Design and Implementation of Online Course Management System

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Submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
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APPROVAL

The project titled "**Design and Implementation of Online Course Management System**" submitted by Shahana Akter (CSE1801013032), Abdul Wahid Khan (CSE1801013109),Md. Estiak Ahmmed (CSE1902017029) and Md. Jakaria (CSE1902017082) to the Department of Computer Science and Engineering, Sonargaon University (SU), has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents.

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DECLARATION

We, hereby, declare that the work presented in this report is the outcome of the investigation performed by us under the supervision of **Bulbul Ahamed, Associate Professor and Head,** Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We reaffirm that no part of this project has been or is being submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

In today's fast-paced world, the demand for accessible and effective online education is soaring. Creating an online course management system is not just about delivering content; it's about crafting a transformative learning experience. This project, "Design and Implementation of Online Course Management System" is a comprehensive guide to conceptualizing, planning, and executing a successful online course that engages learners and facilitates meaningful learning outcomes. This project holds actually how to educate and inspire the target audience, and equips the tools and knowledge needed to create a dynamic online learning environment. It’s an education journey that will empower audience to make a lasting impact on the world of online education.This system supports the cross browser and fully integrated with different databases. This system focused on the several features namely Content Management, Content Protection, Learning Management, Evaluation management, Access Control, etc., and mainly focused on integrated platform needed for e-learning and management.

ACKNOWLEDGMENT

At the very beginning, we would like to express my deepest gratitude to the Almighty Allah for giving us the ability and the strength to finish the task successfully within the schedule time.

We are auspicious that we had the kind association as well as supervision of **Bulbul Ahamed, Associate Professor and Head,** Department of Computer Science and Engineering, Sonargaon University, whose hearted and valuable support with best concern and direction acted as necessary recourse to carry out our project.

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We are also thankful to all our teachers during our whole education, for exposing us to the beauty of learning.

Finally, our deepest gratitude and love to my parents for their support, encouragement, and endless love.

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
CAI	Computer Assisted Instruction
CAL	Computer Assisted Learning
CBI	Computer Based Instruction
CMI	Computer Managed Instruction
CMS	Course Management System
CPU	Central Processing Unit
CSS	Cascading Style Sheet
ER	Entity Relationship
ERD	Entity Relationship Diagram
HTML	Hyper Text Markup Language
ILS	Integrated Learning System
LMS	Learning Management System
MySQL	My Structured Query Language
PC	Personal Computer
PHP	Hypertext Preprocessor
RAM	Random Access Memory
SDLC	Software Development Life Cycle
SQL	Structured Query Language
UI	User Interface
UX	User Experience
XAMPP	X (cross platform), Apache, MySQL, PHP, Perl

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Chapter 1
Introduction to Course Management System

1.1Introduction

A Course Management System, also known as a Learning Management System (LMS), is a software application or web-based platform designed to facilitate the creation, delivery, management, and administration of educational courses or training programs. This system is designed for the student or audience of a country to build their career and skills in smooth and effective manner. These systems will ultimately allow to manage resources.

1.2 What is Course Management System?

A course management system is a software application for the administration, documentation, tracking, reporting, automation, and delivery of educational courses, training programs, materials or learning and development programs [1]. The learning management system concept emerged directly from e-Learning. Learning management systems make up the largest segment of the learning system market. The first introduction of the CMS was in the late 1990s [2]. Learning management systems have faced a massive growth in usage due to the emphasis on remote learning during the COVID-19 pandemic [3].

1.3 History of Course Management System

The history of Course Management Systems (CMS), also known as Learning Management Systems (LMS), traces its origins to the early experiments with computer-based education in the 1960s and 1970s. However, the rapid development and widespread adoption of CMS/LMS began in the late 1990s with the emergence of commercial solutions like Blackboard and WebCT, alongside open-source alternatives like Moodle. With the growth of the internet, these systems evolved to facilitate online course creation, content delivery, user management, and assessment. Throughout the 2000s and beyond, CMS/LMS platforms continued to expand, integrating mobile learning, analytics, and personalized learning features, culminating in their vital role during the COVID-19 pandemic, where they ensured educational continuity and further solidified their place in modern education. The history of the application of computers to education is filled with broadly descriptive terms such as computer-managed instruction (CMI), and integrated learning systems (ILS), computer-based instruction (CBI), computer-assisted instruction (CAI), and computer-assisted learning (CAL). These terms describe drill-and-practice programs, more sophisticated tutorials, and more individualized instruction, respectively [4].

1.4 Course Management System Principle

A good learning management system will help you maintain a sense of continuity and community when learning shifts to a remote format. Help students see the LMS as the remote extension of their physical classroom space. Here are some key principles:

Accessibility and Convenience: An effective CMS should prioritize accessibility and convenience for learners. It should enable users to access learning materials and activities from anywhere with an internet connection, allowing for flexibility in when and where learning takes place. This principle ensures that learners can engage with course content and participate in activities at their own pace and on their preferred devices.

Scalability and Customization: CMS platforms should be scalable to accommodate both small courses and large-scale educational programs. They should also offer customization options to adapt to the unique needs and preferences of educators, institutions, or organizations. Customization may include branding, tailored content organization, and the ability to integrate with other educational tools and systems.

Learning Analytics and Assessment: Course management systems should provide tools for tracking and assessing learner progress. This includes features like gradebooks, assessment creation and management, and analytics that offer insights into learner performance. These tools help instructors and administrators monitor the effectiveness of courses and identify areas for improvement in both content and instructional methods. Modern LMSs include intelligent algorithms to make automated recommendations for courses based on a user's skill profile as well as extract metadata from learning materials to make such recommendations even more accurate [5].

1.5 Global Top Course Management System Platforms

Here are some global top course management system platforms list-

- Coursera
- Udemy
- Skillshare
- LinkedIn Learning
- Khan Academy
- Academy of Mine
- OpenLearn
- LearnWorlds
- MasterClass
- Social Glow

1.6 Course Management System Service in Bangladesh

Course management system Bangladesh (CMSBD) is an eLearning platform in Bangladesh that provides high-quality e-course design training and a platform for learners to create their own courses. With a vision of empowering learners to become e-course creators, learning management system Bangladesh (LMSBD) offers a comprehensive range of online courses and resources that help learners develop the skills and knowledge they need to design and develop engaging and effective e-courses. Here are a few course management system services commonly used in Bangladesh:

Shikho: Shikho is one of the most popular e-learning platforms in Bangladesh. By offering high-quality animated video classes, allowing live classrooms, graphical learning journeys, continuous assessment, and performance metrics, they are showing how distance learning can be a great alternative to house tutors or coaching centers.

10 Minute School: One of the most popular platforms to distance learning in Bangladesh is 10 Minute School. It started as a small initiative but is now quickly growing, with nearly 150000 students routinely taking lessons. Telco giant ROBI and some prominent personalities sponsor this platform.

Programming Hero: Mr. Jhankar Mahbub, a well-known personality in the country's programming sector, established 'Programming Hero,' a platform that gives programming lessons engagingly and entertainingly. An alpha version of the 'Programming Hero' app was launched in 218.

1.7 Some Course Management System services in Bangladesh

These are the top course management system services in our country-

- ShikkhokBatayon
- eshikhon
- Study Press
- Amar Pathshala
- Muktopaath

1.8The Future of Course Management System

A Glimpse into the Future of Education.Imagine a world where the educational experience is tailored to each individual's needs, where the learning process is seamless and engaging, and where educators can focus on nurturing the students' creativity and innovation. The concept of e-learning began developing in the early 20th century, marked by the appearance of audio-video communication systems used for remote teaching [6].The future of Course management systems (CMS) is evolving rapidly, with the integration of artificial intelligence (AI) as a driving force behind these advancements. This article explores the emerging trends, predictions, and innovations in CMS and the crucial role that AI plays in revolutionising the educational landscape. In the future, AI-powered CMS will create individualised learning

paths for each student. By analysing data on students' learning styles, preferences, and performance, AI algorithms will be able to recommend the most suitable content, pace, and sequence. This personalisation will lead to more effective learning and improved outcomes, as students will no longer be forced to follow a one-size-fits-all curriculum. The incorporation of AI in CMS will enable real-time feedback and intervention for both students and educators. By continuously monitoring students' progress, AI algorithms will identify knowledge gaps, misconceptions, or struggles and offer timely support.

1.9 Technology Information:

To develop online based Course management system different technologies need to be used. Here are the list of technologies and their details which are used to develop this platform (Table 1.1).

Technology Information		
SL	**Name**	**Details**
1	Bootstrap	Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains HTML, CSS and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.
2	Javascript	JavaScript, often abbreviated as JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. As of 2022, 98% of websites use JavaScript on the client side for webpage behavior, often incorporating third-party libraries.
3	jQuery	jQuery is a JavaScript framework designed to simplify HTML DOM tree traversal and manipulation, as well as event handling, CSS animation, and Ajax. It is free, open-source software using the permissive MIT License. As of Aug 2022, jQuery is used by 77% of the 10 million most popular websites.

4	Ajax	Ajax is a set of web development techniques that uses various web technologies on the client-side to create asynchronous web applications. With Ajax, web applications can send and retrieve data from a server asynchronously without interfering with the display and behaviour of the existing page.
5	PHP	PHP is a general-purpose scripting language geared toward web development. It was originally created by Danish-Canadian programmer Rasmus Lerdorf in 1993 and released in 1995. The PHP reference implementation is now produced by The PHP Group.
6	SQL	Structured Query Language, abbreviated as SQL, is a domain-specific language used in programming and designed for managing data held in a relational database management system, or for stream processing in a relational data stream management system.
7	MySQL	MySQL is an open-source relational database management system. Its name is a combination of "My", the name of co-founder Michael Widenius's daughter My, and "SQL", the acronym for Structured Query Language.

Table 1.1: Technology information

1.9 Objectives

A Learning Management System has been beautifully crafted to perfection with many effective objectives to make learning, organizing, reporting and administration a fruitful process. From a trainer to employees to a student, this LMS has been gaining accolades for all the right reasons. Nowadays, you will find this Learning Management System not only in schools and universities but also in the corporate organizations. The former makes use of an LMS to share knowledge and education whereas, the latter uses it for training their employees. Hence it can be concluded that both the industries immensely benefit from this online learning system. A Learning Management System has the capacity to hold a plethora of content within itself, aiming to provide a wide set of information to the learner. Be it the learner or the tutor, both have an access to a pool of resources or rather content where they can get an access to at any point in time. This ensures that there is no restriction on the volume of the content that the learner can indulge in. With technology in education, one gets the privilege to add all sorts of creative and effective elements that make education fun and fruitful in nature. From variety in content to social learning element, LMS aims to make education effective for the students. In addition to this, it also allows the learner to access content as many times as possible, accentuating the convenience of the learner. The various assessment tools and reports keep a track on the student’s performance, encouraging to make

amendments as per the need and requirements. This ensures that the sessions are effective for the students.

- Content Centralization: LMS platforms serve as a centralized repository for educational content, making it easily accessible to both instructors and learners.
- Improved Learning Experience: LMS systems enhance learning experiences through interactive content, assessments, and collaborative features.
- Administrative Efficiency: They streamline administrative tasks, reducing the burden on instructors and administrators.
- Progress Tracking: LMS platforms offer tools for tracking learner progress and performance, facilitating assessment and feedback.
- Accessibility and Flexibility: LMS platforms prioritize accessibility, enabling learners to access course materials at their convenience, promoting self-paced learning and flexibility in the learning process.

Chapter 2

Working Procedure

2.1 Working Procedure

Working is mainly the body of Working Procedure, rules, and a particular procedure or set of procedures for achieving proposed model's objectives. We use SDLC model to complete our project. This project work has completed by following some steps.

Diagrammatic representation of these steps of waterfall model is given below:

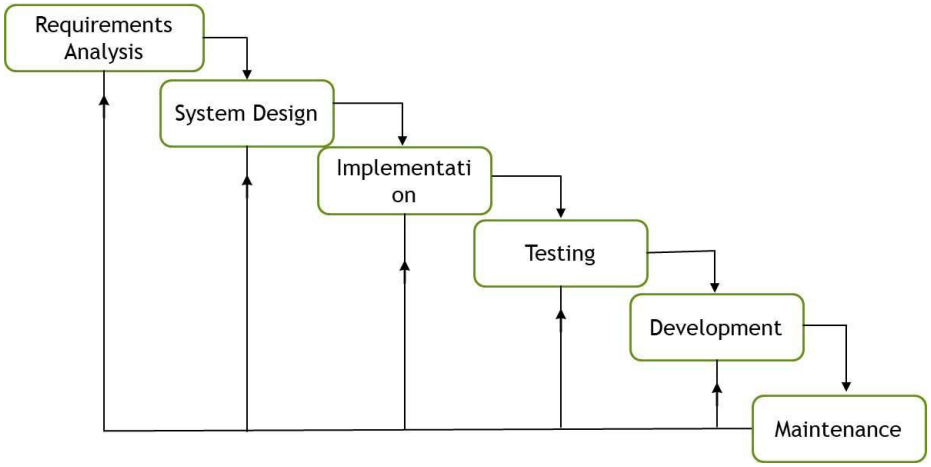


Figure 2.1: SDLC model

2.2 Justification of Procedure

Every software developed is different and requires a suitable SDLC approach to be followed based on the internal and external factors. The SDLC phases are as follows -

- Requirements are very well documented, clear and fixed.
- Product definition is stable.
- Technology is understood and is not dynamic.
- There are no ambiguous requirements.

- Ample resources with required expertise are available to support the product.
- The project is short.

2.3 Description of Procedure

A Description of Procedure is a type of diagram that represents a workflow or process. A Description of Procedure can also be defined as a diagrammatic representation of an algorithm, a step-by-step approach to solving a task. The Description of Methodology shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows.

2.3.1 Requirement Analysis

Gathering and documenting data for moving forward. All your next phase decisions will be based on the data you've collected on this stage. You will consider client interviews and meetings for the development and customization of the project.

- User actions on the website. What all actions can a user perform on the website videos, images, audio, presentation and documentation.
- User Registration and Authentication.
- Defined the user interface (UI) and user experience (UX) requirements.
- Admin and instructor can upload and update lessons.

2.3.2 System Design and Development

System design and development refers to the process of creating and implementing a new computer-based system or improving an existing system to meet specific requirements and solve a particular problem. It involves designing the architecture, components, and functionalities of the system while considering factors like performance, scalability, security, and usability. The process of system design and development typically includes the following steps: Requirement analysis, System design, Implementation, Testing and quality assurance, Deployment, Maintenance and support.

2.3.3 Implementation

With regards to our analysis and system design you will implement your code on this stage. You will apply all system logic and service integration to give your Course Management System its face.

2.3.4 Testing

All the programs for all possible defects, by running test cases either manually or by automation. The client is involved in the testing phase as well, to ensure all requirements are met.

2.3.5 Maintenance

Installation and maintenance include making the appropriate modification to the product or system or enhancing, changing, or modifying attributes related to performance issues related to the system. Its main role is to improve the performance of the system with the maximum accuracy result of our blink apps output. These progressions raised during the support stage are significantly connected with changes started to be finished by the client or clients after the establishment and testing stage, which includes bugs like imperfections revealed during live employments of the framework or requests raised by the customers. So the customer is furnished with convenient upkeep and backing for the created item. You will really be amazed to know that the effort made in the design and development phase of the product is only 60% effort as compared to the efforts made in the maintenance phase.

Maintenance is the generally significant phase of a software life cycle. There are 3 types of maintenance:

- Corrective Maintenance: This sort of upkeep is done to address blunders that were not found during the item advancement stage.
- Perfection Maintenance: This kind of support is done to upgrade the functionalities of the framework in view of the client's solicitation.
- Adaptive Maintenance: Versatile upkeep is typically needed for porting the product to work in another climate like work on another PC stage or with another working framework.

2.4 Requirement Gathering Technique

Whether you are performing a system upgrade or re-platforming altogether, requirements gathering is crucial. Businesses need to establish a water-tight specification for the project with guidance around every feature. That's where Magpie comes in. We are specialist course management system consultants who can add invaluable insight to the planning process and make sure your project is a success.

Chapter 3
Analysis of Requirements, Design and Implementation

3.1 Analysis Requirements

Requirements Analysis is the analysis of defining the expectations of the users or client for an application that is to be built or modified. Requirements analysis involves all the acts that are conducted to identify the needs of the different stages of processing. Therefore requirements analysis is analyzed, documented, validate, system requirements and server requirements.

High-quality requirements are documented, actionable, measurable, testable, traceable, helps to identify business opportunities, and are defined to facilitate system design. For this reason, the system is easy to understand and also easy to modify or correct for future

- System requirements
- User requirements

3.1.1 System Requirement

There are two types of requirements in this system requirements phase. Following is the two types of system requirements:

- Hardware requirements
- Software requirements

3.1.2 Hardware Requirements

- CPU: for web 1,6 GHz , for web and database 4 x 1,6 GHz CPU.
- RAM: 4GB.

- Minimum database space: 10GB.
- CPU: Quad 2GHz+ CPU.

3.1.3 Software Requirements

- Bootstrap
- Javascript
- jQuery
- Ajax
- PHP
- SQL
- MySQL
- XAMPP

3.1.4 User Requirement

- PC/Laptop/Mobile Device
- Must Have reachable to browser

3.2 Design and Implementation

Design and implementation parts have the same basic functions. The function is regarded as follows:

3.2.1 Data Flow Diagram

A flowchart is a type of diagram that represents an algorithm, workflow, or process. The flowchart can also be defined as a diagrammatic representation of an algorithm (step by step approach to solving a task). The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. This diagrammatic representation illustrates a solution model to a given problem. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields.

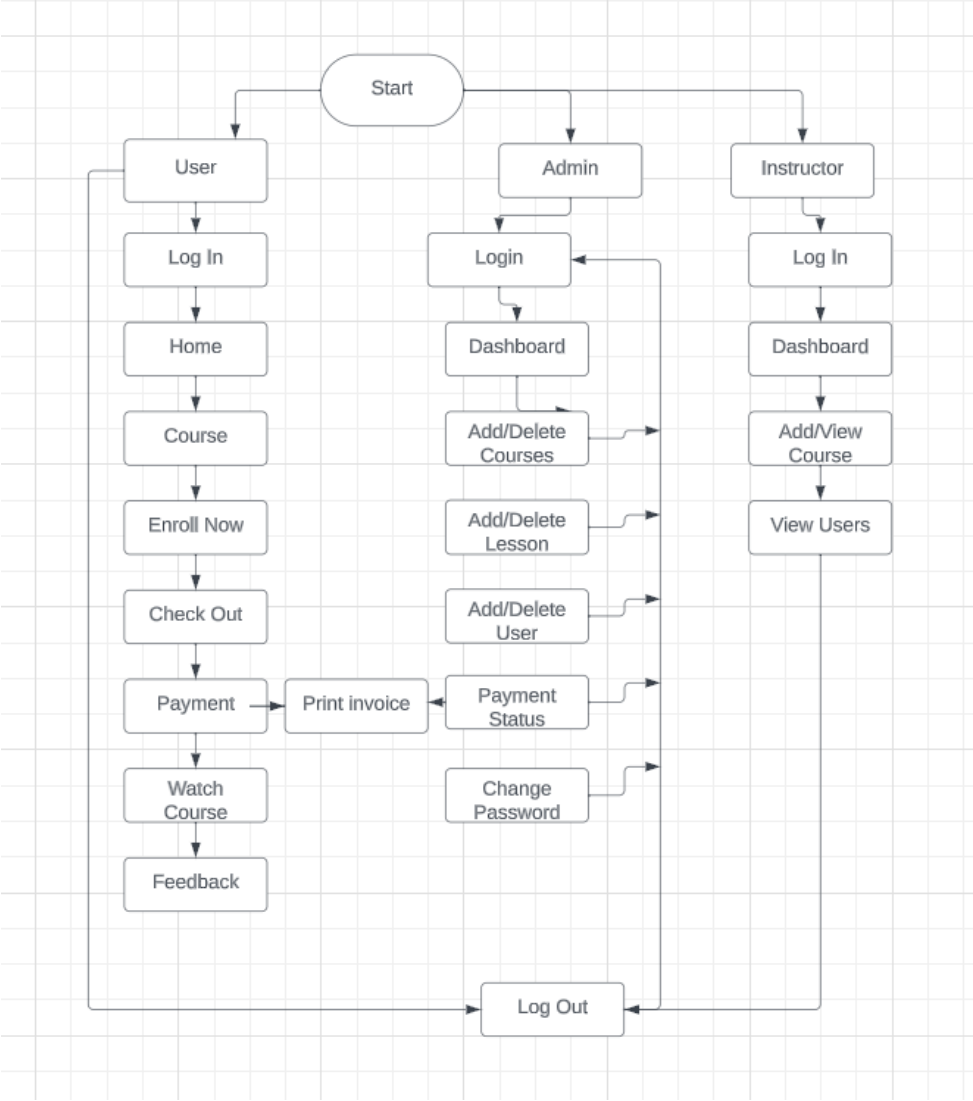


Figure 3.1: Data Flow Diagram

First, a login request needs to make with a username and password. If they are valid, the login will be successful. Here, the user will get his individual profile access. The admin will get the read/write and all the other access

3.2.2 Use Case Diagram

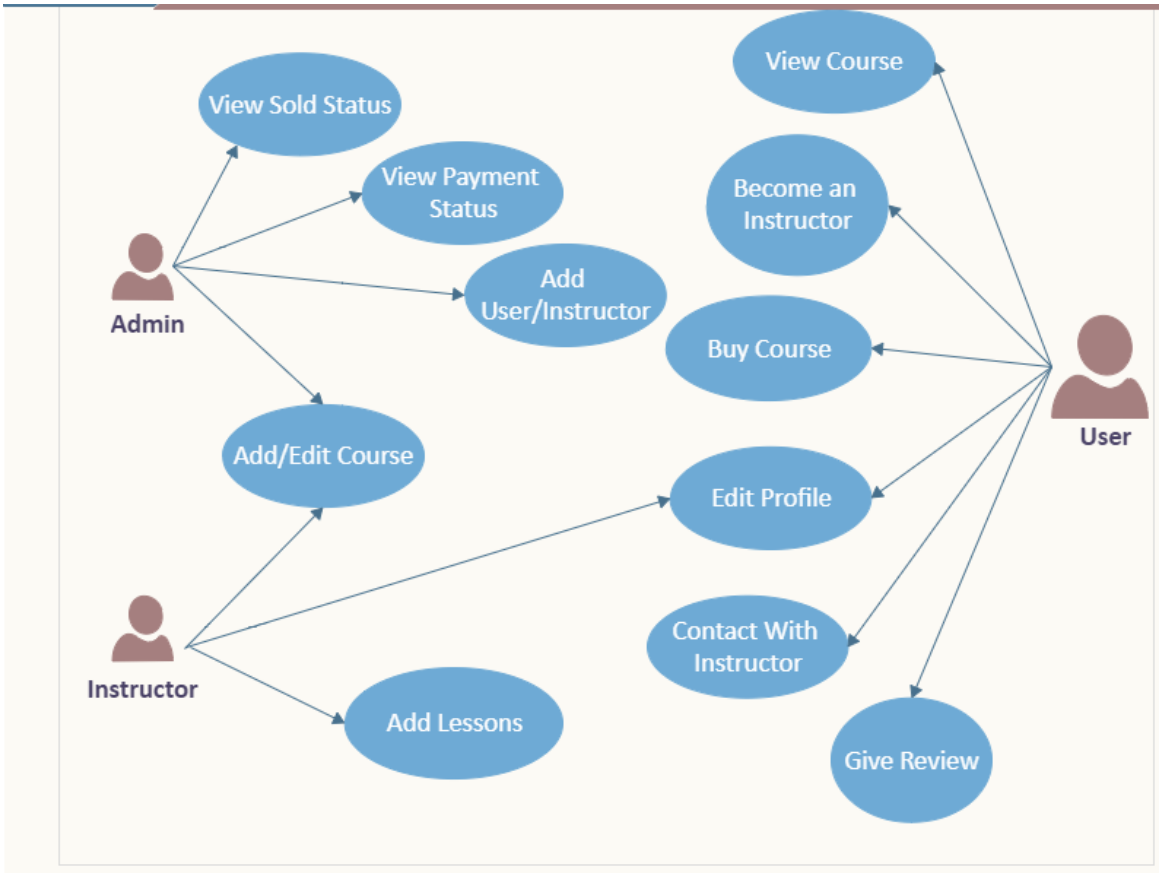


Figure 3.2: Use Case Diagram

View sold status: If admin wantsto see new sold items, By default it will be seen on dashboard. But admin can see all sold items manually.

View payment status: Admin can see all users payment status by using users transaction id.

Add user/Instructor: Admin can add users and instructor. Along with remove them.

Add/Edit course: Admin has both access to add or delete course. After adding a course automatically the new course will appear on the course list.

Add lesson: Both admin and instructor have the access to add or remove lessons. After adding lesson both admin and instructor can see the lesson details.

Bye Course: Users can buy course. If a user buy a course then the user can view all the course lessons.

Edit profile: Users can edit their profile. Change profile picture, change password etc.

3.2.3 ER Diagram

Here is an ER diagram about the Course management system database. An Entity Relationship Diagram (ERD) shows how entities (such as people, objects or concepts, etc.) relate to each other in a particular system. Generally, an ERD does not define business processes, but graphically displays business data patterns. In this case, the entity can be regarded as a noun and the relation can be considered as a verb.

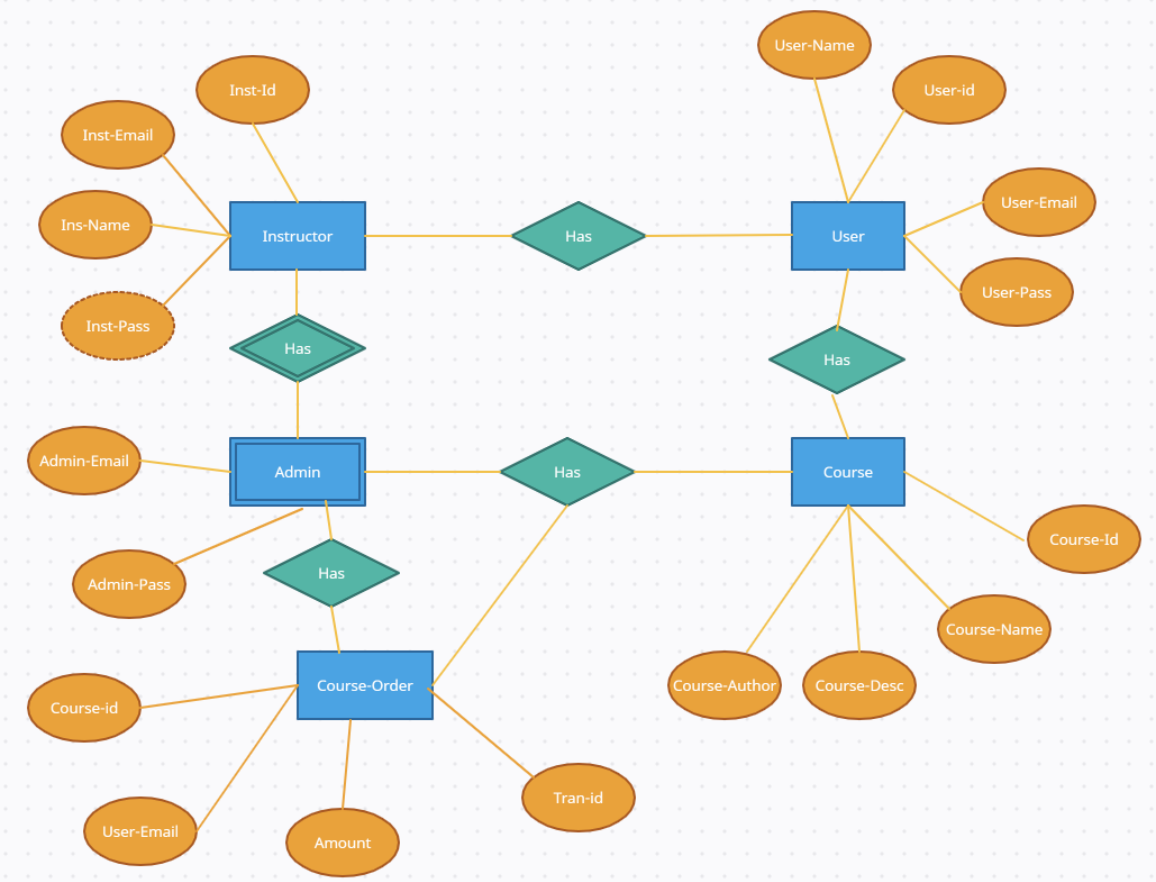


Figure 3.3: ER Diagram

Chapter 4
Project Description

Here is our Project Screenshot Start. Here we will be able to see Admin, user panel and Courses information.

4.1 Admin Dashboard

This is our Admin Dashboard Page. Here we will be able to see all courses, total students and total sold courses and course order for all students who bought it from this platform. From this dashboard we can also add and manage courses and lessons.

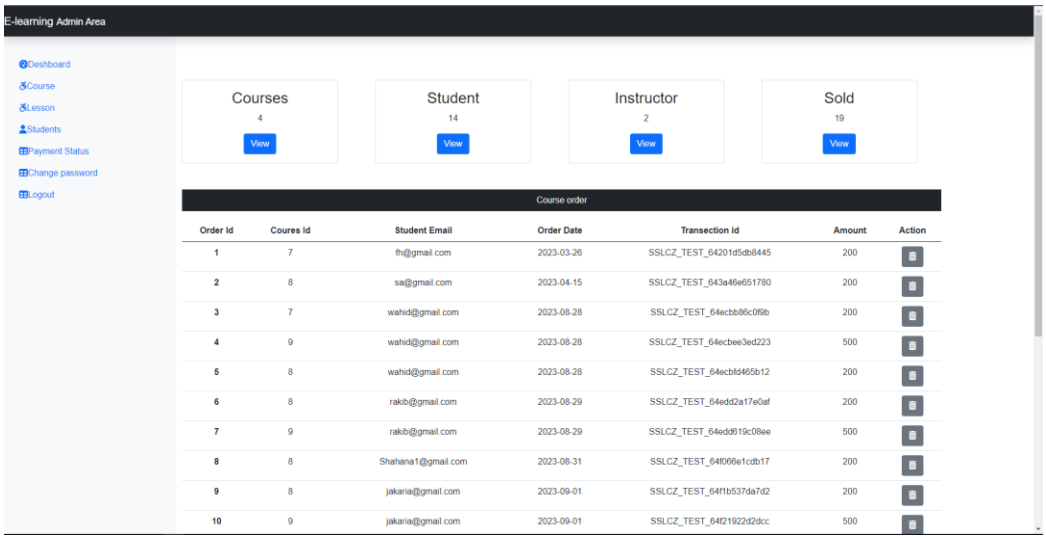


Figure 4.1: Dashboard Overview

4.1.1 All courses list

Here we can see all courses list of this platform.



Figure 4.2: All Courses list

4.1.2 Add Course

Here we can see add course page form of this platform.

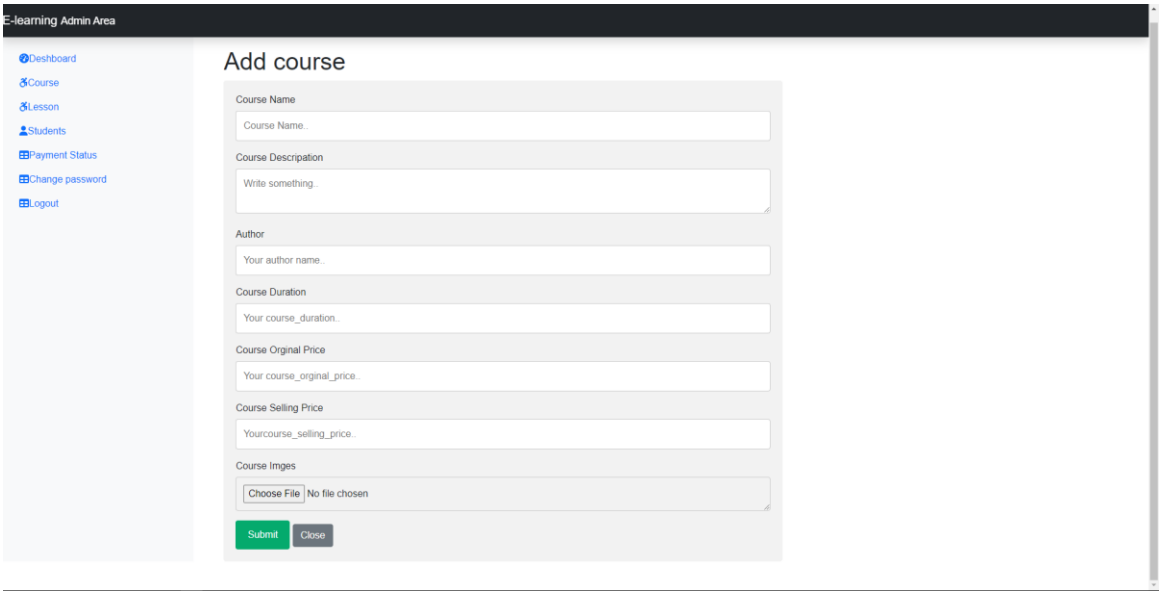


Figure 4.3: Add Course Form

4.1.3 List of Courses

Here we can see list of courses information of this platform.

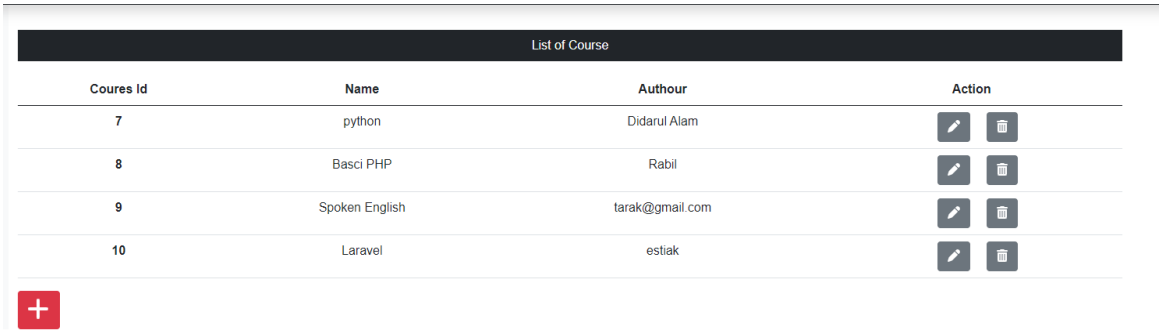


Figure 4.4: List of Courses

4.1.4 Total Students informationfiltered by Student Id

From this dashboard we can see the list of all the studentsfiltered by students id that has been made on the system.

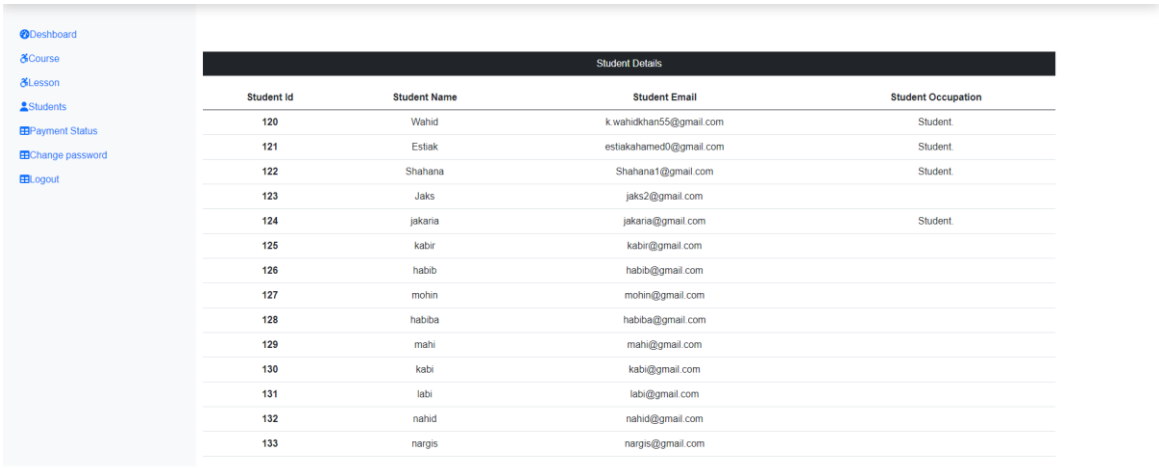


Figure 4.5: Total Student information filtered by student id

4.1.5 Admin Login page

Here is the admin login page of this platform.

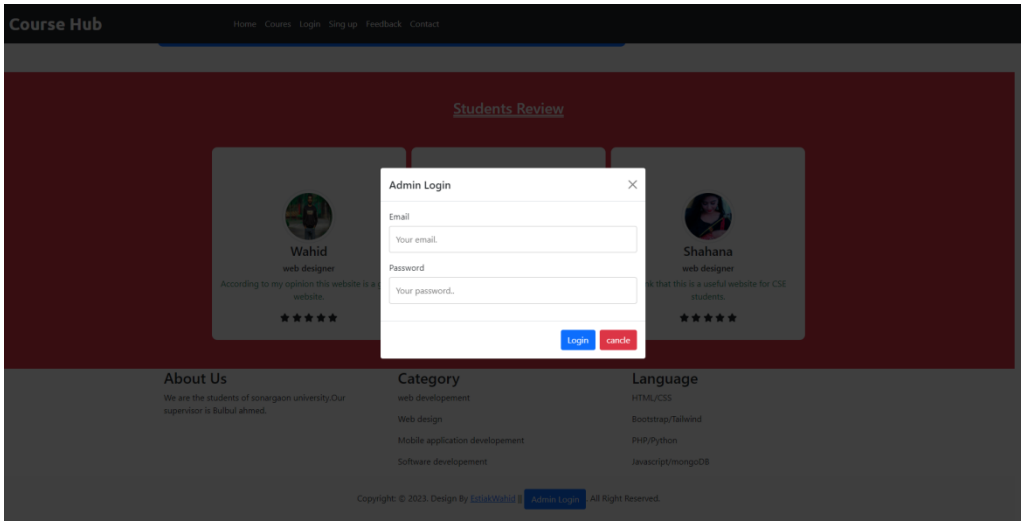


Figure 4.6: Admin Login Page

4.2 Student Registration Page

Here is the Student Registration page of this platform. In registration page at first threefield. “Name” and “Email” and “password”.

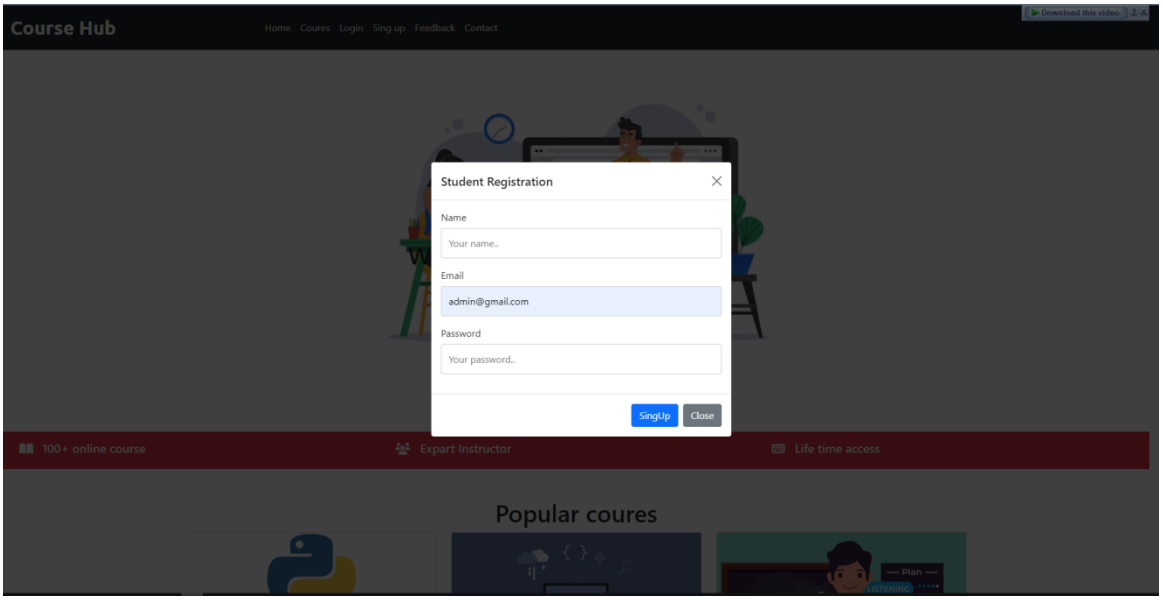


Figure 4.7: Student Registration Page

4.2.1 Students Homepage

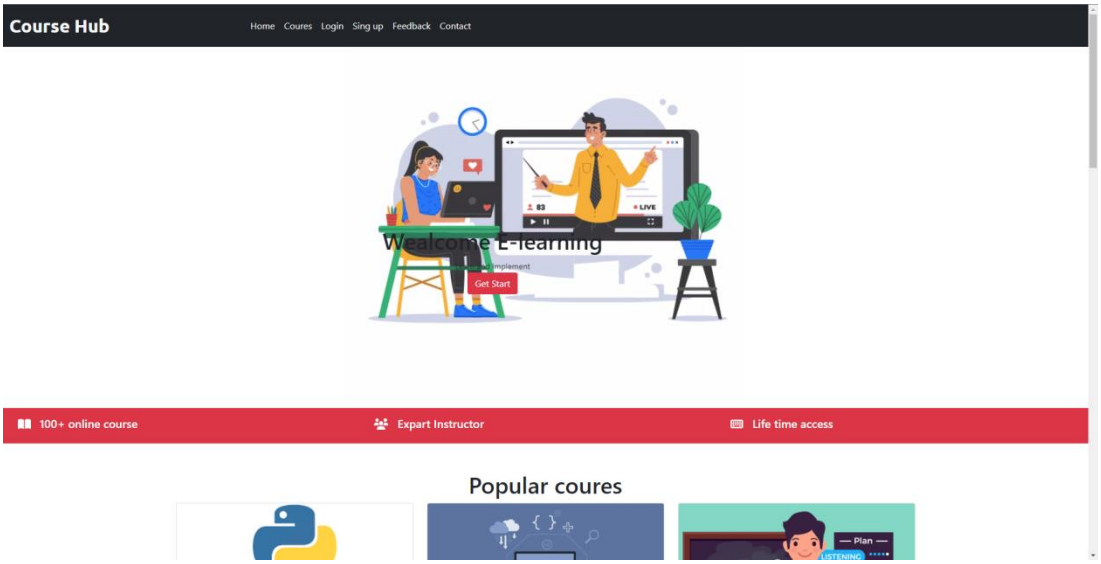


Figure 4.8: Students Homepage

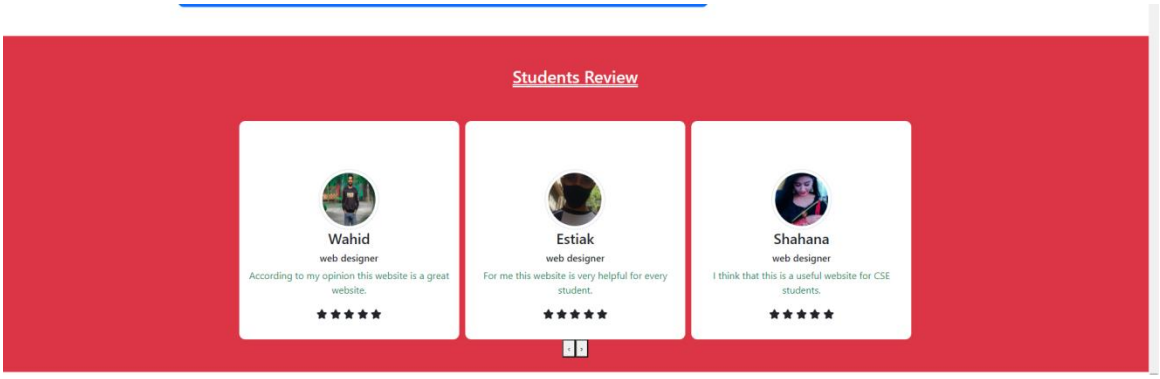


Figure 4.9: Students feedback

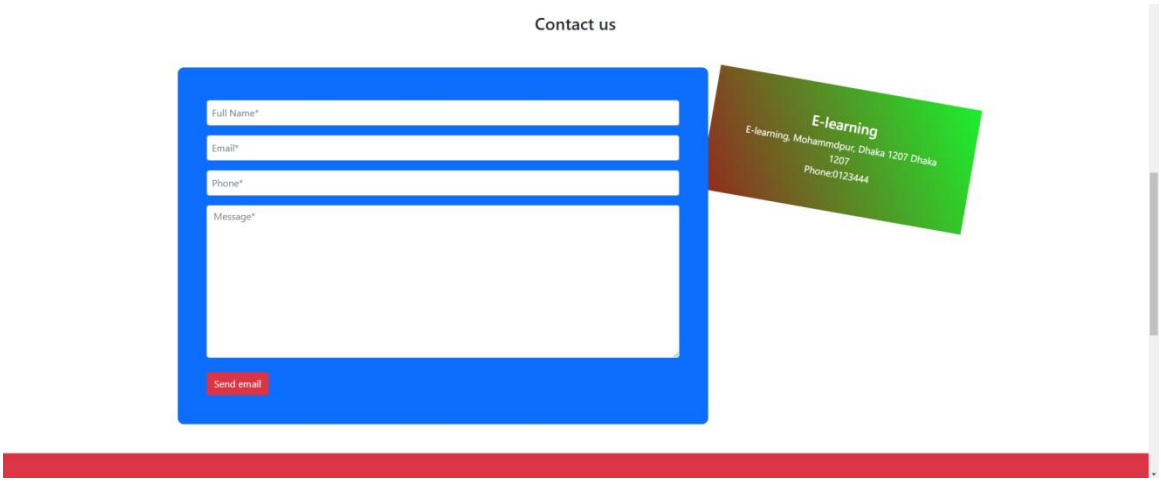


Figure 4.10:Contact Us page



Figure 4.11:Student Profile

4.3 Buy Coursepage

To buy any course first we need to log in to the platform. Then click on “Checkout”.

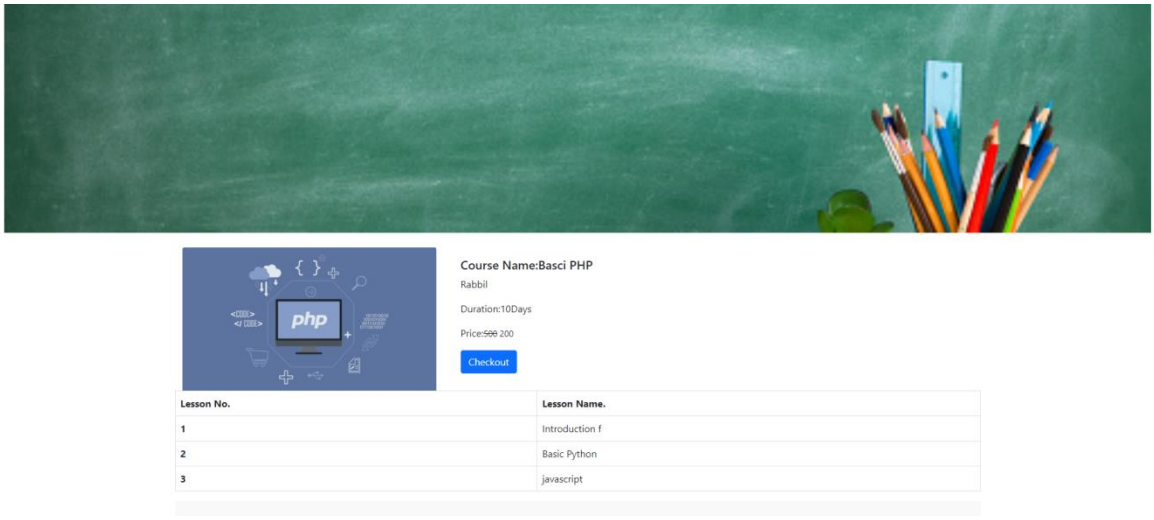


Figure 4.12: Buy Course

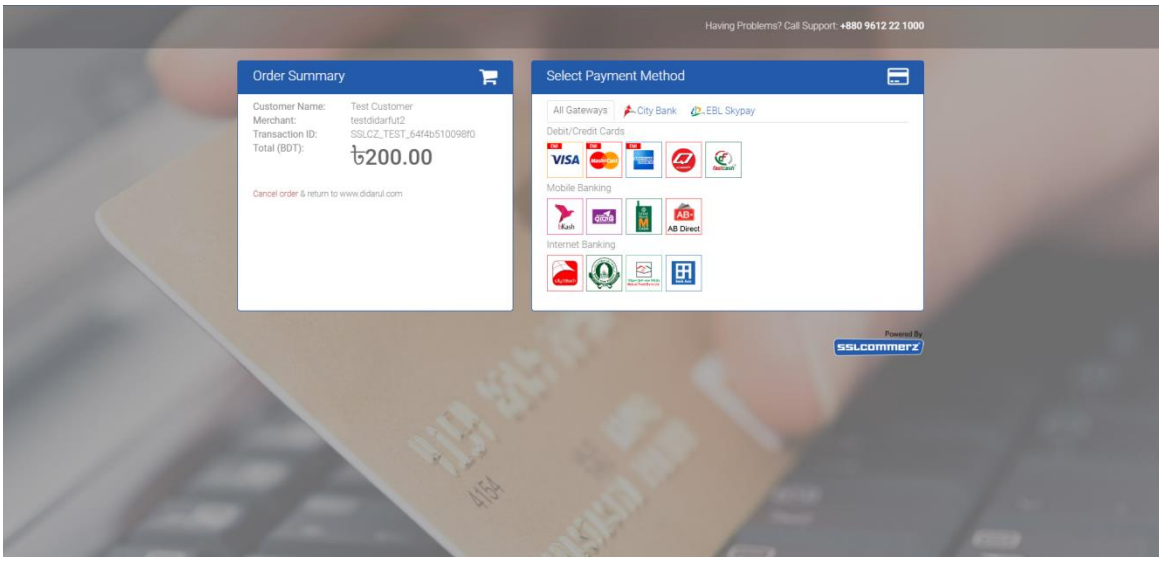


Figure 4.13: Payment System



Figure 4.14: Added course in profile

4.4 Payment Status

After-buyingcourse needs to go to the "Student Profile" (Figure 4.15). Then see all navbaroptions. Thenyou willsee "my payment status" in your profile page section.

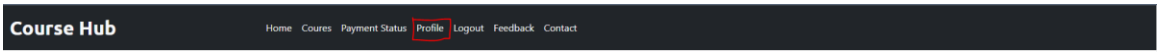
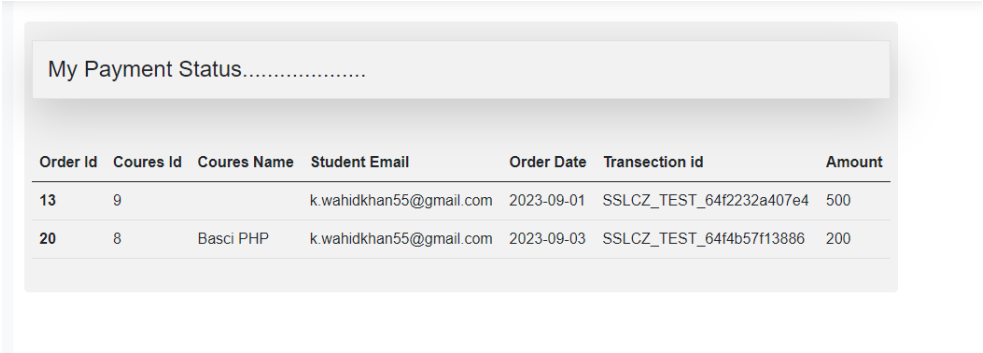


Figure 4.15: Navbar Profile



Order Id	Coures Id	Coures Name	Student Email	Order Date	Transection id	Amount
13	9		k.wahidkhan55@gmail.com	2023-09-01	SSLCZ_TEST_64f2232a407e4	500
20	8	Basci PHP	k.wahidkhan55@gmail.com	2023-09-03	SSLCZ_TEST_64f4b57f13886	200

Figure 4.16: All payment status

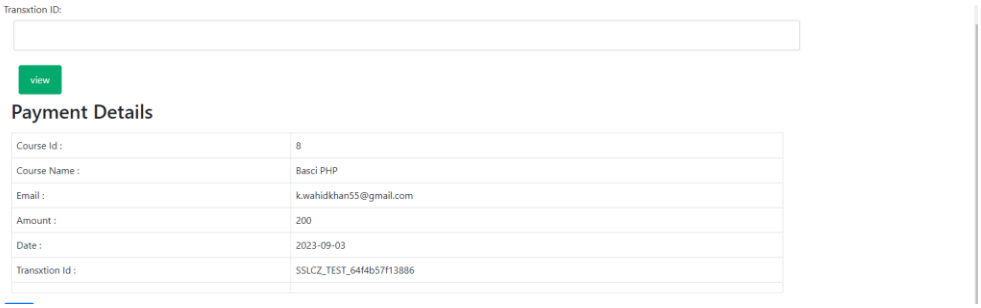


Figure 4.17: Payment Details

4.5 Add Lesson

Adding lessons for a particular course (Figure 4.18), (Figure 4.19),

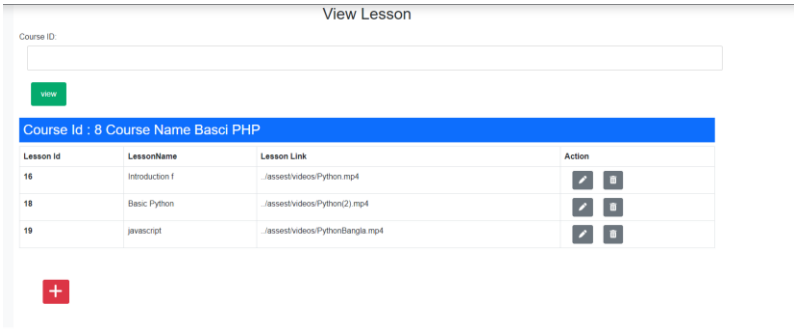


Figure 4.18: Get course by giving course id

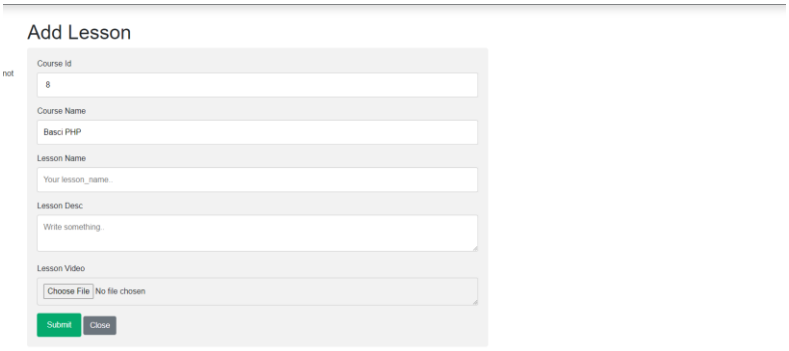


Figure 4.19: Add lesson page

4.6 Invoice

When buying course the system will give you an option to see your Invoice.

Course Id :	8
Email:	k.wahidkhan55@gmail.com
Amount:	200
Date:	2023-09-03
Transxtion Id	SSLCZ_TEST_64f4b57f13886
	print

Figure 4.20: final invoice

Chapter 5

CONCLUSION, LIMITATIONS AND FUTURE WORKS

5.1 Conclusion

In conclusion, the Course Management System (CMS) project represents a significant step forward in enhancing the delivery and management of educational content and experiences. Throughout the project's lifecycle, from conception to implementation, the primary focus has been on meeting the diverse needs of educators, learners, and administrators. By centralizing content, improving the learning experience, streamlining administrative tasks, and promoting accessibility and flexibility, the CMS project has aimed to empower stakeholders with the tools and resources necessary to achieve educational excellence. Through meticulous requirements analysis, the project has sought to ensure that the CMS aligns with the specific goals and objectives of the institution or organization, whether it be in academia, corporate training, or any other sector. This analysis has helped shape a platform that accommodates various user roles and permissions, manages a wide range of content types, facilitates user registration and authentication, and supports robust assessment and tracking mechanisms.

5.2 Limitations

- This platform needs to be made more user friendly.
- Users can not be using any payment system dynamically.
- 'Forgot password' option needs to be added.

5.3 Future Works

After overcoming all limitations of this platform one day this course selling platform may use as a course management system platform for Bangladesh. Another this need to be added. This is our first project on course management system.. From this projects we have learned so many things about different platform like Javascript, CSS &Bootstarp, JQuery, AJAX, Invoice generate, Php, Sql , MySql Database . These knowledge will help us throughout our carrier. In near future, we are planning to we are planning to add a new feature i.e. barcode scanner, payment method. We are working to increase automation in the system to increase user experience greatly. One day we will be able to develop more sophisticated platform.

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