

DESIGN AND IMPLEMENTATION OF A WEB-BASED ACADEMIC INFORMATION SYSTEM USING THE LARAVEL FRAMEWORK

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ABSTRACT

Advancements in information technology have driven the adoption of web-based systems to support the management of academic data and information. Unstructured academic data management can render the processes of information retrieval, processing, and dissemination ineffective, while also increasing the risk of recording errors. This study aims to develop a web-based academic information system using the Laravel framework, creating a software product capable of managing academic information in a structured manner. The Research and Development (R&D) method was employed, comprising stages such as requirements analysis, system design, system development, and product testing. Data collection was conducted through observation, interviews, and literature reviews. The developed system features three user roles—Admin, Teacher, and Student—with access rights tailored to each user's specific needs. Available features include the management of class data, lesson schedules, homeroom teachers, student data, teaching schedules, student attendance, subject lists, learning materials, assignments, quizzes, and grades. Black Box testing was performed to verify that system functions aligned with the established requirements. The results indicate the successful development of a web-based academic information system with core functions that meet the design specifications and system requirements. The use of the Laravel framework facilitated system development through the Model-View-Controller (MVC) architecture, database management, routing, validation, and user authentication. This study produced a web-based academic information system that serves as a foundation for computerized academic information management. Future research could further develop the system by deploying it in an operational user environment and evaluating its usability, security, and performance.

Keywords: Academic Information System, Web-based, Laravel, Research and Development, Black Box.

1 INTRODUCTION

The rapid advancement of information technology has brought about significant changes across various sectors, including education. Technology in educational settings serves not only as a learning tool but also as a means to support the management of academic data and information. Effective academic information management is crucial for supporting administrative activities in both schools and higher education institutions. Data—such as details regarding students, faculty, courses or subjects, schedules, grades, and other academic information—must be managed in a structured manner to ensure the resulting information is easily accessible and manageable. As the volume of academic data grows, manual management or the use of non-integrated systems can lead to various obstacles in processing and disseminating information.

A common issue in academic management is the lack of centralized data organization, which results in longer times required to search for, process, and present information. Furthermore, manual data management carries risks such as recording errors, data duplication, and difficulties in updating information. These conditions highlight the need for an information system capable of managing academic data in a more structured way. A web-based academic information system is a viable solution, as it enables data management through an integrated platform and provides information via a user-friendly interface.

An academic information system is essentially designed to facilitate the management of various information related to academic activities. Such a system can handle data regarding users, students, teaching staff, courses, academic schedules, grades, and other information essential for academic administration. A well-structured system allows data management to follow a clear workflow—encompassing data entry, storage, modification, and deletion, as well as the display of required information. Consequently, developing an academic information system involves more than just creating the application's visual interface; it also entails requirements analysis, system design, database design, interface creation, and the development of functions tailored to user needs. In web-based application development, the choice of technology and framework is a crucial factor to consider. One framework suitable for web application development is Laravel. Laravel is a PHP-based framework that provides an organized structure for application development and implements the Model-View-Controller (MVC) architectural pattern. Utilizing this framework assists developers in separating data management, application logic, and the user interface, thereby enabling a more structured development process. Laravel also offers various features that support web application development, such as routing, database management via Eloquent ORM, authentication systems, validation, and database migration management. These features can be leveraged to build an academic information system that addresses various functions and data management requirements.

Developing an academic information system requires careful consideration of user needs and the characteristics of the data to be managed. The system must feature a clear workflow so that users can easily understand the information management processes. Furthermore, the database design must account for data relationships to ensure consistent information management. Interface design is also crucial; a structured layout assists users in both data entry and information retrieval. Consequently, the development process must be conducted systematically and in stages—ranging from requirements identification, design, and system construction to the final delivery of a software product that aligns with the established specifications.

Given these considerations, there is a need to develop a web-based academic information system that supports structured academic data management. This research utilizes the Laravel framework as the primary technology for building the application. The study focuses on the design and development phases, culminating in a functional web-based academic information system. These phases encompass system requirements analysis, system design, database design, interface design, code implementation, and functional testing. The research does not extend to actual deployment in the user's operational environment; instead, the outcome is the developed system itself, created in accordance with the identified requirements and design specifications. This research aims to produce a web-based academic information system featuring a clear data management structure and functions tailored to the analyzed academic needs. Utilizing the Laravel framework is expected to facilitate a structured development process, resulting in an application with clearly defined components and workflows. Beyond delivering the software product, this study aims to serve as a reference for developing web-based academic information systems using Laravel, particularly regarding the design and development stages prior to user-environment implementation. Ultimately, the research—titled "Design and Implementation of a Web-Based Academic Information System Using the Laravel Framework"—seeks to create a system that serves as a foundation for computerized academic information management and allows for future enhancements based on evolving needs.

2 RESEARCH METHOD

This study employs the Research and Development (R&D) method, aiming to produce a web-based academic information system using the Laravel framework. This method was selected because the research focuses not only on problem analysis but also encompasses the design and development of a software product based on identified requirements. The resulting product is a web-based academic information system, developed into functional software capable of performing tasks in accordance with the system design. The scope of this study is

limited to the development and functional testing phases and does not yet include the actual implementation of the system in the user's operational environment.

2.1 Research Stages

The research was conducted systematically, proceeding from problem identification to the creation of an academic information system product. These stages included requirements analysis, system design, system development, and product testing. Each stage served as a foundation for the subsequent one, ensuring that the system development process was carried out in a structured and focused manner.

2.2 Data Collection Techniques

Data collection in this study was conducted to gather information serving as the basis for determining system requirements. The data collection techniques employed included observation, interviews, and a literature review.

Observation involved examining academic data and information management processes to understand activity workflows, the types of data utilized, and issues that could inform system development. Interviews were conducted to obtain direct information regarding the needs of prospective users and the functions required within the system. These interviews involved stakeholders associated with academic management processes to ensure that the identified system requirements aligned closely with the actual conditions of the research subject.

A literature review was conducted by examining various sources related to academic information systems, web-based application development, the Laravel framework, databases, and software testing methods. This review served as a theoretical foundation and provided supporting material for selecting the technologies and methods used during the development process.

2.3 Development Tools

System development was carried out using hardware and software that support the application creation process. The primary software utilized included the Laravel framework for application development, PHP as the programming language, and a database management system for storing academic data. Additionally, supporting software was used for coding, database management, application testing, and running the application within the development environment.

The choice of Laravel was based on its framework structure, which supports application development using the Model-View-Controller (MVC) pattern. This structure facilitates the separation of model, view, and application logic components, allowing the program code to be managed in a more organized manner. Laravel also supports the development of features such as routing, database management, data validation, and user authentication.

2.4 Product Analysis and Evaluation Techniques

Analysis of the development results is conducted based on the alignment between system requirements and the functions present in the product. Each primary function is compared against the requirements established during the requirements analysis phase. Furthermore, Black Box testing results are used to determine whether system functions produce outputs that correspond to the provided inputs.

Evaluation results serve as the basis for refining the product should any errors or functional discrepancies be identified. The final research product is a web-based academic information system that has undergone the stages of requirements analysis, design, development, and functional testing. This study does not evaluate the system's effectiveness following its deployment in the user environment, as the operational implementation phase falls outside the scope of the research.

3 RESULT AND DISCUSSION

The following is an academic information system developed using the Research and Development (R&D) method. It was created to facilitate the structured management and

dissemination of academic information via a web-based platform. The system comprises three primary entities—Administrators, Teachers, and Students—each with specific access rights and functions tailored to academic requirements. Administrators manage academic data and system configurations; Teachers oversee instructional activities such as scheduling and attendance; and Students access information related to their learning activities. This allocation of access rights ensures that each user can perform system functions appropriate to their specific role.

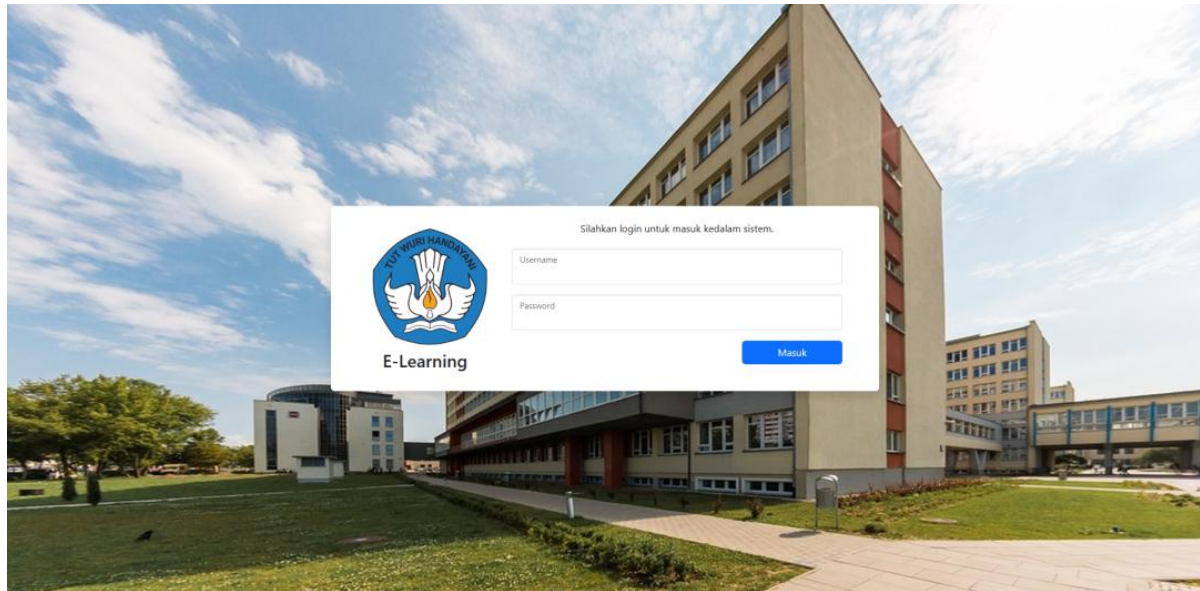


Fig 1. Login Page

Figure 1 shows the login page for administrators, teachers, and students, also referred to as the user login page. On this page, users are required to enter their registered username and password to access the system. The login process ensures that each user can access the system according to their respective roles and permissions. This helps maintain the security of user accounts and ensures that the features displayed are appropriate for each type of user.

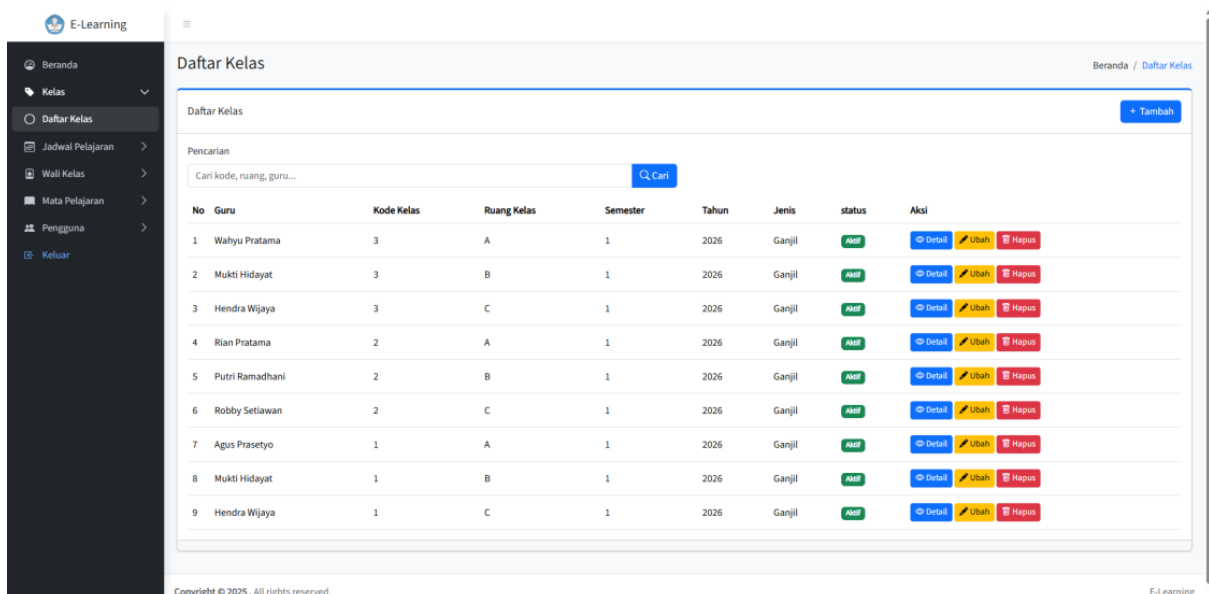


Fig 2. List of Class (Admin)

The class list page is shown in Figure 2. This page is used by the administrator to monitor the number of active classes. The administrator can add, edit, and delete classes, as well as toggle the activation status of classes used in the learning process.

Jadwal Pelajaran

Daftar Jadwal Pelajaran

Pencarian: Cari mata pelajaran, guru... [Cari](#)

No	Hari	Jam	Guru	Kelas	Mata Pelajaran	Aksi
1	Senin	08:00:00 - 09:30:00	Ahmad Fauzi	1 - A	Pendidikan Agama	Ubah Hapus
2	Senin	09:45:00 - 11:15:00	Rina Marlina	1 - B	Ilmu Pengetahuan Sosial (IPS)	Ubah Hapus
3	Senin	09:45:00 - 11:15:00	Rina Marlina	1 - C	Ilmu Pengetahuan Sosial (IPS)	Ubah Hapus
4	Senin	09:45:00 - 11:15:00	Rina Marlina	1 - A	Ilmu Pengetahuan Sosial (IPS)	Ubah Hapus
5	Senin	13:00:00 - 14:30:00	Tarmizi Hakim	2 - A	Sosial dan Budaya Lokal	Ubah Hapus
6	Senin	13:00:00 - 14:30:00	Tarmizi Hakim	2 - C	Sosial dan Budaya Lokal	Ubah Hapus
7	Senin	13:00:00 - 14:30:00	Tarmizi Hakim	2 - B	Sosial dan Budaya Lokal	Ubah Hapus
8	Senin	14:45:00 - 16:15:00	Sulastris Dewi	3 - A	Ilmu Pengetahuan Alam (IPA)	Ubah Hapus
9	Senin	14:45:00 - 16:15:00	Sulastris Dewi	3 - C	Ilmu Pengetahuan Alam (IPA)	Ubah Hapus
10	Senin	14:45:00 - 16:15:00	Sulastris Dewi	3 - B	Ilmu Pengetahuan Alam (IPA)	Ubah Hapus

Fig 3. Lesson Timetable (Admin)

Figure 3 shows the page used by the administrator to manage active class schedules. Through this page, the administrator can view and organize the schedule data for each class. The administrator must ensure that the saved schedule data contains no time conflicts so that each class can follow the assigned schedule properly. This helps prevent overlapping schedules and supports the smooth implementation of the learning process.

Wali Kelas

Daftar Kelas (Wali)

Pencarian: Cari Guru, kelas ... [Cari](#)

No	Kode Kelas	Guru	Ruang	Semester	Tahun	status	Aksi
1	1	Agus Prasetyo	A	1	2026	AKTIF	Detail
2	1	Mukti Hidayat	B	1	2026	AKTIF	Detail
3	1	Hendra Wijaya	C	1	2026	AKTIF	Detail
4	2	Rian Pratama	A	1	2026	AKTIF	Detail
5	2	Putri Ramadhani	B	1	2026	AKTIF	Detail
6	2	Robby Setiawan	C	1	2026	AKTIF	Detail
7	3	Wahyu Pratama	A	1	2026	AKTIF	Detail
8	3	Mukti Hidayat	B	1	2026	AKTIF	Detail
9	3	Hendra Wijaya	C	1	2026	AKTIF	Detail

Fig 4. Homeroom Teacher (Admin)

Each class requires a homeroom teacher who is responsible for overseeing and assisting the students in the class. Figure 4 shows the page where the administrator can manage the list of homeroom teachers, including viewing and organizing the available data. This page is designed to make the information easier to read and manage, allowing the administrator to identify the assigned homeroom teachers more efficiently.

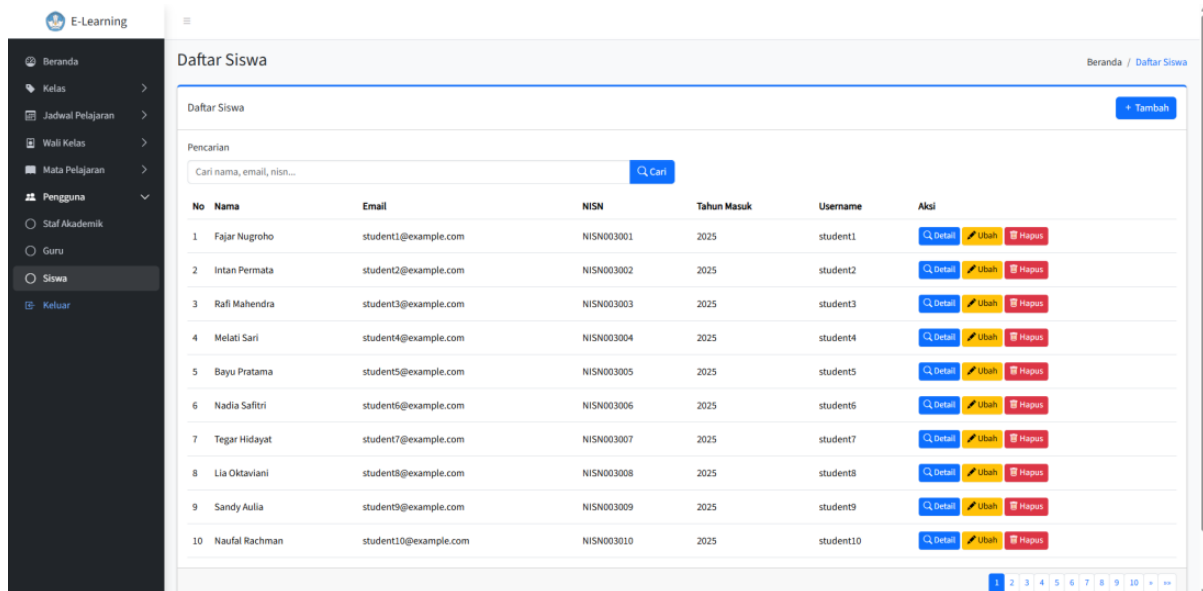


Fig. 5 Student Page (Admin)

The admin is granted access to view and manage student data, as shown in Figure 5 above. This page provides the admin with an overview of the available student information and facilitates the process of managing the data. The admin can also make corrections or updates when errors are found, ensuring that the student data remains accurate and up to date. This helps maintain the consistency and reliability of the information stored in the system.

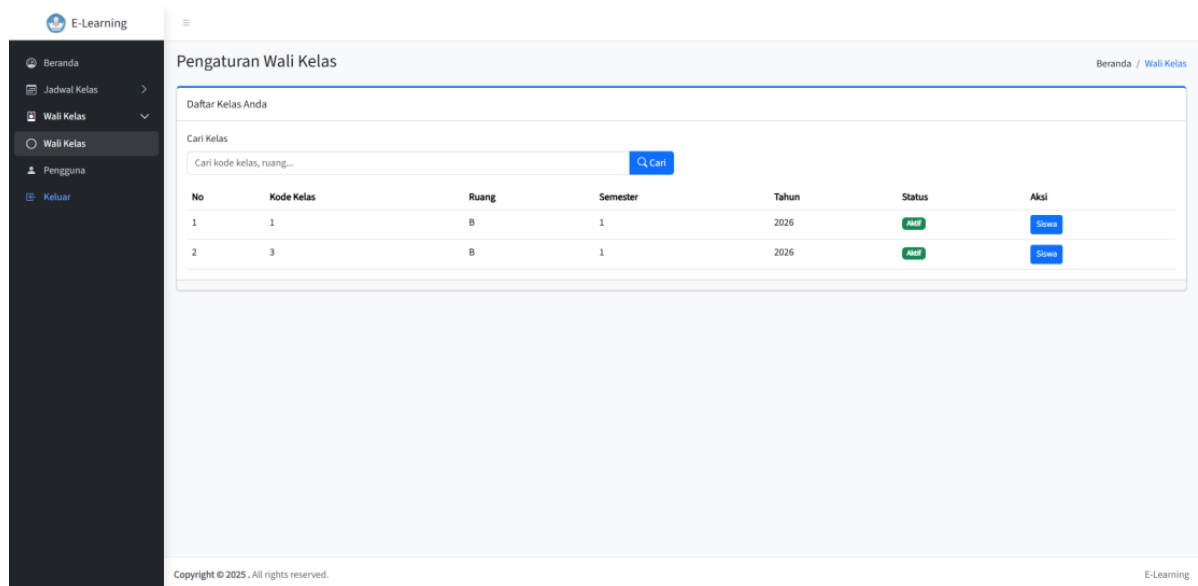


Fig 6. Homeroom Teacher (Teacher)

Figure 6 shows the list of classes for which a teacher is responsible as a homeroom teacher. This page is designed to help each teacher identify the specific class under their supervision. The information displayed allows teachers to easily view the classes assigned to them and understand their responsibilities as homeroom teachers. This also makes it easier for teachers to manage and monitor the students within their assigned class.

No	Hari	Jam	Kelas	Mata Pelajaran	Aksi
1	Rabu	09:45:00 - 11:15:00	3 - A (2026)	Pendidikan Pancasila dan Kewarganegaraan	Pengelolaan Kelas
2	Rabu	09:45:00 - 11:15:00	3 - B (2026)	Pendidikan Pancasila dan Kewarganegaraan	Pengelolaan Kelas
3	Rabu	09:45:00 - 11:15:00	3 - C (2026)	Pendidikan Pancasila dan Kewarganegaraan	Pengelolaan Kelas

Fig 7. Lesson Timetable (Teacher)

Each teacher has a teaching schedule for their classes in accordance with the established regulations. Teachers can view this schedule on the class schedule page, as shown in Figure 7. On this page, they can see the days, times, classes, and subjects they are assigned to teach. The displayed information helps teachers organize their teaching activities and follow the assigned schedule more effectively. This page also makes it easier for teachers to check their teaching responsibilities and avoid missing scheduled classes.

E-Learning

Beranda

Jadwal Kelas

Wali Kelas

Pengguna

Keluar

Absensi Siswa

Beranda / Absensi

Cetak

Kembali

Pendidikan Pancasila dan Kewarganegaraan 3 A

Nama Siswa	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Bayu Pratama	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fajar Nugroho	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lia Oktaviani	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Anisa Rahma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Intan Permata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nadia Safitri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Gilang Prasetya	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Eko Saputra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sandy Aulia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Kartika Sari	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hana Putri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fitri Handayani	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Simpan Absensi

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E-Learning

Fig 8. Student Attendance (Teacher)

When teaching in class, the teacher can record student attendance through the attendance page, as shown in Figure 8. This page displays the names of students along with a series of attendance columns that can be used to record their attendance status. The attendance data can be updated by the teacher according to the students' presence in class. This feature helps teachers keep attendance records organized and makes it easier to monitor student attendance throughout the learning process.

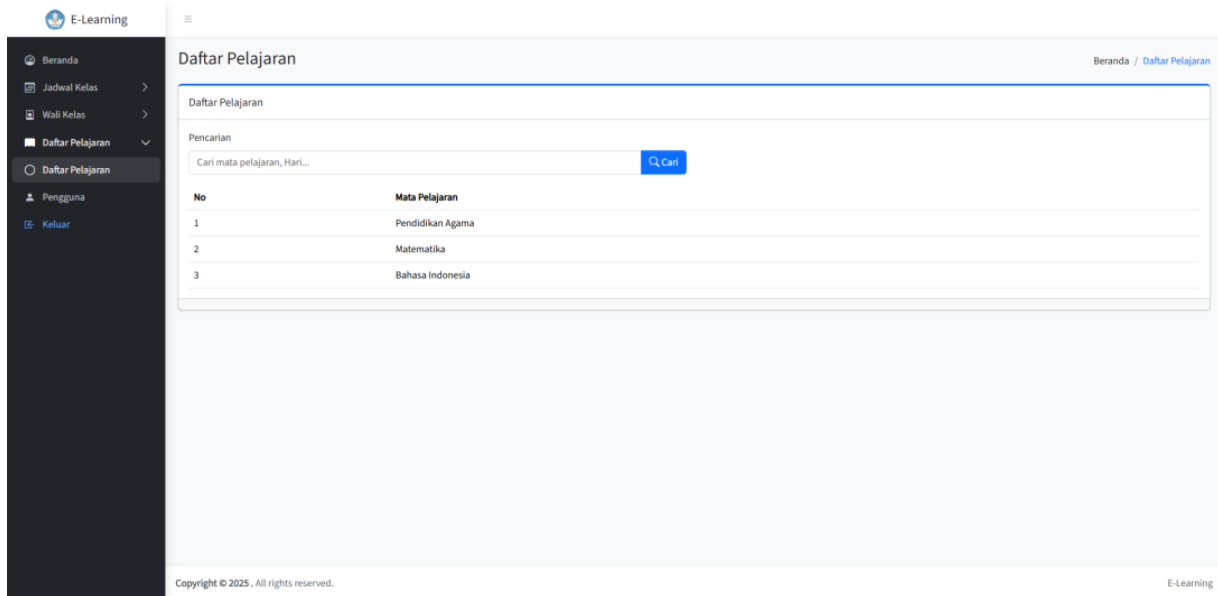


Fig 9. List of Lessons (Student)

Figure 9 shows the page that allows students to access information about the list of subjects they will study during the current semester or academic year. This page provides students with an overview of the subjects assigned to them, making it easier for them to understand their academic schedule and learning activities. The information displayed can also help students prepare for the subjects they are expected to attend throughout the semester or academic year.

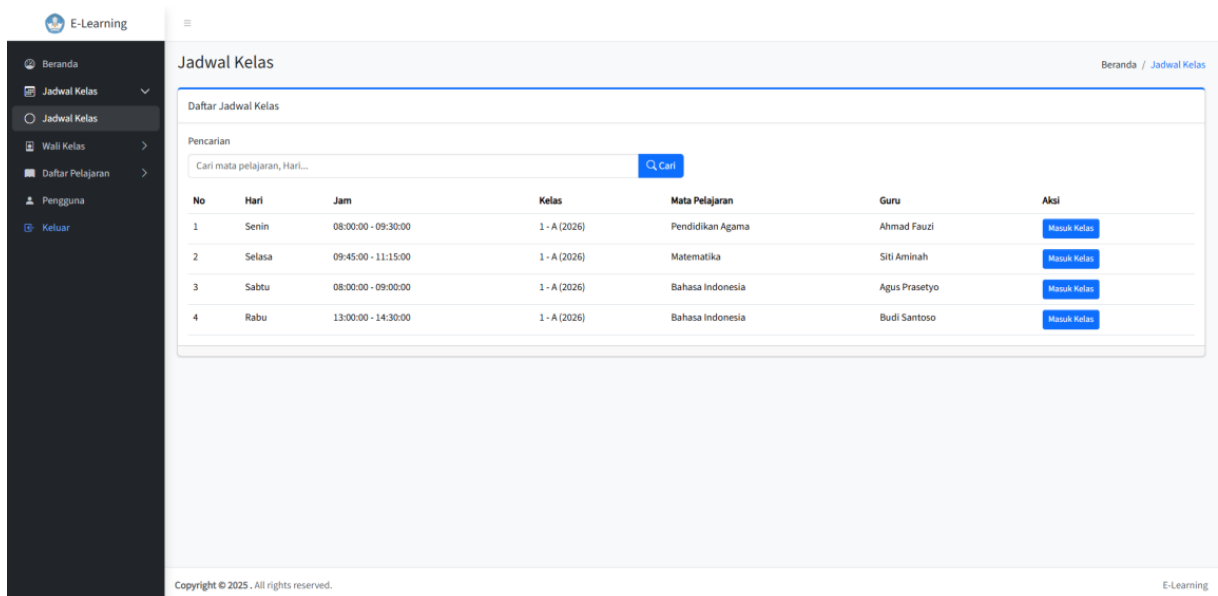


Fig 10. Class Schedule (Student)

Students are provided with class schedules for each subject on the class schedule page, as shown in Figure 10. On this page, students can view information about each class, including the day, time, subject, and assigned teacher. The displayed schedule helps students understand their daily learning activities and prepare for each class accordingly. This feature also makes it easier for students to keep track of their class schedules throughout the semester.

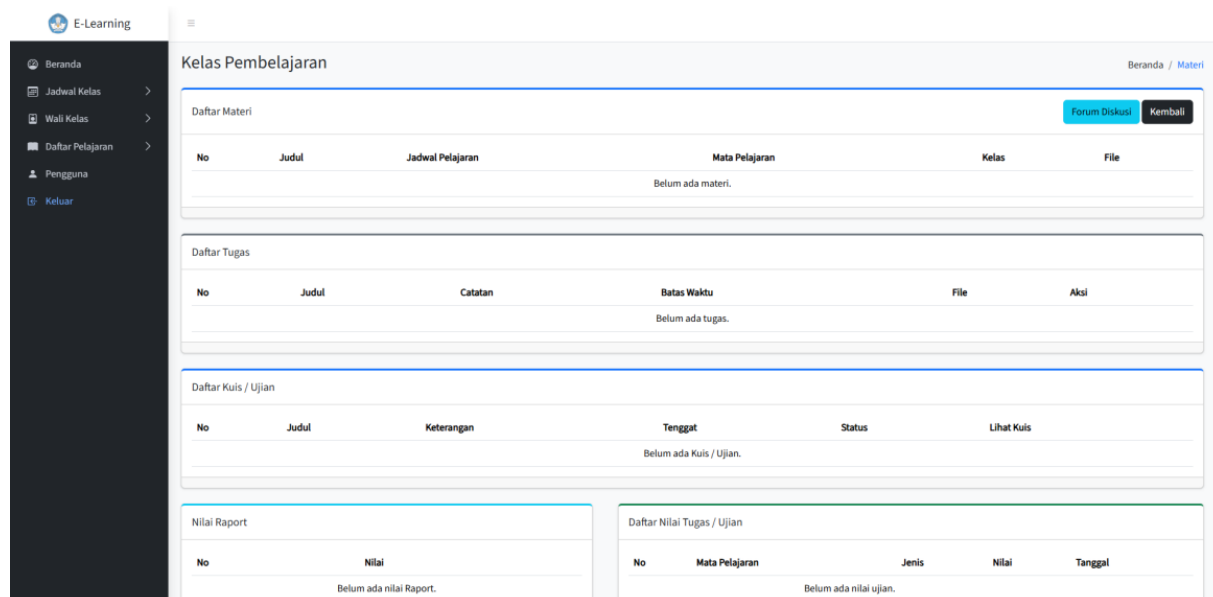


Fig 11. Classroom Learning Page

Figure 11 displays the class page for one of the subjects studied by the students. On this page, students can view the list of learning materials, assignments, quizzes, and grades entered by the instructor.

This concludes the report on the development of this academic information system. The system was developed using the Research and Development (R&D) method, utilizing the Laravel framework as the primary technology for building the web-based application. The resulting system includes features that facilitate academic data management for administrators, teachers, and students—such as the management of class data, lesson schedules, student records, homeroom teachers, attendance, learning materials, assignments, quizzes, and grades. Functional testing results indicate that the system successfully performs the functions designed to meet development requirements. It is anticipated that this system will serve as a software product capable of further development based on user needs, while supporting a more structured and computerized process for managing academic information.

4 CONCLUSION

Based on the research and development conducted, it can be concluded that the Research and Development (R&D) method successfully produced a web-based academic information system using the Laravel framework. The developed system features three user entities—Admin, Teacher, and Student—with access rights and functions tailored to each user's specific needs.

The system provides various functions for managing and presenting academic information, including the management of class data, lesson schedules, homeroom teachers, student data, teaching schedules, student attendance, and course lists, as well as information regarding learning materials, assignments, quizzes, and grades. The inclusion of access-based user roles allows for a more structured process of managing and disseminating academic information.

Utilizing the Laravel framework facilitated the application development process through the Model-View-Controller (MVC) architecture, database management, routing, validation, and user authentication. The research stages—comprising requirements analysis, design, development, and functional testing—resulted in a software product that aligns with the intended functional specifications. Black Box testing was employed to verify that the system's core functions operate correctly based on expected inputs and outputs.

Consequently, this research has produced a web-based academic information system that can serve as a foundation for computerized academic data and information management. However, the scope of this study was limited to the product's development and functional

testing phases and did not extend to actual deployment in the user's operational environment. Therefore, future research could further develop and test the system through implementation in a real-world user environment, alongside evaluations of usability, security, and system performance, as well as assessments of the system's effectiveness in supporting academic administrative processes.

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