



Department of Artificial Intelligence and Machine Learning

B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

Experiment 13

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Experiment No:- 13

Aim:- Create an Online Learning using REST APIs.

Theory:-

Allow users to access educational content such as courses, videos, quizzes.

To ensure smooth communication between frontend & backend, we will create REST APIs that will handle different operations like user authentication, course management, & progress tracking.

Steps to Build.

1) Install dependencies (express, mongoose, cors)

2) Create Express Server

3) Connect MongoDB

- User Model, - Course Model, Progress Model.

4) Define RESTful APIs

- POST /auth/register, POST /auth/login

- GET /courses, POST /courses

Conclusion:- Thus, we successfully build the REST APIs to ensure modularity, scalability & easy maintenance.



Department of Artificial Intelligence and Machine Learning
B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

Aim	Create an Online Learning application using REST APIs
Software	VS Code
Pre-requisite	Active internet connection
Theory	<p>Steps to Create an Online Learning Application using REST APIs</p> <p>Step 1: Set Up Your Development Environment To begin, ensure you have Node.js and npm installed on your system. These tools are required to build both the backend and frontend of your application.</p> <p>Step 2: Design the Application Structure Create separate directories for your backend and frontend to keep the code organized. Your backend will serve as the REST API provider, and the frontend will act as the client interface for users.</p> <ul style="list-style-type: none">• Backend: Contains your API routes and connects to the database.• Frontend: Hosts the user interface, such as registration, login, courses, and learning modules. <p>Express will handle API requests.</p> <p>Mongoose will connect to MongoDB.</p> <p>Body-parser will parse incoming request bodies.</p> <p>Step 4: Define Your API Endpoints</p> <p>Create an <code>app.js</code> file in the backend folder to define your REST API endpoints for core functionalities like registration, login, course enrollment, and progress tracking:</p> <p>Step 5: Connect to MongoDB and Define Schemas</p> <p>Use MongoDB to store user data and course information. Define schemas for users, courses, and enrollments in a <code>models</code> folder within the backend directory:</p> <p>Follow a similar structure for defining course and enrollment schemas.</p> <p>Step 6: Implement User Authentication Add user authentication with JSON Web Token (JWT) to secure access. Install the <code>jsonwebtoken</code> package:</p> <p>Create routes for registration, login, and token verification to ensure only authenticated users can access certain endpoints.</p>



Department of Artificial Intelligence and Machine Learning
B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

	<p>Step 7: Develop the Frontend</p> <p>In the frontend folder, create a React app using the following command:</p> <p>Install Axios for API calls:</p> <p>Design the UI for features like login, viewing courses, and tracking learning progress. Use Axios to fetch data from your backend API.</p> <p>Once set up, start by building the main pages and components:</p> <ol style="list-style-type: none">1. Login and Registration Pages: Forms for user authentication, allowing new users to register and existing users to log in.2. Course List Page: Displays a list of available courses. Users can browse and select courses to enroll in.3. Course Detail Page: Shows details about a specific course, including modules, instructor info, and course requirements.4. User Dashboard: A personalized area for each user to track enrolled courses, view progress, and access completed materials. <p>Use React's state and props to manage data flow between components. Withreact-router-dom, set up routes for each page to provide a smooth navigationexperience:</p> <p>Step 8: Integrate REST APIs with Frontend</p> <p>After building the UI components, connect them to your backend REST APIs. In the <code>src</code>directory, create an <code>api.js</code>file to centralize all Axiosrequests to streamline API interactions and handle responses in a single place:</p> <p>Step 9: Test and Deploy Your Application</p> <p>Test the API endpoints and ensure the frontend displays data as expected. Deploy your backend and frontend using services like Heroku for backend APIs and Netlify for frontend.</p> <p>For deployment:</p> <ul style="list-style-type: none">• Backend: Host the backend on platforms like Heroku or Render. Ensure your environment variables (e.g., MongoDB URI, JWT secret) are securely configured on the server.• Frontend: Deploy the React frontend to services like Netlify or Vercel. Update the backend API URL to the production server URL in your frontend code. <p>By following these steps, you can create a functional online learning application that allows user registration, course enrollment, and tracking of learning progress.</p>
Code	Frontend AllCourses.jsx



Department of Artificial Intelligence and Machine Learning
B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

```
import React from 'react';
import { Link } from 'react-router-dom';
import { useEffect, useState } from 'react';
import axios from 'axios';
const baseURL = 'http://127.0.0.1:8000/api/course/';
function AllCourses() {
  const [courseData, setCourseData] = useState([]);
  useEffect(() => {
    axios.get(baseURL).then((res) => {
      setCourseData(res.data);

      // console.log('data is ', res.data);
    });
  }, []);
  return (
    <div className="container mt-4">
      <div className="row border-bottom border-primary pb-1 mb-1">
        <h3 className="col">Latest Courses</h3>
        <a className="col text-uppercase fw-bold" href="#1">
          <Link to={"/"}>Go Back</Link>
        </a>
      </div>
      <div className="row mb-4">
        {courseData &&
          courseData.map((data, index) => {
            return (
              <div className="col-md-3">
                <div className="card">
                  <Link to="/detail/1">
                    {' '}
                    <img
                      src={data.featured_img}
                      className="card-img-top w-40"
                      alt="..."
                    />
                  </Link>
                  <div className="card-body d-flex flex-column">
                    <h5 className="card-title">
                      <Link to="/detail/1">{data.title}</Link>
                    </h5>
                    <p className="card-text">{data.description}</p>
                    <Link to={` /detail/${courseData.id} `}>
                      <a href="#1" className="btn btn-primary">
                        Course Detail
                      </a>
                    </Link>
                  </div>
                </div>
              </div>
            );
          })
        }
      </div>
    </div>
  );
}
```



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B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

```

        <div className="title">
          <span>Rating: 4.6/5</span>
          <span className="float-end">Views: 5451</span>
        </div>
      </div>
    </div>
  </div>
</div>
</div>
);
}}}
</div>
</div>
);
}

export default AllCourses;

CategoryCourses.jsx:
import React from 'react';
import {Link} from 'react-router-dom';

function CategoryCourses() {
  return (
    <div className="container mt-4">
      <div className="row border-bottom border-primary pb-1 mb-1">
        <h3 className="col">Web development courses</h3>
        <a className="col text-uppercase fw-bold" href="#1">
          <Link to={' '}>Go Back</Link>
        </a>
      </div>
      <div className="row mb-4">
        <div className="col-md-3">
          <div className="card">
            <Link to="/detail/1">
              {' '}
              
            </Link>
            <div className="card-body d-flex flex-column">
              <h5 className="card-title">
                <Link to="/detail/1">Card title</Link>

```




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	<pre> </h5> <p className="card-text"> Some quick example text to build on the card title and make up the bulk of the card's content. </p> Go somewhere </div> </div> </div> <div className="col-md-3"> <div className="card"> <Link to="/detail/1"> { ' ' } </Link> <div className="card-body d-flex flex-column"> <h5 className="card-title"> <Link to="/detail/1">Card title</Link> </h5> <p className="card-text"> Some quick example text to build on the card title and make up the bulk of the card's content. </p> Go somewhere </div> </div>{ ' ' } </div> <div className="col-md-3"> <div className="card"> <Link to="/detail/1"> { ' ' } <img the bulk of the card's content. </p> </pre>
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	<pre> Go somewhere </div> </div> </div>{' '} <div className="col-md-3"> <div className="card"> <Link to="/detail/1"> {' '} </Link> <div className="card-body d-flex flex-column"> <h5 className="card-title"> <Link to="/detail/1">Card title</Link> </h5> <p className="card-text"> Some quick example text to build on the card title and make up the bulk of the card's content. </p> Go somewhere </div> </div>{' '} <div className="col-md-3"> <div className="card"> <Link to="/detail/1"> {' '} </Link> <div className="card-body d-flex flex-column"> <h5 className="card-title"> <Link to="/detail/1">Card title</Link> </pre>
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	<pre> className="card-img-top rounded-circle" alt="..." /> </Link> <div className="card-body d-flex flex-column"> <h5 className="card-title"> <Link to="/detail/1">Card title</Link> </h5> <p className="card-text"> Some quick example text to build on the card title and make up the bulk of the card's content. </p> Go somewhere </div> </div> </div>{' '}</div> <div className="col-md-3"> <div className="card"> <Link to="/detail/1"> {' '} </Link> <div className="card-body d-flex flex-column"> <h5 className="card-title"> <Link to="/detail/1">Card title</Link> </h5> <p className="card-text"> Some quick example text to build on the card title and make up the bulk of the card's content. </p> Go somewhere </div> </div> </div>{' '}</div> <div className="col-md-3"> </pre>
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	<pre> <p className="card-text"> </Link> <div className="card-body d-flex flex-column"> <h5 className="card-title"> <Link to="/detail/1">Card title</Link> </h5> <p className="card-text"> Some quick example text to build on the card title and make up the bulk of the card's content. </p> Go somewhere </div> </div> </div> <div className="col-md-3"> <div className="card"> <div className="card-body d-flex flex-column"> <h5 className="card-title">Card title</h5> <p className="card-text"> Some quick example text to build on the card title and make up the bulk of the card's content. </p> Go somewhere </div> </div>{' '} <div className="col-md-3"> <div className="card"> <img src="https://www.ptuk.edu.ps/projects/edu4all/wp-content/uploads/20 21/02/cropped-Edu-4-all-Final-Jan-2021-01-1.png" className="card-img-top rounded-circle" alt="..." </pre>
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```
    />
    <div className="card-body d-flex flex-column">
      <h5 className="card-title">Card title</h5>
      <p className="card-text">
        Some quick example text to build on the card title and
make up
        the bulk of the card's content.
      </p>
      <a href="#1" className="btn btn-primary">Go
        somewhere
      </a>
    </div>
  </div>{' '}
  <div className="col-md-3">
    <div className="card">
      
      <div className="card-body d-flex flex-column">
        <h5 className="card-title">Card title</h5>
        <p className="card-text">
          Some quick example text to build on the card title and
make up
          the bulk of the card's content.
        </p>
        <a href="#1" className="btn btn-primary">Go
          somewhere
        </a>
      </div>
    </div>
  </div>
</div>
);
}

export default CategoryCourses;

Backend:
Manage.py
#!/usr/bin/env python
"""Django's command-line utility for administrative tasks."""
```



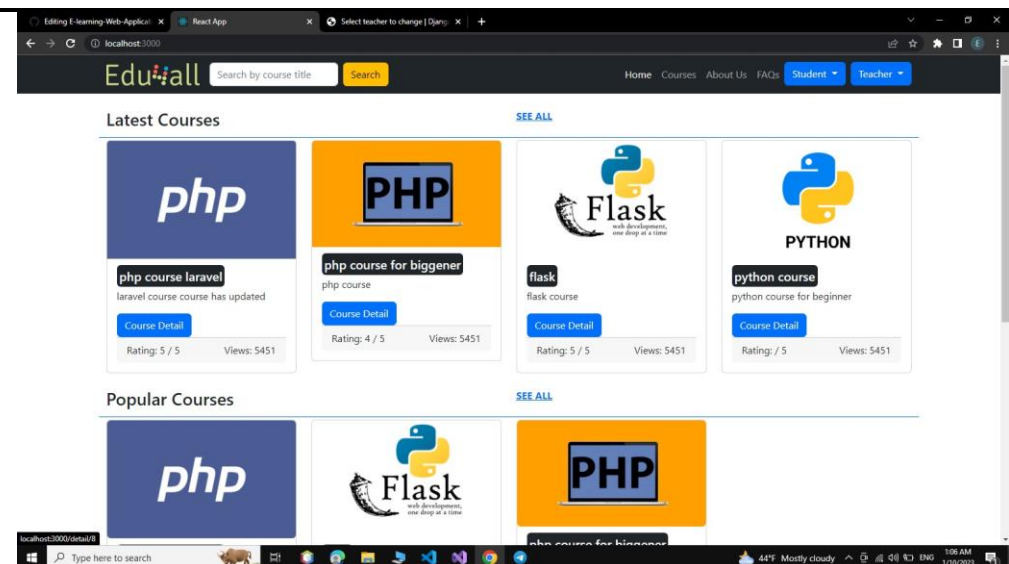

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B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

```
import os
import sys

def main():
    """Run administrative tasks."""
    os.environ.setdefault('DJANGO_SETTINGS_MODULE',
        'lms_api.settings')
    try:
        from django.core.management import
            execute_from_command_line
    except ImportError as exc:
        raise ImportError(
            "Couldn't import Django. Are you sure it's installed and "
            "available on your PYTHONPATH environment variable? Did "
            "you "
            "forget to activate a virtual environment?"
        ) from exc
    execute_from_command_line(sys.argv)

if __name__ == '__main__':
    main()
```

Result





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B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

The image displays two screenshots of the EduHall web application. The top screenshot shows the 'Teacher Sign up' form, which includes fields for Name, Email, Password, Qualification, Mobile No., and Skills. The bottom screenshot shows the 'Teacher Dashboard' with a sidebar menu and summary cards for Total Courses, Total Students, and Total Chapters.

Teacher Sign up Form:

- Name: abdelnasser obeid
- Email: gaza@gmail.com
- Password: *****
- Qualification: html css php
- Mobile No.: 0594982846
- Skills: java oop

Teacher Dashboard:

- Dashboard
- My Courses
- Quiz
- Add Quiz
- My Users
- Add Course
- Profile Setting
- Change password
- Logout

Summary Cards:

- Total Courses: 4 course(s)
- Total Students: 3 student(s)
- Total Chapters: 1 chapter(s)



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B.Tech. Sem: V Subject: Full Stack Development Laboratory (DJS22AML504)

Editing E-learning Web-App...

E-Learn React JS System

React App

Select teacher to change | Django

localhost:3000/teacher-dashboard

Eduall

Search by course title

Search

Home

Courses

About Us

FAQs

Student

Teacher

Dashboard

My Courses

Quiz

Add Quiz

My Users

Add Course

Profile Sitting

Change password

Logout

My Courses

Name	Image	Total Enrollment	Action
php course laravel	php	0	Edit Add View Delete
php course for biggener	PHP	0	Edit Add View Delete
flask	Flask	0	Edit Add View Delete
python course	Python	0	Edit Add View Delete

[Facebook](#) [Twitter](#) [Google](#) [LinkedIn](#)

Windows

Type here to search

44°F Mostly cloudy

1:02 AM 1/16/2023

Editing E-learning Web-App...

React App

Select teacher to change | Django

localhost:3000/edit-course/8

Eduall

Search by course title

Search

Home

Courses

About Us

FAQs

Student

Teacher

Dashboard

My Courses

Quiz

Add Quiz

My Users

Add Course

Profile Sitting

Change password

Logout

Update Course

Title

php course laravel

Description

laravel course course has updated

Course Image

Choose File

No file chosen

Technologies

laravel course1

Update Course

[Facebook](#) [Twitter](#) [Google](#) [LinkedIn](#)

Windows

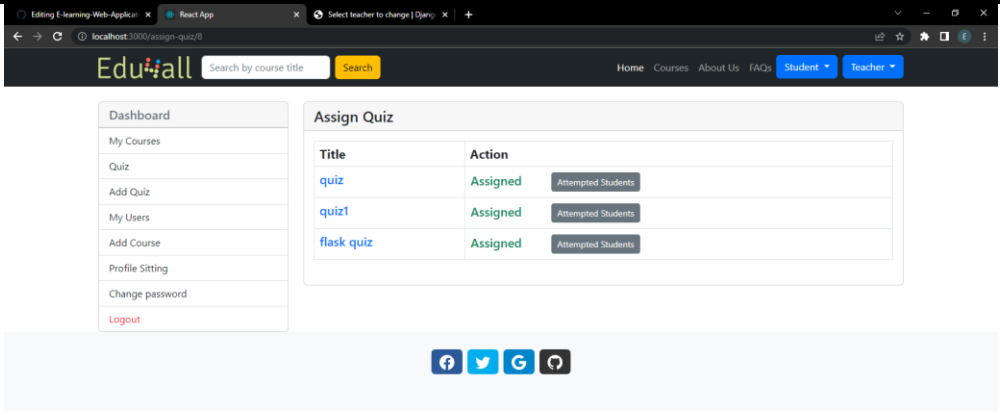
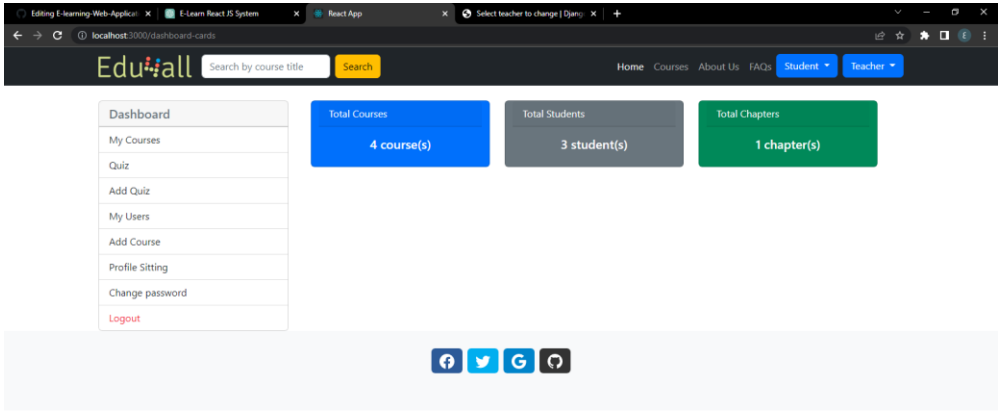
Type here to search

44°F Mostly cloudy

1:03 AM 1/16/2023



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	 <table border="1" data-bbox="718 421 1316 571"><thead><tr><th>Title</th><th>Action</th></tr></thead><tbody><tr><td>quiz</td><td>Assigned Attempted Students</td></tr><tr><td>quiz1</td><td>Assigned Attempted Students</td></tr><tr><td>flask quiz</td><td>Assigned Attempted Students</td></tr></tbody></table> 	Title	Action	quiz	Assigned Attempted Students	quiz1	Assigned Attempted Students	flask quiz	Assigned Attempted Students
Title	Action								
quiz	Assigned Attempted Students								
quiz1	Assigned Attempted Students								
flask quiz	Assigned Attempted Students								
Conclusion	Thus we have successfully created an Online Learning application using REST APIs								