.
- Abnormal case:** No data exists → Display: “Không tìm thấy lỗi phù hợp với mô tả của lỗi. Vui lòng tạo sự cố gửi lên phòng hỗ trợ.”

3.11 Check attendance student

3.11.1 Update student attendance in the exam room

Function trigger:

- Navigation path:** “Lịch thi”-> “Selected one row”-> “Xem phòng thi” button -> Select exam room -> “Điểm danh” button
- Timing Frequency:** On-demand (when Admin or Examiner wants to update student attendance status)

Function description:

- Actors/Roles:** Admin, Examiner

- **Purpose:** Allow Admin or Examiner to update and synchronize the student attendance status in the corresponding exam room during an active exam session.
- **Interface:**
 - View send notifications about the server being open to the exam rooms
 1. “Diem Danh”:
 2. “Radio choose”:
- **Data processing:**
 - User navigates to the “Attendance” screen.
 - Selects one or more student to attendance.
 - Clicks the “Attendance” button.
 - A confirmation modal appears asking the user to confirm the attendance action.
 - Upon confirmation:
 - The system saves status attendance from the list of students to the selected exam codes.
 - Displays a success message and refreshes the list if necessary.

Screen layout:

STT	MÃ SỐ SINH VIÊN	TÊN SINH VIÊN	DIỄM DANH	THỜI GIAN CHECKOUT	XÁC NHẬN	THỜI GIAN XÁC NHẬN	IP SINH VIÊN	GHI CHÚ
1	DS180341	Trần Hữu Nhân Hoàn	<input checked="" type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
2	DS180610	Trần Thảo Nguyễn	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
3	DA180076	Ngô Thị Mỹ Tuyền	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
4	DA170017	A Đỗ En	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
5	DS180242	Ngô Trần Thảo Vy	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
6	DS180397	Dương Bích Ny	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
7	DS180530	Nguyễn Thị Thuận	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
8	HS180973	Kim Trần Huyền Thương	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
9	DS180584	Võ Nguyễn Châu Anh	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
10	DS180506	Lê Hồng Nga	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
11	DS180440	Ngô Doanh Uyên Phi	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			
12	DS180461	Võ Anh Thư	<input type="checkbox"/> Chưa điểm danh		<input checked="" type="checkbox"/> Chưa xác nhận			

Đóng

Figure 129 - Update student attendance in the exam room

Function details:

- Data: Selected exam codes are used to notify the corresponding exam rooms.
- Validation: Ensure selected exam codes are still active.
- Error Handling: If an error occurs during sending, display:
“An error occurred. Please try again later.”

Business rules: (None)

Normal case:

- A valid user is selected, and the user confirms the update.
- System updates attendance and displays:
“Student attendance updated successfully.”

Abnormal case:

- The selected user no longer exists.

- System displays: "Đã xảy ra lỗi vui lòng thử lại."

3.11.2 [ZMP] View the list of students in the exam room from the exam supervisor

Function trigger:

- **Navigation path:** “Trang chủ” -> “Xem thi” -> Choose exam slot -> “Điểm danh” tab
- **Timing demand:** On demand (whenever an exam supervisor want to view the list of students in the exam room from the exam supervisor on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently view the list of students in the exam room from the exam supervisor on the system.
- **Interface:**
 - **“Điểm danh sinh viên” screen:**
 1. **“Họ và tên”:** Display the full name of the students
 2. **“Mã số sinh viên”:** Display the student codes of the students.
 3. **“Điểm danh”:** Button - Button to update the attendance
 4. **“Đánh vắng”:** Button - Button to update absent
 5. **“Trạng thái”:** Display the status of attendance of that student
- **Data processing:**
 - User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “Điểm danh” tab.
 - The system fetches the notification list of students for that exam from the database.

Screen layout:

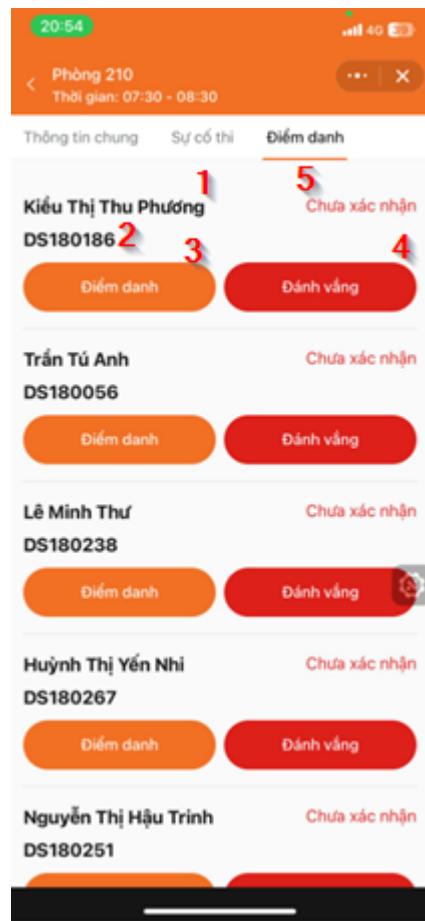


Figure 130 - View the list of students in the exam room from the exam supervisor

Function details:

- **Data:** The function retrieves and displays list information for the student in that exam.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Exam room" in database exists. => Display list of information in correct format.
- **Abnormal case:** Data from table "Exam room" in database does not exist. => Display message: "Không có sinh viên".

3.11.3 [ZMP] Update student attendance in the exam room by the exam supervisor using CCCD scanning

Function trigger:

- **Navigation path:** "Trang chủ" -> "Xem thi" -> Choose exam slot -> "Điểm danh" tab -> "Điểm danh"
- **Timing demand:** On demand (whenever an exam supervisor want to update student attendance in the exam room by the exam supervisor using CCCD scanning on the system)

Function description:

- **Actors/Roles:** Exam supervisor

- **Purpose:** Allow exam supervisors to quickly and efficiently update student attendance in the exam room by the exam supervisor using CCCD scanning on the system.
- **Interface:**
 - “**Điểm danh sinh viên**” screen:
 1. “**QR Scan**”: Modal to scan the qr on citizen identification
- **Data processing:**
 - User clicks on the “Xem thi” button on the taskbar in the Zalo Mini App and chooses the “Điểm danh” tab. Clicking on “Điểm danh” button.

Screen layout:

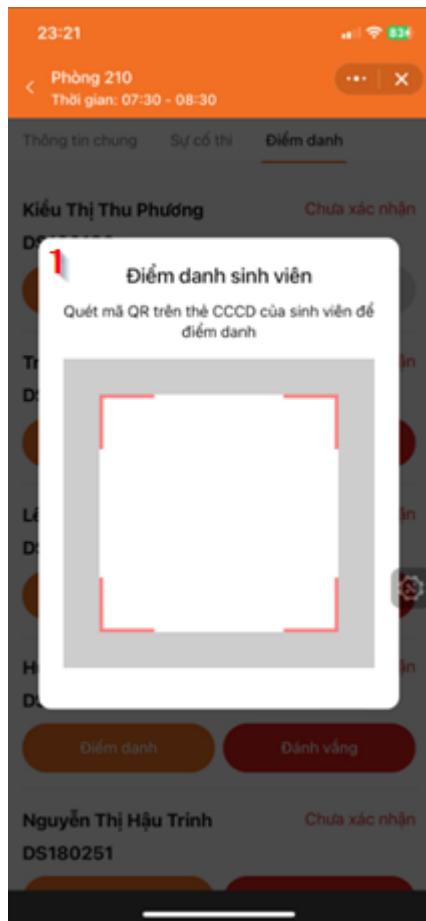


Figure 131 - Update student attendance in the exam room by the exam supervisor using CCCD scanning

Function details:

- **Data:** The function retrieves and updates the student attendance information
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:**
 - The system reads the national identification number (CCCD) and checks whether the student exists in the current exam slot list.
 - If found, the system updates the student's attendance status to “Có mặt” and displays a success notification.
 - The interface reflects the updated status immediately.

- **Abnormal case:** The system successfully reads the QR code but cannot match the CCCD with any student in the current exam slot → displayed error message: "Không có sinh viên này trong slot thi."

3.11.4 [Student] Confirm checkout exam session

Function trigger:

- **Navigation path:** “Trang chủ” -> “Kỳ thi” -> Choose exam slot -> “Điểm danh” tab
- **Timing demand:** On demand (whenever a student want to confirm checkout exam session on the system)

Function description:

- **Actors/Roles:** Students
- **Purpose:** Allow students to quickly and efficiently confirm the checkout exam session on the system.
- **Interface:**
 - **“Check out” screen:**
 1. **“Môn thi”:** Display the name of the subject
 2. **“Phòng thi”:** Display the exam room.
 3. **“Giờ thi”:** Display the exam time
 4. **“Trạng thái”:** Display the status of student check-out
 5. **“Thông tin sinh viên”:** Display the student information
 6. **“Xác nhận”:** Button - button to confirm check out
 7. **“Hủy bỏ”:** Button - button to cancel process
 8. **“Tọa độ”:** Display the address of the students
- **Data processing:**
 - User clicks on the “Kỳ thi” button on the sidebar.
 - Click on “Check out” button and click “Xác nhận” to confirm check out
 - The system saves the check out information of that student into the database.

Screen layout:

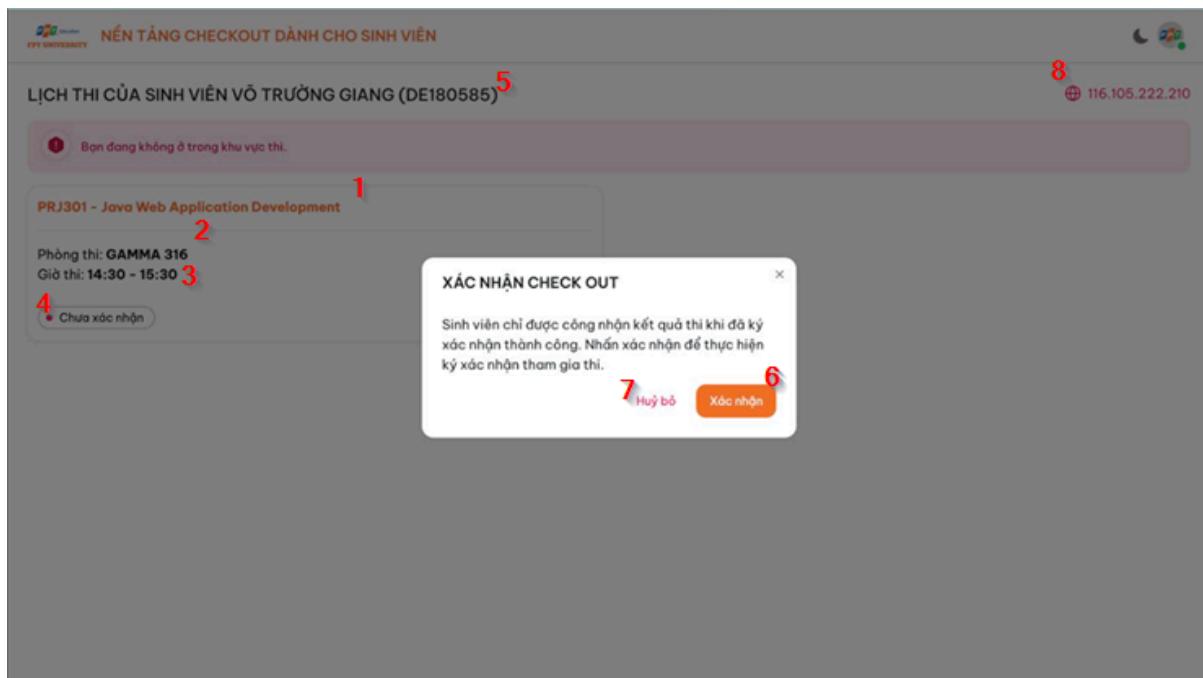


Figure 132 - Confirm checkout exam session

Function details:

- **Data:** The function retrieves and displays a list of student checkout exam sessions.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Checkout" in database exists. => Display list of information in correct format.
- **Abnormal case:** Data from table "Checkout" in database does not exist. => Display message: "Không có sinh viên nào trong đợt thi".

3.12 Notification Management

3.12.1 [ZMP] View a list of notifications sent to me

Function trigger:

- **Navigation path:** "Trang chủ" -> "Thông báo"
- **Timing demand:** On demand (whenever an exam supervisor want to view a list of notification sent to me on the system)

Function description:

- **Actors/Roles:** Exam supervisor
- **Purpose:** Allow exam supervisors to quickly and efficiently view a list of notifications sent to me on the system.
- **Interface:**
 - **Notification screen:**
 - Notification title:** Display the title of the notifications
 - View details:** Button - a button to view notification details.
- **Data processing:**
 - User clicks on the "Thông báo" button in Zalo Mini App.

- The system fetches the notification list of that user for that semester from the database.

Screen layout:

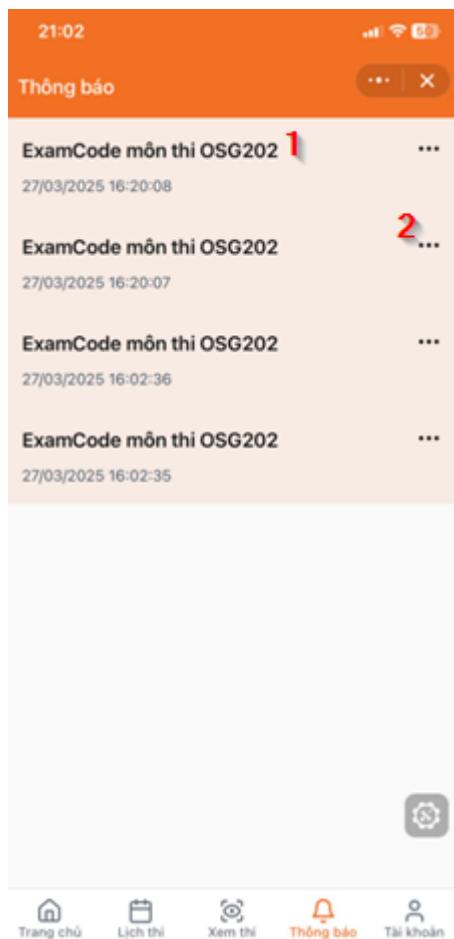


Figure 133 - View a list of notifications sent to me

Function details:

- Data:** The function retrieves and displays notification list information for the user.
- Validation:** (None)
- Business rules:** (None)
- Normal case:** Data from table "Notification" in database exists. => Display list of notifications in correct format.
- Abnormal case:** Data from table "Notification" in database does not exist. => Display message: "Không có thông báo".

3.12.2 [ZMP] View notification details

Function trigger:

- Navigation path:** "Trang chủ" -> "Thông báo" -> Click on specific notification
- Timing demand:** On demand (whenever an exam supervisor want to view notification details on the system)

Function description:

- Actors/Roles:** Exam supervisor

- **Purpose:** Allow exam supervisors to quickly and efficiently view notification details on the system.
- **Interface:**
 - **Notification screen:**
 1. **Notification title:** Display the title of the notifications
 2. **Notification details:** Display the notification details.
- **Data processing:**
 - User clicks on the “Thông báo” button in the Zalo Mini App. Clicking on specific notification
 - The system fetches the notification details of that user for that semester from the database.

Screen layout:

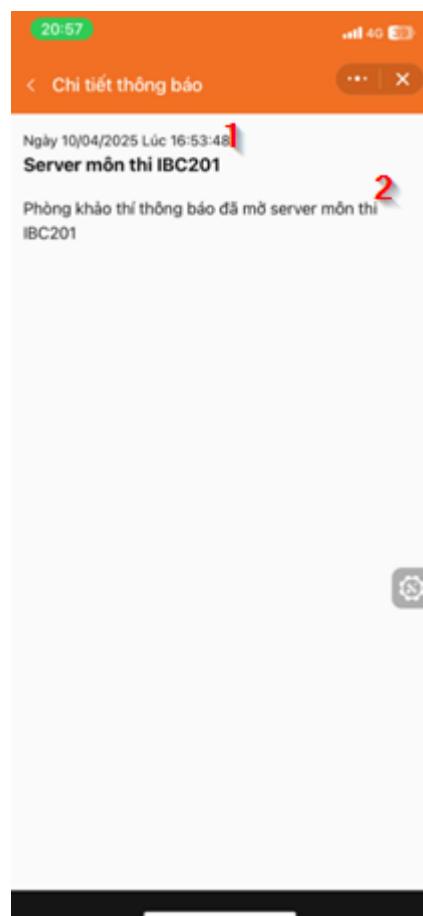


Figure 134 - View a list of notifications details

Function details:

- **Data:** The function retrieves and displays notification details information for the user.
- **Validation:** (None)
- **Business rules:** (None)
- **Normal case:** Data from table "Notification" in database exists. => Display list of notifications in correct format.
- **Abnormal case:** Data from table "Notification" in database does not exist. => Display message: “Không có thông báo”.

3.13 Dashboard Management

3.13.1 View summary report by semester/exam period

Function trigger:

- **Navigation path:** “Trang chủ”
- **Timing Frequency:** On demand – Whenever the Admin needs to view the summary report by semester or exam period

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the Admin to monitor the system's overall status based on the selected semester and exam period, supporting efficient management and timely decision-making.
- **Interface:**

View Summary Report Screen includes the following components:

- **Tab – Học kỳ:** Allows the user to select a specific semester
- **Tab – Đợt thi:** Allows the user to select an exam period within the selected semester
- **Statistic counters:**
 - **Phòng thi được đăng ký:** Total number of exam rooms that have been registered
 - **Phòng thi cần phê duyệt:** Number of rooms pending approval
 - **Phòng thi có GT hành lang:** Number of rooms with assigned hallway invigilators
 - **Môn thi chưa có IT Support:** Number of subjects without assigned IT support
 - **Sự cố đã tạo:** Number of incidents created
 - **Sự cố được xử lý:** Number of incidents that have been resolved.
- **Bar chart – Biểu đồ lượt đăng ký theo ngày:**
 - Displays daily exam registration count during the selected exam period
- **Pie chart – Thông kê sự cố đã được xử lý:**

Visualizes the types and proportions of handled incidents
- **Data processing:**
 - When Admin selects a Học kỳ and Đợt thi, the system:
 - Queries relevant data from tables such as Rooms, Exams, Incidents, SupportAssignments, etc.
 - Aggregates statistics for each dashboard item
 - Renders charts with accurate and updated data corresponding to the selected filters

Screen layout:

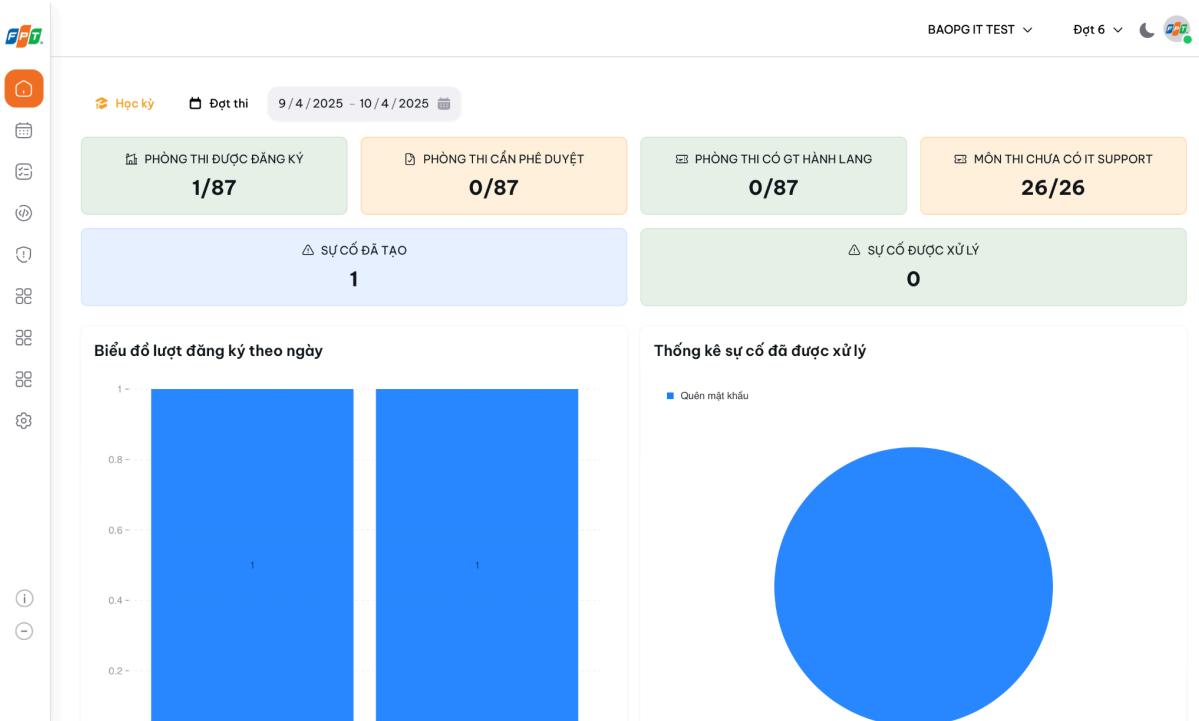


Figure 135 - View summary report by semester/exam period and view daily overview report

Function details:

- **Data:** Total rooms, subjects, incident statuses, etc., filtered by selected semester and exam period
- **Validation:** (None)
- **Business rules:** Each room is counted only once under “**Phòng thi được đăng ký**”
- **Normal case:** Admin selects a valid Học kỳ and Đợt thi => System displays all relevant summary data and visualizations
- **Abnormal case:** No data available for selected exam period => Display message: “Không có dữ liệu thống kê cho học kỳ/đợt thi này.”

3.13.2 View daily overview report

Function trigger:

- **Navigation path:** “Trang chủ”
- **Timing Frequency:** On demand – Whenever the Admin needs to view the summary report from start date to end date.

Function description:

- **Actors/Roles:** Admin
- **Purpose:** Allows the Admin to monitor the system's overall status based on the selected start date and end date, supporting efficient management and timely decision-making.

View Summary Report Screen includes the following components:

- **Tab – Học kỳ:** Allows the user to select a specific semester
- **Tab – Đợt thi:** Allows the user to select an exam period within the selected semester
- **Date :** Allows the user to choose start and end date.
- **Statistic counters:**
 - **Phòng thi được đăng ký:** Total number of exam rooms that have been registered

- **Phòng thi cần phê duyệt:** Number of rooms pending approval
- **Phòng thi có GT hành lang:** Number of rooms with assigned hallway invigilators
- **Môn thi chưa có IT Support:** Number of subjects without assigned IT support
- **Sự cố đã tạo:** Number of incidents created
- **Sự cố được xử lý:** Number of incidents that have been resolved.
- **Bar chart – Biểu đồ lượt đăng ký theo ngày:**
 - Displays daily exam registration count during the selected exam period
- **Pie chart – Thống kê sự cố đã được xử lý:**
Visualizes the types and proportions of handled incidents
- **Data processing:**
 - When Admin selects a Học kỳ and Đợt thi, the system:
 - Queries relevant data from tables such as Rooms, Exams, Incidents, SupportAssignments, etc.
 - Aggregates statistics for each dashboard item
 - Renders charts with accurate and updated data corresponding to the selected filters

Screen layout:

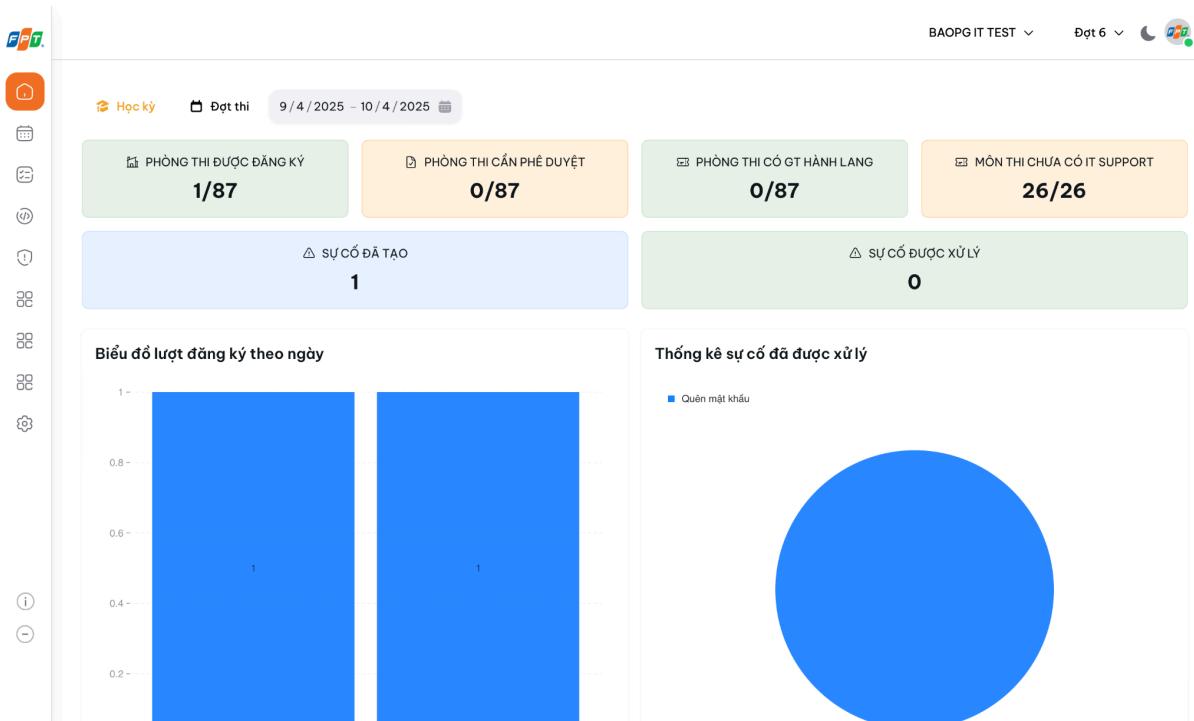


Figure 136 - View daily overview report

Function details:

- **Data:** Total rooms, subjects, incident statuses, etc., filtered by selected semester and exam period
- **Validation:** (None)
- **Business rules:** Each room is counted only once under “**Phòng thi được đăng ký**”
- **Normal case:** Admin selects a valid Học kỳ and Đợt thi => System displays all relevant summary data and visualizations
- **Abnormal case:** No data available for selected exam period => Display message: “Không có dữ liệu thống kê cho học kỳ/đợt thi này.”

4. Non-Functional Requirements

4.1 External Interfaces

- **User Interface:**

The system provides a web-based interface accessible through modern browsers such as Chrome or Firefox. The UI is designed to be intuitive, responsive, and mobile-friendly, allowing lecturers, staff, and supervisors to perform tasks quickly with minimal navigation.

- **External Systems:**

- **CCCD Scanning Integration:** Integration with scanning capabilities (e.g., device camera or scanning hardware) to allow real-time student check-in via Citizen Identification (CCCD) during exams (e.g., UC-311: Mark Attendance).
- **Notification System:** Integrate with internal or external notification systems (e.g., Zalo mini app push notifications) to inform supervisors, students, or staff of updates such as schedule changes or incidents.
- **Reporting Tools:** Interfaces with data visualization tools or internal reporting modules for real-time statistics and exam period analysis.

4.2 Quality Attributes

4.2.1 Usability

- **Training Time:**

- Exam staff and lecturers should be able to use the system with minimal training (15–30 minutes).
- Administrative users (e.g., system admins) can operate the system efficiently after a brief training session (~1 hour), including tasks like managing exam schedules, user statuses, and handling incidents.

- **Task Completion:**

Common operations such as marking attendance, creating schedules, or viewing exam lists should be completed within 5 minutes.

- **User-Friendly Interface:**

The system interface must follow usability best practices: clear navigation, minimal clicks, helpful prompts, and consistent layout to enhance user productivity.

4.2.2 Reliability

- **Availability:**

The system should achieve a minimum of 95% uptime, accounting for scheduled maintenance in a university setting.

- **Error Handling:**

Clear error messages should be shown for scenarios such as scanning failures, missing attendance data, or failed API requests.

- **Data Integrity:**

All student and exam-related data, such as attendance records and schedules, must be saved and preserved accurately without loss or corruption.

- **Bug Management:**

Critical bugs—especially in functionalities like attendance scanning or schedule viewing—should be addressed within 24 hours during development and active exam periods.

4.2.3 Performance

- **Response Time:**
 - Standard operations (e.g., viewing exam lists, tracking student attendance) should load within 2–3 seconds under normal conditions.
 - More complex processes (e.g., generating schedules, scanning CCCD) should complete within 5 seconds.
- **Capacity:**

The system should support up to 200 concurrent users including lecturers, staff, and exam supervisors.
- **Throughput:**

Capable of handling data for up to 1,000 concurrent exams, students, or attendance records at any given time.
- **Resource Efficiency:**

The system should be optimized to run on university-standard servers with stable memory and CPU usage, even during peak exam sessions.

4.3 Security

- **Authentication:**

Secure login system using username/password for different roles (Admin, Supervisor, Examiner). Role-based access ensures each user only sees authorized features.
- **Data Protection:**

Passwords must be hashed, and SSL should be used to secure sensitive data transmissions (e.g., during login or CCCD scanning).
- **Access Control:**

Enforce role permissions on features such as schedule editing, attendance tracking, and incident reporting to protect against unauthorized access.

4.4 Maintainability

- **Code Modularity:**

The system should follow a modular architecture with clear separation of concerns (e.g., attendance module, incident reporting module), making it easier for future developers to update.
- **Testing:**

Critical functions such as student attendance updates and schedule management must include unit and integration tests to ensure stability.
- **Documentation:**

Maintain clear and updated technical documentation, including API usage, external system integration points (e.g., scanning, notifications), and user manuals for each role.

5. Requirement Appendix

5.1 Business Rules

ID	Rule Definition
BR-01	Attendance must be verified using a valid Citizen ID (CCCD) with a QR code.

BR-02	A student's attendance must be confirmed only during the official time window of the exam session
BR-03	Only authorized exam supervisors assigned to a room can update the attendance of students in that room.
BR-04	Each incident must be tied to a specific exam session and room.
BR-05	Supervisors can only access and update data related to the exam rooms they are assigned to.
BR-06	No student is allowed to have overlapping exams in the same time slot.
BR-07	A supervisor cannot be assigned to two exam rooms at the same time.
BR-08	Each exam must be associated with a schedule, room, proctor, and student list.
BR-09	Changes to schedules must trigger automatic notifications to affected users (students, supervisors).
BR-10	Only the Admin and Exam Department have access to export data reports.
BR-11	Sensitive actions (e.g., reassigning supervisors, modifying attendance) require confirmation or dual approval.
BR-12	A student can only be marked present during the valid check-in window
BR-13	Only assigned supervisors can update the attendance of students in their room.
BR-14	Each exam must be associated with a schedule, room, exam supervisor, and student list.
BR-15	The system must check the availability of the staff before confirming registration to avoid double-booking.
BR-16	Upon successful registration or cancellation, the system must send confirmation notifications via Zalo Mini App.
BR-17	Each exam supervisor can register for a maximum of X exam slots per day depending on their quota.

Table 8 - Business Rules

5.2 Application Messages List

#	Message code	Message Type	Context	Content
1	MSG01	In line	There is not any search result	<i>No search results.</i>
2	MSG02	In red, under the text box	Input-required fields are empty	<i>The * field is required.</i>
3	MSG03	Toast message	Updating asset(s) information successfully	<i>Update asset(s) successfully.</i>
4	MSG04	Toast message	Adding new asset successfully	<i>Add assets successfully.</i>

5	MSG05	Toast message	Confirming email of asset hand-over is sent successfully	<i>A confirmation email has been sent to {email_address}.</i>
6	MSG06	Toast message	Resetting asset information successfully	<i>Return asset(s) successfully.</i>
7	MSG07	Toast message	Deleting asset information successfully	<i>Delete asset(s) successfully.</i>
8	MSG08	In red, under the text box	Input value length > max length	<i>Exceed max length of {max_length}.</i>
9	MSG09	In line	Username or password is not correct when clicking sign-in	<i>Incorrect username or password. Please check again.</i>

Table 9 - Application Messages List