

# Web Application for College using MERN stack

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**Abstract**— As digitization has evolved in every sector of the economy, many sectors are adopting this technology for their smooth functionality. Along with various other sectors, the education sector is also adopting this technology at a rapid pace.

Computerization and automated technology have made things much easier for schools, colleges, and universities. It has streamlined the whole administrative, academic, and financial day-to-day operations of educational institutions, also known as campus management solutions, has been developed for automating the daily operations of educational institutions.

The software meant to cater to the assorted needs of students, faculty members, and departmental staff. This software or system can be use to manage a variety of things.

In today's era, every education institution is in the race of proving themselves the best in offering education at every level. To draw more and more students into their institutions, these institutes are adapting all kinds of latest technologies.

One such technology called the MERN stack has been used to implement this project in order to keep the application at par with the latest technology.

**Index Terms:** Full-Stack Development, College Website, Web Design, Web Development, Reactjs, Nodejs, Express, MongoDB.

## INTRODUCTION

The project “Web Application for College using MERN stack” aims at building a web application for college management using the robust technologies that constitute the MERN stack. These technologies include: MongoDB, Expressjs, Reactjs, Nodejs. MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. Express.js, or simply Express, is a back end web application framework for Node.js, released as free and open-source software under the MIT Licence. It is designed for building web applications and APIs. It

has been called the de facto standard server framework for Node.js. React is a free and open-source front-end JavaScript library for building user interfaces based on UI components. It is maintained by Meta and a community of individual developers and companies. Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser.

## SYSTEM ARCHITECTURE

The following modules have been implemented during the execution of this project:

1.Home Page: The home page is built using the powerful features of the Reactjs library and is attractive as well as fast. It provides the visitor of the website with the first impressive look and displays basic information about the college such as the name of the college, accreditation details, address of the college, courses offered and a contact us page. The Home page consists of a navigation bar to navigate to the different pages of the website.

2.Login Page : The login page first confirms if the visitor of the website is a student, teacher, or the admin himself. After confirmation, accordingly, access to the several pages of the website is provided after the credentials are verified. While the teachers and students can register themselves if new to the college, the credentials of the admin remain fixed in order to enhance the security.

3.Registration Page: New students and teachers can register themselves using the register portal. The passwords are hashed while storing to the MongoDB database using the node js implementation of Bcrypt.js. Bcrypt is one of the most used encryption libraries today. It incorporates hash encryption along with a work factor, which allows you to determine how expensive the hash function will be (i.e. how

long it takes to decrypt it by brute force measures). Therefore, it keeps up with Moore's law, so as computers get faster you can increase the work factor and the hash will get slower to brute force.

4. Fees management module: The website also includes a fees management module which is accessible to students and the account section of the college. On the student's end, he/she can view the calculated fees according to their category of admission along with the number of instalments the fees need to be paid in.

While on the account section's side, the officials can take a view at the student information and the fees status of the students.

5. Attendance module: The attendance module enables the teachers to enter the student attendance according to their course and generate an attendance report on a monthly basis.

6. Academics Page: The academics page enables the student to look at the topper's list, syllabus of the subjects, etc.

7. Resource Page: The resource consists of a file uploader to let the teachers upload the resources and enables the students to download the resources according to their respective courses.

8. Photogallery Area: The photogallery area displays the pictures of the various events and co-curricular activities held in the college on a regular basis.

9. Alumni Portal: The Alumni portal enables the alumni of the college to login based on their personal registration number and a password. The Alumni Portal also displays the announcements of the alumni meet as well as a list of the past year achievers.

#### SOFTWARE AND HARDWARE REQUIREMENTS

1. Operating System: Windows 7 and above
2. Language : Html,CSS , Javascript
3. Technology stack: MongoDB, ExpressJs, ReactJs, NodeJs
4. Browser: Any browser and IE 8 and above.

5.Database language: Mongodb

6.Processor: a single-core 2GHz processor

7.RAM: 512 Mb and above

#### ADVANTAGES

- 1 every section of the school or institute is managed from a single platform
- 2 As the administrator deserves the universal rights, he/she can keep all the critical data safe and secure within the ecosystem.
- 3 Students can check the schedule for different courses and exams without hovering over the notice board.
- 4 Implementing an web-based College Management System is a step towards a paperless system.

#### CONCLUSION

An educational institution is a place where innovation and imagination come together. Unfortunately, the current educational system lacks the right tools and the IT infrastructure to manage and operate correctly. Hence, it is crucial for the administrators to invest in a quality College Management System which can boost productivity and increase efficiency.

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