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Faculté de Technologie

قسم الإلكترونيك
Département d'Électronique



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Création d'une plateforme d'affichage appliquée dans le département d'électronique de Blida

Promoteur : M. Bensebti Messaoud

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Creation of a display platform applied in the electronics department of Blida

Promoter: Mr. Messaoud Bensebti

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Gratitude

We would like to express our sincere gratitude to all those who have contributed, directly or indirectly, to the completion of this thesis.

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Thank you from the bottom of our hearts.

ملخص:

مشروعنا الطموح يهدف إلى تعزيز الكفاءة والشفافية وإمكانية الوصول إلى الخدمات الأكاديمية داخل قسم الإلكترونيات. لتحقيق ذلك، قمنا بتقييم دقيق لمختلف المنصات واخترنا في النهاية WordPress الإصدار 6.5.3 كأساس لنا بسبب واجهته السهلة الاستخدام ونظام الإضافات الواسع. بالإضافة إلى ذلك، اخترنا قالب Avantex لضمان مظهر احترافي وحديث. بدأت رحلتنا محليًا، حيث قمنا بتطوير وتحسين الحل باستخدام برنامج يسمى "Local". تلت ذلك اختبارات صارمة لضمان أن منصتنا تفي بمعاييرنا العالية. بمجرد أن كنا راضين، قمنا بالانتقال بسلاسة إلى خادم مباشر، مما جعل خدماتنا متاحة للمجتمع الأكاديمي الأوسع عبر الإنترنت.

كلمات المفاتيح: WordPress; Live server; Local; plugin; Avantex ;

Résumé :

Notre projet ambitieux vise à améliorer l'efficacité, la transparence et l'accessibilité des services académiques au sein du département d'électronique. Pour y parvenir, nous avons méticuleusement évalué diverses plateformes et avons finalement choisi WordPress version 6.5.3 comme base en raison de son interface conviviale et de son vaste écosystème de plugins. De plus, nous avons sélectionné le thème Avantex pour garantir une apparence professionnelle et moderne. Notre parcours a commencé localement, où nous avons développé et affiné notre solution en utilisant un programme appelé "Local." Des tests rigoureux ont suivi, garantissant que notre plateforme répondait à nos normes élevées. Une fois satisfaits, nous avons migré sans problème vers un serveur en ligne, rendant nos services accessibles à la communauté académique au sens large via Internet.

Mots clés: WordPress; Live server; Local; plugin; Avantex.

Abstract:

Our ambitious project centres on enhancing the efficiency, transparency, and accessibility of academic services within the electronics department. To achieve this, we meticulously evaluated various platforms and ultimately chose WordPress version 6.5.3 as our foundation because of its User-Friendly Interface and Extensive Plugin Ecosystem. Additionally, we selected the Avantex theme to ensure a professional and modern appearance. Our journey began locally, where we developed and fine-tuned our solution using a program called "Local." Rigorous testing ensued, ensuring that our platform met our high standards. Once satisfied, we seamlessly migrated to a live server, making our services accessible to the wider academic community via the internet.

Keywords: WordPress; Live server; Local; plugin; Avantex.

Table of acronyms and abbreviations

CSS: (Cascading Style Sheets)

CMS: (Content Management System)

GPL: (General Public License)

HTML: (Hypertext Markup Language)

HTTP: (Hypertext Transfer Protocol)

IP: (Internet Protocol)

MathML: (Mathematical Markup Language)

NGO: (Non-Governmental Organization)

PDF: (Portable Document Format)

PHP: (Hypertext Pre-processor)

RDBMS: (Relational Database Management System)

SEO: (Search Engine Optimization)

SQL: (Structured Query Language)

SVG: (Scalable Vector Graphics)

UNICEF: (United Nations International Children's Emergency Fund)

URL: (Uniform Resource Locator)

WPML: (WordPress Multilingual)

XML (eXtensible Markup Language)

Contents

General introduction	1
Chapter 1: General information on websites	2
1.1 Introduction:.....	3
1.2 Websites	3
1.2.1 Website definition.....	3
1.2.2 Different types of websites	3
1.2.3 Role and importance of websites.....	5
1.3 Functioning of a website	6
1.3.1 Web technologies.....	6
1.3.2 Client-server:	8
1.3.3 Hosting and Domain name.....	10
1.4 WordPress	13
1.4.1 WordPress definition.....	13
1.4.2 Features and benefits of WordPress.....	13
1.5 WordPress Database Functionality	14
1.6 Conclusion	16
Chapter 2: Design of our website	17
2.1 Introduction.....	18
2.2 User identification and roles	18
2.2.1 Students.....	18
2.2.2 Teachers	19
2.2.3 Administrators.....	20
2.3 User Engagement and Experience.....	22
2.3.1 No Account Requirement for Students.....	22
2.3.2 Intuitive Main Page	22
2.3.3 User-Friendly Design	22
2.3.4 Mobile-Friendly	23
2.4 Enhanced Privacy Measures.....	23

2.4.1	Security Code Access.....	23
2.4.2	Limited Access.....	24
2.5	Objectives of the Website.....	24
2.5.1	Centralized Information Hub.....	24
2.5.2	Professional Communication.....	24
2.5.3	Efficiency.....	24
2.5.4	Modernization.....	24
2.5.5	Transparency.....	25
2.5.6	Engagement.....	25
2.6	Explanation of Theme and Plugin Choices.....	25
2.6.1	Theme.....	25
2.6.2	Plugins.....	26
2.7	Sequence diagrams.....	27
2.7.1	Sequence diagram for student specialization selection and authentication.....	27
2.7.2	Teacher Portal Interaction Sequence Diagram:.....	27
2.8	WordPress Database Functionality.....	29
2.8.1	Database Setup and Configuration.....	29
2.8.2	Data Storage and Retrieval.....	29
2.8.3	Common Database Operations in WordPress.....	30
2.8.4	Performance Optimization.....	32
2.9	Conclusion.....	33
Chapter 3: Test and results.....		34
3.1	Introduction.....	35
3.2	Test.....	35
3.2.1	Mobile version.....	35
3.2.2	Desktop.....	36
3.3	Student point of view.....	36
3.3.1	Home page.....	36
3.3.2	Teachers.....	42
3.3.3	Canva.....	43
3.3.4	Reserved for teachers.....	44
3.4	Teacher's point of view.....	45

3.4.1	Dashboard	45
3.4.2	Page editing	47
3.5	Administrator point of view	48
3.5.1.1	Dashboard.....	48
3.5.2	Customization.....	51
3.6	Conclusion	52
General conclusion.....		54
Bibliography		55

Chapter 1: General Information on Websites

Figure 1. 1: Hypertext Markup Language logo	6
Figure 1. 2: Cascading Style Sheets logo	7
Figure 1. 3: JavaScript.....	7
Figure 1. 4: Hypertext Transfer Protocol.....	8
Figure 1. 6: Client-server model.....	9
Figure 1. 7 : Domain name structure	10
Figure 1. 8: Web hosting illustration	12
Figure 1. 9: Content Management System (CMS).....	12
Figure 1. 10: WordPress logo	13
Figure 1. 11: Structured Query Language	15
Figure 1. 12: MySQL logo.....	15
Figure 1. 13: Hypertext Pre-processor	16

Chapter 2: design of our website

Figure 2. 1: Student identification and roles.....	19
Figure 2. 2: Teacher identification and roles	20
Figure 2. 3: User roles and access levels diagram	21
Figure 2. 4: Main page design	22
Figure 2. 5: Mobile Responsiveness	23
Figure 2. 6: Specialty Access Validation Process for Students	27
Figure 2. 7: Teacher's Login and Grade Upload Process	28
Figure 2. 8: WordPress Database Insertion Process Diagram.....	30
Figure 2. 9: WordPress Database Retrieval Process Diagram.....	31
Figure 2. 10: WordPress Database Update Process Diagram	31
Figure 2. 11: WordPress Database Deletion Process Diagram	32

Chapter 3 : Test and results

Figure 3. 1: Website performance on PageSpeed Insights (Mobile)	35
Figure 3. 2: Website performance on PageSpeed Insights (Desktop)	36
Figure 3. 3: Homepage layout	37
Figure 3. 4: Main menu	37
Figure 3. 5: Academic degrees menu	38
Figure 3. 6: Specialty selection.....	38
Figure 3. 7: Password prompt	38
Figure 3. 8: Academic information display.....	39
Figure 3. 9: Module selection.....	39

Figure 3. 10: Grade display with commenting option.....	40
Figure 3. 11: Comment form with reCAPTCHA	41
Figure 3. 12: Dark Mode Display	41
Figure 3. 13: Language changer	42
Figure 3. 14: Teachers section.....	42
Figure 3. 15: Teacher information display	43
Figure 3. 16: Canva section	43
Figure 3. 17: Canva PDF.....	44
Figure 3. 18: Teacher login section	45
Figure 3. 19: Teacher dashboard.....	45
Figure 3. 20: Media section for teachers	46
Figure 3. 21: Pages section for teachers	46
Figure 3. 22: Comment moderation for teachers	47
Figure 3. 23: Page editing option	47
Figure 3. 24: PDF upload for grade updates.....	48
Figure 3. 25: Admin dashboard	48
Figure 3. 26: Media section for admins.....	49
Figure 3. 27: Pages section for admins.....	49
Figure 3. 28: Theme management for admins	50
Figure 3. 29: Plugin management for admins	50
Figure 3. 30: User management for admins.....	51
Figure 3. 31: Theme customization for admins.....	51

General introduction

Effective management of academic information within an academic department is of paramount importance to ensure transparency, accessibility and quality of services provided to students and faculty members. In this context, this End of Study Project (PFE) focuses on the design and development of a website dedicated to the display of exam grades, timetables, as well as information on teachers and teaching modules in the electronics department.

This project aims to create a centralized and user-friendly platform allowing students of all specialties and years within the electronics department to easily access essential information regarding their academic career. In addition to displaying exam grades, the site will also provide a detailed view of regular and exam timetables, making time management and study planning easier for students and teachers.

The innovative aspect of this project lies in its ambition to integrate complete functionalities, such as the provision of information on teachers, their grade and the course they teach, as well as the modules and their respective coefficients. This holistic approach aims to meet diverse user needs and simplify interactions between students, faculty and department administration.

This thesis will explore the website design and development process in detail, with a focus on the technical challenges encountered, the solutions implemented and the results obtained. In addition, it will analyze the impact of this solution on the department's operational efficiency, user experience and internal communication.

Chapter 1

General information on websites

Chapter 1: General information on websites

1.1 Introduction:

An overview of the key ideas and technologies used in the creation and hosting of websites is provided. It starts out by explaining websites and the different kinds of them, highlighting their functions and importance in the current digital environment. After that, the explanation moves to how websites operate by going over web technologies like HTML, CSS, JavaScript, and content management systems (CMS). It also discusses the concepts of hosting and domain names, as well as the client-server architecture, all of which are critical to the online accessibility of websites.

1.2 Websites

1.2.1 Website definition

A website, also known as a web site, is a collection of web pages linked together and accessible from a single address called a URL. These pages are stored on a server and transmit information a website is created using web programming languages. There are hundreds of them, but some are more popular than others. This includes PHP, CSS, HTML, JavaScript, Ruby, Python, etc. in addition to custom web development using programming languages, another popular method for creating websites is through content management systems (CMS) like WordPress [1].

1.2.2 Different types of websites

There are so many types of websites available and we cannot discuss each type, so there we discuss some basic websites in detail:

- **Personal Website**

These websites are used for sharing your personal information. Also, you can share your philosophical thoughts and showcase your work. Many people use personal websites to brand themselves [2].

- **Photo Sharing Website**

This type of website enables you to store your photographs online and share them with your family and friends. Here you can upload as much as you want, also manage it as well as share it [2].

Chapter 1: General information on websites

- **Blog**

A blog is a website where people share information, ideas, and views. It is a place where you can express your vision and your thoughts to the world. Earlier, blogs were used as a journal, but now they are becoming one of the important mass communication tools where people get to know about new things. WordPress and Google blogger are famous blogging sites where you can write articles. Blogs include a travel blog, news blog, cooking blog, etc [2].

- **Informational website**

The term itself gives us the idea. This website provides information on various topics. We very often get confused about many things and searching for them in a book is very time-taking. These websites save our lives, as we get information about everything. For example, Wikipedia is an information website where you can get information about everything related to history, geography, science and technology, cinema, famous people, etc [2].

- **E-commerce website**

This website is a place for online shopping where a person can buy or sell a product. Amazon, Flipkart, and Olx are some of the examples of an E-commerce website. E-commerce has a lot of potentials to grow as nowadays, people tend to shop online because of their hectic life [2].

- **Social Media website**

This is the most popular website where people can connect with each other. Social media websites enable the user to share their personal information, pictures, video ideas, and opinion in real-time. Facebook, Instagram, and Twitter are some examples of social media websites [2].

- **Educational Websites**

Education websites include websites of colleges and schools and tuitions. The new normal has changed the structure of educational institutions. Nowadays, people are learning through online classes and the demands of educational websites also grow. As people want

Chapter 1: General information on websites

to learn more than their college and schools. So there are platforms like Coursera, GeeksforGeeks where people are learning more than their college and school [2].

- **Non-Profit Websites**

We all know marketing is the essence of the business and, more importantly, it is a public presence. Likewise, non-profit organizations need attention from the public and thus, websites come into the picture. These days, every NGO has its own website. They use them to inform their audience, raising funds, and also informing about themselves what they are doing. For example, United Nations International Children's Emergency Fund (**UNICEF**) is a non-profit website [2].

1.2.3 Role and importance of websites

- **Role**

Websites are versatile platforms that play several important roles in our daily lives. As information hubs, they act as knowledge centres, providing information on a multitude of subjects ranging from news to science to history, thus offering easy access to a wide range of knowledge. Additionally, they facilitate communication between individuals through forums, social networks, and instant messaging, thereby promoting the exchange of ideas and opinions. Websites also serve as commercial destinations, offering the opportunity to buy and sell products and services online. As a source of entertainment, they provide a variety of entertaining content such as games, videos, and music. Finally, they also serve as learning platforms, offering online courses and tutorials for those seeking to acquire new skills or deepen their knowledge. In summary, websites are versatile tools that enrich our lives in various ways by facilitating access to information, communication, commerce, entertainment, and learning [3].

- **The importance**

The importance of websites lies in their accessibility, user-friendliness, speed, cost-effectiveness, and interactivity. Accessible 24/7, they overcome geographical barriers and offer convenience to users worldwide. Their user-friendly interface makes them accessible to individuals with varying levels of technological proficiency. Additionally, websites facilitate

Chapter 1: General information on websites

rapid information sharing and communication, streamlining processes and saving time. Compared to traditional methods, they provide a cost-effective means of reaching a wide audience and disseminating information. Their interactive features allow users to engage with content, participate in discussions, and contribute to online communities, thus fostering an enriching internet experience [3].

1.3 Functioning of a website

1.3.1 Web technologies

- **Hypertext Markup Language (HTML)**

Hypertext Markup Language is the language used to describe and define the content of a web page is the backbone of web pages. It provides the structure and content of a webpage by using a markup language consisting of various tags and elements. These tags define different parts of a webpage such as headings, paragraphs, images, links, and more. HTML documents are interpreted by web browsers to render the content of web pages as we see them [4].



Figure 1. 1: Hypertext Markup Language logo [5]

- **Cascading Style Sheets (CSS)**

Cascading Style Sheets is the language used to describe the appearance of web content, CSS complements HTML by providing styling and presentation to web pages. It allows web developers to control the layout, colors, fonts, and other visual aspects of a webpage. CSS achieves this by applying style rules to HTML elements. By separating content (HTML) from

Chapter 1: General information on websites

presentation (CSS), developers can create visually appealing and consistent websites across different devices and screen sizes [6].

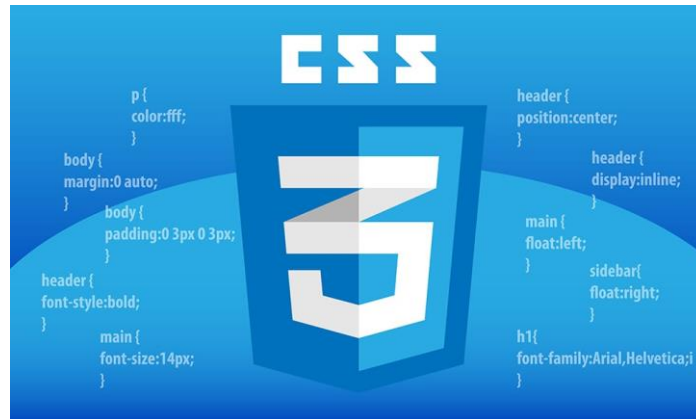


Figure 1. 2: Cascading Style Sheets logo [7]

- **JavaScript**

JavaScript is the programming language primarily used for adding interactivity and dynamic behaviour to web pages. With JavaScript, developers can create interactive elements like forms, animations, games, and much more. It allows for client-side scripting, meaning the code is executed on the user's browser rather than on the web server. JavaScript is widely supported by modern web browsers and is an essential tool for creating modern, engaging web applications [8].

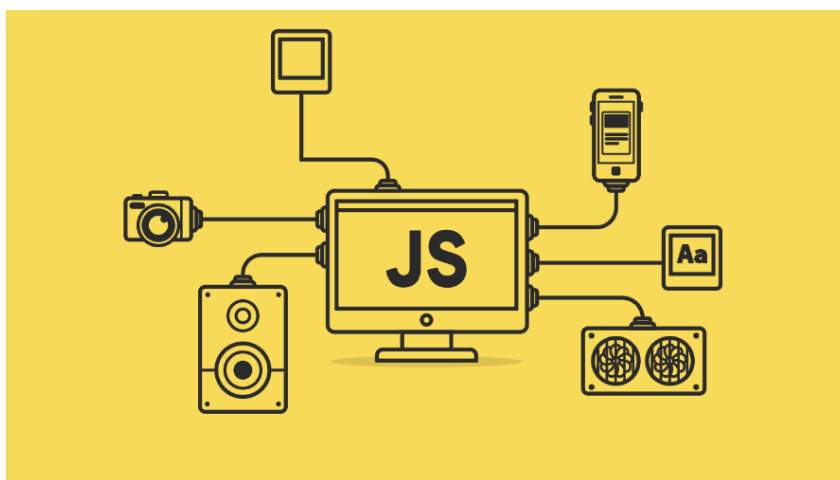


Figure 1. 3: JavaScript [9]

Chapter 1: General information on websites

- **Hypertext Transfer Protocol (HTTP)**

Hypertext Transfer Protocol is the protocol used for communication between web browsers and web servers. It defines how messages are formatted and transmitted, allowing for the transfer of data and resources over the internet. HTTP operates as a request-response protocol, where a client (usually a web browser) sends requests to a server, and the server responds with the requested resources, such as HTML documents, images, or other media files [10].



Figure 1. 4: Hypertext Transfer Protocol [11]

1.3.2 Client-server

- **Definition**

The client-server model is a fundamental architecture used in computer networks and distributed computing systems. In this model, computing tasks are divided between two types of entities: clients and servers. Here's a concise definition of each:

Client: A client is a computing device or software application that initiates communication with a server to request services, resources, or data. Clients typically make requests for information or services and wait for responses from servers. Examples of clients include web browsers, email clients, and mobile apps.

Server: A server is a powerful computing device or software application that provides services, resources, or data to clients over a network. Servers listen for incoming requests from clients, process these requests, and send back responses accordingly. Servers are

Chapter 1: General information on websites

often optimized for handling multiple client connections simultaneously. Examples of servers include web servers, email servers, file servers, and database servers [12].

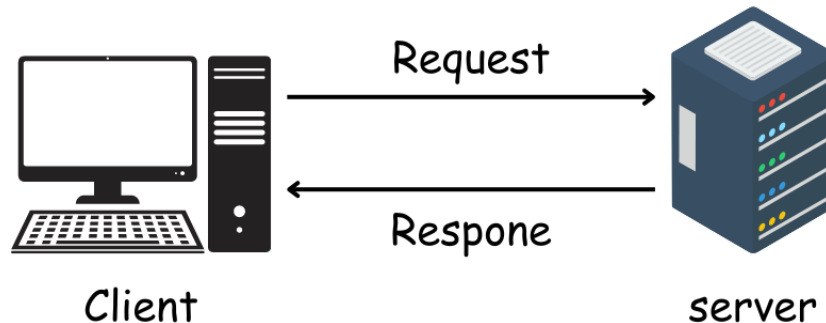


Figure 1. 5: Client-server model

- **Categories of Client-Server Computing**

There are four main categories of client-server computing:

1. **One-Tier architecture:** consists of a simple program running on a single computer without requiring access to the network. User requests don't manage any network protocols, therefore the code is simple and the network is relieved of the extra traffic.
2. **Two-Tier architecture:** consists of the client, the server, and the protocol that links the two tiers. The Graphical User Interface code resides on the client host and the domain logic resides on the server host. The client-server GUI is written in high-level languages such as C++ and Java.
3. **Three-Tier architecture:** consists of a presentation tier, which is the User Interface layer, the application tier, which is the service layer that performs detailed processing, and the data tier, which consists of a database server that stores information.
4. **N-Tier architecture:** divides an application into logical layers, which separate responsibilities and manage dependencies, and physical tiers, which run on separate machines, improve scalability, and add latency from the additional network communication. N-Tier architecture can be closed-layer, in which a layer can only communicate with the next layer down, or open-layer, in which a layer can communicate with any layers below it [12].

Chapter 1: General information on websites

- **Benefits of Client-Server Computing**

There are numerous advantages of the client server architecture model:

- A single server hosting all the required data in a single place facilitates easy protection of data and management of user authorization and authentication.
- Resources such as network segments, servers, and computers can be added to a client-server network without any significant interruptions.
- Data can be accessed efficiently without requiring clients and the server to be in close proximity.
- All nodes in the client-server system are independent, requesting data only from the server, which facilitates easy upgrades, replacements, and relocation of the nodes.
- Data that is transferred through client-server protocols are platform-agnostic [12].

1.3.3 Hosting and Domain name

- **Domain name definition**

A domain name is none other than your website address, it consists of a name and an extension, for example, the domain name for Google is “google.com”. It helps the users or the audience to find your website easily instead of them using its internet protocol (IP) address. A domain name helps internet users to search your website more effortlessly as they don’t need to memorize the IP address as it consists of a string of numbers. It also communicates your brand and its purpose to the users [13].

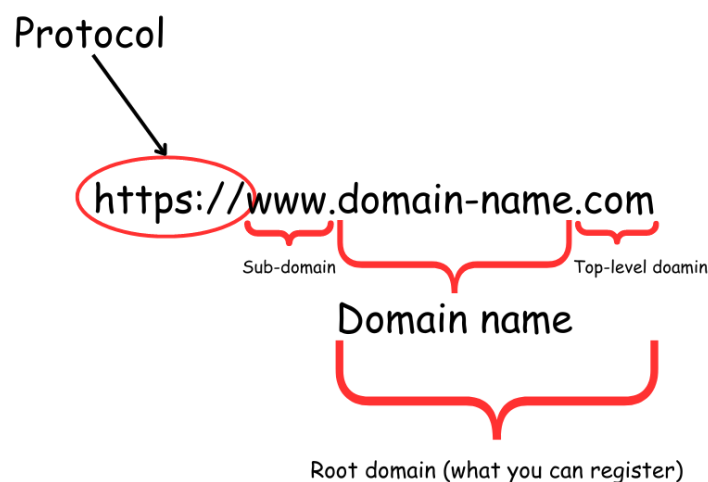


Figure 1. 6 : Domain name structure

Chapter 1: General information on websites

- **Web Hosting definition**

Web hosting is an internet service that helps you to host your web application or a website online. After signing up for a hosting service, you first rent a space on a physical server where your data and files are stored for your web application to work on devices like mobile, tablets and desktops smoothly.

Any website is generally made of folders like videos, text, images and code. Web hosting happens when all the files that happen to make a website are uploaded from a local computer to a web server. The hosting service provider configures, maintains and runs physical servers and also provides additional support like website backup, security and website performance. This allows you time to focus on the core functions of your website.

Web hosting providers manage hardware resources for many websites and have greater purchasing power. It invests in advanced technology so that you can get high-performing web servers with internal memory, processing power and other computing resources [13].

- **Difference between Domain and Hosting**

Domain and hosting are two different things but equally important to build a website. A domain name is a website's digital identity that allows internet users to access your website easily. Whereas, web hosting stores your website's data.

A domain name generally needs a website name and a domain extension like .com, .net and .org. Also, there are types of top-level domains available and various alternatives from which you can choose to create an effective domain name.

To host a website, you need both the element domain name and web hosting to successfully make your online website. They together make a perfect balance to run a website. Domain name works as an identifier of your website and web hosting helps you to host your website and stores all your information [13].

How does WEB HOSTING WORK

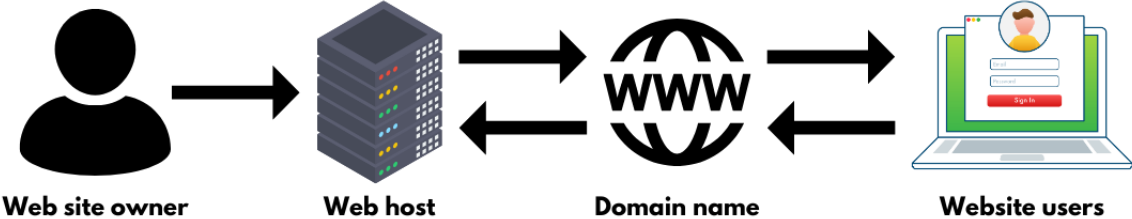


Figure 1. 7: Web hosting illustration

- **Content Management System (CMS)**

Content Management System, dynamic websites are websites built using a Content Management System (CMS) and are connected to a database. In fact, in this type of websites, the content is stored in databases while the container is contained in HTML, PHP, etc. files. The most commonly used CMS is WordPress, which is an open-source module, therefore free, and undergoes regular evolution and updates. It allows creating websites with an administration panel, thus allowing any desired style or content modification to be made. Creating a WordPress website can be done without any knowledge of development and coding. Although this tool offers an infinity of free and paid extensions (features) and themes (designs), developing a specific solution requires knowledge of PHP, HTML, and CSS [14].

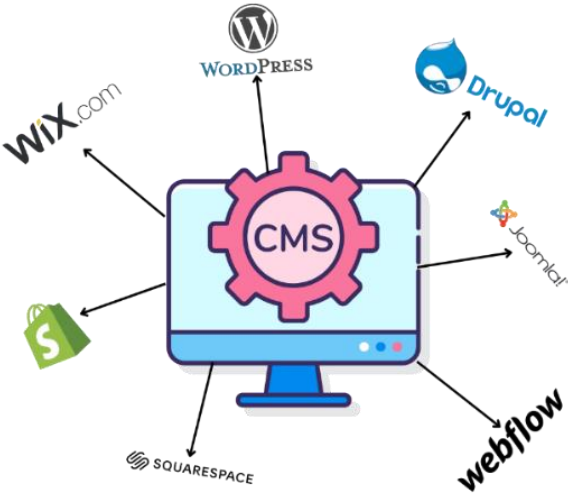


Figure 1. 8: Content Management System (CMS)

Chapter 1: General information on websites

1.4 WordPress

1.4.1 WordPress definition

WordPress is a CMS (Content Management System), which is a tool for publishing and managing content on the Internet. It allows you to create and administer your website. It is free and Open Source (GPL license), which means that WordPress can be downloaded, installed, modified, and redistributed by anyone while retaining this license.

Originally, WordPress was known for creating blogs; it is now a powerful and scalable CMS. It allows you to design any type of website, all with a relatively user-friendly interface: showcase website, e-commerce store, informational website, and social network, web TV, extranet, etc [15].



Figure 1. 9: WordPress logo [16]

1.4.2 Features and benefits of WordPress

There are several advantages and benefits to using WordPress to create a website:

- **Ease of use:** WordPress is designed to be user-friendly, even for users with no advanced technical skills. It offers an intuitive interface for creating and managing website content.
- **Customization:** WordPress provides great flexibility in terms of customization, thanks to thousands of available themes and plugins. Themes allow you to change the appearance of your site, while plugins add additional functionality.

Chapter 1: General information on websites

- **Security:** WordPress is a popular content management system, so there is a strong community of developers constantly working to improve the security of the CMS. Security updates are frequent, and the community is vigilant for potential security vulnerabilities.
- **Support and community:** There is a large community of WordPress users who share tips, tricks, and solutions to common problems. WordPress also relies on many experienced developers who offer WordPress website development services.
- **Responsive design and Mobile First:** WordPress is designed to be compatible with various screen types (desktop, tablet, mobile) and different web browsers. This means that websites created with WordPress will automatically adapt to the screen size on which they are displayed.
- **Multilingual:** WordPress is designed to handle multilingual websites to cater to different countries and markets. This is made possible through localization plugins available for WordPress, such as WPML, Polylang, etc [17].

1.5 WordPress Database Functionality

During WordPress installation, a database is typically created automatically on the website provider's server ("database host"). Alternatively, manual database creation or integration with existing databases can be employed. The server, upon receiving a user's browser request, retrieves relevant data from the underlying database (often MySQL-based) using MySQL queries (instructions) to ensure proper website display and functionality. This client-server interaction facilitates the dynamic presentation of content. Direct database access and manual command execution are possibilities, but database management tools are generally preferred for efficiency [18].

- **Structured Query Language (SQL)**

Structured Query Language SQL is a domain-specific language used for managing and manipulating relational databases. It provides a standard way to interact with databases by defining queries for tasks such as retrieving data, inserting new records, updating existing records, and deleting records. SQL operates on the principles of set theory and allows for

Chapter 1: General information on websites

powerful data manipulation operations. It is used by web developers to interact with databases in conjunction with server-side scripting languages like PHP, Python, or Java [19].

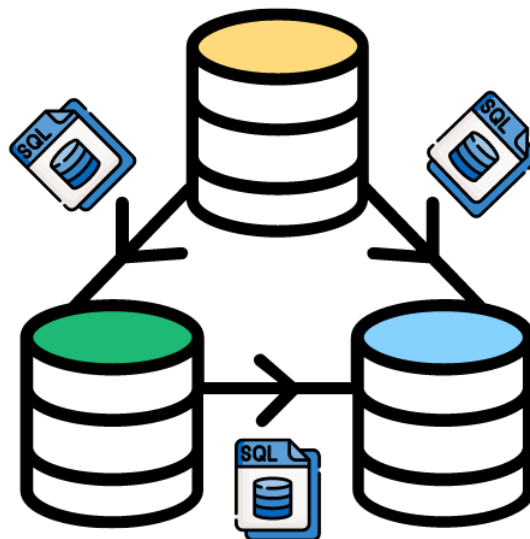


Figure 1. 10: Structured Query Language

- **MySQL**

MySQL is an open-source relational database management system (RDBMS) that uses SQL as its query language. It is one of the most popular database systems used in web development due to its reliability, performance, and ease of use. MySQL is often used in conjunction with PHP to create dynamic websites and web applications. It supports features such as transactions, replication, and clustering, making it suitable for a wide range of applications, from small personal websites to large-scale enterprise systems. MySQL is known for its scalability, robustness, and active community support [19].

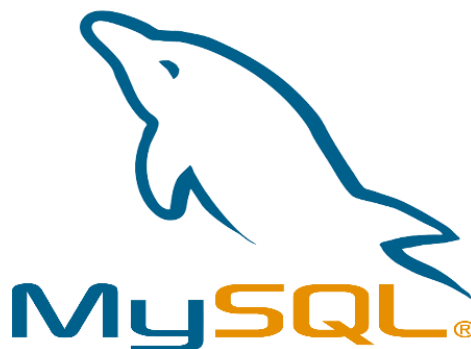


Figure 1. 11: MySQL logo

Chapter 1: General information on websites

- **Hypertext Pre-processor (PHP)**

Hypertext Pre-processor PHP is a server-side scripting language that is widely used for web development. It is especially suited for creating dynamic and interactive web pages. PHP scripts are executed on the server, generating HTML content that is then sent to the client's browser. PHP can be embedded directly into HTML, allowing developers to mix dynamic content with static content seamlessly. It is commonly used for tasks such as processing form data, interacting with databases, managing user sessions, and generating dynamic web content [19].



Figure 1. 12: Hypertext Pre-processor [20]

1.6 Conclusion

The foundation for understanding the fundamental structures and technologies that make websites possible is laid. It goes over the fundamentals of client-server architecture, web development languages, hosting, and domain names.

Chapter 2

Design of our website

Chapter 2: Design of our website

2.1 Introduction

The objectives and design considerations of the electronics department's own website are highlighted. The first step involves classifying the various user roles—administrators, teachers, and students—as well as their corresponding access levels. The next section discusses methods for improving user experience and engagement, like having an easy-to-use main page, a user-friendly design, responsiveness for mobile devices, and improved privacy controls. It also describes the goals of the website, which include building an educational center, encouraging professional interaction, and encouraging transparency. It then goes on to explain the reasons behind the theme and plugin selections.

2.2 User identification and roles

2.2.1 Students

The students are the primary users of the website. They will have access to a wide range of information and services without the need for an account. Their functionalities include:

- **Academic Information**

Students can view their grades, exam schedules, and class schedules. This allows them to stay informed about their academic progress and plan their studies effectively.

- **Teacher Information**

Information about teachers, including their qualifications and contact details, will be available to students. This facilitates better communication and understanding between students and teachers.

- **Specialties Information**

Detailed information on various specialties offered by the university will be accessible. This helps students make informed decisions about their academic path.

- **Commenting**

Students can comment on various aspects of their academic experience. This provides a platform for feedback and discussion.

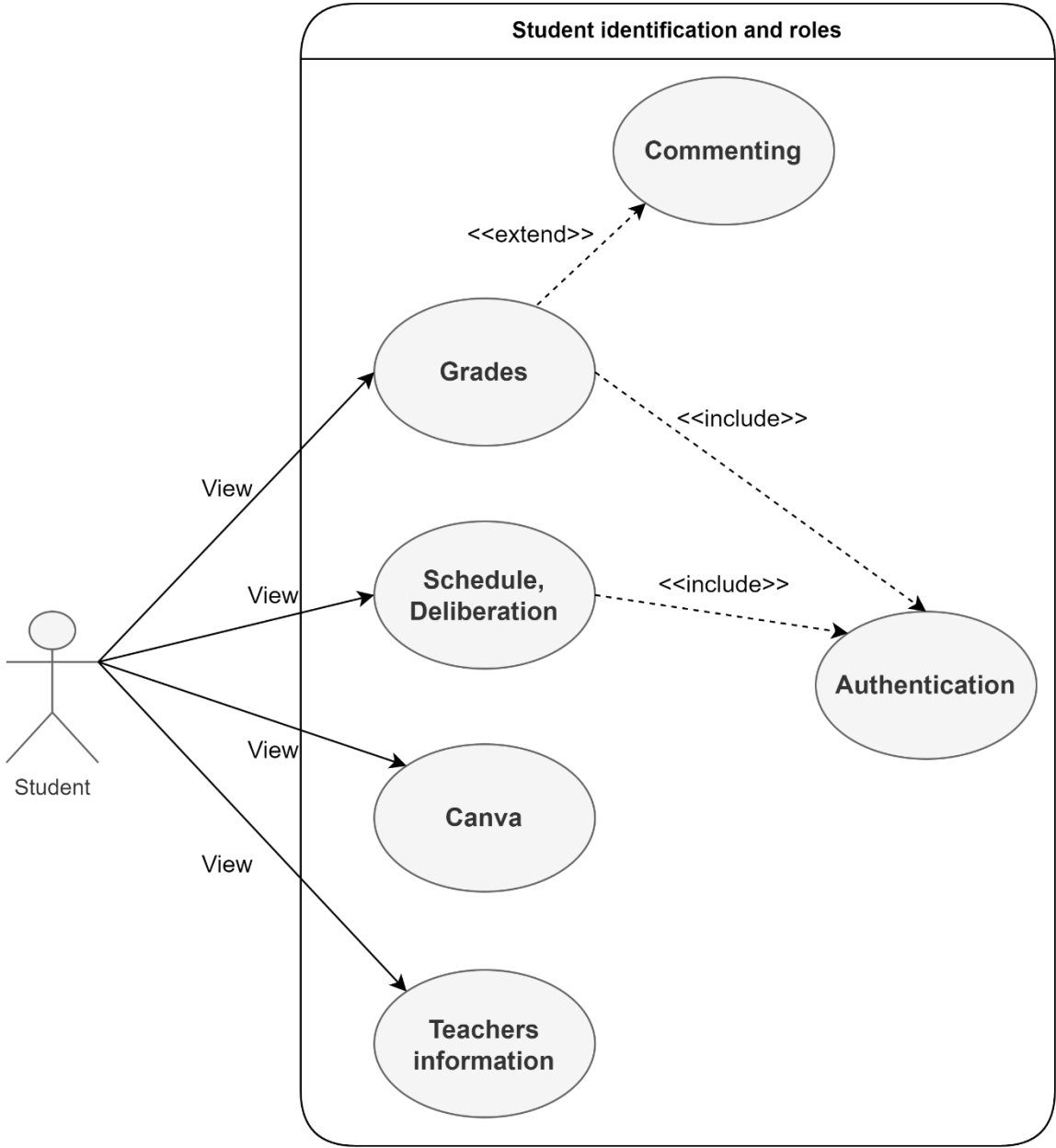


Figure 2. 1: Student identification and roles

2.2.2 Teachers

Teachers play a crucial role in managing academic information. They will need accounts to access their functionalities. These include

- **Grade Management**

Teachers can display and update student’s grades. This allows for timely and accurate dissemination of academic results.

Chapter 2: Design of our website

- **Comment Moderation**

Teachers can approve or decline comments. This helps maintain a positive and respectful discussion environment.

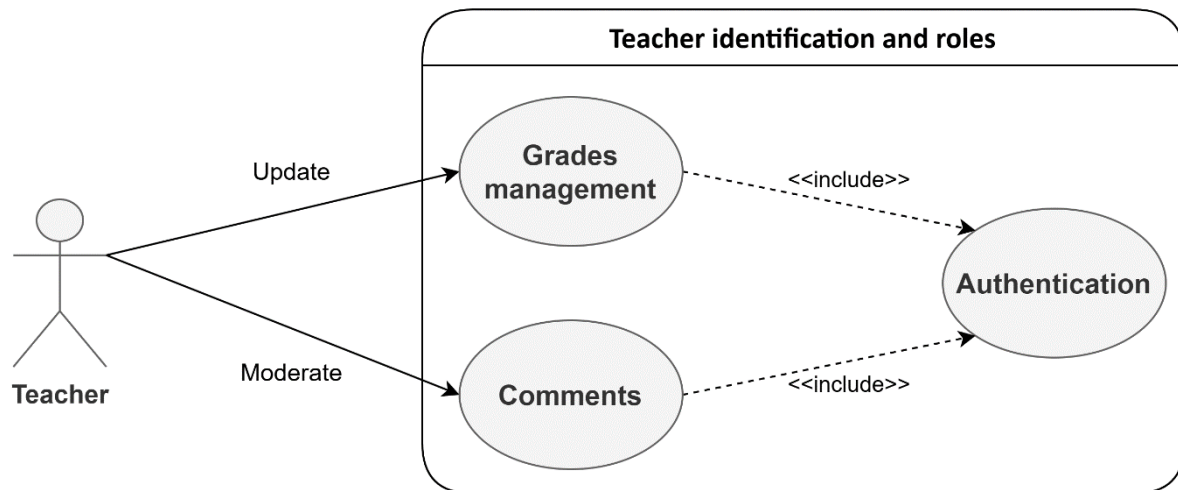


Figure 2. 2: Teacher identification and roles

2.2.3 Administrators

Administrators have the highest level of access and control over the website content. Their responsibilities encompass:

- **Content Management**

Administrators can modify all types of information on the website, including grades, schedules, teacher information, and specialties. This ensures that the website content is up-to-date and accurate.

- **Comment Moderation**

Administrators also have the authority to approve or decline comments. This helps maintain a positive and respectful discussion environment.

- **Account Creation**

Administrators are responsible for creating accounts for teachers. This ensures that only authorized individuals have access to teacher functionalities.

Chapter 2: Design of our website

- **Plugins and themes**

Administrators have the capability to manage plugins, including both installing new ones and removing existing ones. This allows them to customize and enhance the functionality of the system according to the organization's needs.

- **Roles**

Administrators have the authority to manage user roles, including assigning, modifying, and removing roles as necessary. This allows them to control user permissions and ensure that each user has the appropriate level of access and functionality within the system.

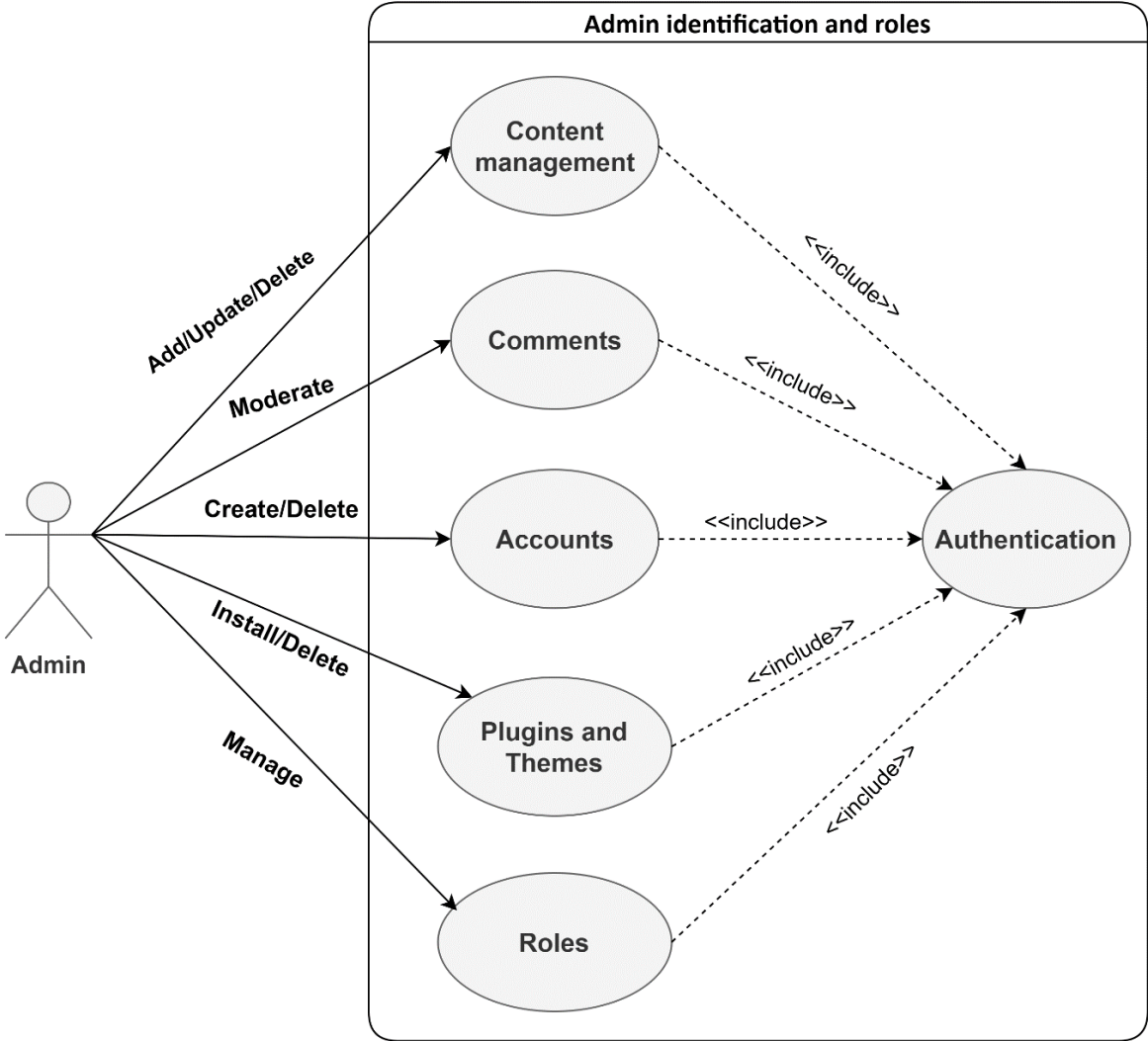


Figure 2. 3: User roles and access levels diagram

Chapter 2: Design of our website

2.3 User Engagement and Experience

The design of the website prioritizes user engagement and ease of use, particularly for its primary users - the students. Here are some of the key features that enhance the user experience:

2.3.1 No Account Requirement for Students

One of the standout features of the website is that students do not need to create accounts to access their grades and other information. This removes a potential barrier to entry and makes the website more accessible to all students.

2.3.2 Intuitive Main Page

The main page of the website is designed to be straightforward and easy to navigate. Information is organized logically and clearly, allowing users to find what they need quickly and efficiently.

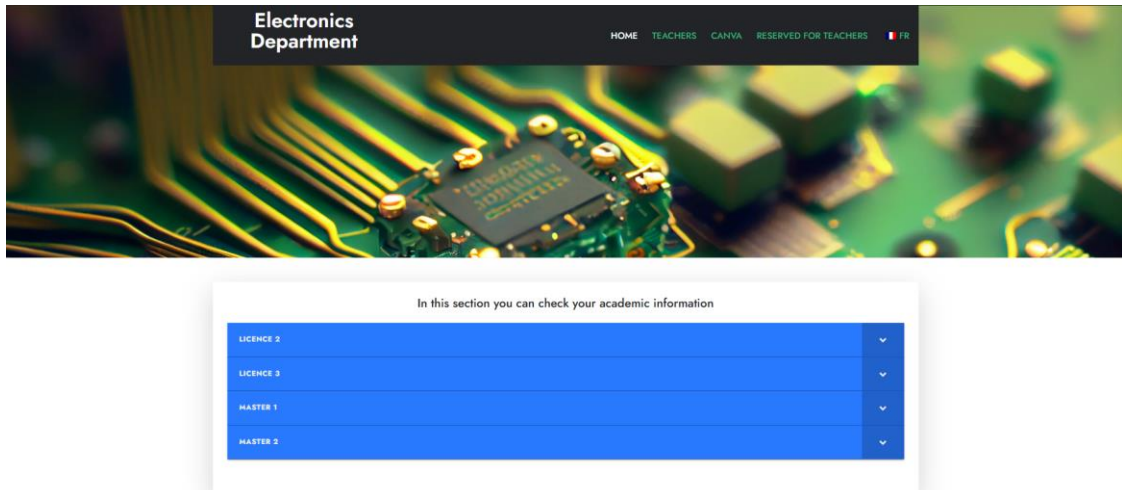


Figure 2. 4: Main page design

2.3.3 User-Friendly Design

The website is designed with a focus on user-friendliness. It uses clear language, intuitive navigation, and a clean, uncluttered layout to make it as easy as possible for users to find and understand the information they need.

Chapter 2: Design of our website

2.3.4 Mobile-Friendly

In today's digital age, many users access websites from their mobile devices. Our website is designed to be mobile-friendly, ensuring that it looks good and works well not just on desktop computers, but also on smartphones and tablets. This allows students to access their grades, schedules, and other important information anytime, anywhere.

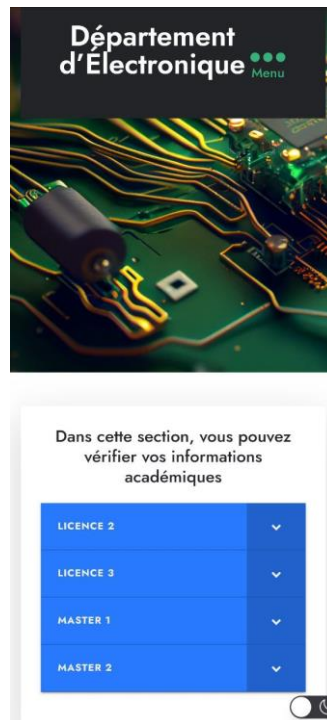


Figure 2. 5: Mobile Responsiveness

2.4 Enhanced Privacy Measures

The website is designed with a strong emphasis on privacy, particularly when it comes to sensitive information such as student grades and specialty-specific content. It incorporates several robust features to ensure that only authorized individuals can access this information.

2.4.1 Security Code Access

A standout security feature of the website is the use of unique security codes. When a student wishes to check their grades or access other private information, they are prompted to enter a security code. This code is unique to each specialty, ensuring that students can only access information relevant to their own specialty. This additional layer of security not only

Chapter 2: Design of our website

protects the privacy of the students but also maintains the integrity of the data by preventing unauthorized access.

2.4.2 Limited Access

The website strictly controls access to sensitive information. Only certain individuals, such as the student themselves and authorized faculty members, can view this information. This prevents unauthorized access and protects the privacy of the students.

2.5 Objectives of the Website

The primary objective of this website is to revolutionize the way information related to the university is shared with students. It aims to replace traditional methods with a more professional, modern, and efficient system. Here are some expanded objectives:

2.5.1 Centralized Information Hub

The website serves as a centralized hub for all information related to the university. This includes grades, schedules, faculty details, course information, and more. By consolidating all this information in one place, the website makes it easier for students to find and access the information they need.

2.5.2 Professional Communication

In the past, information was often disseminated through individual teachers or faculty workers via emails. This could lead to inconsistencies and confusion. The website provides a more professional platform for communication, ensuring that all students receive the same information at the same time.

2.5.3 Efficiency

The website significantly improves efficiency. Instead of waiting for emails or visiting the faculty department to check grades, students can now access this information instantly with just a few clicks. This saves time for both students and faculty members.

2.5.4 Modernization

The website represents a modern approach to information dissemination. It leverages the power of technology to make the process of sharing and accessing information faster, easier, and more convenient.

Chapter 2: Design of our website

2.5.5 Transparency

By making all information readily available, the website promotes transparency. Students can easily track their academic progress, stay informed about upcoming exams or classes.

2.5.6 Engagement

The website also aims to increase engagement. By providing a user-friendly platform with all the necessary information, it encourages students to take a more active role in their education.

2.6 Explanation of Theme and Plugin Choices

The website's design and functionality are significantly influenced by the choice of theme and plugins. For this project, we have carefully selected a theme and a set of plugins that align with our objectives and enhance the user experience.

2.6.1 Theme

We chose the Avantex Education theme for several reasons. This theme is specifically designed for educational institutions, making it an ideal fit for our university website. It offers a clean, professional design that is easy to navigate, ensuring that students can find the information they need quickly and efficiently. The theme is also highly customizable, allowing us to tailor the look and feel of the website to match the university's branding and meet our specific needs.

Chapter 2: Design of our website

2.6.2 Plugins

Plugin	Description
Avantex Companion	This plugin enhances the functionality of the Avantex Education theme, providing additional customization options and features.
Bellows Accordion Menu	This plugin allows us to create dynamic, collapsible menus, making it easier for users to navigate the site and find the information they need.
Elementor	This is a powerful page builder plugin that allows us to create beautiful, responsive page layouts without any coding.
TranslatePress Multilingual	This plugin provides automatic translation functionality, making the website accessible to students from different linguistic backgrounds.
LoginPress	This plugin enhances the login experience for users, providing additional security features and customization options.
PublishPress Capabilities	This plugin allows us to manage user roles and capabilities, ensuring that only authorized individuals can access certain features and information.
WP Dark Mode	This plugin provides a dark mode option for the website, making it more comfortable to view in low-light conditions.
WpDiscuz	This plugin enhances the website's commenting system, providing more options for user interaction.
LiteSpeed Cache	An all-in-one site acceleration plugin, featuring server-level cache and optimization features. It supports WordPress Multisite and is compatible with most plugins
Flexy Breadcrumb	A simple and robust breadcrumb navigation plugin that allows customization of text, links, and separators. It's SEO-friendly and can be added anywhere on your site via shortcode
Pdf Embed	A Gutenberg Block plugin to display PDFs on your website using the Adobe PDF Embed API. It's fully responsive and works across various browsers
Wordfence Security	A comprehensive security plugin that includes a firewall, malware scanner, and login security features. It helps protect against threats like hacking, malware, and brute force attacks
WPvivid Backup Plugin	A WordPress backup, migration, and staging tool with features like easy backups, auto migration, staging, scheduled backups, offsite storage, and one-click restore.

Tableau 2. 1: plugins

2.7 Sequence diagrams

2.7.1 Sequence diagram for student specialization selection and authentication

A series of interactions between a student, a website, and a database system for obtaining academic information based on chosen degrees and specializations are shown in the diagram.

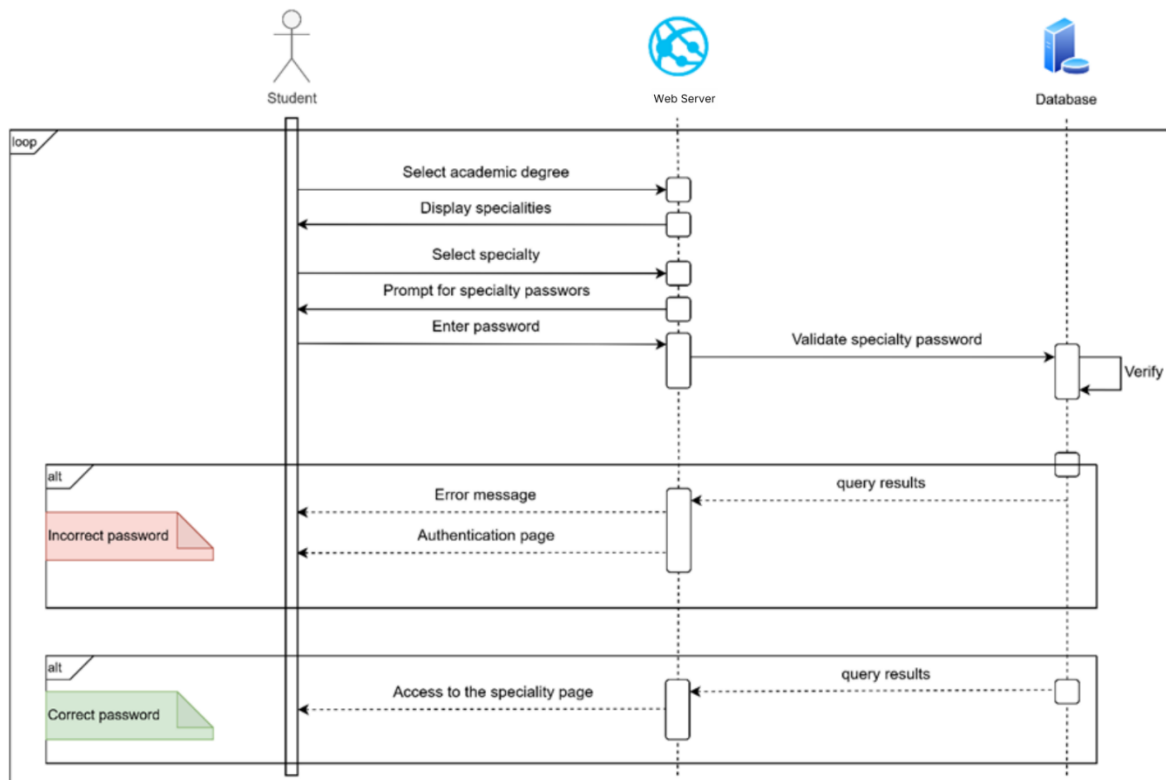


Figure 2. 6: Specialty Access Validation Process for Students

2.7.2 Teacher Portal Interaction Sequence Diagram:

This sequence diagram illustrates interactions in a teacher portal system involving login, grade uploads, and comment management.

Chapter 2: Design of our website

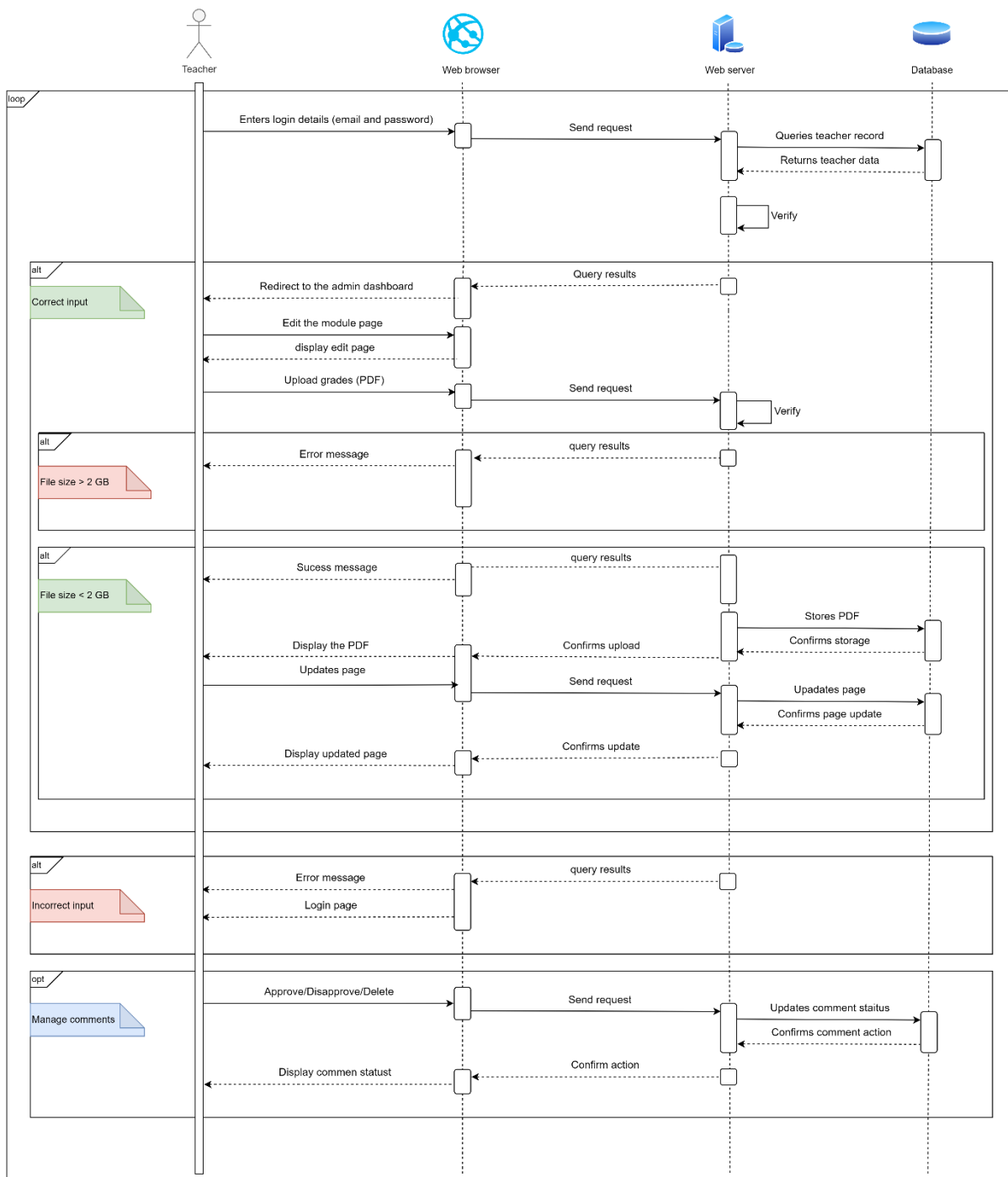


Figure 2. 7: Teacher's Login and Grade Upload Process

2.8 WordPress Database Functionality

A database plays a major role in WordPress's ability to store and manage website content as a Content Management System (CMS). The database serves an important part in the background operations that guarantee the seamless and effective operation of the website. A thorough examination of WordPress's database interaction can be found here:

2.8.1 Database Setup and Configuration

- **During Installation**

WordPress asked for database information during the installation process, including the database name, username, password, and host. WordPress then creates a configuration file (wp-config.php) that connects to the database using this information.

- **Automatic Table Creation**

WordPress generates multiple tables in the database during installation to hold different kinds of data. WP_posts, WP_users, WP_options, WP_comments, and other tables are included in these tables. Every table has a different function; for example, it can store comments, user data, post content, and site settings.

2.8.2 Data Storage and Retrieval

- **Storing Data**

WordPress stores this data in the appropriate database tables whenever we create a new post, page, or other type of content. For instance, the content of a blog post, along with metadata like the post date, author, and status, is saved in the wp_posts table when it is written.

- **Retrieving Data**

WordPress gets the info from the database when a user visits our website so that the right content is displayed. The necessary data is retrieved from the database using SQL queries in this procedure, and it is subsequently dynamically added into the HTML templates of the websites.

Chapter 2: Design of our website

2.8.3 Common Database Operations in WordPress

Below are visual representations of how WordPress performs common database operations:

- **Inserting Data**

```
public function insert( $table, $data, $format = null ) {  
    return $this->_insert_replace_helper( $table, $data, $format, 'INSERT' );  
}
```

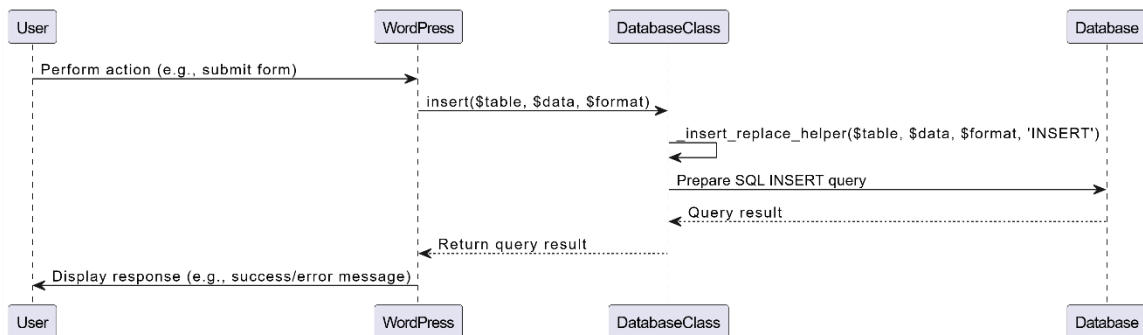


Figure 2. 8: WordPress Database Insertion Process Diagram

The sequence diagram visually represents the process of inserting data into the database, showing the interaction between the user, WordPress, the DatabaseClass, and the database itself.

- **Retrieving Data**

```
public function get_results( $query = null, $output = OBJECT ) {  
    $this->func_call = "\$db->get_results(\"$query\", $output)";  
  
    if ( $query ) {  
        if ( $this->check_current_query && $this->check_safe_collation( $query ) ) {  
            $this->check_current_query = false;  
        }  
  
        $this->query( $query );  
    } else {  
        return null;  
    }  
  
    $new_array = array();  
    if ( OBJECT === $output ) {  
        // Return an integer-keyed array of row objects.  
        return $this->last_result;  
    } elseif ( OBJECT_K === $output ) {
```


Chapter 2: Design of our website

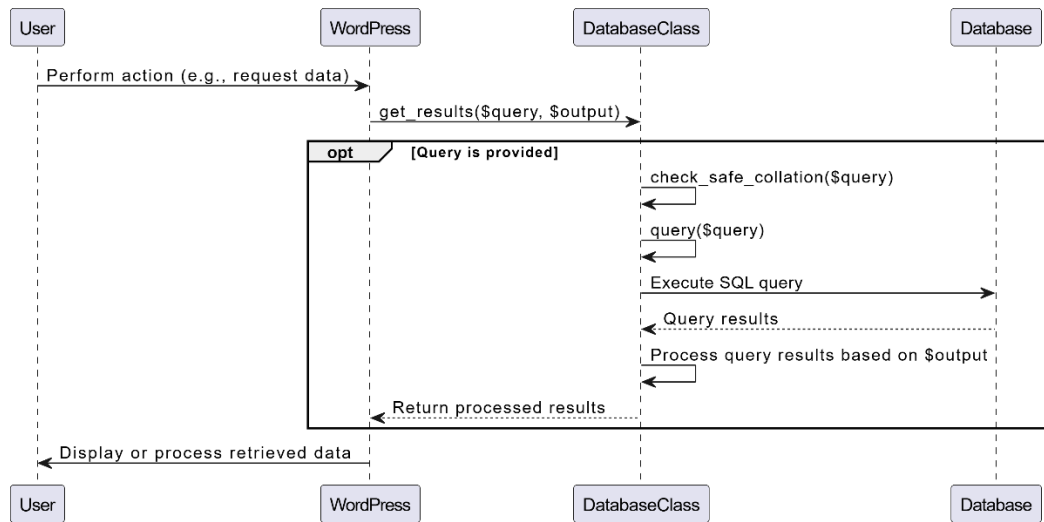


Figure 2. 9: WordPress Database Retrieval Process Diagram

The diagram highlights the flow of data and interactions between the different components involved in the process of retrieving and processing data from the database.

- **Updating Data**

```

// Combine fields and conditions into SQL query
$fields = implode( ' ', $fields );
$conditions = implode( ' AND ', $conditions );

$sql = "UPDATE `stable` SET $fields WHERE $conditions";
// Execute the query
$this->check_current_query = false;
return $this->query( $this->prepare( $sql, $values ) );
  
```

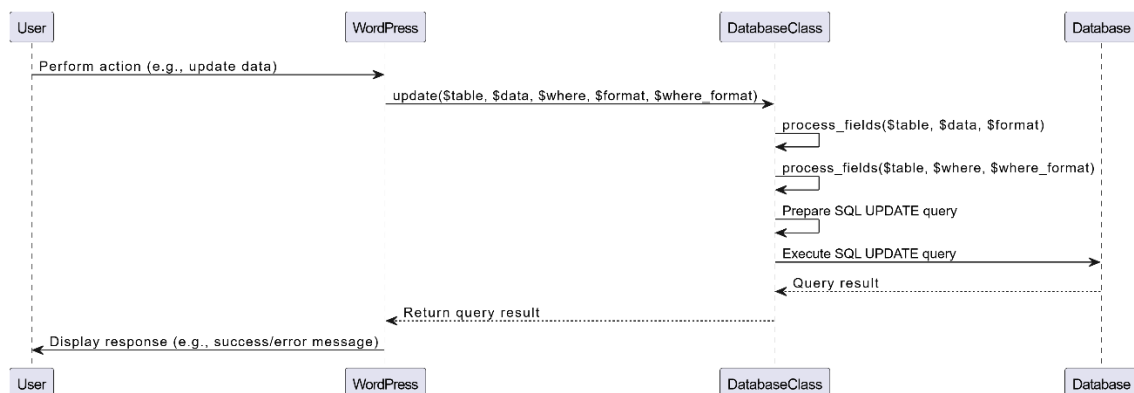


Figure 2. 10: WordPress Database Update Process Diagram

Chapter 2: Design of our website

The data update is started by the user. WordPress asks for the update method of the DatabaseClass with the necessary arguments. The SQL UPDATE query is prepared, executed, and the data is processed by the DatabaseClass. WordPress receives the query result and presents the user with a response.

- **Deleting Data**

```
// Combine conditions into SQL query
$conditions = implode( ' AND ', $conditions );

$sql = "DELETE FROM ` $table ` WHERE $conditions";

// Execute the query
$this->check_current_query = false;
return $this->query( $this->prepare( $sql, $values ) );
```

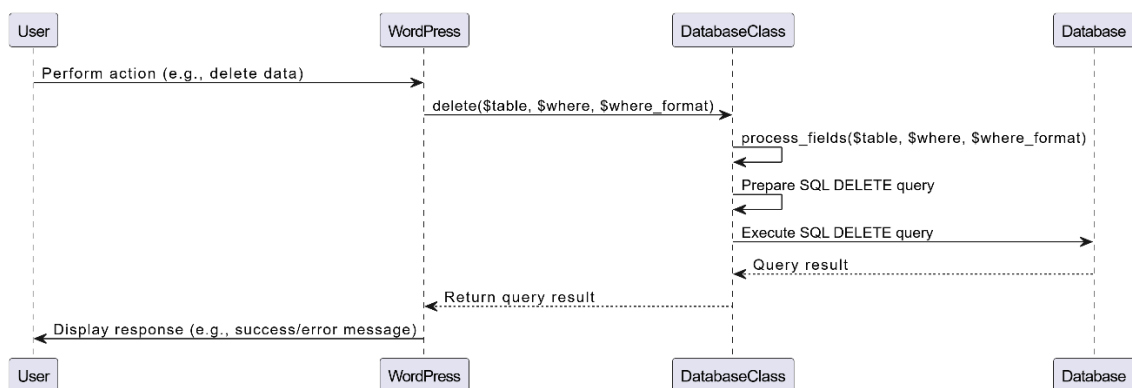


Figure 2. 11: WordPress Database Deletion Process Diagram

The deletion action is started by the user. WordPress calls for the DatabaseClass's delete function with the required arguments. The SQL DELETE query is prepared, executed, and processed by the class. WordPress receives the result from DatabaseClass after it has been returned by the database. WordPress then shows the user a response.

2.8.4 Performance Optimization

The performance of the WordPress database can be optimized by regularly cleaning up unnecessary data, such as spam comments and post revisions, and using caching mechanisms to reduce the load on the database server.

2.9 Conclusion

This chapter offers an in-depth overview of the design objectives and principles that directed the development of the website. The chapter provides a solid structure for the effective implementation of the website by carefully examining user roles, engagement strategies, privacy measures, and specific objectives. The justification for the theme and plugin selections strengthens the technical decisions made for the project.

Chapter 3

Test and results

Chapter 3: Test and results

3.1 Introduction

Chapter 3 focuses on the testing and evaluation of the website from the perspectives of students, teachers, and administrators. It provides a detailed walkthrough of the website's features and functionality, accompanied by screenshots and explanations. The chapter showcases the user experience for each user role, demonstrating the website's ability to meet the diverse needs of the electronics department.

3.2 Test

We decided to test our website's performance on PageSpeed Insights for both mobile and desktop versions.

3.2.1 Mobile version

The mobile version of our website performs well, receiving scores of 96 for Best Practices, 83 for SEO, and 96 for accessibility. The performance score, at 75, is good but it suggests that the speed at which content is visible needs to be increased.

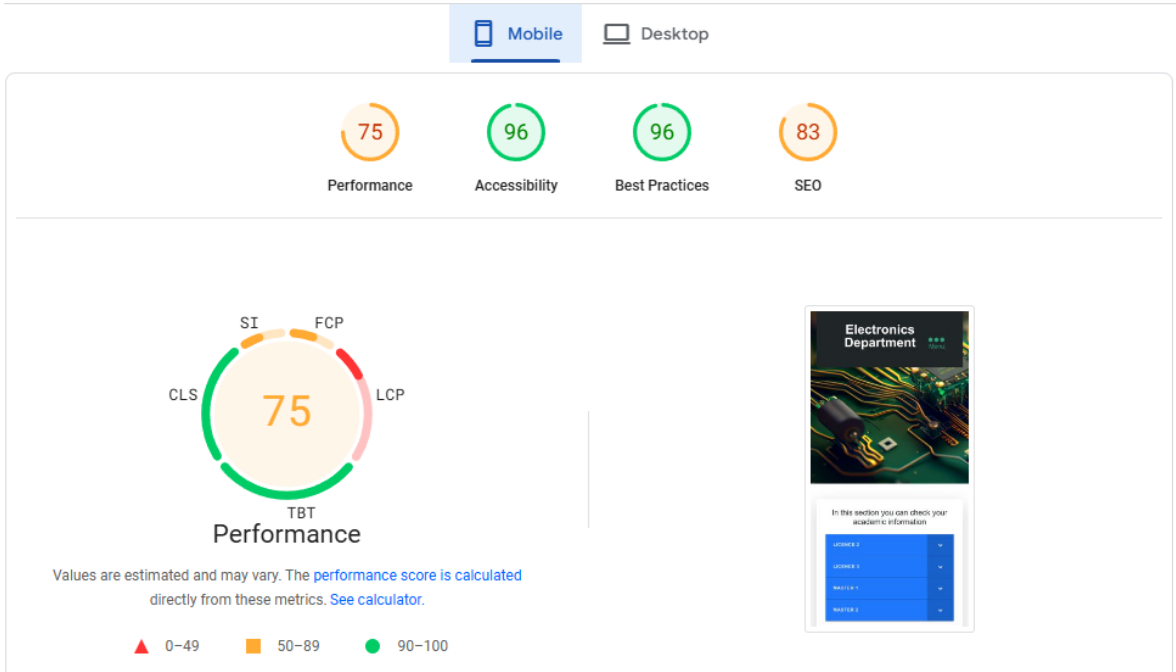


Figure 3. 1: Website performance on PageSpeed Insights (Mobile) [21]

Chapter 3: Test and results

3.2.2 Desktop

The desktop version of our website performs extremely well, receiving scores of 93 for Performance, 96 for Accessibility, and 96 for Best Practices. Even though the SEO score of 85 is high, there is still space for improvement. The website loads rapidly and meets with web standards superbly.

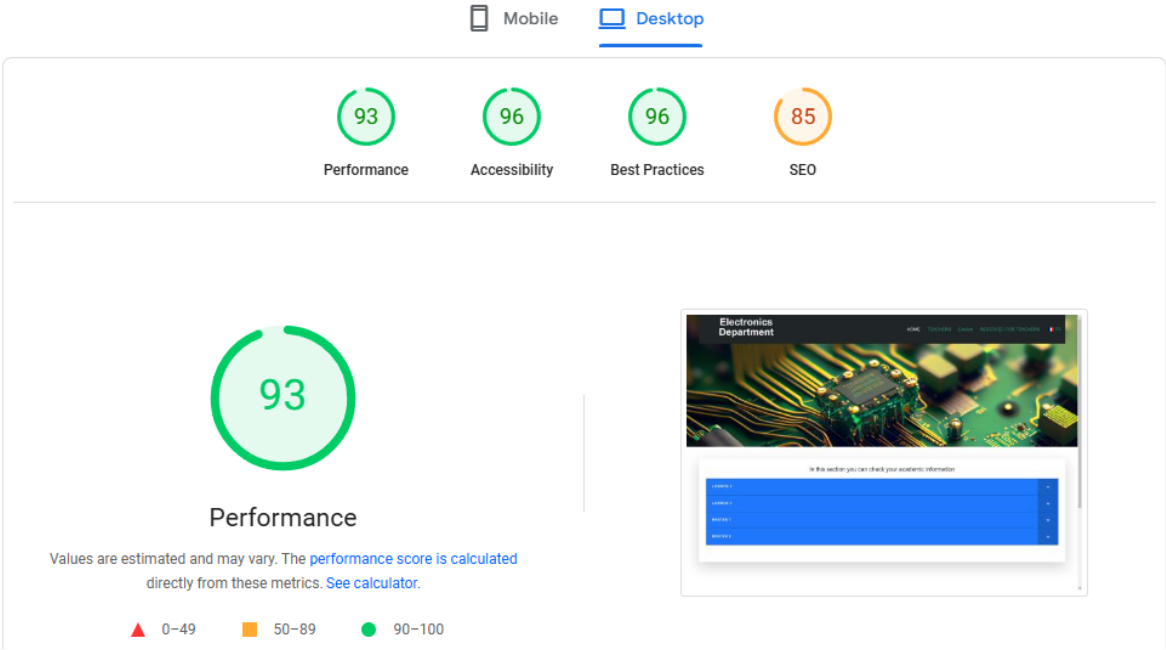


Figure 3. 2: Website performance on PageSpeed Insights (Desktop) [21]

3.3 Student point of view

3.3.1 Home page

The homepage is typically the first page new visitors see, creating their first impression of the website. We aim to keep it easy to navigate while offering a modern, updated design.

Chapter 3: Test and results

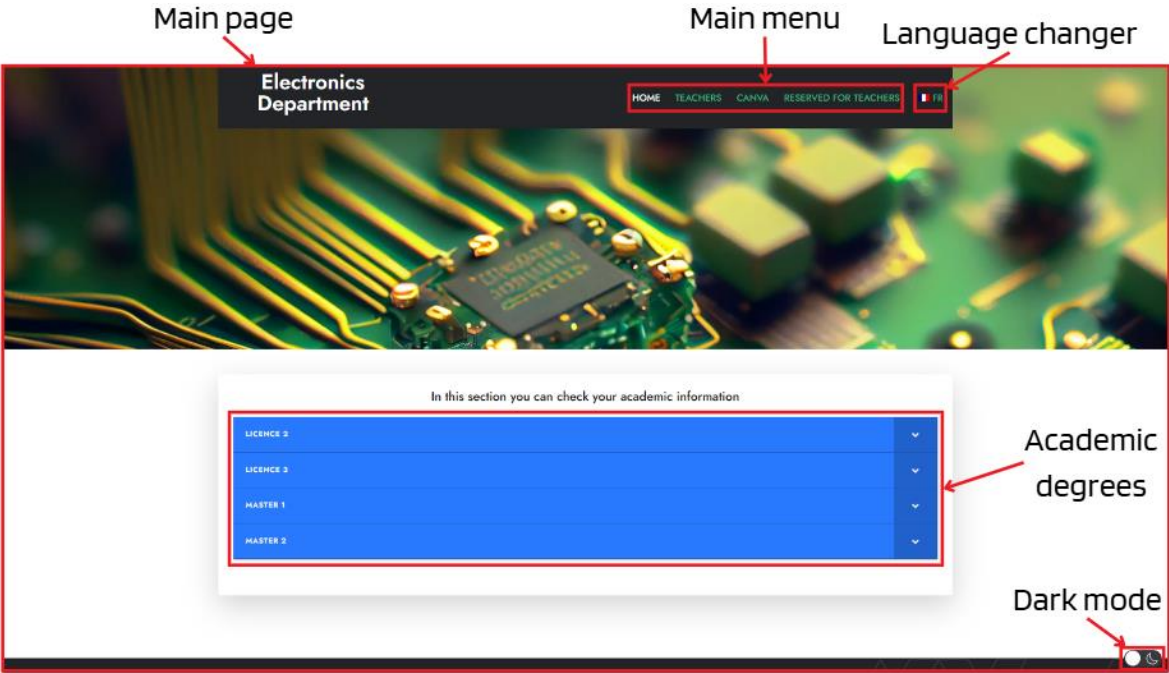


Figure 3. 3: Homepage layout

- **Main menu**

The main menu efficiently organizes the website's content into clear categories, making it easier for users to find what they need quickly. It directs users to essential sections such as Home, Teachers, and Canva, while also providing a dedicated area for teachers. This streamlined navigation enhances.

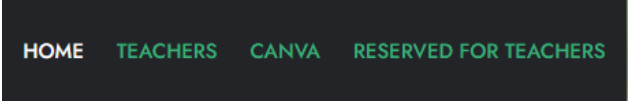


Figure 3. 4: Main menu

- **Academic degrees**

This academic degree menu allows students to access and review their academic information. It categorizes degrees into four levels: LICENCE 2, LICENCE 3, MASTER 1, and MASTER 2.

Chapter 3: Test and results



Figure 3. 5: Academic degrees menu

When a user selects their academic degree, a list of available specialties appears, allowing them to choose the specific field they are studying. Let's imagine a scenario where a Master 2 Network and Telecommunication student wants to check their academic information.



Figure 3. 6: Specialty selection

Once the student selects Network and Telecommunication, they must enter a specialty-specific password to continue.

This content is password protected. To view it please enter your password below:

Password:

Figure 3. 7: Password prompt

After entering the correct password, a new page appears displaying various academic information for the Network and Telecommunication specialty, including grades, class schedule, exam schedule, student groups, and deliberation details.

Chapter 3: Test and results



Figure 3. 8: Academic information display

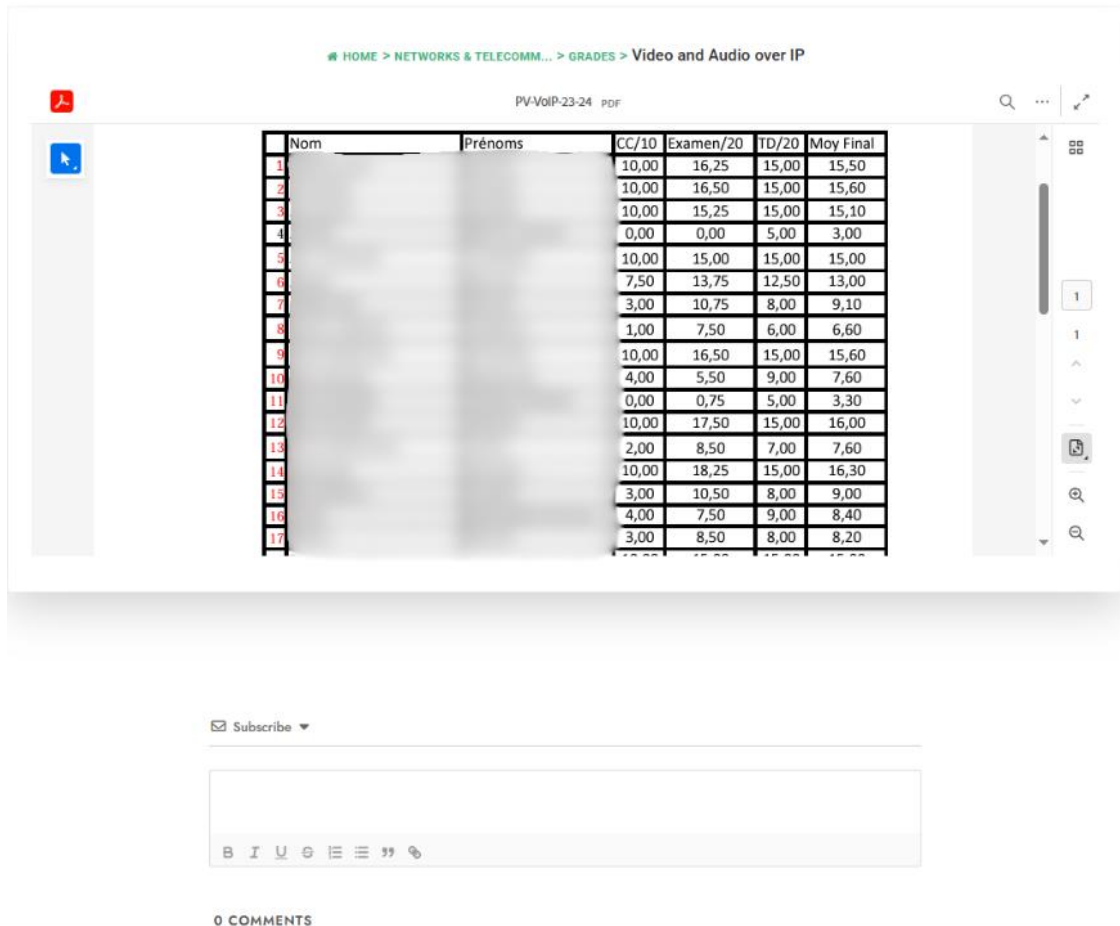
If the student wants to check their grade in the Video and Audio over IP module, they can click on "Grades." A new page will then appear, showing a list of modules from which they can select "Video and Audio over IP."



Figure 3. 9: Module selection

Chapter 3: Test and results

After selecting the module, a new page opens displaying a PDF provided by the teacher. The student can print and download the PDF and has the option to comment if they spot any mistakes in the grades.



The screenshot shows a web interface for viewing grades. At the top, there is a breadcrumb trail: HOME > NETWORKS & TELECOMM... > GRADES > Video and Audio over IP. Below this, the document title is 'PV-VoIP-23-24 PDF'. The main content is a table with columns: Nom, Prénoms, CC/10, Examen/20, TD/20, and Moy Final. The table contains 17 rows of student data. Below the table, there is a 'Subscribe' button and a text input field for comments. The input field has a rich text editor toolbar with icons for bold, italic, underline, link, list, quote, and link.

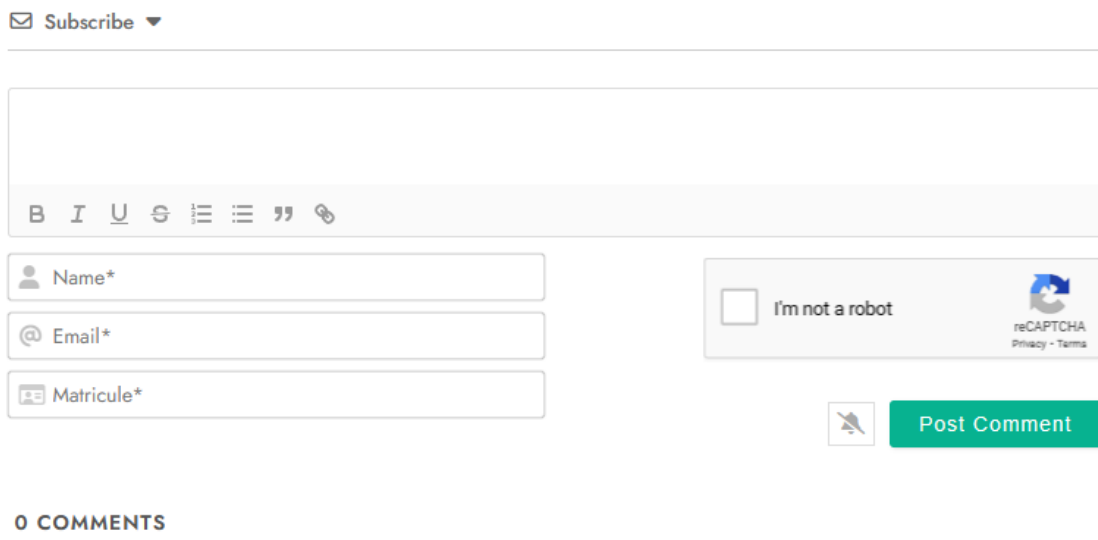
	Nom	Prénoms	CC/10	Examen/20	TD/20	Moy Final
1			10,00	16,25	15,00	15,50
2			10,00	16,50	15,00	15,60
3			10,00	15,25	15,00	15,10
4			0,00	0,00	5,00	3,00
5			10,00	15,00	15,00	15,00
6			7,50	13,75	12,50	13,00
7			3,00	10,75	8,00	9,10
8			1,00	7,50	6,00	6,60
9			10,00	16,50	15,00	15,60
10			4,00	5,50	9,00	7,60
11			0,00	0,75	5,00	3,30
12			10,00	17,50	15,00	16,00
13			2,00	8,50	7,00	7,60
14			10,00	18,25	15,00	16,30
15			3,00	10,50	8,00	9,00
16			4,00	7,50	9,00	8,40
17			3,00	8,50	8,00	8,20

Figure 3. 10: Grade display with commenting option

When a student clicks on the comment section, a form with three required fields - name, email, and "matricule" - appears. These fields are necessary for commenting. Additionally, students must bypass a reCAPTCHA test, which helps prevent spam and ensures that the comments are genuine.

Comments submitted by students require approval from either a teacher or an admin before they are published. Furthermore, students have the option to receive notifications whenever a response is provided or a new comment is added.

Chapter 3: Test and results



The image shows a comment form on a website. At the top left, there is a 'Subscribe' button with a mail icon and a dropdown arrow. Below it is a large text area for the comment. Underneath the text area is a toolbar with icons for bold (B), italic (I), underline (U), strikethrough (ABC), bulleted list, numbered list, quote, and link. To the right of the text area is a reCAPTCHA widget with a checkbox labeled 'I'm not a robot' and the reCAPTCHA logo. Below the text area are three input fields: 'Name*', 'Email*', and 'Matricule*'. To the right of these fields is a 'Post Comment' button with a paper plane icon.

Figure 3. 11: Comment form with reCAPTCHA

- **Dark mode**

Users can choose between dark and light mode on the website. By default, the website's appearance matches the user's device system settings, so it automatically adapts to the light or dark mode set on the device. This ensures the website's display is consistent with the user's preferred visual environment.

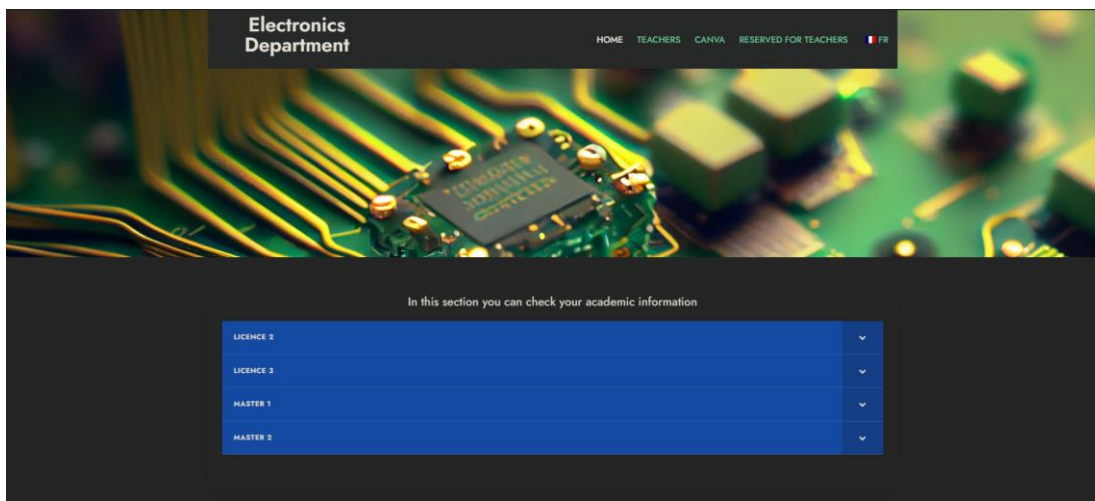


Figure 3. 12: Dark Mode Display

Chapter 3: Test and results

- Language changer

The website offers the option to translate the entire site to French, with English set as the default language. The translation has been done manually to ensure accuracy and maintain quality.

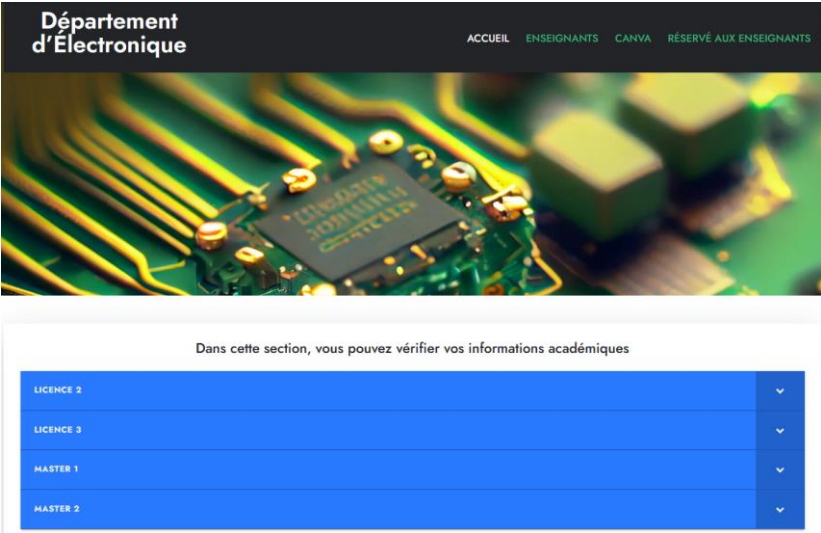


Figure 3. 13: Language changer

3.3.2 Teachers

The "Teacher" section follows the same structure and navigation principles as the homepage. It also provides students with easy access to information about their teachers.

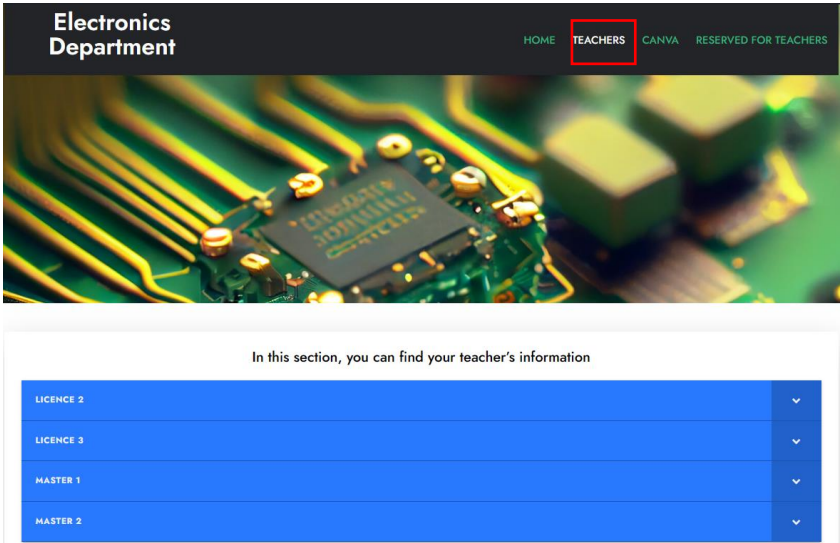


Figure 3. 14: Teachers section

Chapter 3: Test and results

Continuing with the Network and Telecommunication student example, when they select the Network and Telecommunication option, a new page opens. This page lists all the teachers in that specialty, including their rank, email, and the courses they teach.








 Mehdi Marouane Rank: Professor Email: mehdi@univ-blida.com Course: Cryptography and Network Security	 Bensebti Messaoud Rank: Professor Email: m_bensebti@yahoo.fr Course: Documentary research and thesis design	 zine leila Rank: Professor Email: zine.leila@gmail.com Course: Radio Navigation Systems	 Djebari Mustapha Rank: Professor Email: Course: Wireless networks and mobile networks
 Mahdi Bersali Rank: Email: Course: Video and audio over IP	 Berkati Rank: Email: Course: Web Technologies	 Fatma Zohra Reguieg Rank: Email: Course: Artificial Intelligence	

Figure 3. 15: Teacher information display

3.3.3 Canva

The Canva section helps students explore different specialties. It follows the same structure and navigation principles as other sections, but when selecting a specialty, it presents options by semester: two semesters for Licence 1, Licence 2, and Master 1, and one semester for Master 2.

LICENCE 3	^
BIOMEDICAL ENGINEERING	v
TELECOMMUNICATIONS	^
SEMESTER 5	
SEMESTER 6	
ELECTRONICS	v

Figure 3. 16: Canva section

Chapter 3: Test and results

When selecting a semester, a new page opens with a PDF that provides comprehensive information about each specialty. This includes details on courses, credits, coefficients, weekly hours, and evaluation methods.

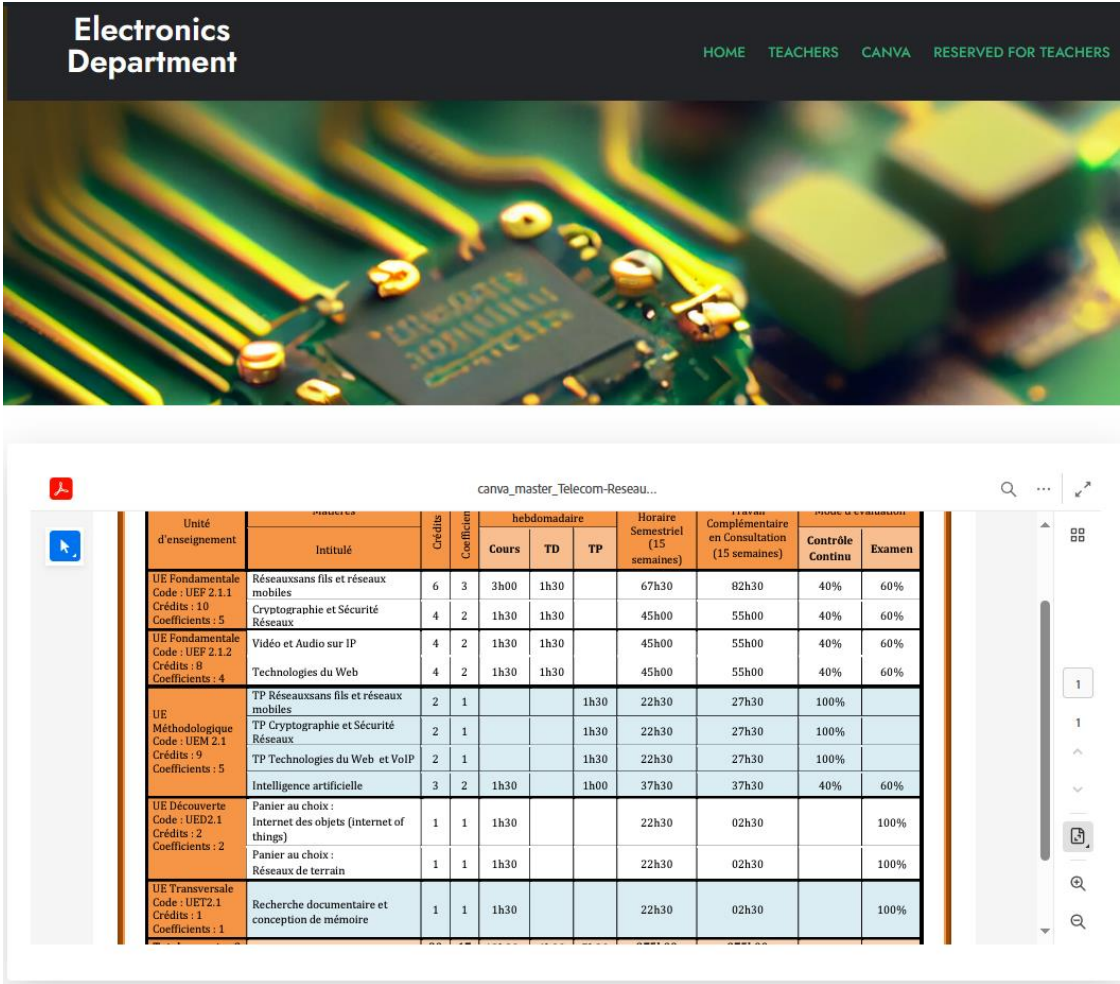


Figure 3. 17: Canva PDF

3.3.4 Reserved for teachers

This section is exclusively for administrators and teachers. Users with accounts created by administrators can access administration mode from this section, allowing them to edit website pages and content.

Chapter 3: Test and results

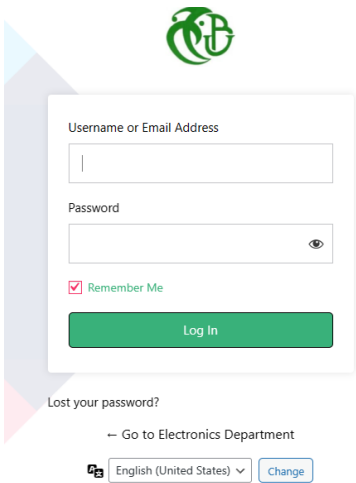


Figure 3. 18: Teacher login section

3.4 Teacher’s point of view

3.4.1 Dashboard

Once a teacher logs in, they see a simplified admin dashboard with limited editing options. We created separate accounts for each specialty so that each teacher can only edit content related to their own specialty. This helps keep things organized and prevents mistakes.

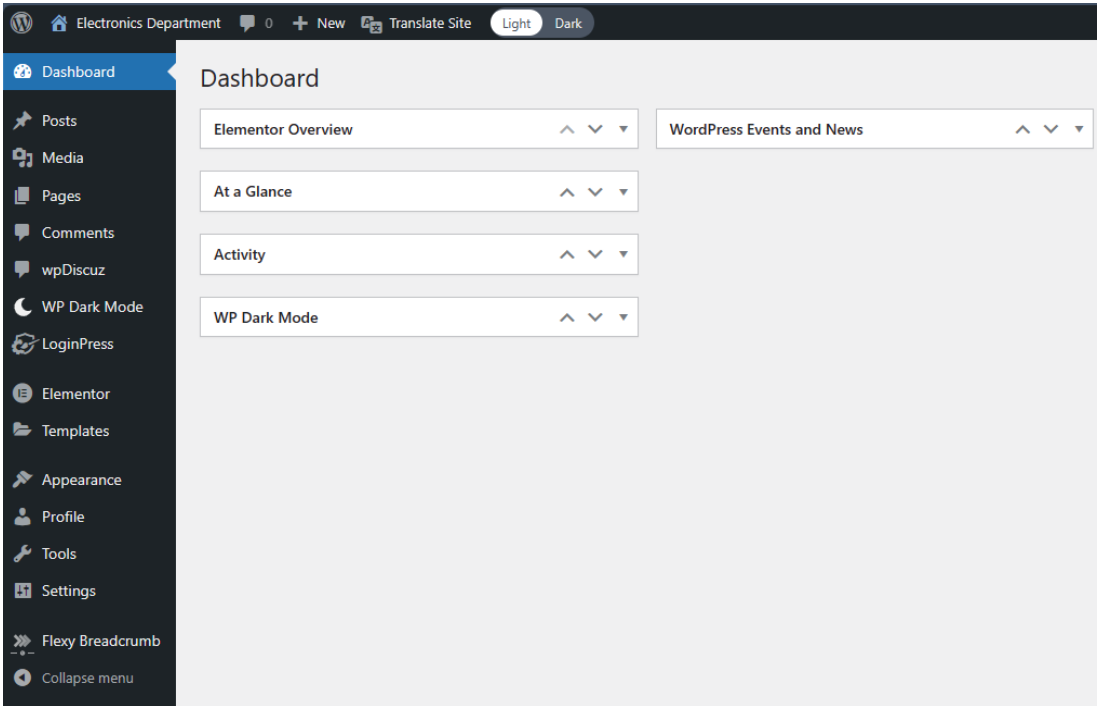


Figure 3. 19: Teacher dashboard

Chapter 3: Test and results

- **Media**

In the Media section, teachers can upload PDFs containing grades, but they don't have the authority to delete anything. Only administrators have the ability to delete files.

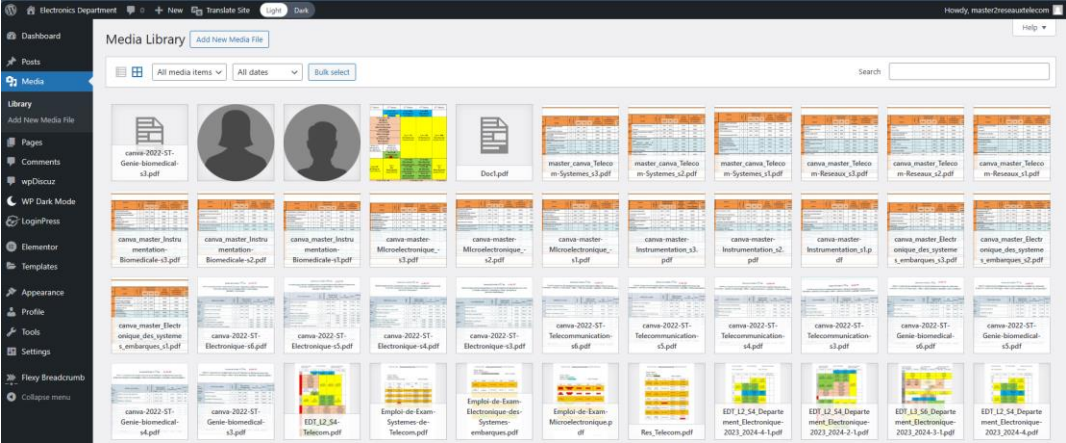


Figure 3. 20: Media section for teachers

- **Pages**

In this section, teachers have easy access to the pages they can edit to add grades, simplifying the process of managing student grades

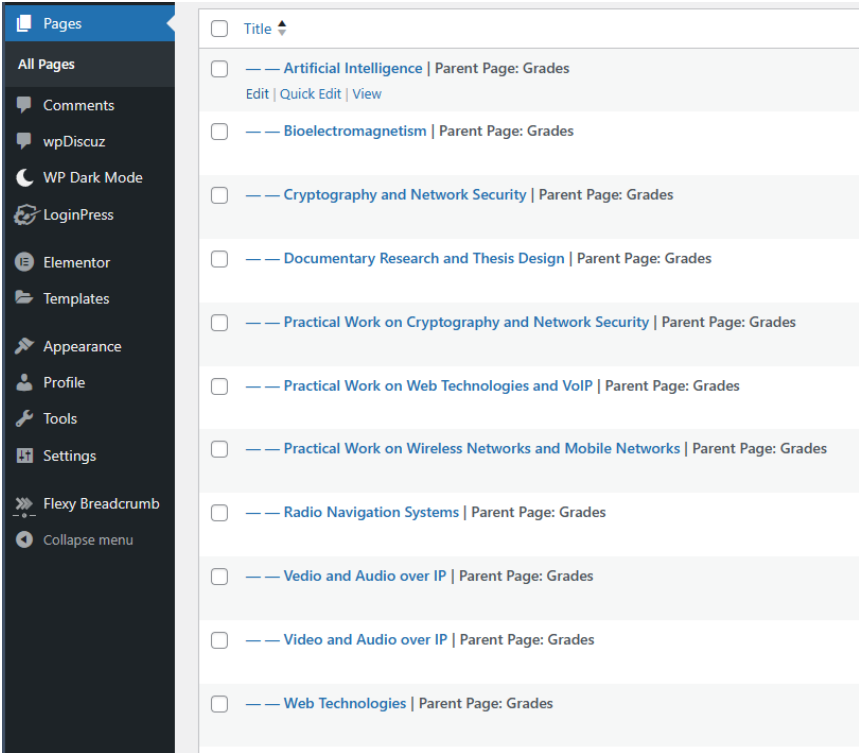


Figure 3. 21: Pages section for teachers

Chapter 3: Test and results

- **Comments**

In the comment section, teachers have several options available. They can approve, reply to, edit, mark as spam, or move comments to trash. Once approved by a teacher, the comment becomes visible for all users to see.

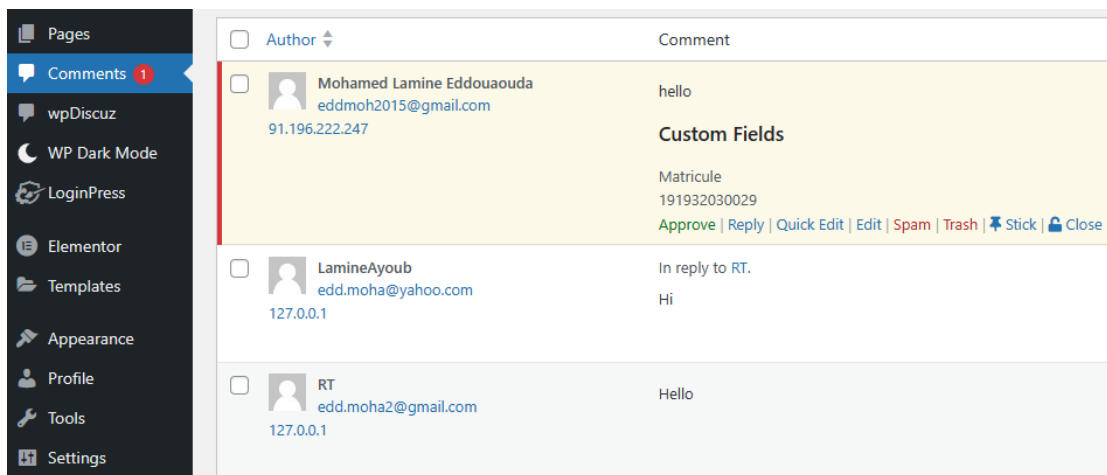


Figure 3. 22: Comment moderation for teachers

3.4.2 Page editing

When a teacher needs to update grades, they can simply click on the "Edit" button located at the top left of the module page, or they can access editing options directly from the dashboard by clicking on "Edit" in the pages section.

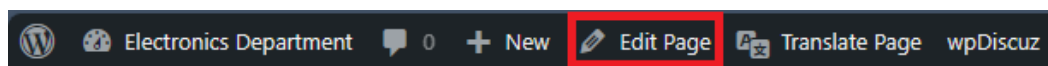


Figure 3. 23: Page editing option

This action opens a new page where they can choose to replace the current PDF with a new one by uploading it.

Chapter 3: Test and results

Wireless Networks and Mobile Networks

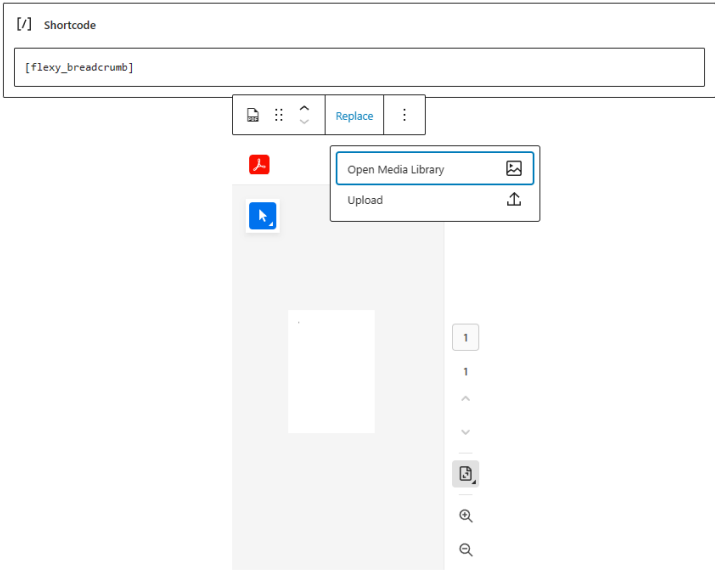


Figure 3. 24: PDF upload for grade updates

3.5 Administrator point of view

3.5.1.1 Dashboard

Admins possess complete authority over the website, with the ability to add or delete pages and media, moderate comments, change the website theme, edit theme files, add or delete plugins, create new users, manage themes, and adjust user roles.

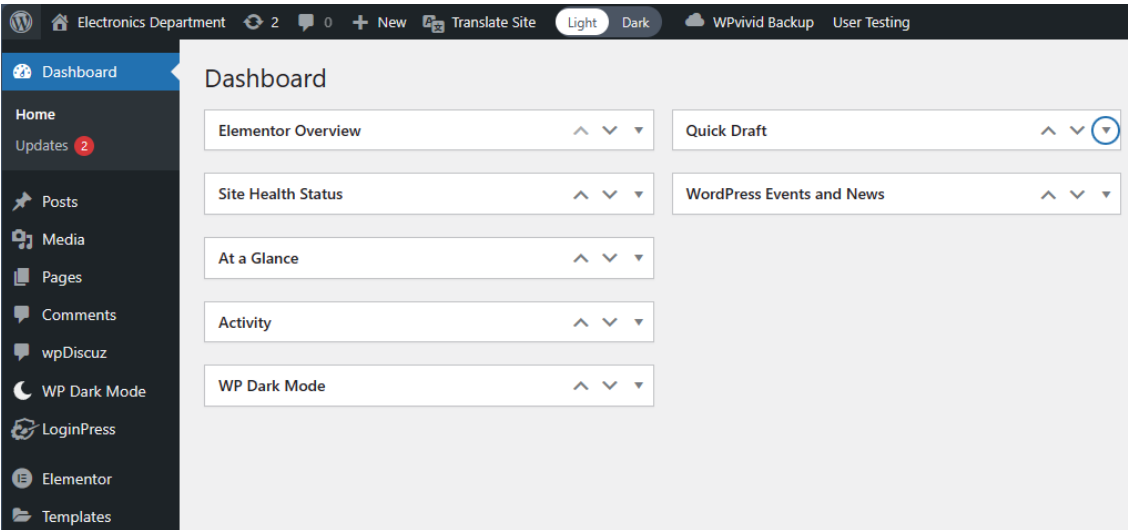


Figure 3. 25: Admin dashboard

Chapter 3: Test and results

- **Media**

Admins have the same capability as teachers to upload media, but they also have the additional authority to delete media, a privilege not granted to teachers.

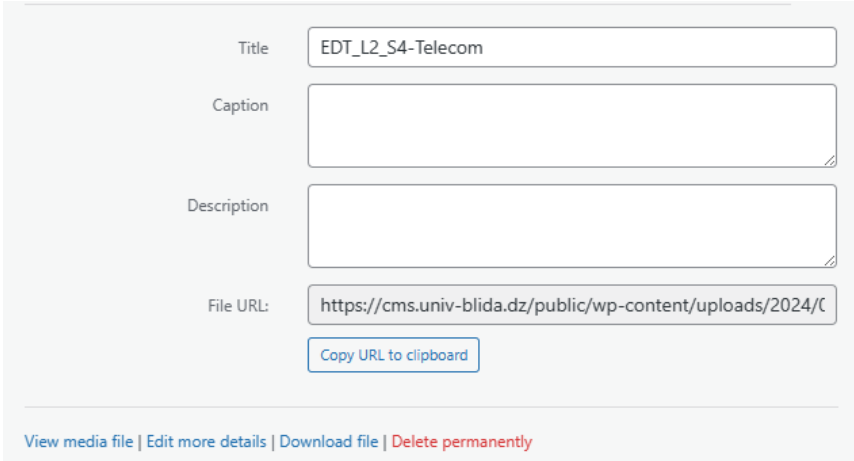


Figure 3. 26: Media section for admins

- **Pages**

Admins possess the authority to edit and delete all pages on the website, granting them comprehensive control over its content and structure.

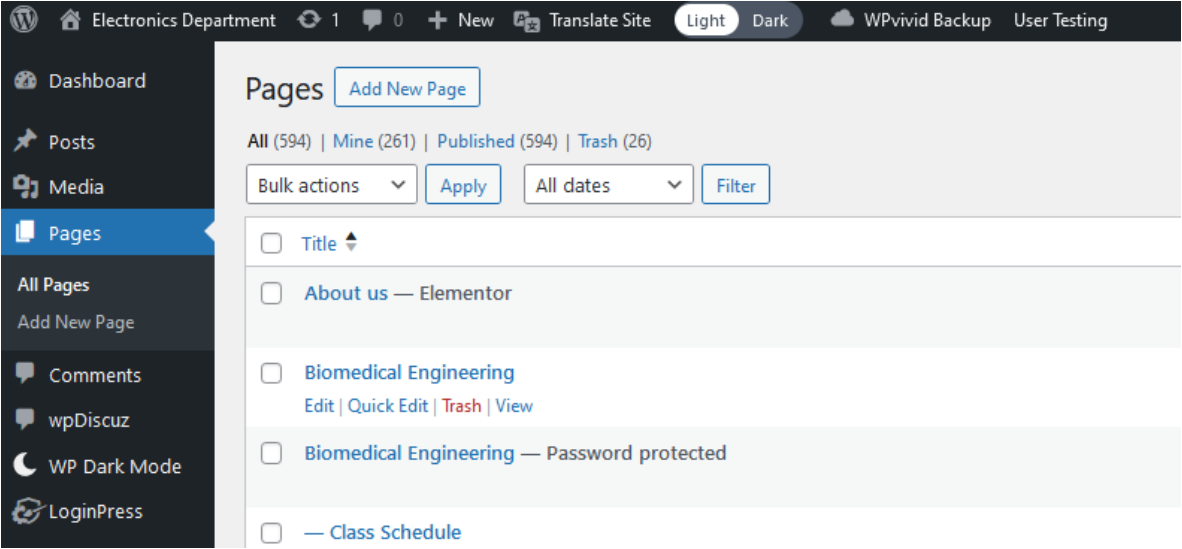


Figure 3. 27: Pages section for admins

Chapter 3: Test and results

- Themes

Admins can switch the website's theme, giving them the flexibility to update its look and feel as needed.

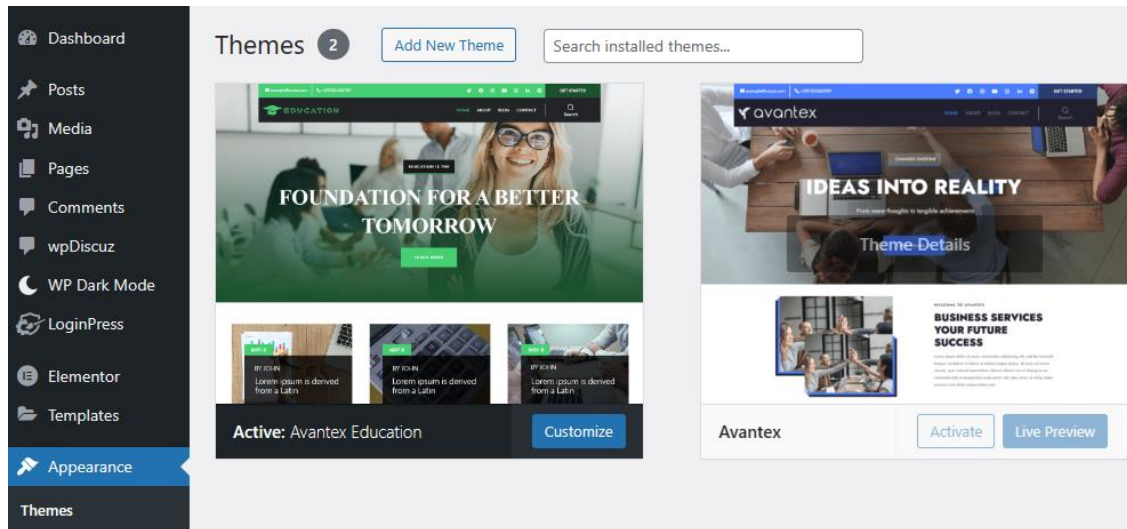


Figure 3. 28: Theme management for admins

- Plugins

Admins can manage plugins, adding or removing them as necessary to enhance the website's functionality.

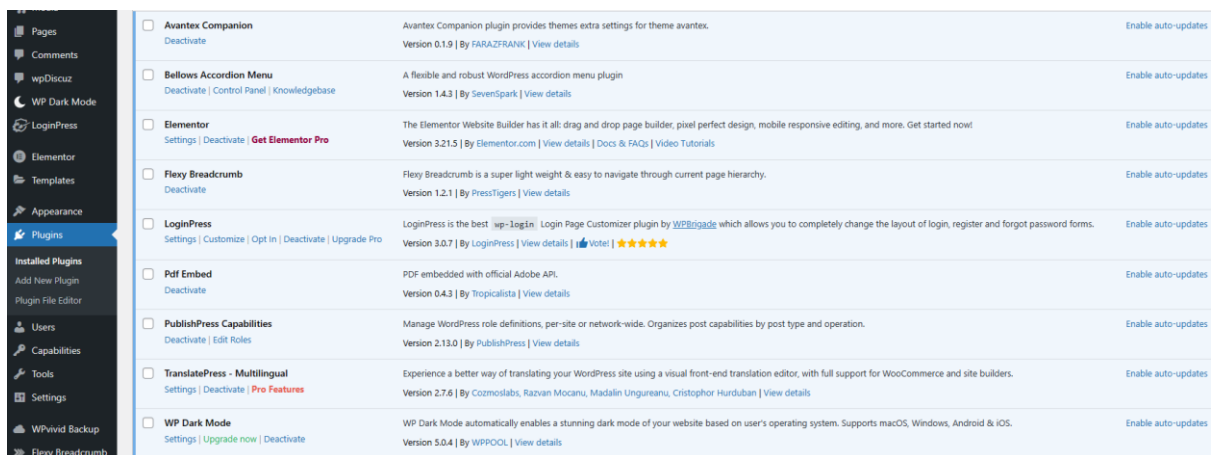
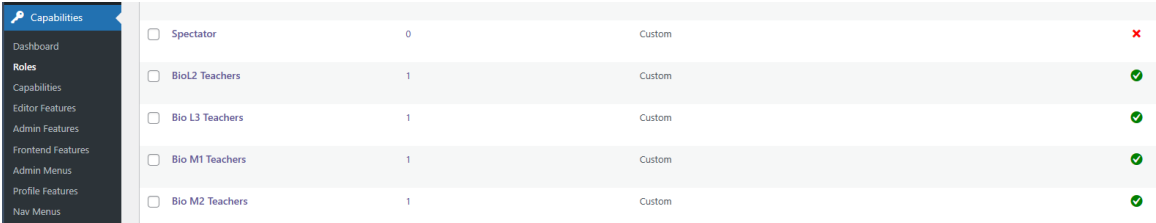


Figure 3. 29: Plugin management for admins

Chapter 3: Test and results

- **Users managing**

Admins have the ability to create user accounts, such as those for teachers, and assign specific roles to them. These roles come with tailored permissions, ensuring that each user has access to only the necessary features and functions required for their responsibilities.

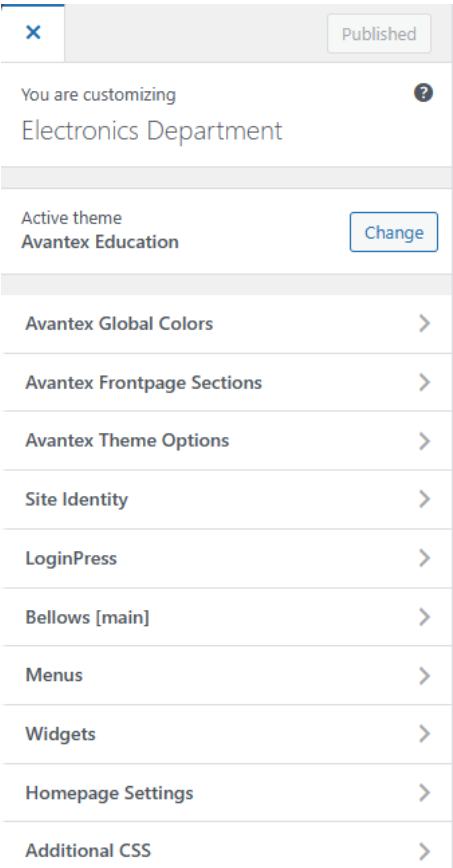


Role	Count	Permissions	Status
<input type="checkbox"/> Spectator	0	Custom	✘
<input type="checkbox"/> BioL2 Teachers	1	Custom	✔
<input type="checkbox"/> Bio L3 Teachers	1	Custom	✔
<input type="checkbox"/> Bio M1 Teachers	1	Custom	✔
<input type="checkbox"/> Bio M2 Teachers	1	Custom	✔

Figure 3. 30: User management for admins

3.5.2 Customization

Admins have the capability to customize the appearance and functionalities of the website's theme according to their preferences and requirements.



Published

You are customizing **Electronics Department**

Active theme: **Avantex Education** [Change](#)

- Avantex Global Colors >
- Avantex Frontpage Sections >
- Avantex Theme Options >
- Site Identity >
- LoginPress >
- Bellows [main] >
- Menus >
- Widgets >
- Homepage Settings >
- Additional CSS >

Figure 3. 31: Theme customization for admins

Chapter 3: Test and results

3.6 Conclusion

The evidence that the website successfully met the requirements of the electronics department was made possible by the testing and evaluation phase that was covered in Chapter 3. The chapter included in-depth walkthroughs from the perspectives of teachers, administrators, and students to demonstrate how important elements and objectives were carried out effectively. The positive results obtained show the website's ability to improve the sharing of information, enhance transparency, and increase participation in the academic community. The evaluation points to the project's overall success in offering a user-focused solution for effective academic information management.

General conclusion

General conclusion

In conclusion, the electronics department now has a dedicated website that was designed and developed by this End-of-Studies Project (ESP), which seeks to improve academic services' accessibility, efficiency, and transparency. The website enabled easy access for both students and faculty members by organizing important information such as exam results, schedules, instructor details, and module-specific content, all through a user-friendly platform.

User experience and engagement took top priority in the website's thoughtful design, including features like a simple user interface, a mobile-friendly website, and responsive design. Furthermore, solid privacy measures, including limited access to sensitive information, were implemented to maintain data integrity and protect students' privacy.

Through WordPress serving as the Content Management System (CMS) and careful theme and plugin selection, the website offers a great deal of customization and functionality along with a smooth, modern look. Plugins improved the functionality of the website by offering advanced page-building tools, support for multiple languages, and an enhanced commenting system.

Clear testing and evaluation from the viewpoints of administrators, teachers, and students was carried out throughout the project to make sure the website met with the highest standards for security, usability, and accessibility. The outcomes demonstrated how well-integrated key features, effective content management, and simplified information distribution were all included in the website.

All things considered, this End-of-Studies Project has shown how technology can transform educational services and raised the bar for transparency, effectiveness, and engagement in the electronics department. The success of the website serves as proof of the successful combination of functionality, design, and user-friendly design, opening the door for more developments in the field of academic information management.

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