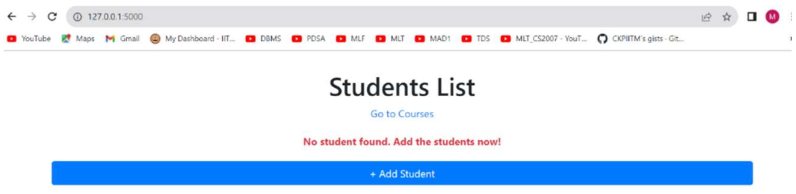
Using a standard flask template, create an application that:

CRUD Operations for Students:

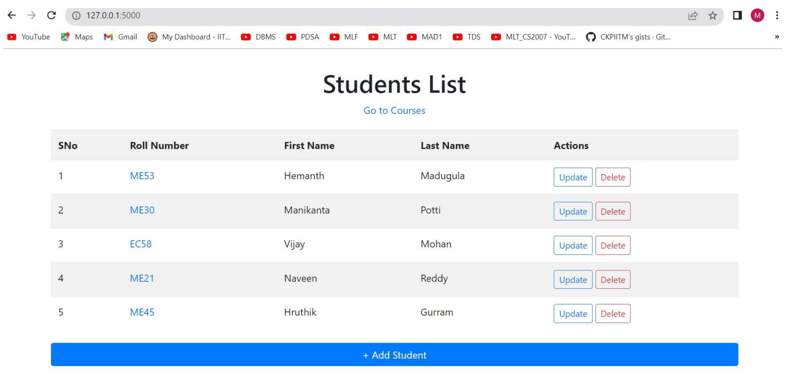
1. On the home page (URI = ‘/’), (when we open it via the browser) displays an index page. The index page displays a table with the list of currently existing students in the database and displays an appropriate message if no student exists. It also consists a button labeled “Add student”.



Students List

Go to Courses

No student found. Add the students now!

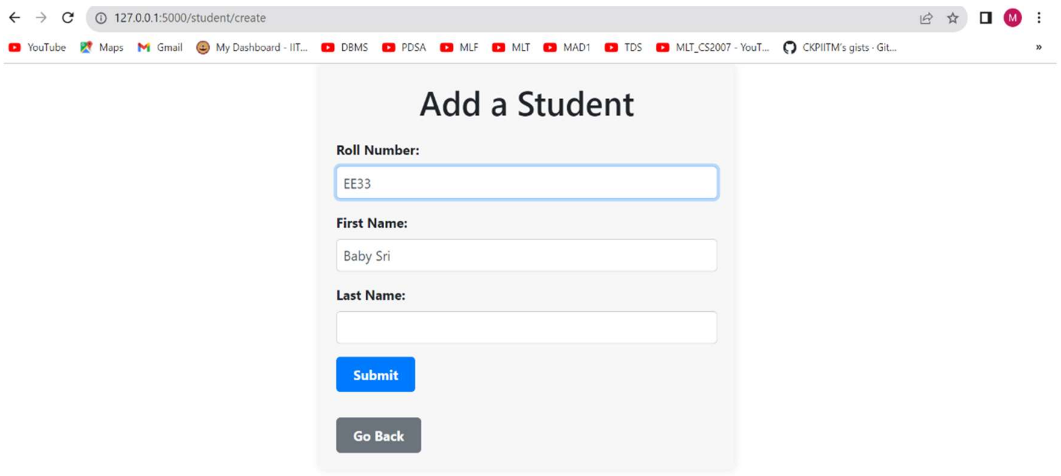


Students List

Go to Courses

SNo	Roll Number	First Name	Last Name	Actions
1	ME53	Hemanth	Madugula	Update Delete
2	ME30	Manikanta	Potti	Update Delete
3	EC58	Vijay	Mohan	Update Delete
4	ME21	Naveen	Reddy	Update Delete
5	ME45	Hruthik	Gurram	Update Delete

2. If the user clicks the “Add student” button, the flask application will send a GET request to an endpoint “/student/create”, which displays an HTML form.



Add a Student

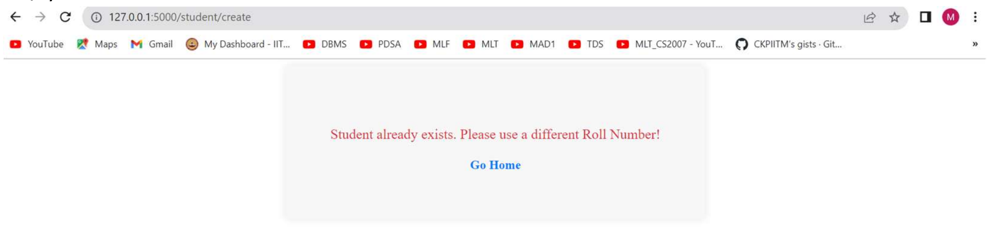
Roll Number: EE33

First Name: Baby Sri

Last Name:

3. If the user clicks the submit button, the browser sends a POST request to flask application's "/student/create" URI. The flask application then creates a student object (with attributes roll number, first name and last name) and add it into the database and, it redirects to the home page (URI = '/') and the student will be added into the table. The roll number in each row of the table is clickable.

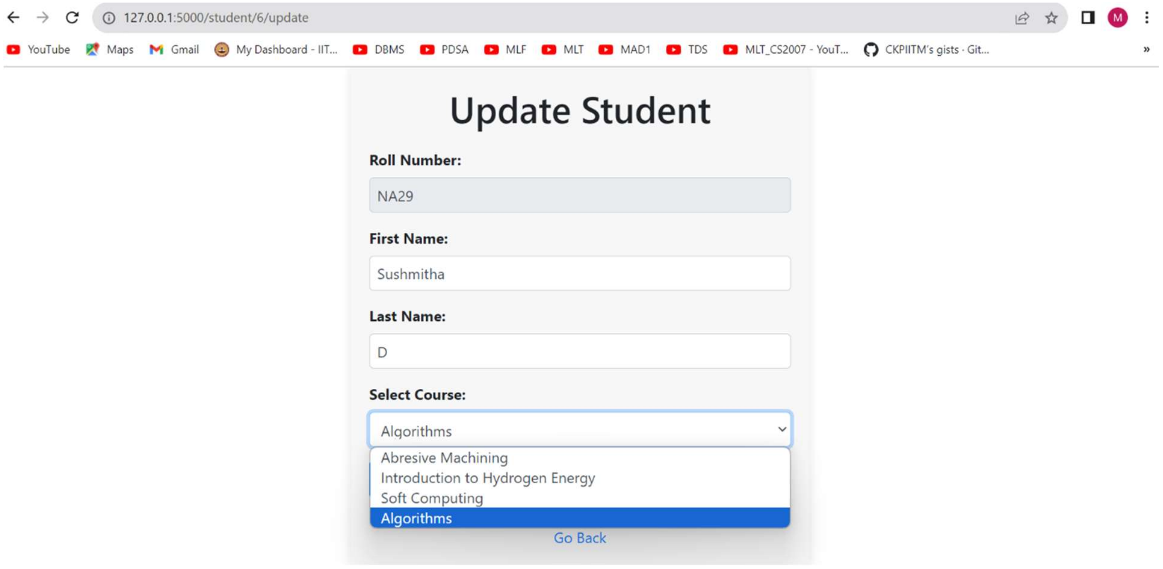
4. If the roll number already exists, then, the user will be redirected to an HTML page, which displays an appropriate message and have a button to navigate back to the home page (URI = '/')



Student already exists. Please use a different Roll Number!

Go Home

5. If the user clicks the "Update" button on the home page (URI = '/'), the flask application sends a GET request to an endpoint "/student/<int:student id>/update", which displays an HTML form.



Update Student

Roll Number: NA29

First Name: Sushmitha

Last Name: D

Select Course: Algorithms

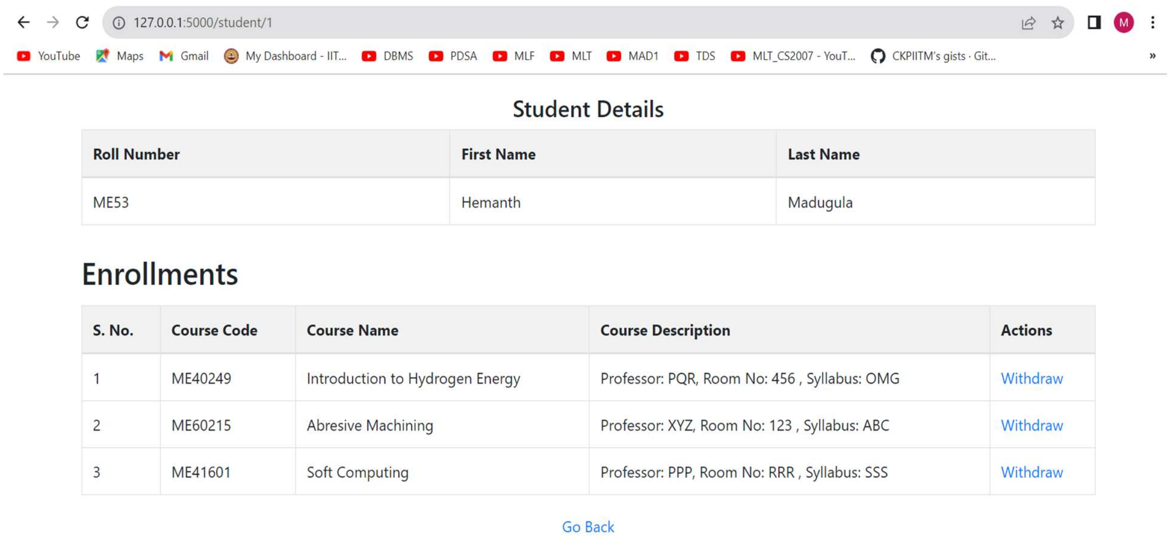
Abresive Machining
Introduction to Hydrogen Energy
Soft Computing
Algorithms

Go Back

6. If the user clicks the submit button, the browser sends a POST request to your flask application's "/student/<int:student id>/update" URI. The flask application then updates the student and corresponding enrollment into the database and redirect to the home page (URI = '/'). The previous enrollment(s) will persist. (if any)

7. If the user clicks the "Delete" button on the home page (URI = '/'), the flask application sends a GET request to an endpoint "/student/<int:student id>/delete", which deletes the student and all the corresponding enrollments from the database and redirected to the home page (URI = '/').

8. If the user clicks on the roll number of any row in the table in the home page of the flask application, the application sends a GET request to an endpoint “/student/<int:student id>”, which shows all the information (student details and enrollment details) in an HTML page. The HTML page also have a button labelled “Go Back” to navigate back to the home page (URI = ‘/’). There are 2 HTML tables in this page, one for showing the personal details and the other for displaying the enrollment details. Every record in the enrollments table have a “withdraw” button, which when clicked, the flask application sends a GET request to an endpoint “/student/<int:student id>/withdraw/<int:course id>”, which removes the course from current enrollments of the student from the database and redirected to the home page (URI = ‘/’).



Student Details

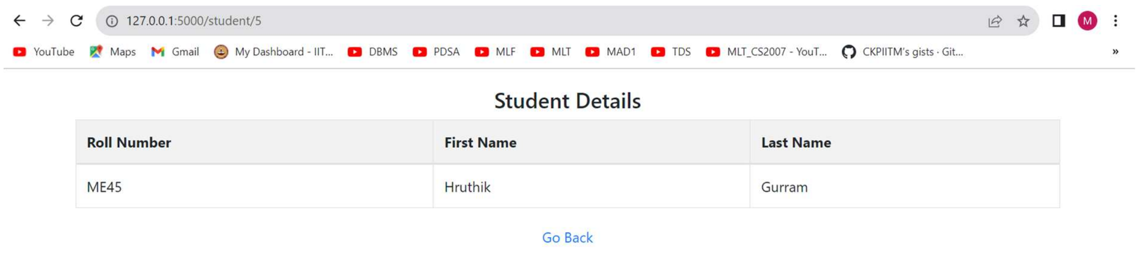
Roll Number	First Name	Last Name
ME53	Hemanth	Madugula

Enrollments

S. No.	Course Code	Course Name	Course Description	Actions
1	ME40249	Introduction to Hydrogen Energy	Professor: PQR, Room No: 456 , Syllabus: OMG	Withdraw
2	ME60215	Abresive Machining	Professor: XYZ, Room No: 123 , Syllabus: ABC	Withdraw
3	ME41601	Soft Computing	Professor: PPP, Room No: RRR , Syllabus: SSS	Withdraw

Go Back

9. This table only exists when there is at least 1 enrollment for that particular student. The table must not exist if there are no enrollments.



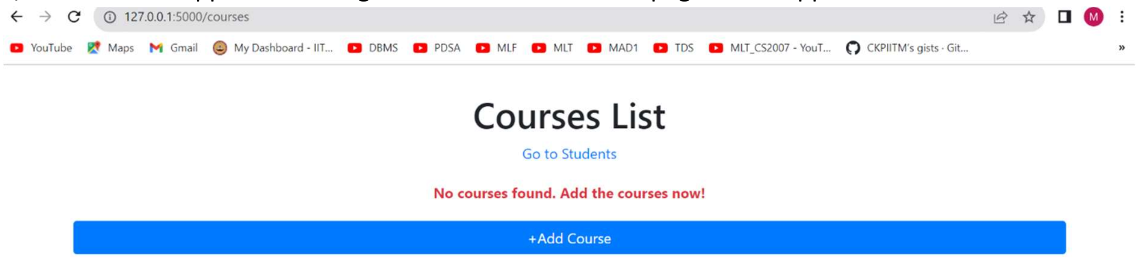
Student Details

Roll Number	First Name	Last Name
ME45	Hruthik	Gurram

Go Back

CRUD Operations for Courses:

1. The index page also consists a button “Go to courses”, When a user clicks on “Go to Courses”, the browser sends a GET request to your flask application’s “/courses” URI and the application navigate the user to the courses page, which displays a table of all the courses currently available in the database. It displays an appropriate message if no course exists in the database. It also consists a button labeled “Add course” . The HTML page also have a button “Go to Students”. When a user clicks on “Go to Students”, the browser sends a GET request to your flask application’s “/” URI and the application navigate the user to the index page of the application.

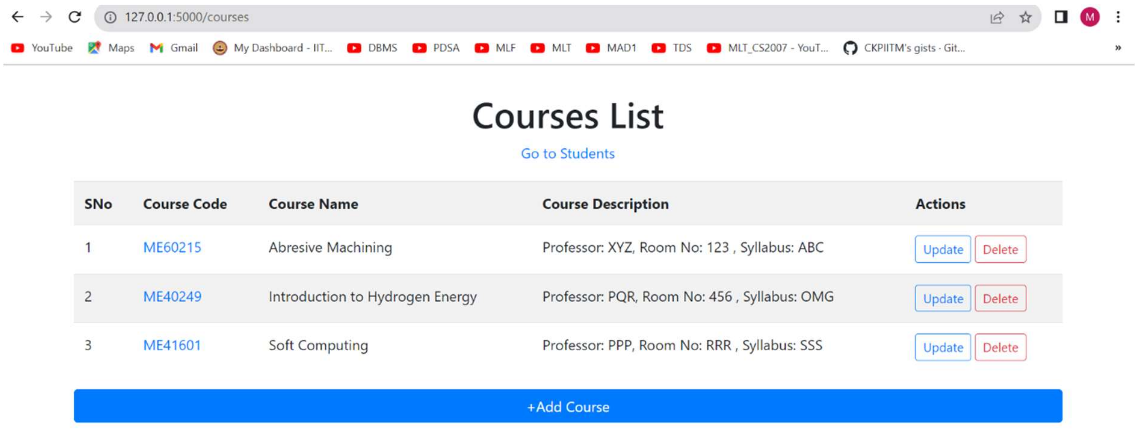


Courses List

Go to Students

No courses found. Add the courses now!

+Add Course



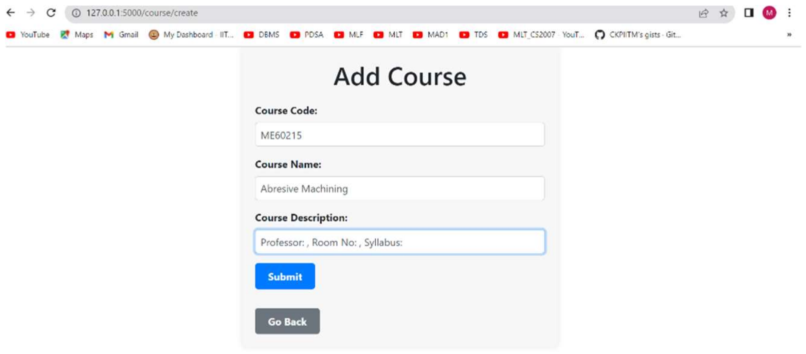
Courses List

Go to Students

SNo	Course Code	Course Name	Course Description	Actions
1	ME60215	Abresive Machining	Professor: XYZ, Room No: 123 , Syllabus: ABC	Update Delete
2	ME40249	Introduction to Hydrogen Energy	Professor: PQR, Room No: 456 , Syllabus: OMG	Update Delete
3	ME41601	Soft Computing	Professor: PPP, Room No: RRR , Syllabus: SSS	Update Delete

+Add Course

2. If the user clicks the “Add course” button, flask application sends a GET request to an endpoint “/course/create”, which displays an HTML form. If the user clicks the submit button, the browser sends a POST request to your flask application’s “/course/create” URI. The flask application then create a course object (with attributes course code, course name and course description) and add it into the database and, it should redirect to the courses page (URI = ‘/courses’).Note that the course code in each row of the table can be clickable.



Add Course

Course Code: ME60215

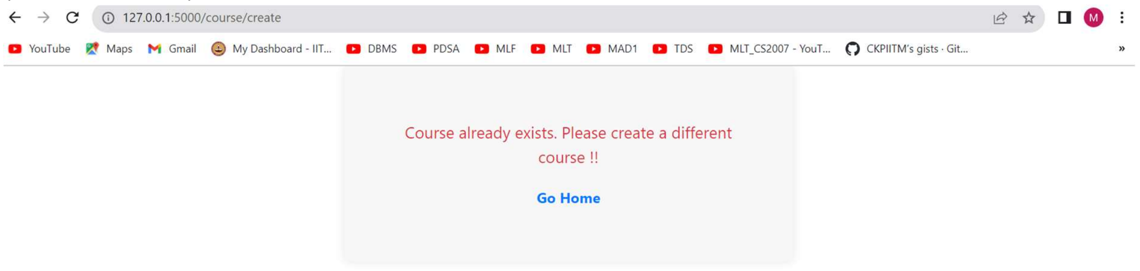
Course Name: Abresive Machining

Course Description: Professor: , Room No: , Syllabus:

Submit

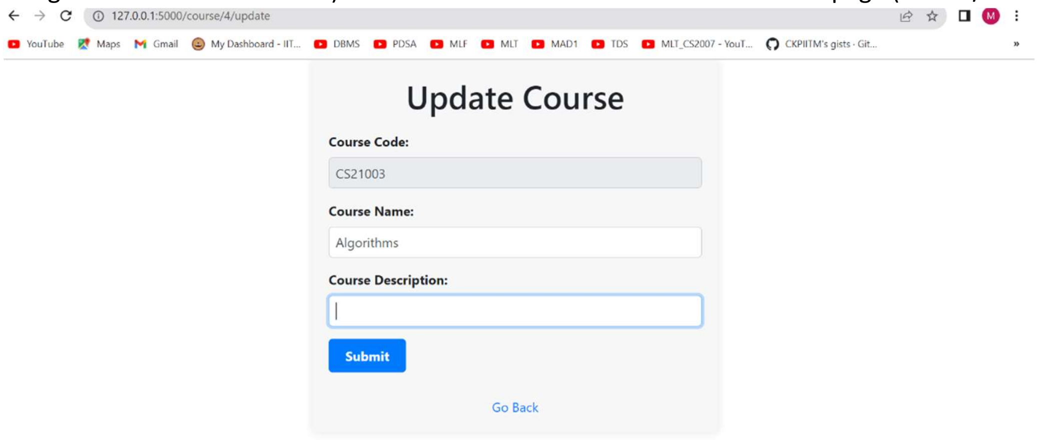
Go Back

3. If the course code already exists, then, the user should be redirected to an HTML page, which should display an appropriate message and have a button to navigate back to the courses page (URI = '/courses')


127.0.0.1:5000/course/create

Course already exists. Please create a different course !!

4. If the user clicks the "Update" button on the courses page (URI = '/courses') flask application sends a GET request to an endpoint "/course/<int:course id>/update", which displays an HTML form. If the user clicks the submit button, the browser sends a POST request to your flask application's "/course/<int:course id>/update" URI. The flask application then updates the targeted course (with the given course id in the URI) in the database and redirect to the courses page (URI = '/courses').


127.0.0.1:5000/course/4/update

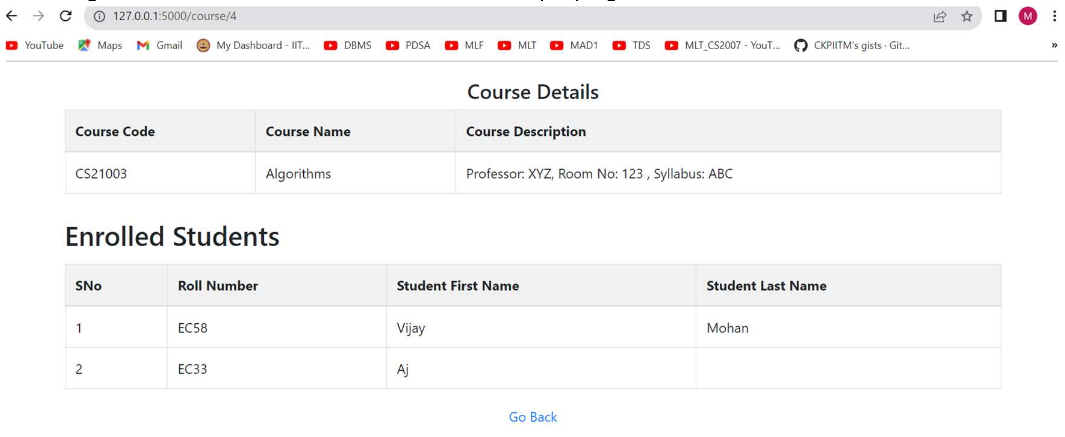
Update Course

Course Code: CS21003

Course Name: Algorithms

Course Description:

5.If the user clicks on the course code of any row in the table in the courses page of the flask application (URI = '/courses'), the application sends a GET request to an endpoint "/course/<int:course id>", which shows all the information (course details and students enrolled in the course) in an HTML page. The HTML page also consists a button labelled "Go Back" to navigate back to the courses page (URI = '/courses'. There must be 2 HTML tables in this page, one for showing the course details and the other for displaying the enrollment details.


127.0.0.1:5000/course/4

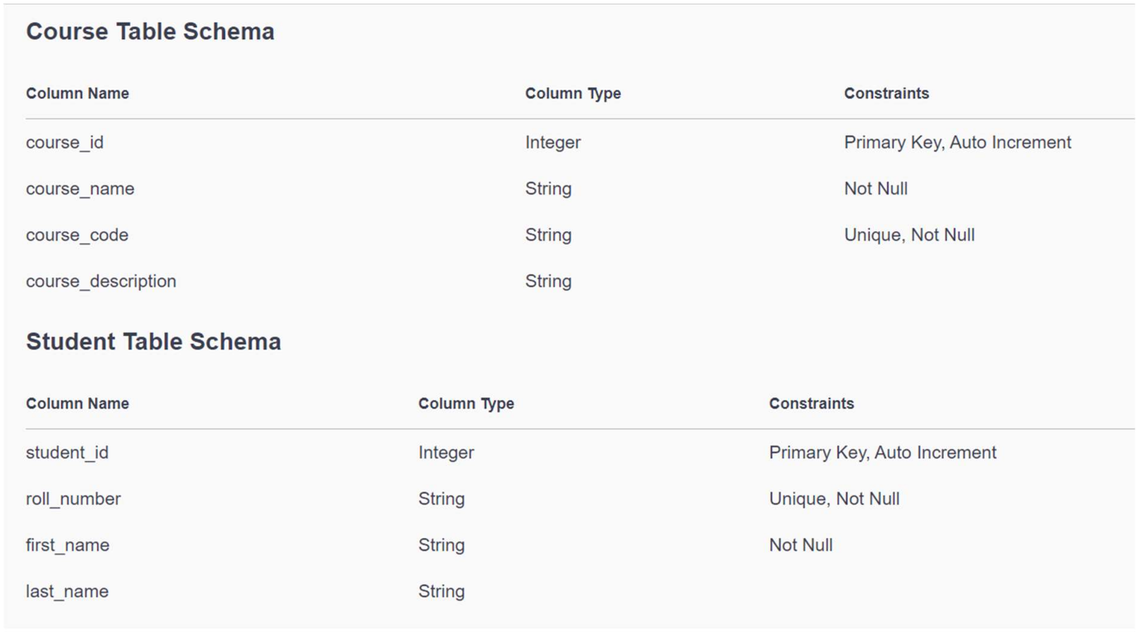
Course Details

Course Code	Course Name	Course Description
CS21003	Algorithms	Professor: XYZ, Room No: 123 , Syllabus: ABC

Enrolled Students

SNo	Roll Number	Student First Name	Student Last Name
1	EC58	Vijay	Mohan
2	EC33	Aj	

Created a RESTful API, database models using Flask-RESTful and flask-SQLAlchemy, Postman/Thunderclient

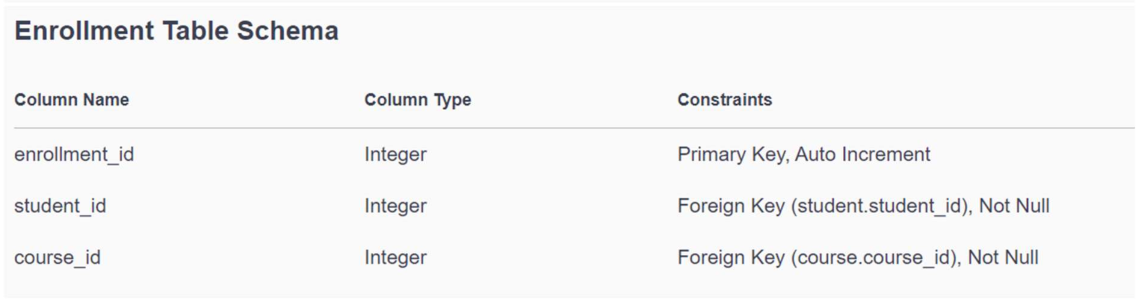


Course Table Schema

Column Name	Column Type	Constraints
course_id	Integer	Primary Key, Auto Increment
course_name	String	Not Null
course_code	String	Unique, Not Null
course_description	String	

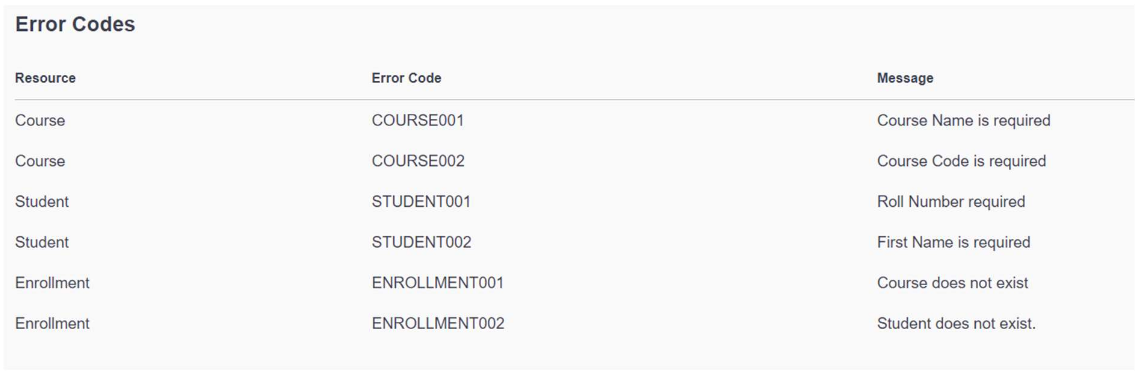
Student Table Schema

Column Name	Column Type	Constraints
student_id	Integer	Primary Key, Auto Increment
roll_number	String	Unique, Not Null
first_name	String	Not Null
last_name	String	



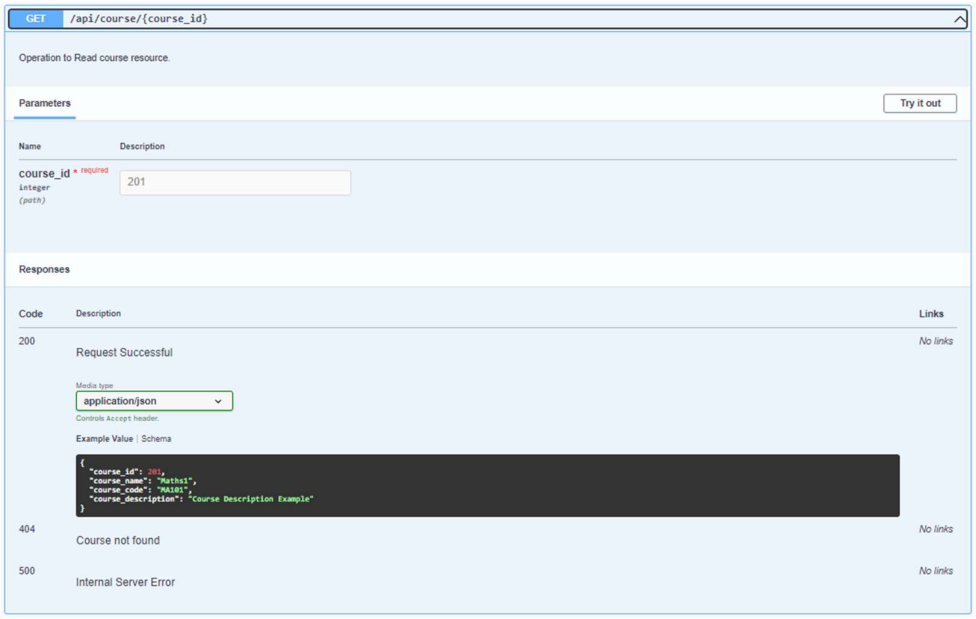
Enrollment Table Schema

Column Name	Column Type	Constraints
enrollment_id	Integer	Primary Key, Auto Increment
student_id	Integer	Foreign Key (student.student_id), Not Null
course_id	Integer	Foreign Key (course.course_id), Not Null



Error Codes

Resource	Error Code	Message
Course	COURSE001	Course Name is required
Course	COURSE002	Course Code is required
Student	STUDENT001	Roll Number required
Student	STUDENT002	First Name is required
Enrollment	ENROLLMENT001	Course does not exist
Enrollment	ENROLLMENT002	Student does not exist.



`/api/course/{course_id}`

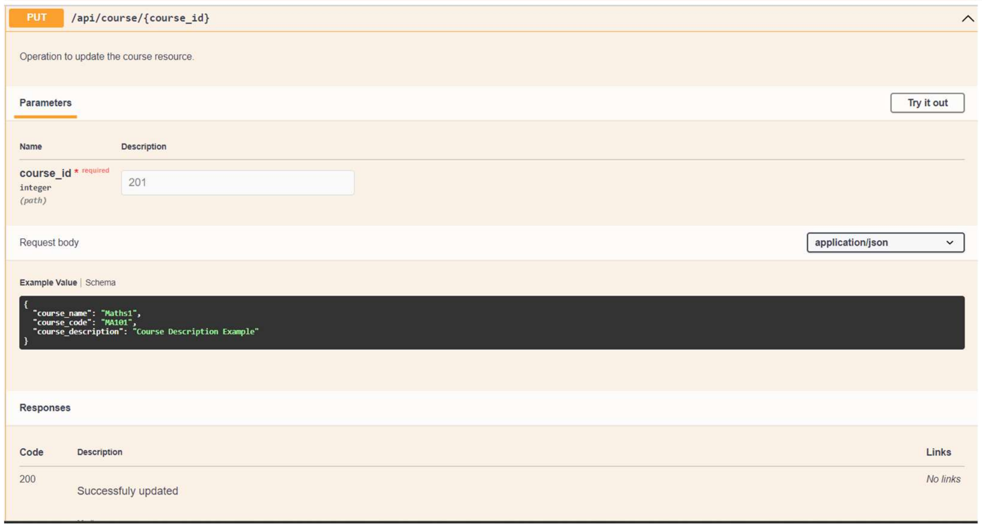
Operation to Read course resource.

Name	Description
course_id * required integer *(path)*	201

Responses

Code	Description	Links
200	Request Successful Media type: application/json Controls Accept header. Example Value | Schema	*No links*
404	Course not found	*No links*
500	Internal Server Error	*No links*

```
{
  "course_id": 201,
  "course_name": "Maths1",
  "course_code": "MA101",
  "course_description": "Course Description Example"
}
```



`/api/course/{course_id}`

Operation to update the course resource.

Name	Description
course_id * required integer *(path)*	201

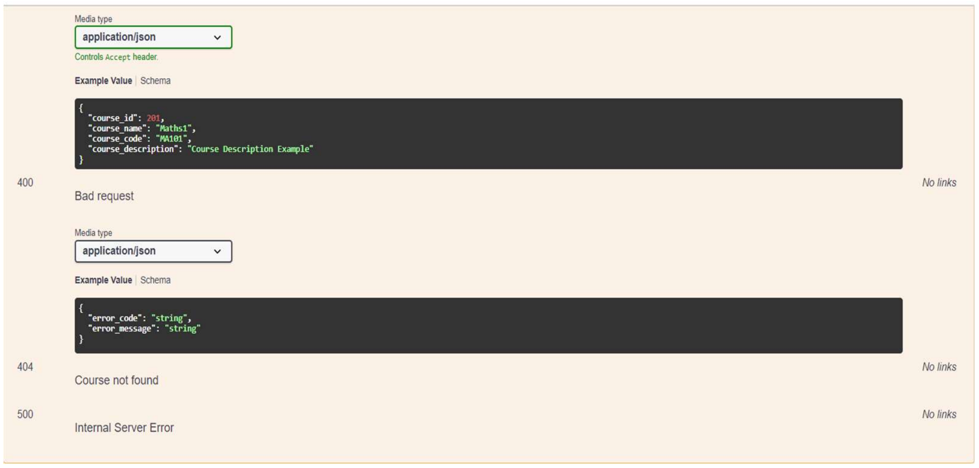
Request body: application/json

Example Value | Schema

```
{
  "course_name": "Maths1",
  "course_code": "MA101",
  "course_description": "Course Description Example"
}
```

Responses

Code	Description	Links
200	Successfuly updated	*No links*


Media type: application/json

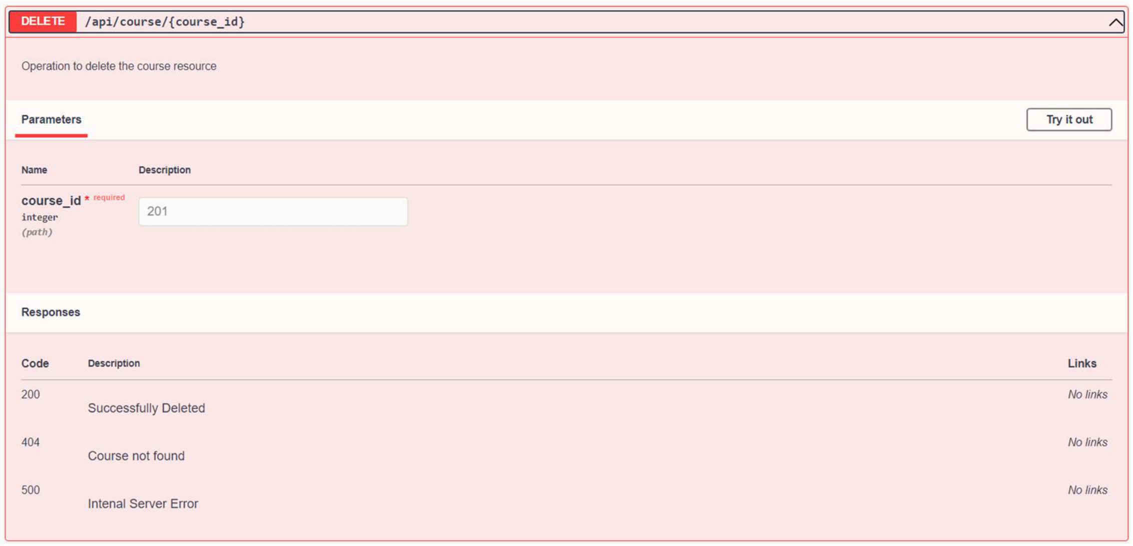
Controls Accept header.

Example Value | Schema

```
{
  "course_id": 201,
  "course_name": "Maths1",
  "course_code": "MA101",
  "course_description": "Course Description Example"
}
```

Code	Description	Links
400	Bad request Media type: application/json Example Value | Schema	*No links*
404	Course not found	*No links*
500	Internal Server Error	*No links*

```
{
  "error_code": "string",
  "error_message": "string"
}
```



`/api/course/{course_id}`

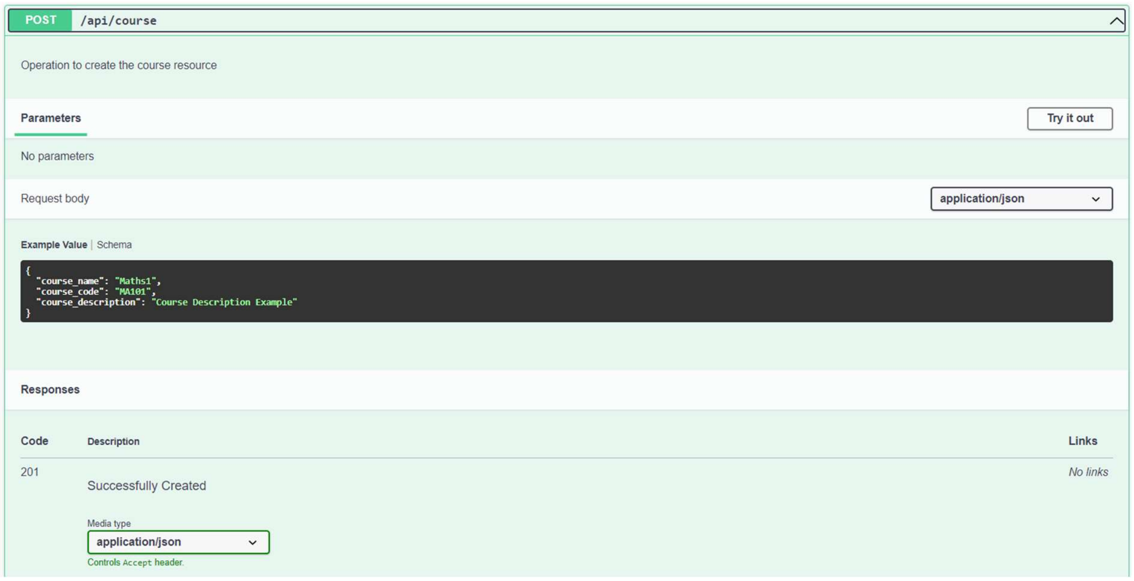
Operation to delete the course resource

Parameters

Name	Description
course_id * required integer *(path)*	201

Responses

Code	Description	Links
200	Successfully Deleted	*No links*
404	Course not found	*No links*
500	Intenal Server Error	*No links*



`/api/course`

Operation to create the course resource

Parameters

No parameters

Request body application/json

Example Value | Schema

```
{
  "course_name": "Maths1",
  "course_code": "MA101",
  "course_description": "Course Description Example"
}
```

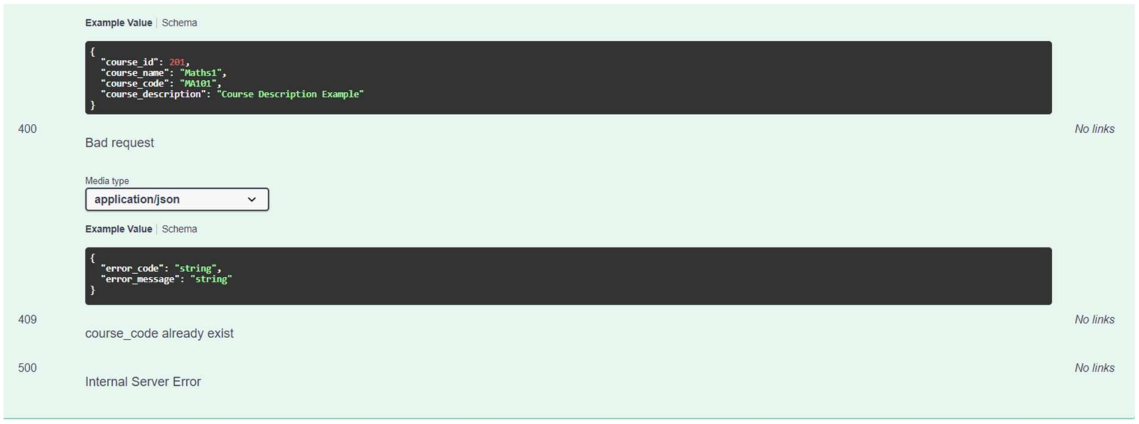
Responses

Code	Description	Links
201	Successfully Created	*No links*

Media type

application/json

Controls `Accept` header.



Example Value | Schema

```
{
  "course_id": 201,
  "course_name": "Maths1",
  "course_code": "MA101",
  "course_description": "Course Description Example"
}
```

Code	Description	Links
400	Bad request	*No links*

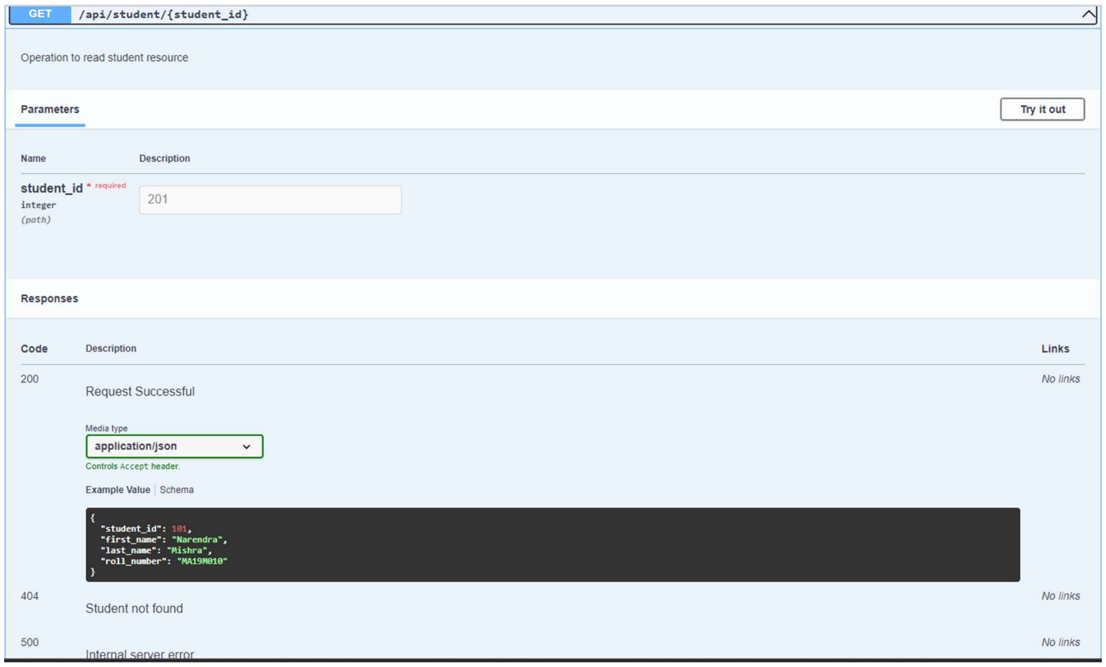
Media type

application/json

Example Value | Schema

```
{
  "error_code": "string",
  "error_message": "string"
}
```

Code	Description	Links
409	course_code already exist	*No links*
500	Internal Server Error	*No links*



GET /api/student/{student_id}

Operation to read student resource

Parameters

Try it out

Name	Description
student_id * required `integer` *(path)*	201

Responses

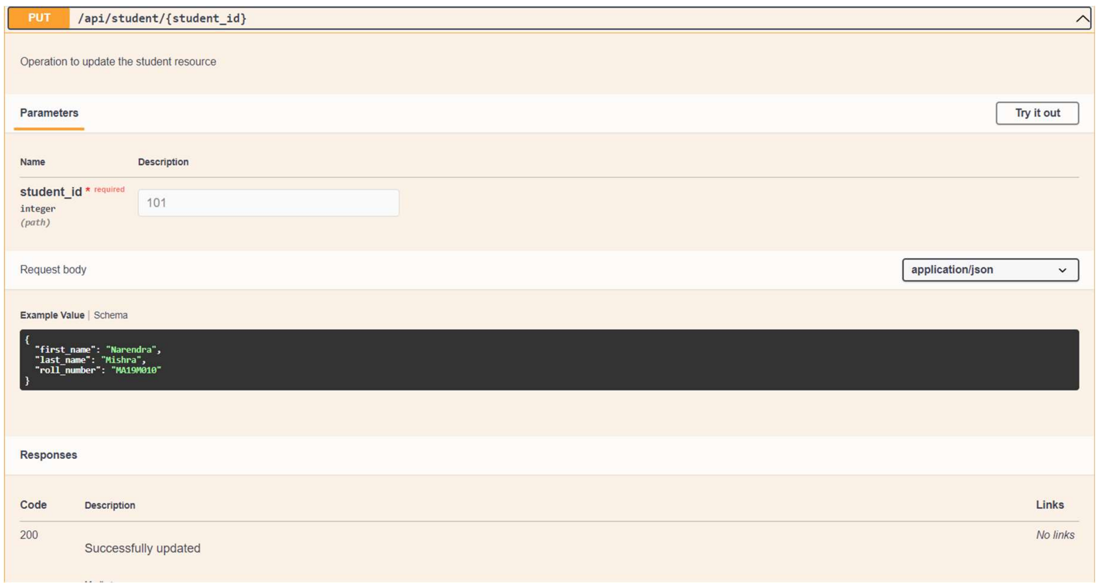
Code	Description	Links
200	Request Successful	*No links*
404	Student not found	*No links*
500	Internal server error	*No links*

Media type: application/json

Controls `Accept` header.

Example Value | Schema

```
{
  "student_id": 101,
  "first_name": "Narendra",
  "last_name": "Mishra",
  "roll_number": "MA19M010"
}
```



PUT /api/student/{student_id}

Operation to update the student resource

Parameters

Try it out

Name	Description
student_id * required `integer` *(path)*	101

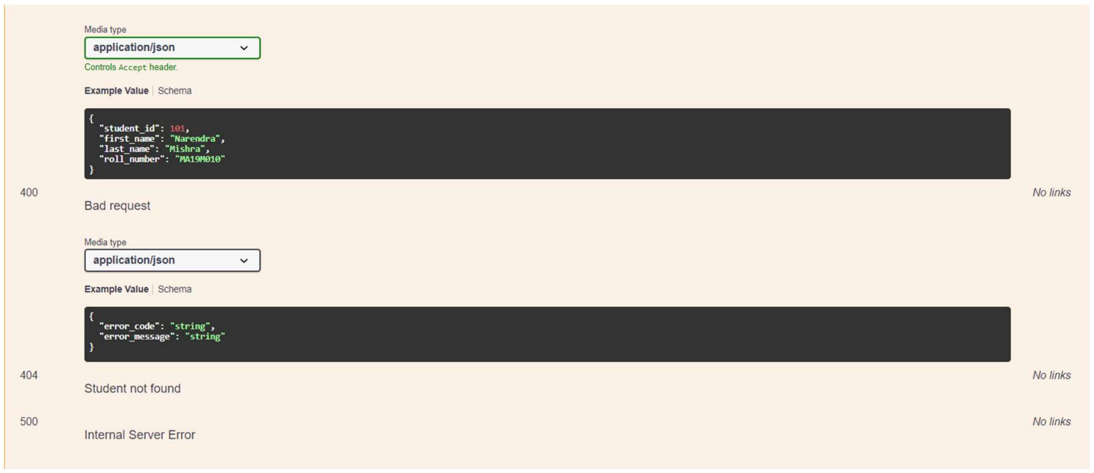
Request body: application/json

Example Value | Schema

```
{
  "first_name": "Narendra",
  "last_name": "Mishra",
  "roll_number": "MA19M010"
}
```

Responses

Code	Description	Links
200	Successfully updated	*No links*
400	Bad request	*No links*
404	Student not found	*No links*
500	Internal Server Error	*No links*



Media type: application/json

Controls `Accept` header.

Example Value | Schema

```
{
  "student_id": 101,
  "first_name": "Narendra",
  "last_name": "Mishra",
  "roll_number": "MA19M010"
}
```

400 Bad request

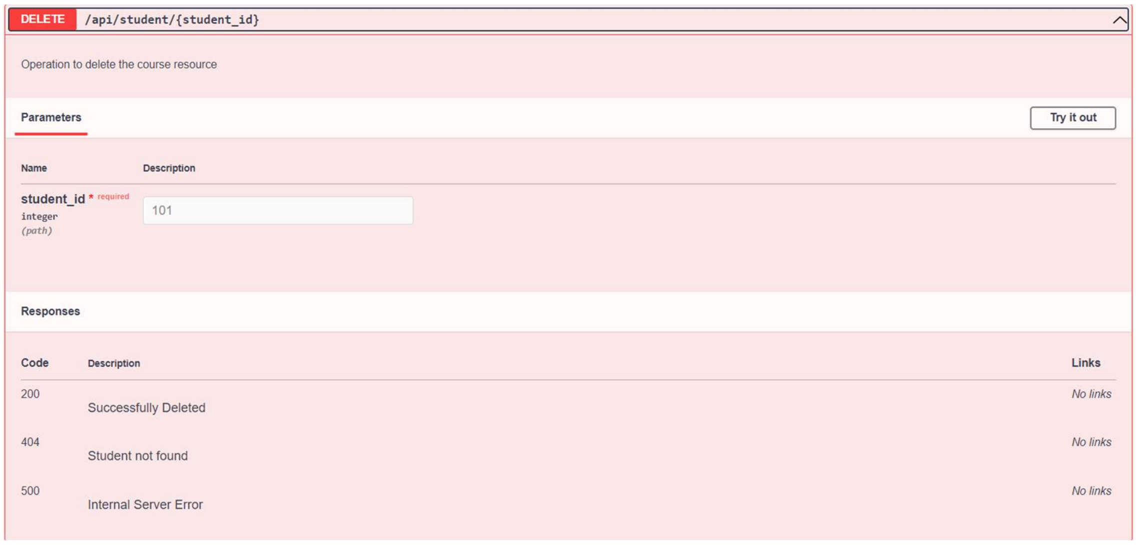
Media type: application/json

Example Value | Schema

```
{
  "error_code": "string",
  "error_message": "string"
}
```

404 Student not found

500 Internal Server Error



`/api/student/{student_id}`

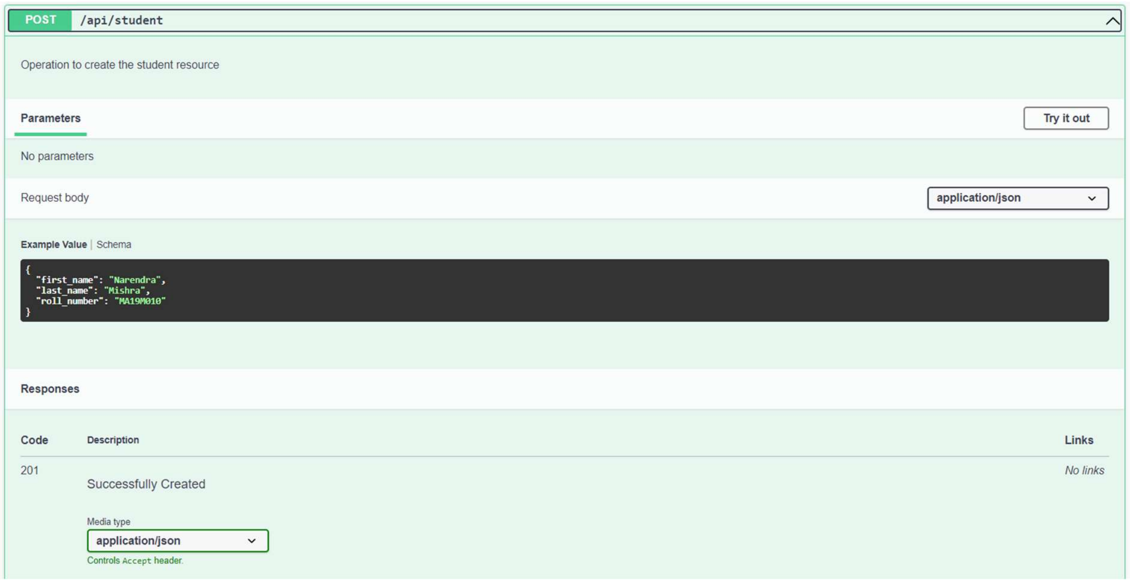
Operation to delete the course resource

Parameters

Name	Description
student_id * required integer *(path)*	101

Responses

Code	Description	Links
200	Successfully Deleted	*No links*
404	Student not found	*No links*
500	Internal Server Error	*No links*



`/api/student`

Operation to create the student resource

Parameters

No parameters

Request body: application/json

Example Value | Schema

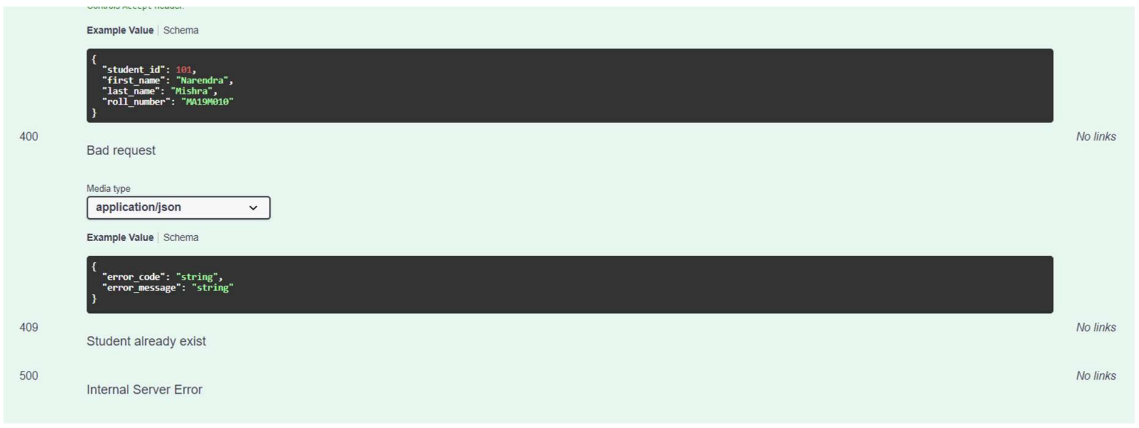
```
{
  "first_name": "Narendra",
  "last_name": "Mishra",
  "roll_number": "MA19M010"
}
```

Responses

Code	Description	Links
201	Successfully Created	*No links*

Media type: application/json

Controls `Accept` header.



Example Value | Schema

```
{
  "student_id": 101,
  "first_name": "Narendra",
  "last_name": "Mishra",
  "roll_number": "MA19M010"
}
```

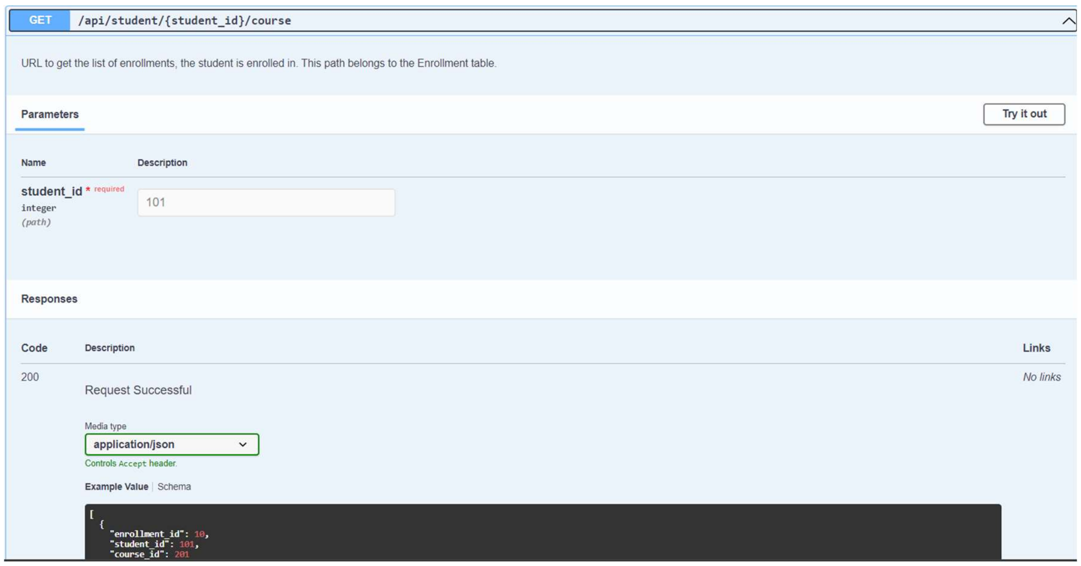
Code	Description	Links
400	Bad request	*No links*

Media type: application/json

Example Value | Schema

```
{
  "error_code": "string",
  "error_message": "string"
}
```

Code	Description	Links
409	Student already exist	*No links*
500	Internal Server Error	*No links*



GET /api/student/{student_id}/course

URL to get the list of enrollments, the student is enrolled in. This path belongs to the Enrollment table.

Parameters

Name	Description
student_id * required integer (path)	101

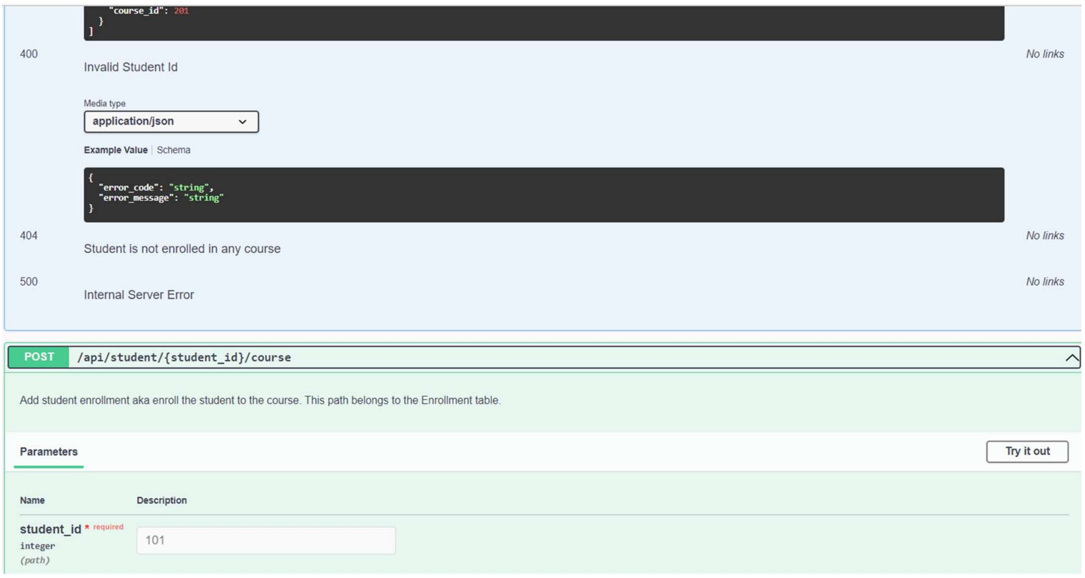
Responses

Code	Description	Links
200	Request Successful	No links

Media type: application/json
Controls Accept header.

Example Value | Schema

```
[
  {
    "enrollment_id": 10,
    "student_id": 101,
    "course_id": 201
```



```
    "course_id": 201
  }
]
```

Code	Description	Links
400	Invalid Student Id	No links

Media type: application/json

Example Value | Schema

```
{
  "error_code": "string",
  "error_message": "string"
}
```

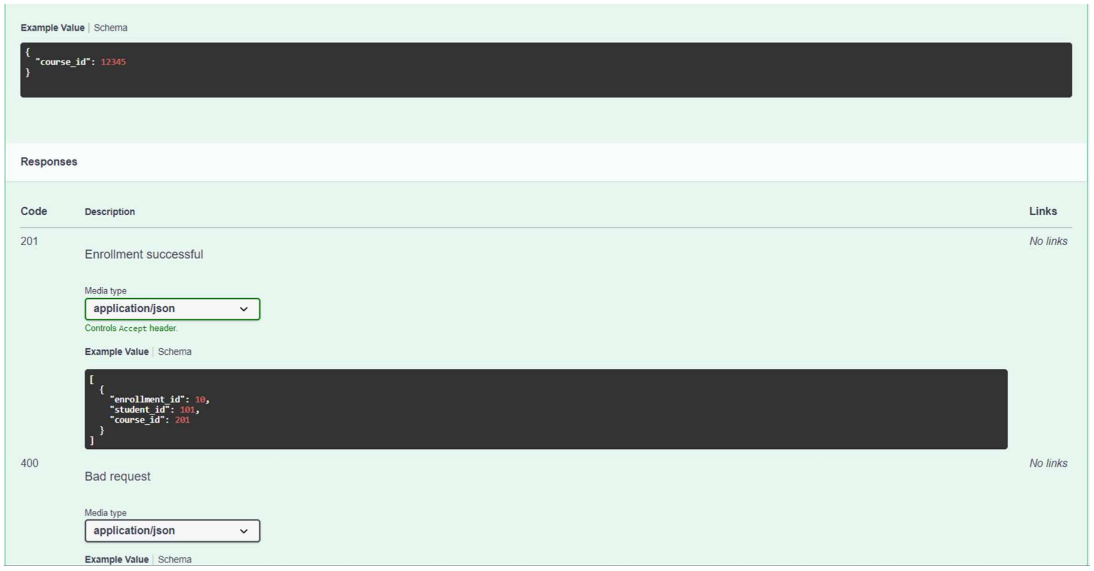
Code	Description	Links
404	Student is not enrolled in any course	No links
500	Internal Server Error	No links

POST /api/student/{student_id}/course

Add student enrollment aka enroll the student to the course. This path belongs to the Enrollment table.

Parameters

Name	Description
student_id * required integer (path)	101



Example Value | Schema

```
{
  "course_id": 12345
}
```

Responses

Code	Description	Links
201	Enrollment successful	No links

Media type: application/json
Controls Accept header.

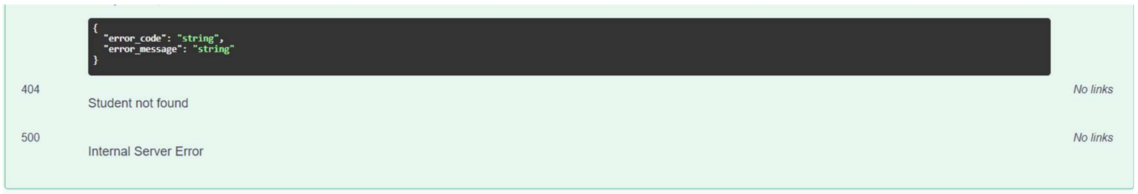
Example Value | Schema

```
[
  {
    "enrollment_id": 10,
    "student_id": 101,
    "course_id": 201
  }
]
```

Code	Description	Links
400	Bad request	No links

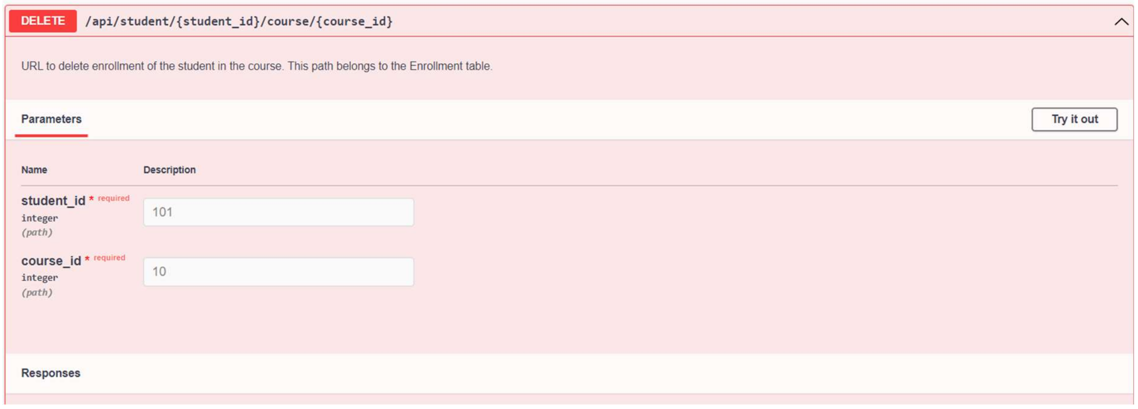
Media type: application/json

Example Value | Schema



```
{
  "error_code": "string",
  "error_message": "string"
}
```

404	Student not found	No links
500	Internal Server Error	No links



DELETE /api/student/{student_id}/course/{course_id}

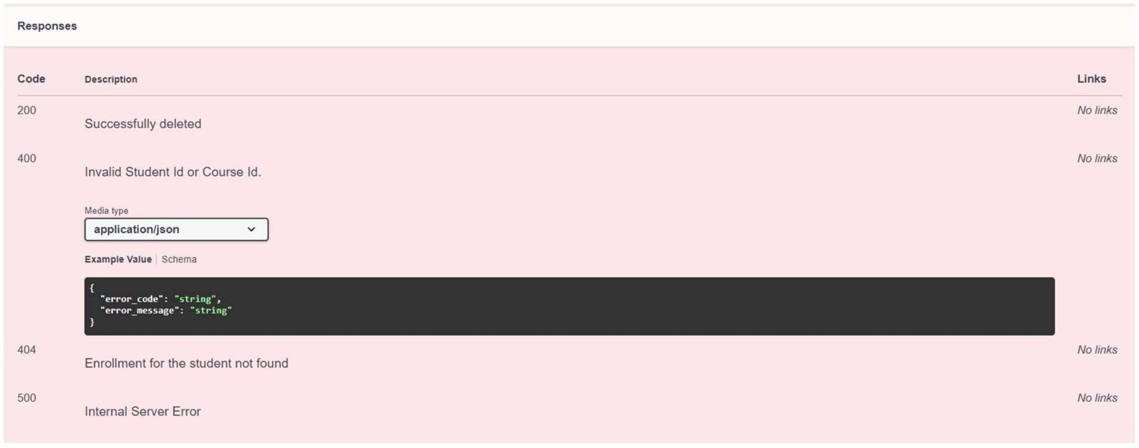
URL to delete enrollment of the student in the course. This path belongs to the Enrollment table.

Parameters

Try it out

Name	Description
student_id * required integer (path)	101
course_id * required integer (path)	10

Responses



Responses

Code	Description	Links
200	Successfully deleted	No links
400	Invalid Student Id or Course Id.	No links

Media type: application/json

Example Value | Schema

```
{
  "error_code": "string",
  "error_message": "string"
}
```

Code	Description	Links
404	Enrollment for the student not found	No links
500	Internal Server Error	No links

Reference:

https://onlinedegree.gitlab.io/mad1/week_six_openapi/#/