

# IET PATHSHALA

## A VIRTUAL CLASSROOM

A

Synopsis submitted

in the partial fulfilment of the requirements for the award of the degree of

**Bachelor of Technology  
in  
Information Technology**

By

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## **Declaration**

We hereby declare that this submission is our own work and that, to the best of our belief and knowledge, it contains no material previously published or written by another person or material which to a substantial error has been accepted for the award of any degree or diploma of university or other institute of higher learning, except where the acknowledgement has been made in the text. The project has not been submitted by us at any other institute for the requirement of any other degree.

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## **Certificate**

This is to certify that the project report entitled “IET Pathshala” presented by Aakriti Agarwal, Pragati and Shuvanshu Gupta in the partial fulfilment for the award of Bachelor of Technology in Computer Science and Engineering, is a record of work carried out by them under my supervision and guidance at the Department of Computer Science and Engineering at Institute of Engineering and Technology, Lucknow.

It is also certified that this project has not been submitted at any other Institute for the award of any other degrees to the best of my knowledge.

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In the end, We want to thank our friends who displayed appreciation for our work and motivated us to continue our work.

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## **Abstract**

In the last few decades, education has witnessed some advances in technologies involving computer aided learning that promise to drastically change the methods of teaching and learning. The World Wide Web has played a major role in information storage and dissemination in the educational community. Conventional classroom based teaching involves the delivery of course materials by the lecturer in a particular place at a defined time. Hence it imposes a constraint of time and place on both the instructor and the student. Due to human factors arising from the traditional classroom method, the lecturer may not always be able to put in optimum effort towards preparing and delivering course materials. There may also be inconsistencies in the pedagogy and learning style due to the repetitive nature of teaching/learning. The objective of this paper is to develop a virtual classroom system to enhance learning on campus [7]. The system was developed using NodeJS and MongoDB as server side programming and database respectively. The web-based virtual classroom provides a web enabled interactive model for e-learning in which the course material is presented using multimedia and hypermedia.

Keywords: Virtual classroom, e-learning, multimedia, education.

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## **Chapter 1 - Introduction**

A virtual classroom environment ensures human connection, a vital element of classroom teaching that video-on-demand courses don't have and sorely miss [12]. In a virtual classroom, teachers interact with students in real time, students can voice their questions and interact with peers similar to how they would in a regular classroom, albeit over the internet [2 , 5].

However, virtual classrooms also make use of pre-recorded components such as videos, presentations, and lecture slides to facilitate learning, much like offline classrooms do.

With the increasing use of network computers, the Internet and advances in telecommunication technology, e-Learning has been widely recognized as a valuable tool for learning and training. The traditional means of higher education has remained dominant in schools in some developing countries. With the significant growth of e-learning, teachers and students normally explore new ways of constructing knowledge. The current technology being heavily researched as an educational platform is the World Wide Web (WWW). The WWW which represents a platform for information storage and dissemination can be accessed in minimum time, and this is very important to the educational community. The fact is that the transition from digital divide society to a global village information society causes the traditional instructional model to be unable to cover the instructional needs of modern societies. The globe is faced with a transition from a static economy to a new knowledge driven economy.

## **Chapter 2 - Literature Review**

Previous works in the area of virtual classrooms will be discussed in their historical development of VCR, architectural design and system implementation and provision of e-learning platforms for the disabled. The history of distance learning, current issues, the federal government's role, and four specific areas of improvement including: curricular change, new patterns of interaction, changes in organisational structures, and the roles and activities of participants in both business and academic distance-learning environments. Students on various campuses of tertiary institutions are facing certain level of challenges that affect their participation in classes and learning generally. Some of these students may be physically challenged, and hospitalised due to illness or may be involved in one type of job or the other to be able to meet up with their financial needs. Web-based learning therefore offers interesting opportunities and democratic advantage to these categories of students.

A model for improving online educational systems for both teachers and learners was proposed. The model allows for more accurate assessment and more effective evaluation of the learning process. The model includes logistics systems to show that it could be necessary to integrate systems that handle shipment of textbooks and other physical materials to distant students. The architectural design of an integrated system for the delivery of lectures in a virtual environment. The architecture and description of the system components are presented with the techniques and recommendations for the implementation of the designed system. The system architecture is multi-tier, modular, scalable and built for adaptability to database middleware suite. The experiences in developing VCM with different authoring tools and evaluates their effectiveness. The results of the survey shows that this research proved that the Virtual Classroom Module (VCM) developed.

### **2.1 Related Works**

#### **1. Piazza**

Piazza is a learning management system which allows students to ask questions in a forum-type format. Instructors are able to moderate the discussion, along with endorsing accurate answers. The software was invented by Pooja Nath in 2009 in order to speed response times and create a common place where students could engage in discussion outside of the classroom. Utilising an extensive notification system and a simple layout, the response time on Piazza averages approximately 14 minutes. Instructors also have the ability to allow students to post anonymously, encouraging more in-depth discussion.

Users can publicly (and anonymously, if the head instructor allows it) ask questions, answer questions, and post notes. Each question prompts a collective answer to which any user can contribute and an instructor answer, shown directly below, which can only be edited by instructors. Multiple students are allowed to contribute to each answer like Wikipedia entries, and each answer has a version history that shows what each student wrote. Users are allowed to attach external files to posts, use LaTeX formatting, view a post's edit history, add follow-up questions, and receive email notifications when new content is added. The

interface consists of a dynamic list of posts on the left side of the screen, a central panel for viewing and contributing to individual posts, and an upper bar for account control. According to the company's data, the average Piazza question is answered within 14 minutes.

Individual Piazza classes are self-contained and can be locked with an access code. Anyone may create a class, but the head instructor retains full control over the class content, along with administrative abilities such as endorsing good answers and viewing more detailed statistics on class activity.

## 2. Google Classroom

Google Classroom is a free blended learning platform developed by Google for educational institutions that aims to simplify creating, distributing, and grading assignments. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students. As of 2021, approximately 150 million users use Google Classroom.

Google Classroom integrates a variety of other Google Applications for Education, such as Google Docs, Google Sheets, Google Slides, Gmail, and Google Calendar into a cohesive platform to manage student and teacher communication. Students can be invited to join a class through a private "class code", or be imported automatically from a school domain. Teachers can create, distribute and mark assignments all within the Google domain. Each class creates a separate folder in the respective user's Google Drive, where the student can submit work to be graded by a teacher. Assignments and due dates are added to Google Calendar, where each assignment can belong to a category or topic. Teachers can monitor each student's progress by reviewing revision history of a document, and after being graded, teachers can return work along with comments and grades.

Features	Google Classroom	Piazza	IET Pathshala
Class Scheduling	✓	✗	✓
Assignment Management	✓	✗	✓
Q & A platform	✗	✓	✗
Study Material uploads	✓	✓	✓
Dynamic Time Table	✗	✗	✓
Attendance Management	✗	✓	✓

Table 2.1 Comparison Chart of Piazza, Google Classroom and IET Pathshala features

## **2.2 Motivation**

The effect of pandemic [1] on the education sector has resulted in the shift of education mode to online. From classes to tests, everything was forced to happen virtually. Unfamiliarity and randomness to the situation [6] could affect the studies. Hence, there is a need for an application which enables teachers as well students to maintain curriculum in an organised manner. Also, it must aggregate all the academic activities while keeping data secure.

Conventional classroom based teaching involves the delivery of course lectures by the lecturer in a particular place at a specific time. Hence it imposes a constraint of time and place on both the instructor and the student. Due to the human factor, the lecturer may not always be able to put the optimum effort towards preparing and delivering course models [3].

The remedy to this situation seems to be the learning techniques that are based on modern technologies such as the Internet and WWW combined with traditional classroom teaching. One of the ways this can be achieved is through the use of virtual classrooms. A virtual classroom is an environment conducive for learning, which takes place in cyberspace. It provides the tools that learners need and brings together educators and learners to share information and ideas. The virtual classroom is a special form of e-learning that finds relevant applications in enriching the conventional learning methods opined that e-learning can be deployed using a wide range of technologies and media [11].

Present technologies enable the creation of virtual classrooms using the Internet and its resources . For the educators and trainees, a benefit of the Internet as a platform for virtual classrooms is that the information that can be stored is almost limitless. One of the contributions of Virtual Classroom (VCR) is access to high quality and flexible learning technologies [10]. The information being electronically stored can be accessed or downloaded by learners at their own pace, thereby overriding the constraint of time and place experienced in classroom based learning. The involvement of distance learning includes teaching using telecommunication tools, which transmit and receive numerous materials through data, voice, and video. There is also an increased use of virtual classrooms (online presentations delivered live) as an online learning platform and classroom for a diverse set of education providers [8]. In addition to virtual classroom environments, social networks have become an important part of e-learning.

One of the major concerns by using third party solutions is Data Security [4]. That comes as a major issue when no academic activity is possible in offline mode, owing to the pandemic. Our solution will be housed on the institute server hence depleting chances of Data Exploitation. Also, it will not use any third party service by sharing data, instead developer credentials will be used for all the related meet infrastructure.

Additionally, an Inhouse Virtual Classroom brings several benefits of its own. It enhances the scalability and cost effectiveness of the overall solution. It offers customisations, which were not possible before with third party solutions.

Some of the customisations are described below.

1. Dedicated Institute space
2. Aggregated academic activities
3. Student document upload and verification
4. Virtual exams
5. Control over institute data
6. Instant bug fix

Also, It resolves the issue of data security.

## Chapter 3 - Methodology

Some of the initial features of the application will be as follows:

- Simple, intuitive and interactive UI
- Easy Onboarding
- A personalised Classroom web application that keeps data secure by not using any third party application.
- Supports multi user tier of admin, faculty, class representative, and students.
- In house assignment submissions and grading.
- Dynamic real time timetable avoiding conflict between classes, streamlining student experience.
- Easy access/download to study resources.
- Dedicated forms section for feedback, doubts etc. with added functionality of reminders.
- Tracking attendance of a student using an interactive chart.
- Dedicated section for placement related information, enabling students to apply for ongoing placement drives.
- Dedicated Class space and institution space for discussions.

### 3.1 System Design

#### **3.1.1 Data Flow Diagrams**

The following two diagrams are the data flow diagrams (level 0 and level 1) of the system with two external entities: Student and Faculty. The level-1 diagram has four processes: Time Table, Assignment, Forms, Study Material and the data flow is being shown.

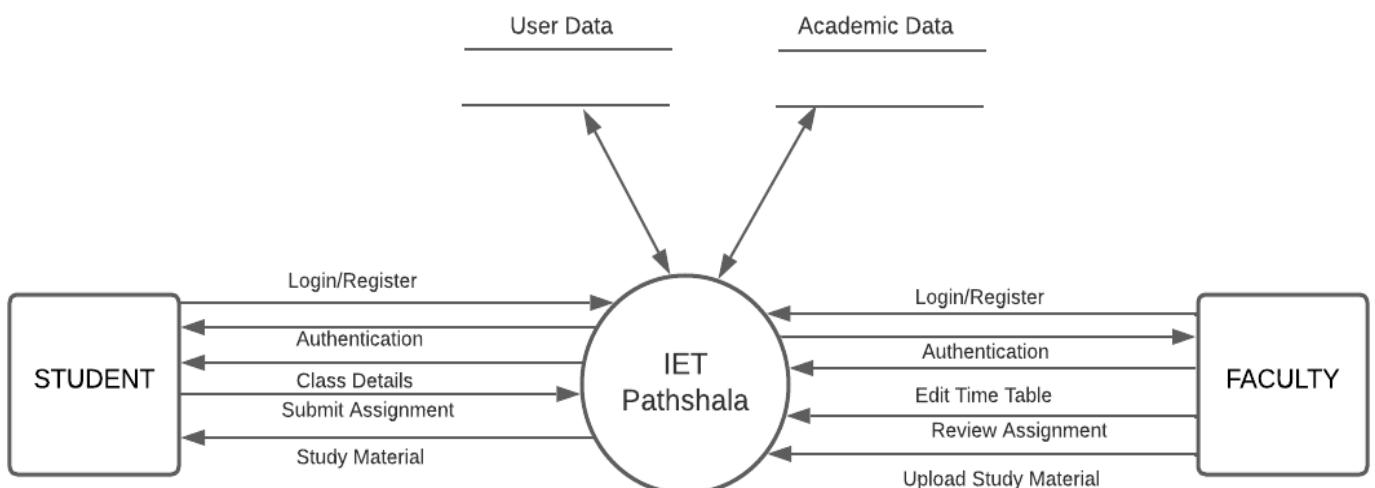


Figure 3.1(a) showing data flow diagram (Level-0) of the application

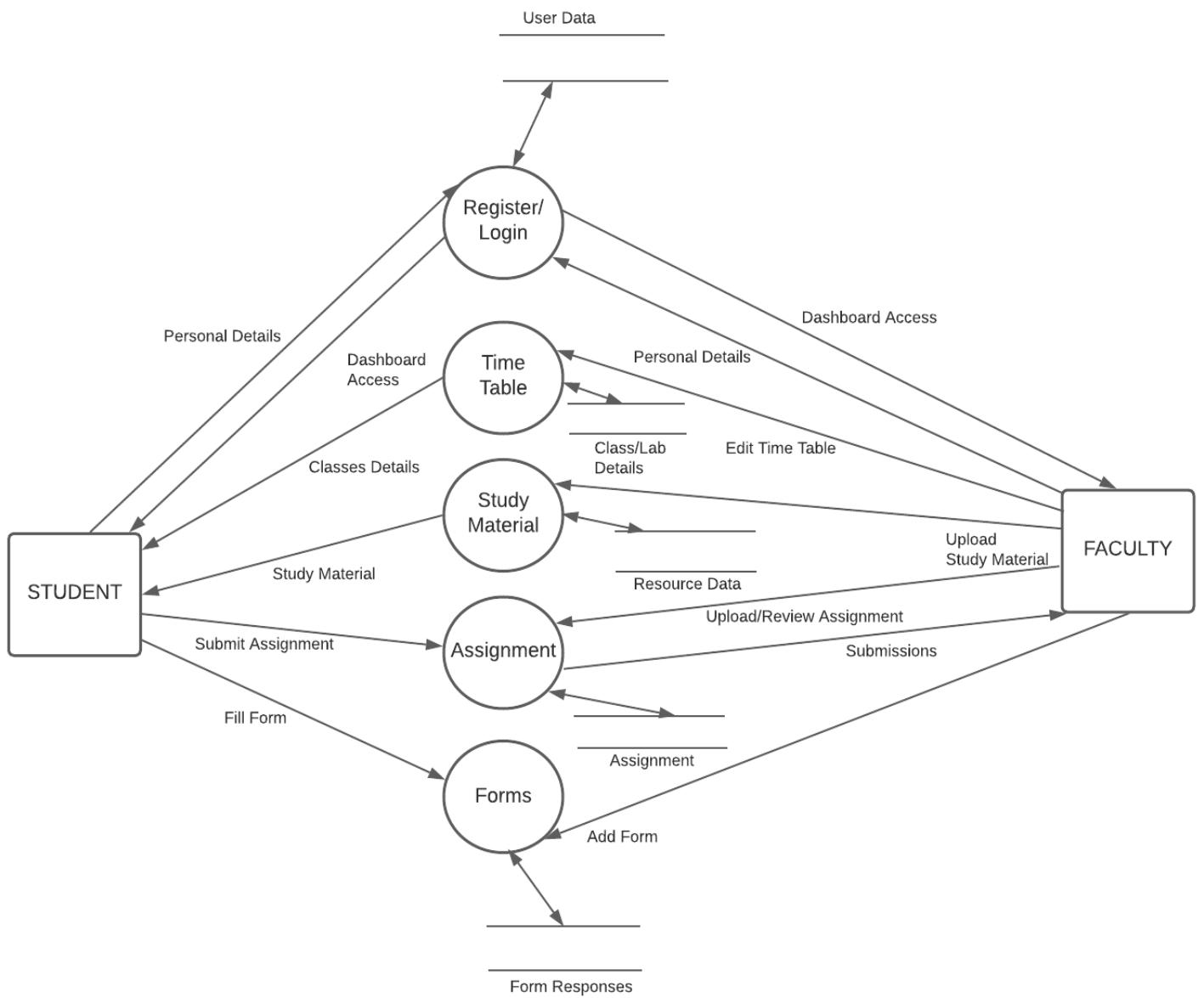


Figure 3.1(b) showing data flow diagram (Level-1) of the application

### 3.1.2 Use Case Diagram

In the following figure, the use case diagram is showing two actors: student and faculty. Students can view the timetable, submit the assignment, view study material, view forms. Faculty can add and view forms, study material, view and edit time-table, and can review assignments.

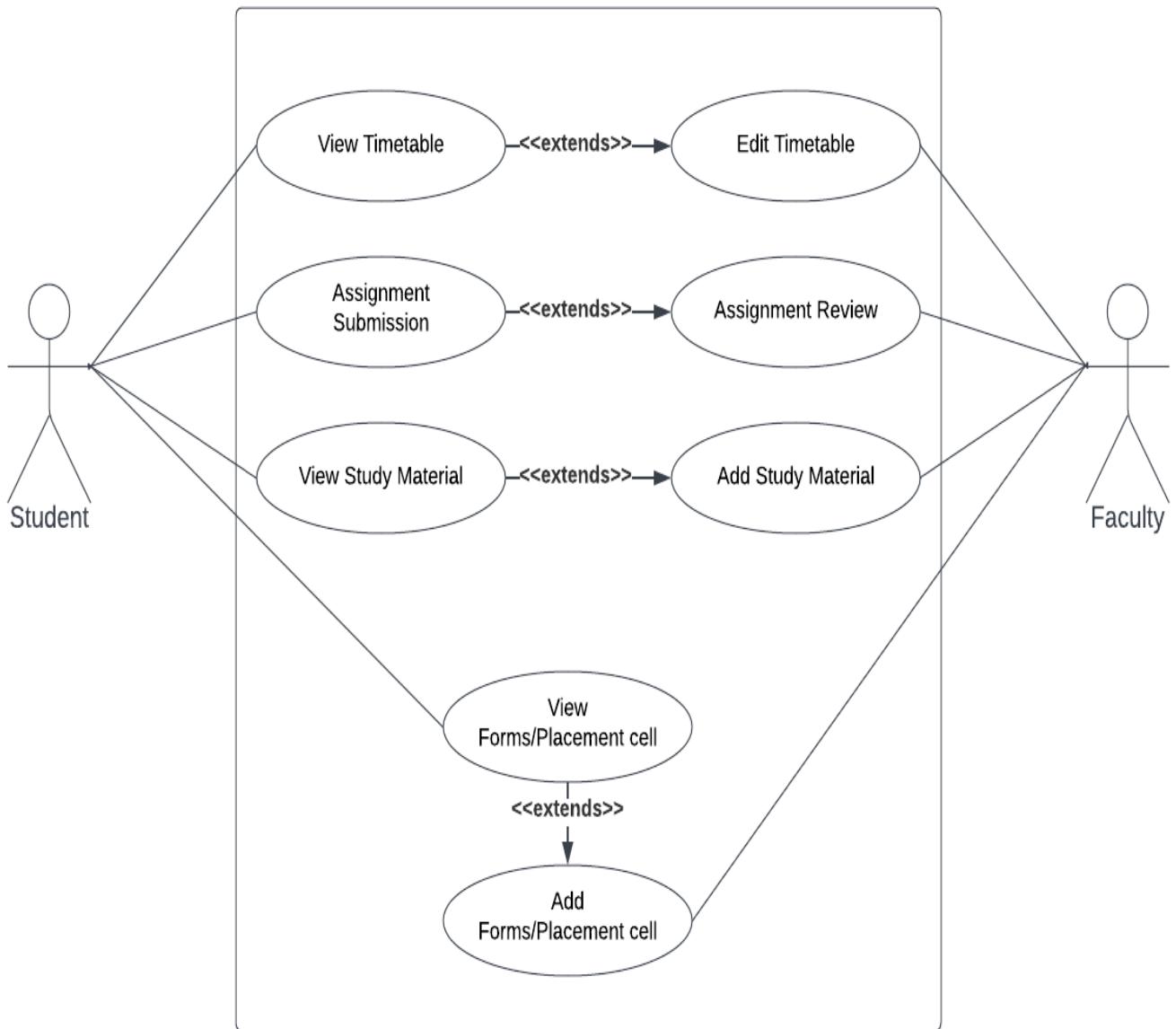


Figure 3.2 showing use case diagram of the application

### 3.1.3 Entity- Relationship Diagram

The Entity-Relationship Diagram of the application shows the six major entities - Student, Faculty, Time Table, Form, Study Material, and Assignment, their attributes and the relationship between each other.

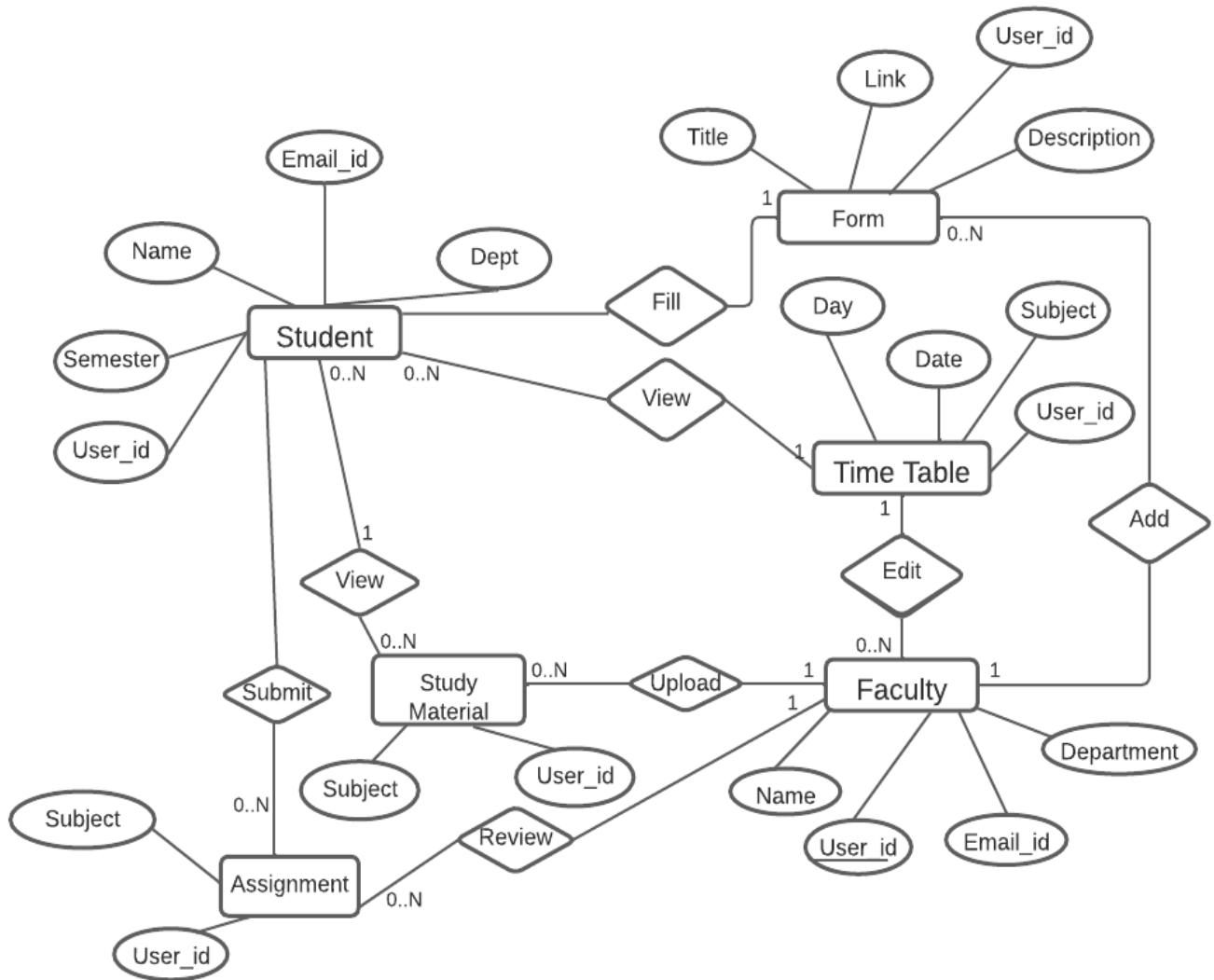


Figure 3.3 showing Entity-Relationship diagram of the application

### **3.1.4 Class Diagram**

Class Diagram of the application showing all the classes used in the applications, i.e. User, Subject, Assignment, Submission, Chapter, Form, Branchsem, Notification, with all of its associated properties and methods.

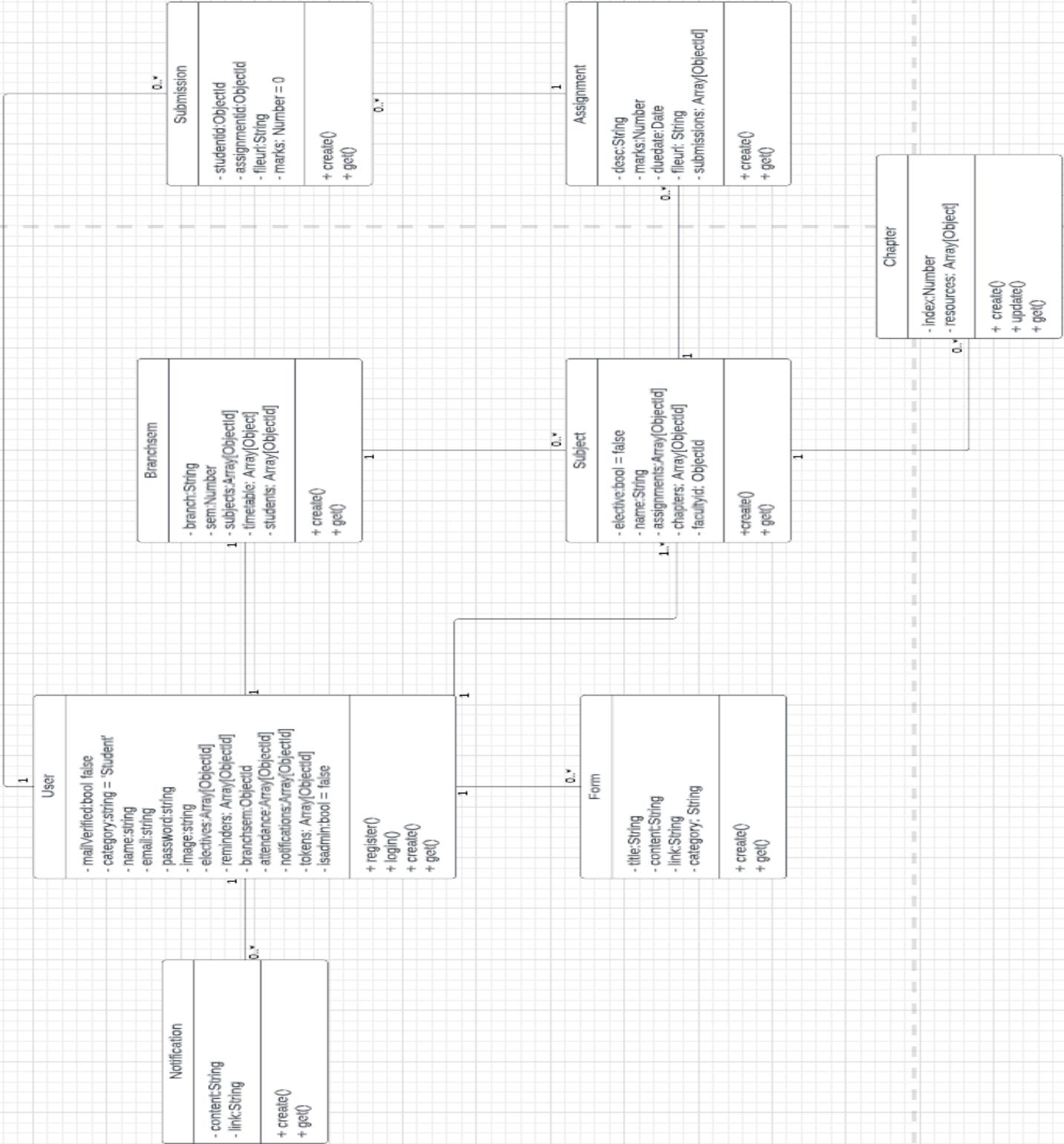


Figure 3.4 showing class diagram of the system

References will be used for connecting between different Database models instead of encapsulating data in the student model. Some of the Database models will be as follows:

- Assignment
- Attendance
- Chapter
- Form
- Notification
- Reminder
- Subject
- Submission

**Major technologies used** in the whole process are described as follows:

- Backend- NodeJS, ExpressJS
- GUI Frontend- HTML/CSS, Bootstrap, JavaScript
- IDE- Visual Studio Code
- Database- MongoDB Atlas
- API Usage- Google Open Source APIs
- Version Control System- Github
- Deployment- Heroku

### 3.1.2 Terminologies Used

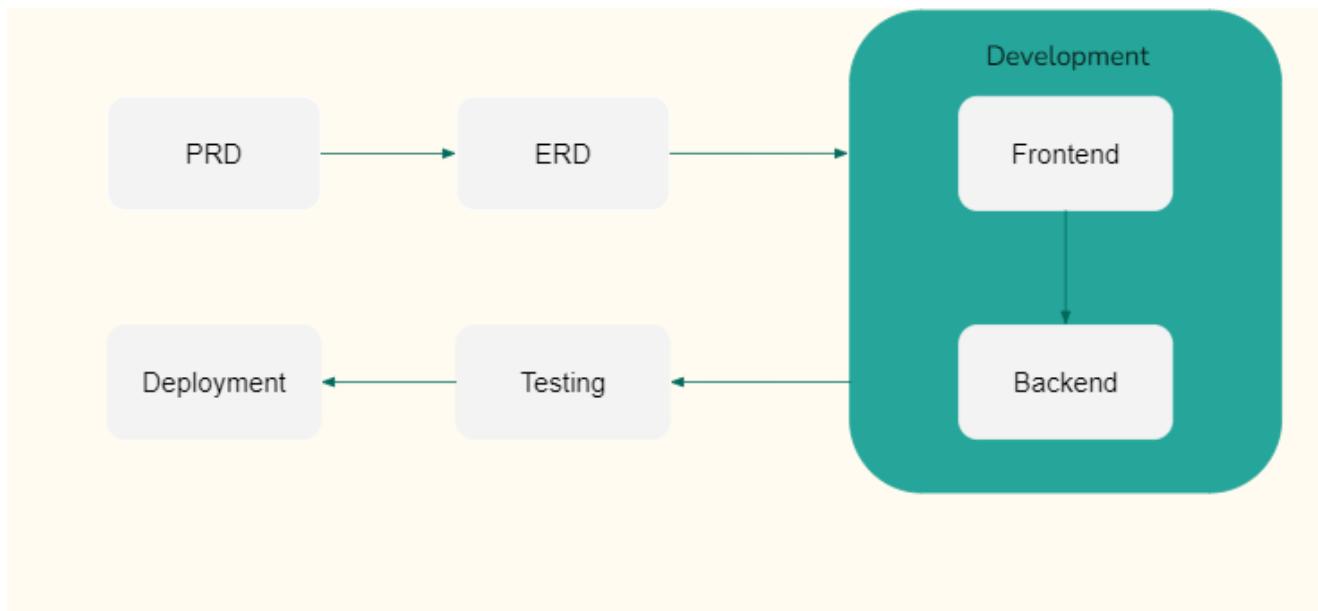


Figure 3.5 shows different stages of the Software Cycle Action plan.

- PRD (Product Requirement Document)

A product requirements document (PRD) is a document containing all the requirements to a certain product. It is written to allow people to understand what a product should do. A PRD should, however, generally avoid anticipating or defining how the product will do it in order to later allow interface designers and engineers to use their expertise to provide the optimal solution to the requirements.

- ERD (Engineering Requirement Document)

An engineering requirements document (ERD) is a statement describing the goal and purpose of a new component. Unlike a product requirements document (PRD), which tells engineers what they need to build, an ERD specifies why a part is being built and how its design fuels its purpose. By following the engineering requirements outlined in an ERD, engineers can ensure that the part they build will satisfy customer needs.

Software Development Life Cycle (SDLC) model:

- Agile model

Agile software development refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organising cross-functional teams. Agile methods or Agile processes generally promote a disciplined project management process that encourages frequent inspection and adaptation, a leadership philosophy that encourages teamwork, self-organisation and accountability, a set of engineering best practices intended to allow for rapid delivery of high-quality software, and a business approach that aligns development with customer needs and company goals. Agile development refers to any development process that is aligned with the concepts of the Agile Manifesto.

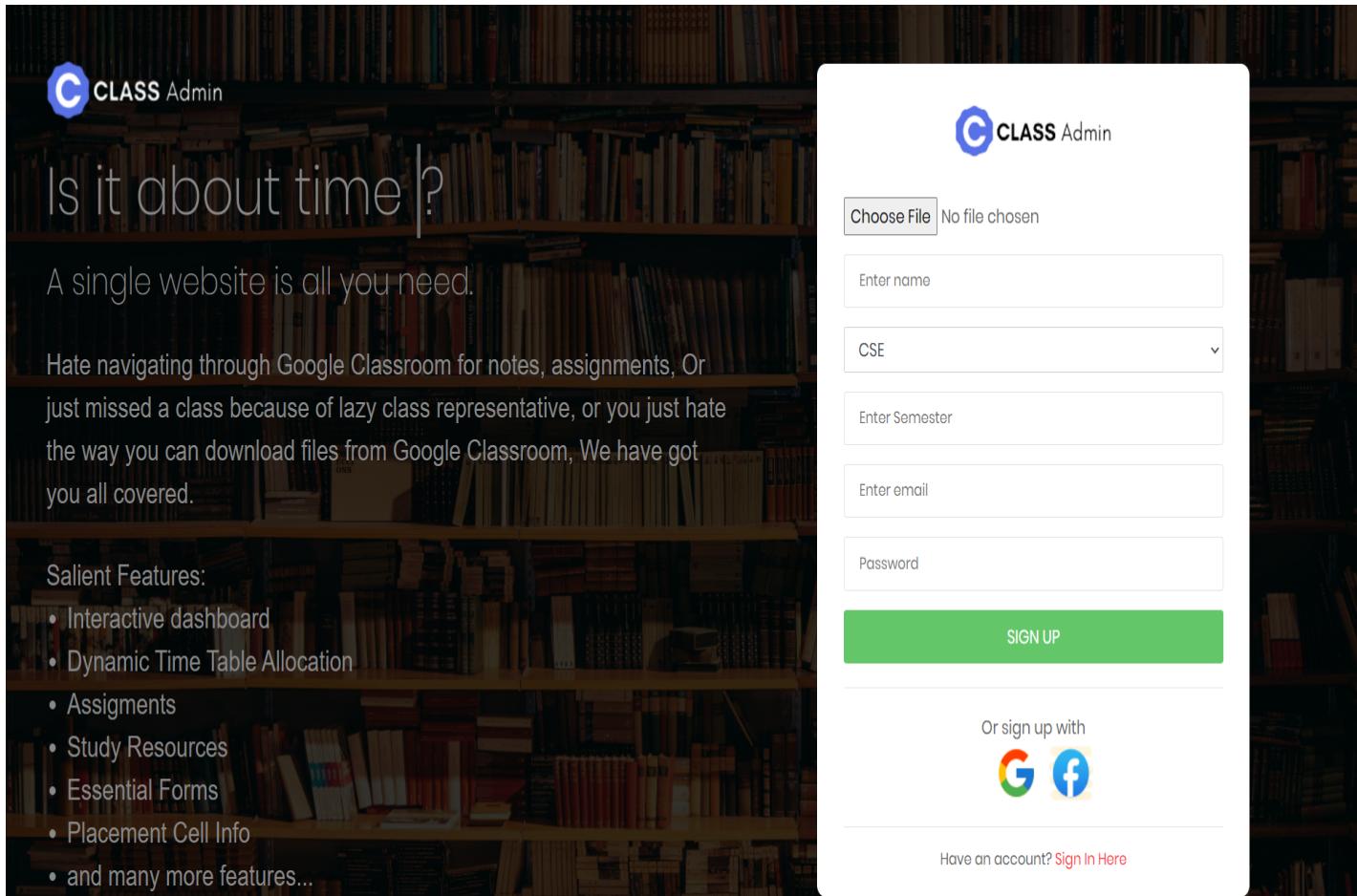
Deployment Phases:

- Staging (on Heroku)
- Production (on AWS)

The Sprint will be of duration one month. First two sprints will be utilised for the PRD, ERD and UI development as it will be a static part and makes the testing and integration process a lot easier. For the backend features, an incremental aspect of the agile model will be used. In the first prototype, some of the elementary features i.e. Authentication, user model etc will be implemented. In the subsequent prototypes of the application, features will be added and integrated to the solution. Backend will take three dedicated sprints after the first two sprints allocated for PRD, ERD and UI development.

## **3.2 Onboarding Flow**

### **3.2.1 Sign-up Flow**



*Figure 3.6 shows Signup screen UI*

To get a user onboard, they have to register on the page(shown above) first. During the registration/sign-up, we are storing the user's information as Name, Branch, Semester, Email id, and password(to be generated), and a file of a photograph. This will allow users to get registered with IET Pathshala. To get started, a user is required to sign-in.

### 3.2.2 Sign-in Flow

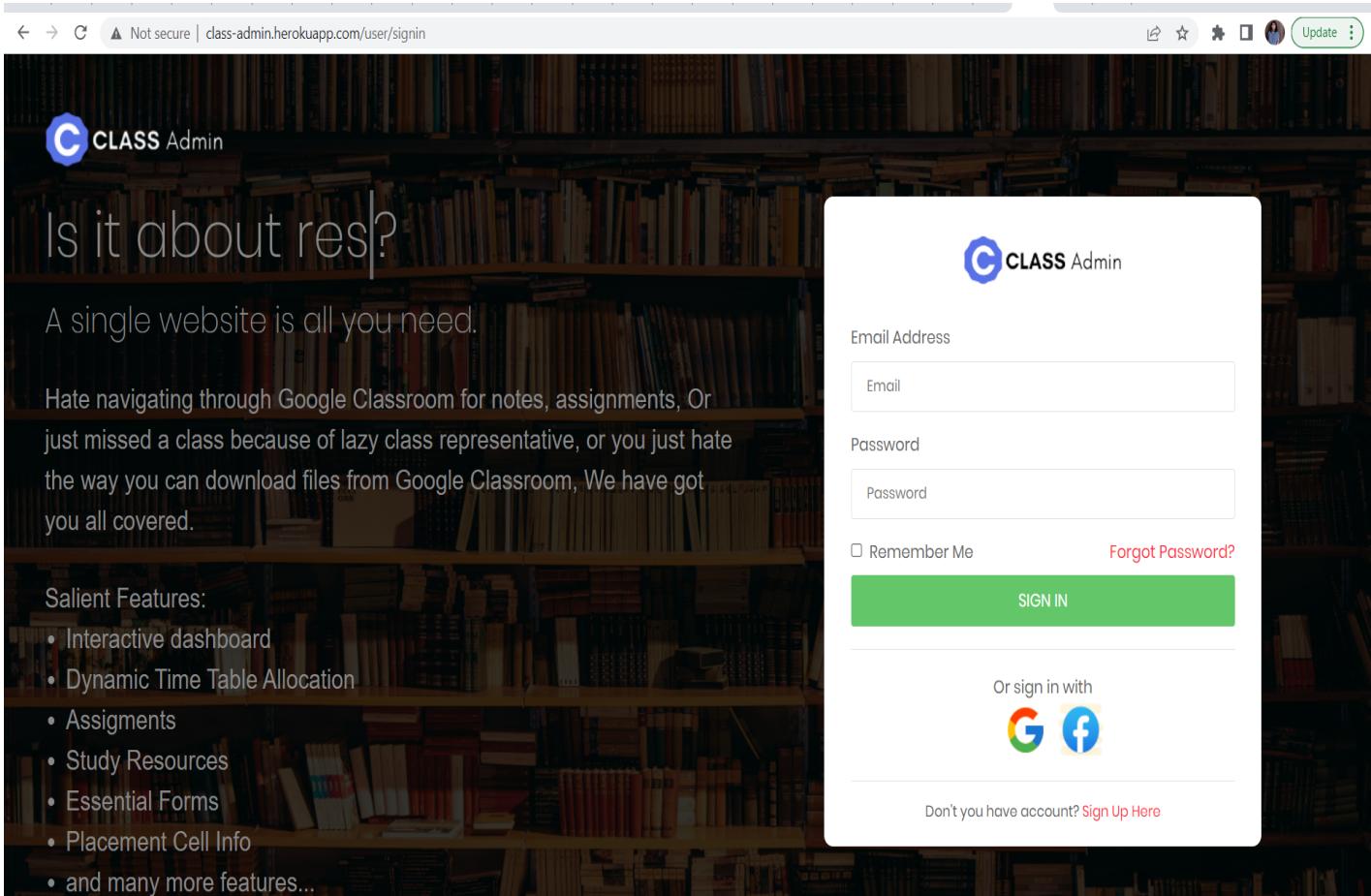


Figure 3.7 shows sign in screen UI

After getting registered, one should sign-in the classroom. For this, they will require the email-id they have used and password, they have created while registering. Then, if the details get verified, the user is allowed to sign-in.

### 3.3.3 Google Authentication

One of the ways to sign-up and sign-in the classroom is through Google Authentication. Unlike the former method, users are not required to fill in the details explicitly and they can login with their email id. Firstly, the user clicks on the G-icon and then it asks to select the email id(logged in the system) with which user wants to log in.

This method is more secure and easy to use as users need not to memorise a password.

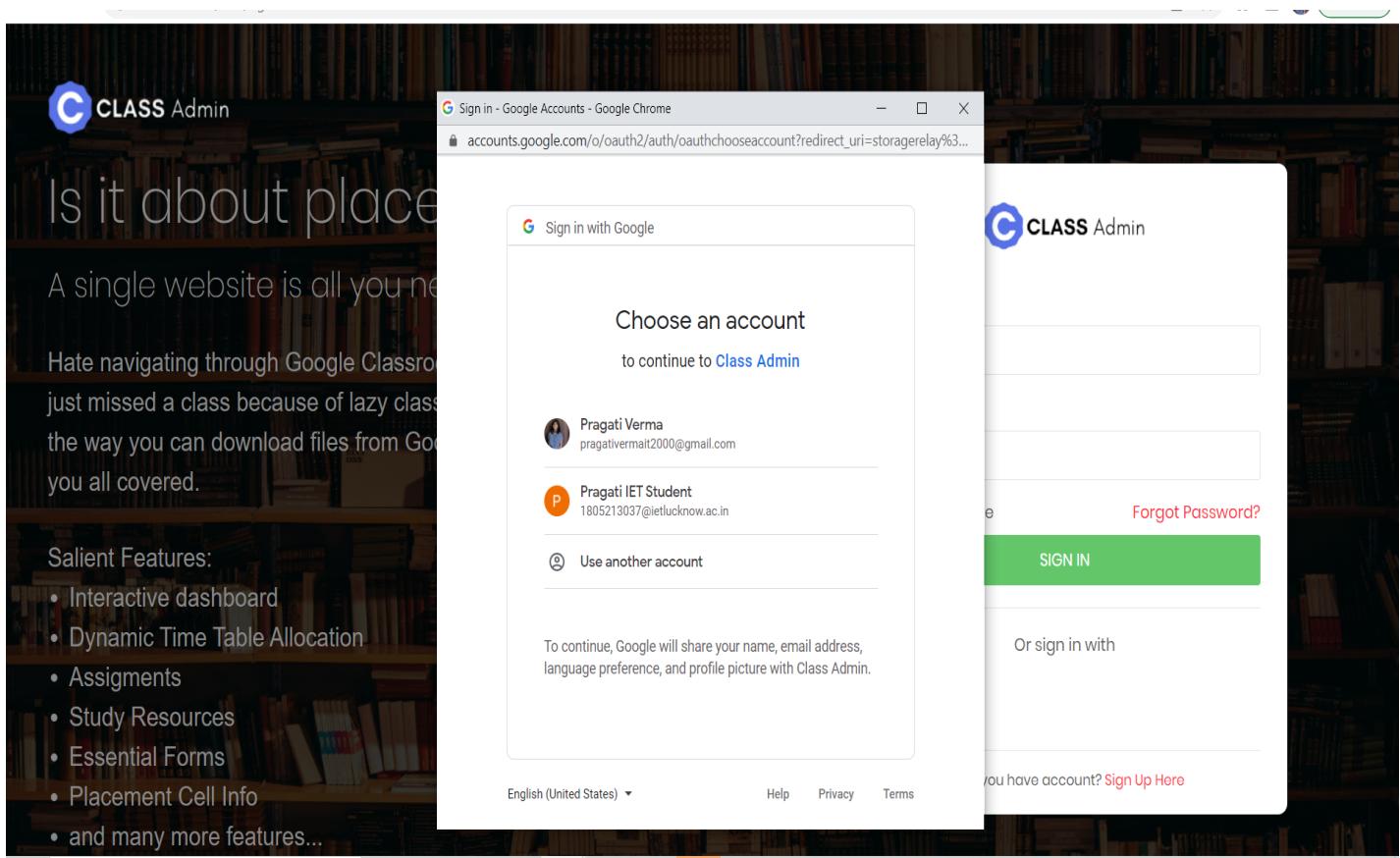


Figure 3.8 shows Google authentication screen

### **3.3 Channels**

#### **3.3.1 Forms**

Forms section is one channel with which Teachers, CRs etc. can provide some information and can take inputs from students. Example: Feedback Form, Doubt Clearing Form, Consensus Form etc. In these forms, teachers will post the information and the link leading to the google form. Students will, then, fill their inputs in the form. This will help in taking feedback on the teaching style, to clear doubts, and to take students' consensus on any topic in an organised manner.

The screenshot shows the CLASS Admin application interface. On the left, there is a sidebar with various menu items: Dashboard, Time Table, Forms (which is selected and highlighted in blue), Assignments, Study Material, and Placement Cell. The main content area has a dark header with the text "Forms for You" and a "Add a New Form" button. Below this, there are two card-like boxes. The first box is titled "dummy form" and contains the text "dummy data". It has two buttons at the bottom: "Link" (in blue) and "Remind me Later" (in green). The second box is titled "Google SDE Intern" and contains the text "CWUUW". It also has "Link" and "Remind me Later" buttons. At the bottom of the page, there is a horizontal progress bar with several colored segments.

*Figure 3.9 shows forms channel section*

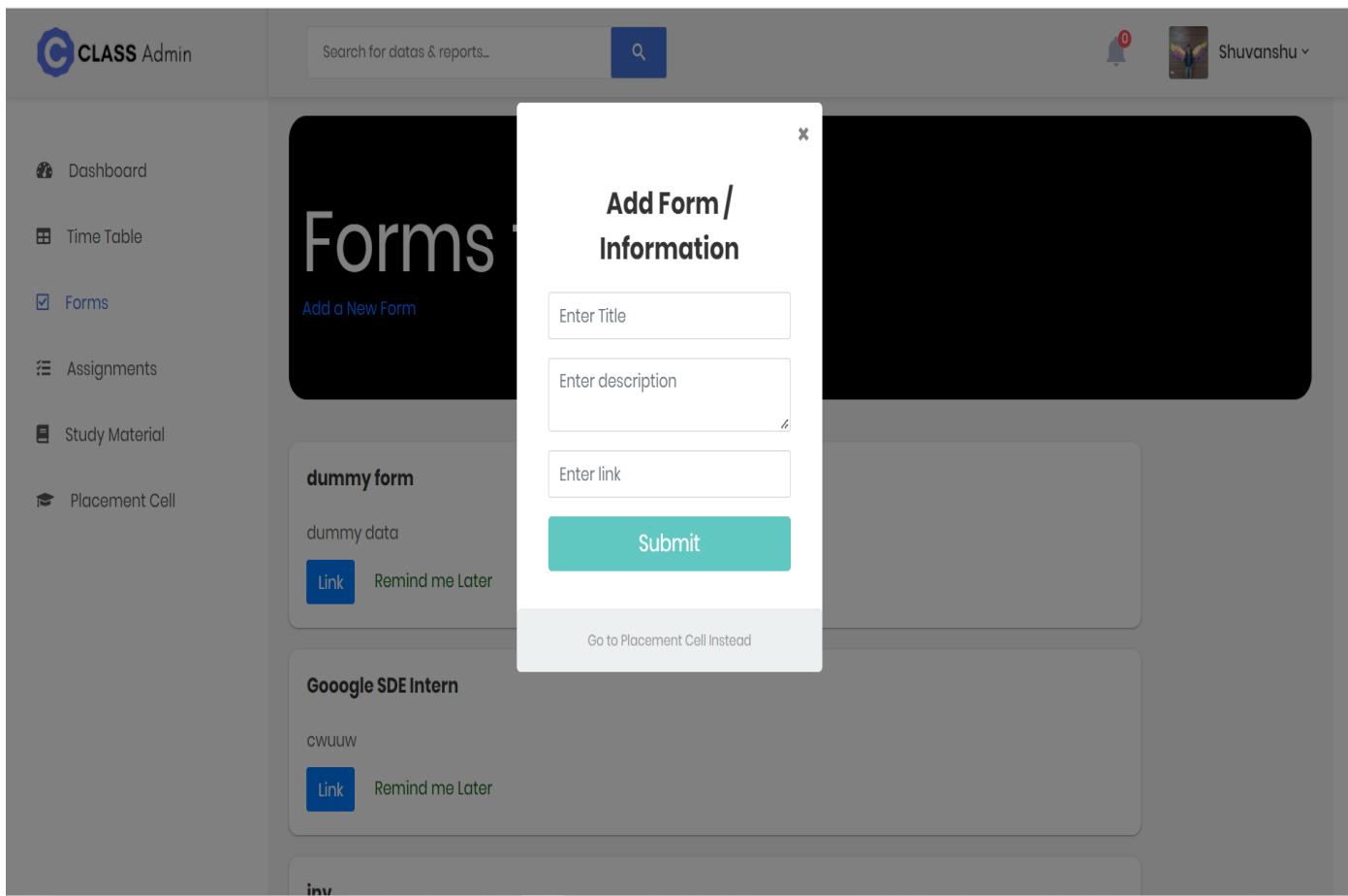


Figure 3.10 shows the form to add a new form

### 3.3.2 Placement Cell

Placement cell is a channel which is dedicated to all the information regarding job openings/placement drives. This will include the information and the link through which the user will apply to the same. The motive of this section is to avoid missing out on important opportunities by students. We have also enabled a reminder section, which allows the user to get reminded later, if he/she doesn't want to fill the form at the moment.

The screenshot shows the CLASS Admin application interface. On the left, there is a sidebar with the following menu items:

- Dashboard
- Time Table
- Forms
- Assignments
- Study Material
- Placement Cell

The main content area has a title "Placement Cell Info" and a sub-section "Add New Information". Below this, there are two cards:

- Google SDE Intern**  
form in link  
[Link](#) [Remind me Later](#)
- sample form**  
descriptio  
[Link](#) [Remind me Later](#)

At the bottom of the main content area, there is a partial view of another card starting with "google".

Figure 3.11 shows placement channel section

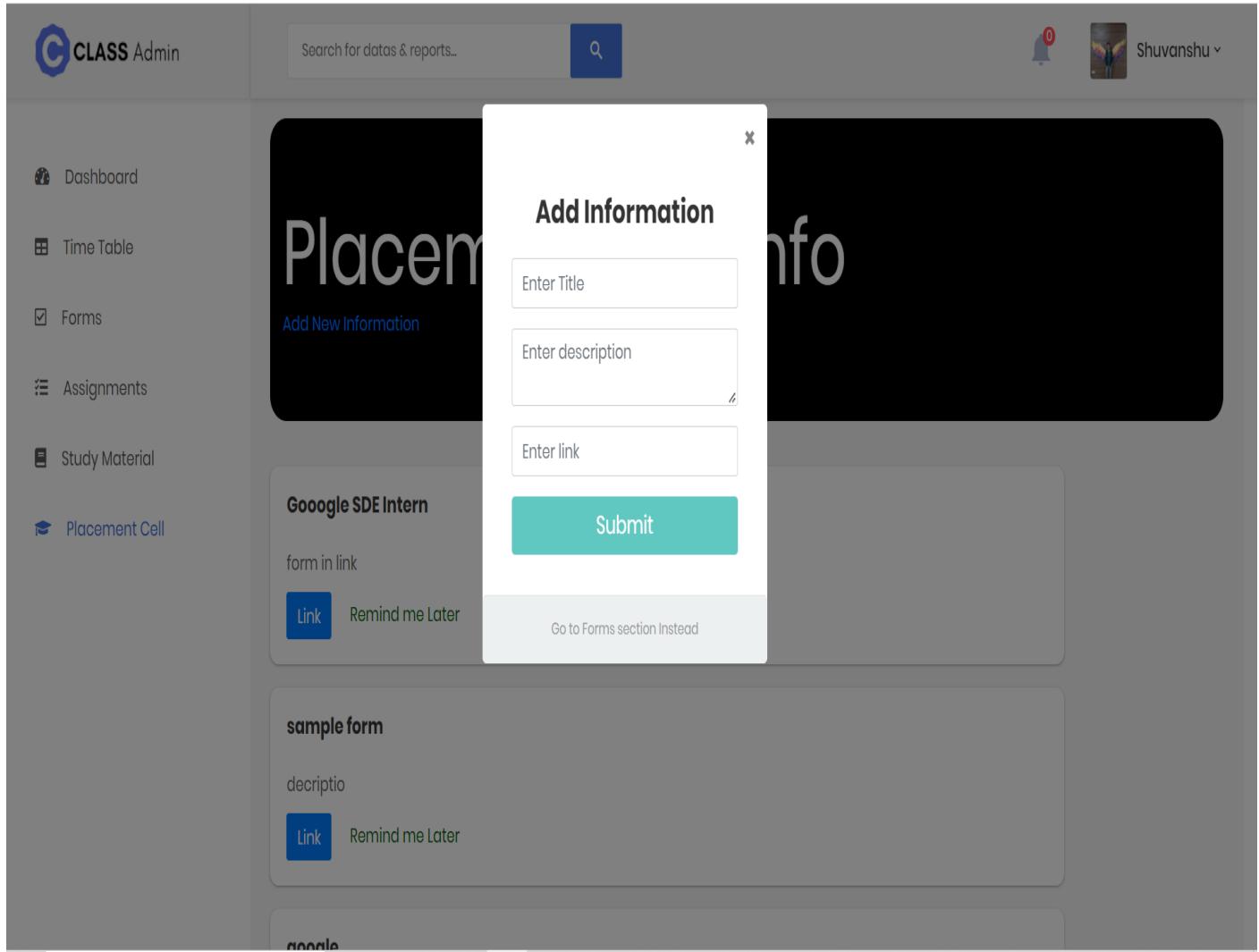


Figure 3.12 shows form to add placement cell info

## **3.4 Assignment**

### **3.4.1 Submission**

This section allows the students to submit the assignments. They can view the assignment(question) file posted by the teacher and then by clicking on the choose file button, they can upload a file from their system and submit by clicking on the submit button.

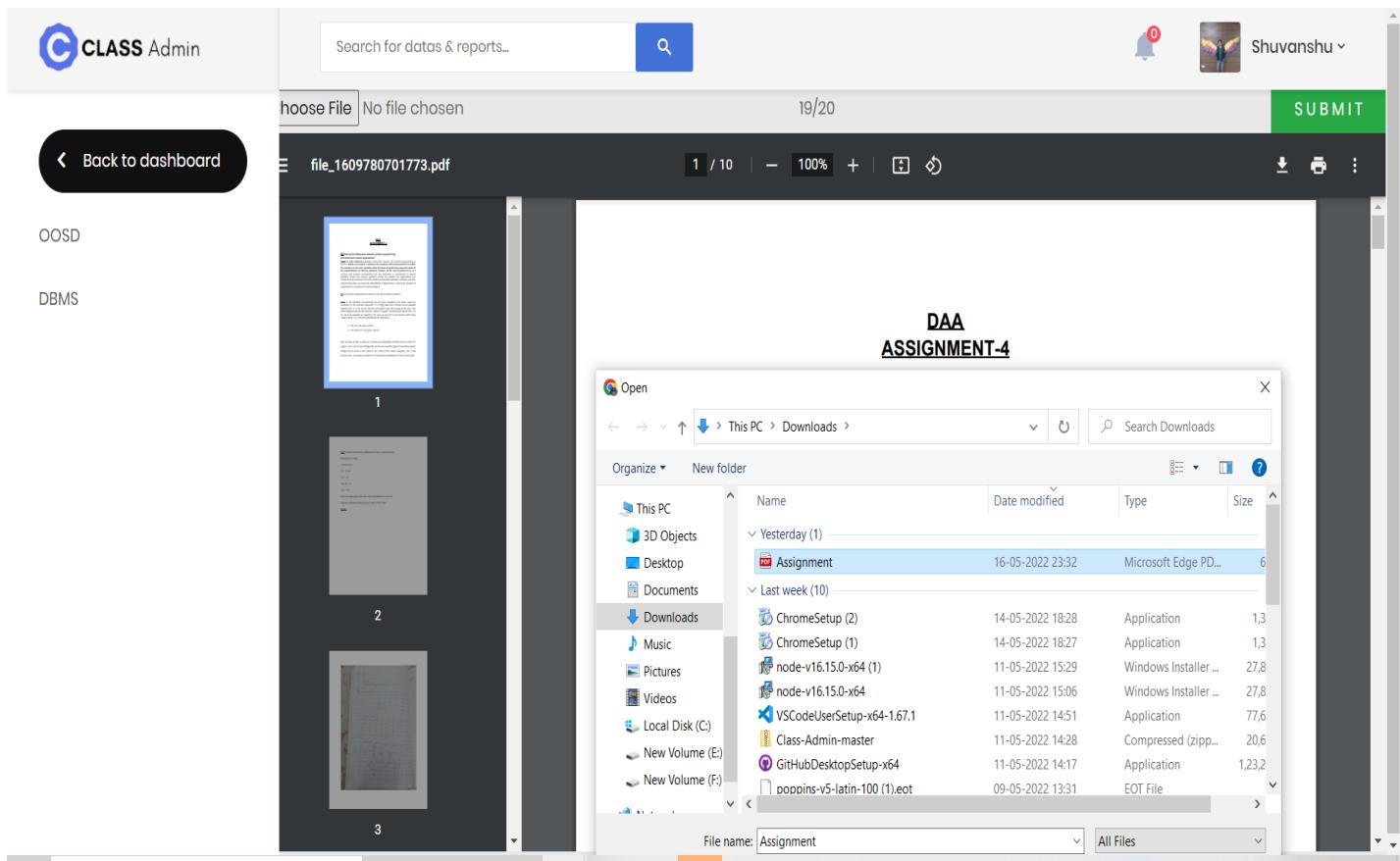
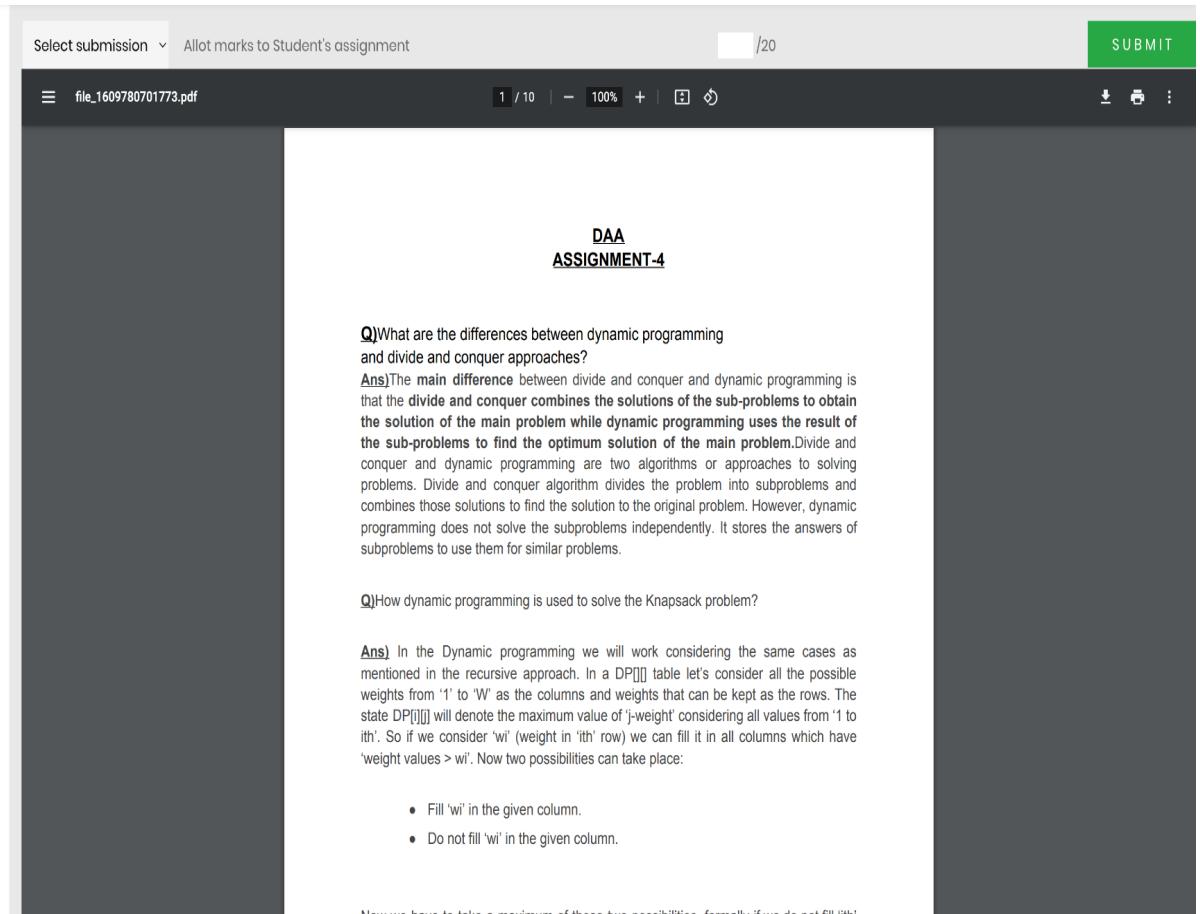


Figure 3.13 shows Assignment Submission Screen UI

### 3.4.2 Review

This section allows the teachers to post the assignments and then review/grade the assignments submitted by the students. Please notice the additional “Add Assignment” button only being shown to faculty, to upload new assignments. “Select Submission” dropdown is used to navigate among different student submissions.



The screenshot shows a web-based assignment review interface. At the top, there's a navigation bar with a 'Back to dashboard' link, a 'Select submission' dropdown, and a 'SUBMIT' button. Below the navigation is a toolbar with file operations like download, print, and more. The main content area displays a PDF document titled 'file\_1609780701773.pdf'. The PDF page has a header 'DAA' and 'ASSIGNMENT-4'. It contains two questions: 'Q) What are the differences between dynamic programming and divide and conquer approaches?' and 'Q) How dynamic programming is used to solve the Knapsack problem?'. The 'Ans' for the first question explains the difference between divide and conquer and dynamic programming, stating that divide and conquer combines subproblems to find the main solution, while dynamic programming uses the result of subproblems to find the main solution. The 'Ans' for the second question describes the knapsack problem and how dynamic programming can be used to solve it by filling a DP table. A note at the bottom says 'Now we have to take a maximum of these two possibilities, formally if we do not fill 'ith' weight values > wi'. The sidebar on the left lists 'OOSD', 'DBMS', and an 'Add Assignment' button.

Figure 3.14 shows Assignment Review screen UI

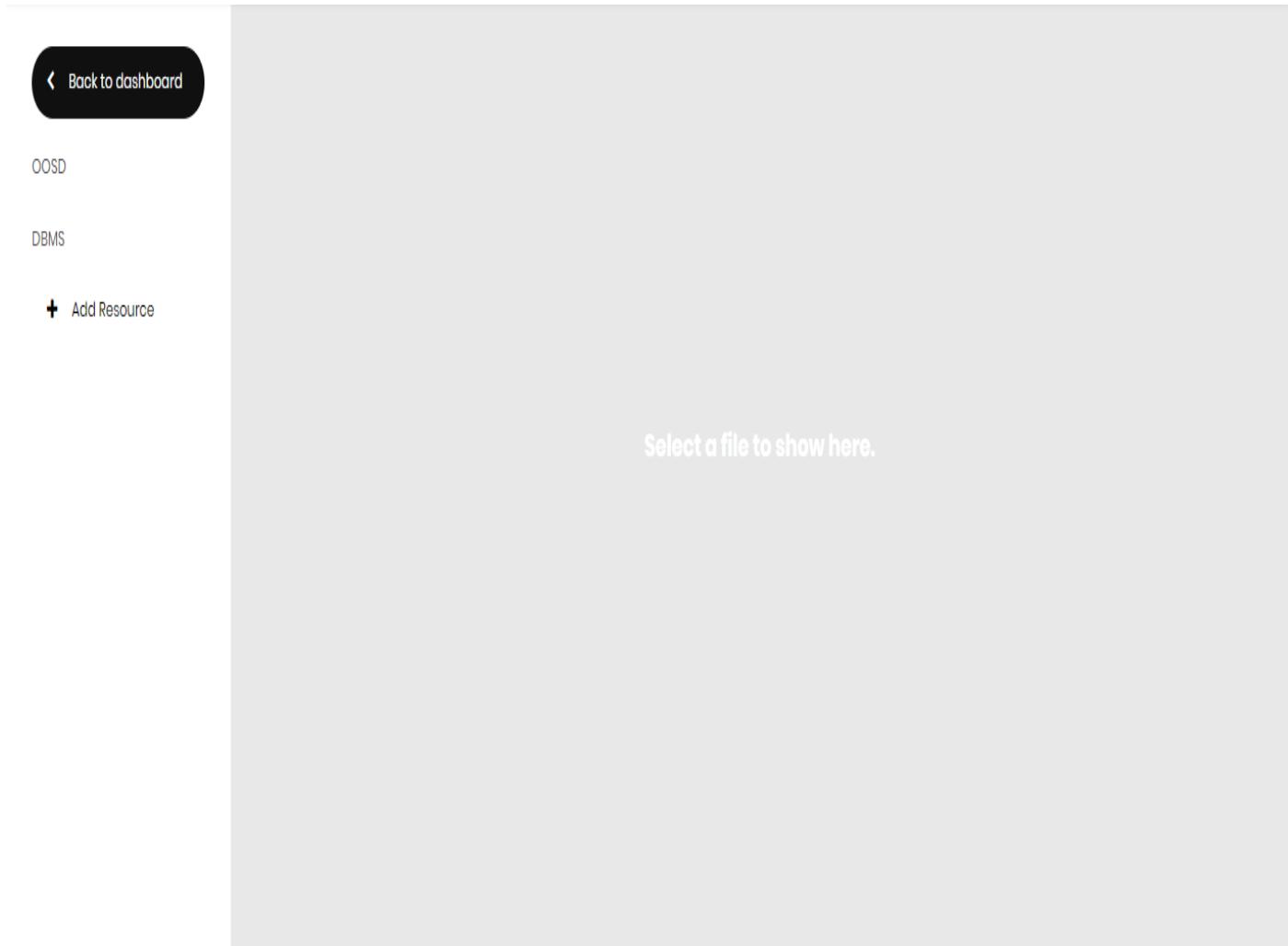
### 3.5 Study Material

This section is dedicated to the study material of the curriculum. Teachers can upload the material by clicking the upload button. This also allows students to access the study material in an organised manner and sorted according to the unit. One of the special features that is not found in other virtual classrooms is that students will be able to download the study material in their system through the same tab and they need not to open the material in the new window/tab to download.

The screenshot shows a web-based application interface for managing study materials. On the left, there is a sidebar with a dark background containing course navigation links: OOSD, Unit1, use case diagram, dummy form, Unit2, use case diagram, Unit3, RDBMS, Unit5, dummy form, and Unit4. A large blue button labeled 'Back to dashboard' is positioned above the sidebar. The main content area has a light gray background. At the top, there is a search bar with the placeholder 'use case' and a magnifying glass icon. Below the search bar, the URL 'file\_1609704132078.pdf' is displayed. The main content area shows a PDF document titled 'file\_1609704132078.pdf'. The PDF contains three pages, numbered 1, 2, and 3. Page 1 is a use case diagram, page 2 is a dummy form, and page 3 is another use case diagram. To the right of the PDF, there is a text area with two sections of text. The first section is a question and answer about the difference between divide and conquer and dynamic programming. The second section is a question and answer about how dynamic programming is used to solve the Knapsack problem. At the bottom of the text area, there is a list of bullet points. The top right corner of the interface shows a user profile for 'Shuvanshu' with a notification count of 0.

Figure 3.15 shows study material screen

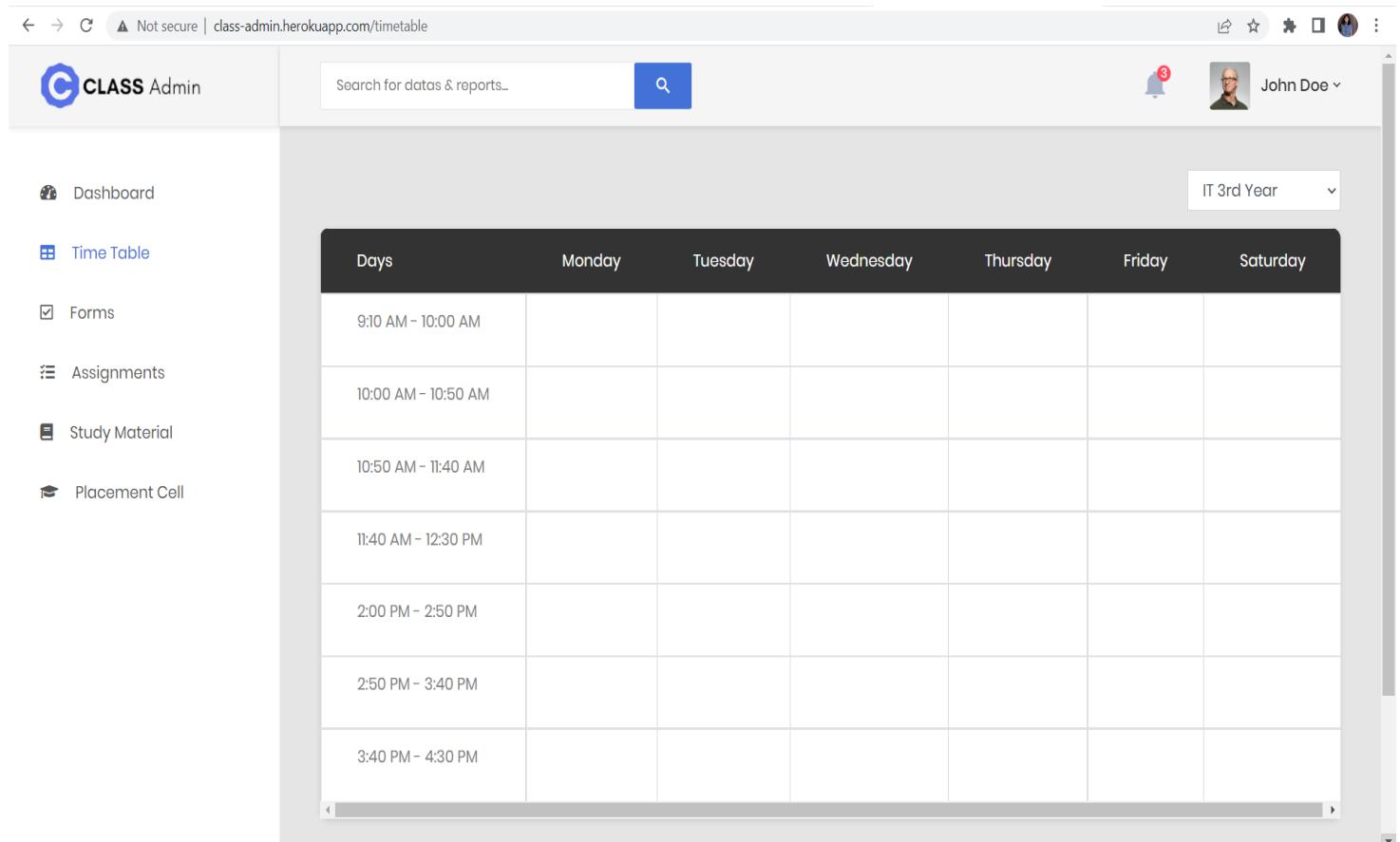
This is the screen for faculty where he/she has the feature to add resources (study material).



*Figure 3.16 shows study material screen for faculty*

### 3.6 Time Table

The Time Table section is one of the special features of this project. This is the dynamic timetable which allows the teacher to schedule their class as per the availability of them as well as the time slot. This will show the time slots which are filled/acquired by other teachers and then the teacher will click on the available cell and fill the information i.e. Time, day, and Subject. The google link for the class will then automatically created and will be added in the cell and the tile slot will be booked. The students will be able to get notified without the need of Class Representatives as the medium.



The screenshot shows the CLASS Admin application interface. On the left is a sidebar with icons for Dashboard, Time Table (selected), Forms, Assignments, Study Material, and Placement Cell. The main area is titled 'Time Table' and shows a grid for scheduling classes. The grid has columns for Days (Monday through Saturday) and rows for time slots: 9:10 AM - 10:00 AM, 10:00 AM - 10:50 AM, 10:50 AM - 11:40 AM, 11:40 AM - 12:30 PM, 2:00 PM - 2:50 PM, 2:50 PM - 3:40 PM, and 3:40 PM - 4:30 PM. Each cell in the grid is empty, indicating no classes are currently scheduled.

Figure 3.17 shows the timetable layout

The screenshot shows the CLASS Admin application interface. On the left is a sidebar with icons for Dashboard, Time Table, Forms, Assignments, Study Material, and Placement Cell. The main area has a search bar and a user profile for John Doe. A modal window titled "Add Class/Lab" is open, prompting for class details. The background shows a weekly timetable grid for Monday through Saturday.

**Add Class/Lab**

Days

Monday

10:00 AM to 10:50 AM

10:50 AM - 11:40 AM

11:40 AM - 12:30 PM

2:00 PM - 2:50 PM

2:50 PM - 3:40 PM

3:40 PM - 4:30 PM

Submit

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Figure 3.18 shows the form to schedule new class in timetable

### 3.7 Dashboard

Dashboard is the page which will act like the main menu of the classroom. It has a feature showing the attendance of the student in a pie chart attendance tracker. Also, the dashboard contains the links of all the pages like study material, assignments, timetable, forms etc. It contains a section which shows the overview of the day like deadlines, meetings, classes or any other activities that are scheduled for that day.

The screenshot shows the CLASS Admin dashboard. At the top, there is a header with the CLASS Admin logo, a search bar, and a user profile for John Doe. On the left, a sidebar lists navigation options: Dashboard (selected), Time Table, Forms, Assignments, Study Material, and Placement Cell. The main area is titled 'Overview' and displays a timeline of events for April 26, 2018. The timeline includes:

- Meeting about plan for Admin Template 2018 at 10:00 AM
- Create new task for Dashboard at 11:00 AM
- Meeting about plan for Admin Template 2018 at 02:00 PM
- Create new task for Dashboard at 03:30 PM

On the right, there are three cards: one for reminders (10 reminders), one for tasks (1,086 tasks this week), and a pie chart for attendance (Present: blue, Absent: red).

Figure 3.18 shows the dashboard screen

## Chapter 4 - Plan of Action

### 4.1 Plan of Action Timechart

Stage of Development	Months	Dec 2021	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022
PRD*, ERD*							
UI Development							
Backend Development							
Testing							
Deployment							

*Figure 4.1 shows plan of Action Time Chart*

\*PRD- Product Requirement Document

\*ERD- Engineering Requirement Document

## 4.2 Plan of Action Timesheet

Months	Stage of Development	Details
Dec 2021	PRD, ERD ( <i>first 20 days</i> ), Elementary UI development	<ul style="list-style-type: none"> <li>• Home/login UI</li> <li>• External static pages UI</li> <li>• Dashboard UI</li> <li>• Time table UI</li> <li>• Forms and Placement cell UI</li> </ul>
Jan 2022	UI Development	<ul style="list-style-type: none"> <li>• Admin Base UI</li> <li>• Faculty Base UI</li> <li>• Study Material UI</li> <li>• Assignments submission and assessment UI</li> <li>• Discussion spaces UI</li> </ul>
Feb 2022	Backend Development	<ul style="list-style-type: none"> <li>• Authentication</li> <li>• Timetable functionalities</li> <li>• Discussion Spaces (Class/Institute)</li> <li>• Forms section</li> </ul>
Mar 2022	Backend Development	<ul style="list-style-type: none"> <li>• Assignment Submission and Assessment</li> <li>• Multi user tier implementation</li> <li>• Notification implementation</li> <li>• Study material section implementation</li> </ul>
Apr 2022	Backend Development, Testing	<ul style="list-style-type: none"> <li>• Admin code implementation</li> <li>• Onboarding code implementation</li> <li>• Faculty Side implementation</li> <li>• Jest tests for Unit tests</li> <li>• Integration tests</li> </ul>
May 2022	Testing, Deployment	<ul style="list-style-type: none"> <li>• Staging/Heroku deployment</li> <li>• Unit tests and integration</li> <li>• AWS deployment</li> <li>• Presentation Preparation</li> <li>• UI Final Touches</li> <li>• Product Documentation/Report</li> </ul>

Figure 4.2 shows plan of Action Timesheet

## **Chapter 5 - Conclusion**

### **5.1 Conclusion**

The end result of the mentioned methodology and planned action will be a highly interactive UI with working functionalities of a virtual classroom, which will keep user data secure and will be able to handle customised academic activities for an institution. This application aims to eliminate the use of third party applications being used for various activities in the institution. Also, it will be able to aggregate all these activities to a homogeneous ecosystem, which greatly enhances the user experience and streamline user flow. The system can be used to increase student faculty interaction and also increase their involvement with the college. Also, the aggregation of all the activities on a single platform will help students to perform their curricular and co-curricular activities in an organised manner and it will help them to avoid missing out on important opportunities.

## **5.2 Future Works**

IET Pathshala is very useful in many aspects for the students as well as teachers of the institutions to aggregate all the activities at one platform in an organised manner. Through this, we are providing the facility of scheduling online live classes through google meet and providing study material, assignment posting and grading etc. Though this is currently solving several issues but can be improved in many dimensions.

There will be a messaging application in the classroom where students can form different communities as per their interests and connect with each other, they can share their views and opinions, future career opportunities etc.

We can also include a section for contests and competitions organised by teachers/seniors/alumni. The students can take part in these competitions/hackathons and get inspired to perform better.

An open channel, in which students can post their doubts, queries etc and their fellow mates can solve them or help them, will be inculcated in the application. This will help to increase the spirit of self help and mutual help among students.

A section of E-Library should also be there where students can access e-books of the curriculum as well as other books to help students to grow in a holistic way. It will be a step to save paper as well.

As of now, we are using google meet for the live classes, meetings etc. In the future, we can also try to build a video conferencing application of our own. It will also reduce the issues of data security and make our application self reliant.

Due to the constraint of time as well as resources, we couldn't implement these features but this part could be done in the future as it will widen the scope of the application.

## **References**

- [1] Shivangi Dhawan,“Online Learning : A panacea in the Time of COVID-19 Crisis”, *Journal Of Educational Technology systems* ,Vol.49(I) 5-22.December 2020
- [2] Saba Maanvizhi, Jiyaram Neha Jaiswal, Ravi Ram Narayanan, Rajendra Rohit Jain,“A Review on Virtual Classroom”, *Indian Journal of Pharmaceutical Education and Research*,October 2020
- [3] Rajab Ali Biswas, Dr. Soma Nandi,“Teaching in Virtual Classroom: Challenges and Opportunities”,*International Journal of Engineering Applied Sciences and Technology*, Vol. 5, Issue 1ISSN No 2455-2143, May 2020.
- [4] Brooke Auxier, Lee Rainie,“Public opinion on Security of Data from companies”, *Pew Research Center:Online Learning* ,November 2019,
- [5] Arvind Mahajan, Assistant Manager,“Virtual Learning Environment”, *AIMA Journal of Management & Research*,Volume 10 Issue 2/4, ISSN 0974-497 Copyright @ 2016 AJMR-AIMA, 2016
- [6] J. Bissonnette, F. Dubé, M.D. Provencher, M.T. Moreno Sala. “Evolution of Music performance anxiety and quality of performance during virtual reality exposure training”, *Virtual Reality*, Volume 20, Issue 1, pp 71-81,March 2016 .
- [7] Özgür Yılmaz,“Students opinions on Live Virtual Classroom”, *The Turkish Online Journal Of Educational Technology*, Volume 14 issue 1 January 2015.
- [8] Jesper Nilsson. “Virtual Characters for a Virtual Classroom”. *Computer Science , Degree Project, School of Science and Technology*, Örebro University,January 2015,
- [9] Michael Chikodi Agarana,“Design and Implementations of Virtual Classroom”, *Department of Computer and Information Sciences, Covenant University (NIGERIA)*, *Department of Mathematics, Covenant University (NIGERIA)*,November 2015.
- [10] Poeschl, S., Doering, N.. 2012. “Virtual Training For Fear Of Public Speaking – Design Of an Audience For Immersive Virtual Environments”. *Virtual Reality Short Papers and Posters (VRW)*, 2012 IEEE. Pages 101-102.
- [11] D. Villani, C. Repetto, P. Cipresso, G. Riva. 2012. “May I experience more presence in doing the same thing in virtual reality than in reality?”*An answer from a simulated job interview, Interact. Comput.* (2012) 24 (4): 265-272 doi: 10.1016/j.intcom.2012.04.008
- [12] Tassos A. Mikropoulos, “Presence: a Unique Characteristic in Educational Training Environments”. *Virtual Reality*, volume 10, issue 3, pp 197-206,December 2006.